Decision **DRAFT DECISION OF ALJ DUDA** **(Mailed 11/22/2005)**

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Rulemaking on the Commission's Own Motion to Govern Open Access to Bottleneck Services and Establish A Framework for Network Architecture Development of Dominant Carrier Networks.	Rulemaking 93-04-003 (Filed April 7, 1993)
Investigation on the Commission's Own Motion into Open Access and Network Architecture Development of Dominant Carrier Networks.	Investigation 93-04-002 (Filed April 7, 1993) (Verizon UNE Phase)

OPINION ESTABLISHING UNBUNDLED NETWORK ELEMENT RATES AND PRICE FLOORS FOR VERIZON CALIFORNIA AND MODIFYING DECISION 99-11-050 REGARDING MONOPOLY BUILDING BLOCKS

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I. Summary

This proceeding, known as the Open Access and Network Architecture Development (OANAD) proceeding, was initiated in April 1993 to set prices that California's two largest incumbent local phone companies, Verizon California (formerly GTE California)[1] and Pacific Bell Telephone Company d/b/a SBC California (SBC, formerly Pacific Bell[2]) charge competitors who lease specified portions of their network. By leasing network components known as "unbundled network elements" (UNEs), competitors are able to use portions of Verizon's network to offer competitive local exchange services.[3]

In this decision, in what is known as the "Verizon UNE Phase" of OANAD, the Commission adopts final rates for Verizon's UNEs, as set forth in Appendix A of this order. The newly adopted rates for the most frequently cited UNEs are:

Table 1
Adopted UNE Rates

UNE	Adopted Rate[4]
Average 2-wire Loop	$ 13.65
Average DS-1 Loop	$ 77.16
Average DS-3 Loop	$ 585.03
2-wire Port	$ 3.11
UNE-Platform[5]	$ 17.10

[1] This decision refers to GTEC as the incumbent local exchange carrier (ILEC) that existed at the time this proceeding was initiated and prior to GTE's merger with Bell Atlantic. The decision refers to Verizon as the successor to GTEC, following the merger with Bell Atlantic in July 2000.

[2] Pacific Bell adopted the name SBC for business purposes in late 2002. This order will refer to Pacific Bell as the entity involved in OANAD prior to 2002, and will refer to SBC as the current entity.

[3] *See* Appendix D for a glossary of common acronyms used in this order.

[4] These rates include an 8.93% shared and common cost markup, as set forth in Section VI.M of this order.

The rates in today's order replace Verizon's interim rates for loops and switching established in Decision (D.) 03-03-033, and later modified in D.05-01-057, and the rates for other UNEs originally adopted when the Commission approved an interconnection agreement between AT&T Communications of California, Inc. (AT&T) and GTEC in D.97-01-022. On December 5, 2005, the U.S. District Court issued its order in *Verizon v. Peevey* and found the interim rates in D.03-03-033 did not comply with federal law. The rates were vacated and UNE rates adopted in D.97-01-022 were reinstated, subject to true-up once permanent rates are established. (*Verizon v. Peevey*, (N.D. Cal. 2005) Case No. C03-2838 TEH, discussed further in Section IX below.)

In adopting today's rates, the Commission evaluated two cost models. Verizon proposed UNE rates based on a model known as VzCost that it has recently developed for use in UNE costing proceedings. AT&T and MCI (formerly known as WorldCom) (hereinafter referred to as "Joint Commentors" or simply "JC") proposed UNE rates based on the latest version of the HAI Model, known as HM 5.3. The proposals of the parties differed greatly from each other and from the interim UNE rates currently in place for basic loops and switching, as seen in the table below:

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[5] UNE-Platform (UNE-P) refers to the combination of a 2-wire loop, 2 wire-port, tandem switching and transport and is calculated assuming 1,400 local minutes and 300 toll minutes of usage. Based on recent federal actions, Verizon is no longer required to sell UNE-P to competitors. Nevertheless, the price for UNE-P is noted in this order because Verizon must perform billing adjustments for the period that interim UNE-P rates were in effect. (*See* Section IX.)

Table 2
Comparison of Proposals

UNE	Verizon Proposal	JC Proposal	Interim Rate[6]
Average 2-wire Loop	$33.19	$5.12	$11.36
2-wire Port	$3.60	$1.39	$2.72
UNE-P	$43.74	$6.80	$17.62

After careful review of the competing cost models filed by Verizon and JCs, the Commission finds that although both models contain flaws, the Verizon model is not forward-looking because it attempts to replicate Verizon's embedded network configuration and fails to efficiently size and deploy current technology. In addition, the Commission finds errors in Verizon's preprocessed inputs and assumptions related to expense and switch modeling. Finally, the various modules that comprise Verizon's model lack integration which makes it cumbersome to test input sensitivity.

With regard to HM 5.3, the Commission finds that the method it uses to model customer locations, create customer clusters, and estimate the cost of reconstructing Verizon's loop network is reasonable. Moreover, the Commission can modify most inputs and assumptions in HM 5.3. Thus, the Commission modifies many inputs and assumptions in HM 5.3 and then uses the modified model run to set Verizon's UNE rates.

Some of the key modeling inputs used for the Commission's HM 5.3 model run include a 9.89% cost of capital, a 52% copper distribution fill factor, and an overhead markup for shared and common costs of 8.93%. The

[6] Interim rates were originally adopted in D.03-03-033, modified in D.05-01-057, and include a 10% shared and common cost markup.

Commission's model run includes several inputs and assumptions proposed by Verizon, including asset lives, labor inputs, a 12,000-foot maximum copper loop length, and the weighting of switch line prices between new and growth lines. Furthermore, today's order adopts a flat-rate structure for the switching UNE wherein switching costs are incorporated into one flat monthly port price, as proposed by JC.

As set forth in D.03-03-033, Verizon must adjust, or "true-up" the interim rates it charged for some of its UNEs to the new rates adopted in this order. In other words, Verizon must calculate whether the previous interim rates were higher or lower than these newly adopted rates, and whether it has over or under-collected the appropriate revenues for any UNEs it sold at interim rates. This order stays the effective date of any true-up until its amount can be calculated and further proceedings held to determine payment options or consider other mitigations to minimize negative financial effects of the true-up on competitive carriers.

This decision establishes price floors for certain retail services offered by Verizon. The price floor methodology is modified, based on a petition filed by Verizon, to remove switching costs from the price floor calculation. The decision then relies on the interim price floors established in D.03-03-033, with adjustments based on the UNE prices adopted in this order, as permanent price floors for Verizon.

Finally, this order commits the Commission to establishing a procedure for reexamination of Verizon's UNE rates in the next phase of this proceeding. The Commission will consider a proposal to adjust UNE rates using a price cap mechanism, or the adoption of a procedure similar to the one established for SBC in D.99-11-050, coupled with the use of updated inputs and assumption to the

HM 5.3 model. The Commission shall not reexamine the UNE rates adopted in this order before February 2008.

II. Background

The Commission opened the OANAD rulemaking in 1993 with the intent of setting rates for the "basic network functions," or BNFs, now more commonly known as UNEs, that make up the network of SBC and Verizon. In D.99-11-050, the Commission set prices for UNEs offered by SBC (then Pacific) based on costs developed using the Total Element Long Run Incremental Cost (TELRIC) methodology, as set forth by the Federal Communications Commission (FCC) in 1996.[7] Thus, the Commission achieved its intent to set TELRIC-based UNE prices for SBC, but has encountered numerous obstacles in its efforts to set rates for Verizon.

In the interest of brevity, we will not recount the full history of this case because it is described at length in D.03-03-033, where the Commission set interim UNE rates for Verizon. (*See* D.03-03-033, *mimeo*. at 4-9.)

Following adoption of interim UNE prices for Verizon, the parties and Commission turned their efforts toward setting permanent UNE rates for Verizon. After repeated delay requests by the parties, Verizon and JC each filed cost studies and supporting materials on November 3, 2003.[8] Opening comments were also filed by the United States Department of Defense and Federal

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[7] *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996* (CC Docket No. 96-98); First Report and Order, FCC No. 96-325, 11 FCC Rcd 15499, (rel. Aug. 8, 1996) ("First Report and Order").

[8] Verizon filed amendments, errata and supplements to opening comments on 12/30/03, 2/17/04, 2/20/04, 4/2/04, and 5/4/04. JCs filed amendments, errata and supplements to their opening comments on 2/6/04 and 6/2/04.

Executive Agencies (DOD/FEA) and Covad Communications Company (Covad).

In January 2004, the Administrative Law Judge (ALJ) and Telecommunications Division staff held three days of technical workshops where parties described their cost models and answered questions about them. Following numerous amendments and supplements in the spring of 2004, as well as several delay requests, the following parties filed reply comments on August 8, 2004: DOD/FEA, JCs, the Commission's Office of Ratepayer Advocates (ORA),[9] The Utility Reform Network (TURN), Verizon and XO California, Inc. (XO).[10] The same parties filed rebuttal comments on November 9, 2004.[11]

On December 3, 2004, Verizon filed a motion requesting leave to file limited surrebuttal testimony to address revisions to the HM 5.3 cost model in JC's November 9 rebuttal filing. The ALJ granted Verizon's request in part and on January 28, 2005, Verizon filed limited surrebuttal on three factual issues. The ALJ also required JCs to subsequently file a summary table identifying all changes to the HM 5.3 model in the rebuttal filing. This summary table was filed January 21, 2005. Verizon provided comments on the summary table on March 15, 2005.

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[9] On January 1, 2006, ORA changed its name to the Division of Ratepayer Advocates (DRA). To avoid confusion, this decision will continue to refer to ORA because that was the name it used on all filings in this proceeding.

[10] Amendments and errata to reply comments were filed as follows: Verizon on 9/30/04; JCs on 9/17/04 and 10/12/04; TURN on 8/10/04, 8/16/04 and 9/2/04; XO on 10/6/04; ORA on 10/7/04.

[11] JCs filed an amendment to their rebuttal on 3/25/05.

As part of this phase of OANAD, the Commission must set price floors for Verizon. In February 2004, the ALJ directed Verizon to supplement its filing with detailed price floor proposals and workpapers since this had not been included in earlier filings. (Prehearing Conference Transcript (Tr.), 2/2/04, at 16486.) Reply comments on Verizon's price floor proposals were filed by MCI, ORA, and TURN on January 28, 2005, and rebuttal comments were filed on April 1, 2005 by AT&T, ORA, TURN and Verizon.

On April 29 and May 5, 2005, Verizon and MCI, respectively, filed motions requesting hearings. These motions were denied in a ruling of November 8, 2005.

On May 5, 2005, AT&T filed a notice of withdrawal from the Verizon UNE phase of the OANAD proceeding. On December 8, 2005, MCI filed a notice of withdrawal as well.[12]

On November 22, 2005, the California Association of Competitive Telephone Companies (CALTEL) filed a motion requesting clarification of the date when Verizon may modify UNE rates adopted in this proceeding, and requesting consideration of a process for future UNE rate modifications. The substance of CALTEL's motion is discussed in Section X of this order. CALTEL's motion also requests that it be allowed to make an appearance as a party to this proceeding. On December 15, 2005, Cbeyond Communications LLC (Cbeyond) filed a petition to intervene in this proceeding in order to comment on the draft decision.

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[12] Despite the withdrawal of both AT&T and MCI from the proceeding, this order will continue to refer to filings by Joint Commentors because AT&T and MCI were active in the case at the time the filings were made.

The petitions to intervene by CALTEL and Cbeyond are unopposed. CALTEL and Cbeyond have an interest in the outcome of the proceeding and their participation will not broaden the issues or delay the process. The petitions to intervene are granted.

III. Applicable Standards

A. The Consensus Costing Principles

During the first years of the Commission's efforts to cost "basic network functions," the precursors to UNEs, the Commission adopted a set of "Consensus Costing Principles" (CCPs) that had been negotiated and agreed to by AT&T, MCI, Pacific Bell, GTEC and others for use in those early cost proceedings.[13] (*See* D.95-12-016, Appendix C.) The CCPs in large part foreshadowed the FCC's TELRIC principles and are largely based on the concept of determining incremental costs that reflect the entire quantity of output provided. Additional critical concepts incorporated in the CCPs include:

- Principle No. 1: Long run implies a period long enough that all costs are variable.
- Principle No. 2: Cost causation is a key concept in incremental costing.
- Principle No. 3: The increment being studied shall be the entire quantity of the service provided, not some small increase in demand.
- Principle No. 6: Technology used in a long run incremental cost study should be the least-cost, most efficient technology that is currently available for

[13] The CCPs were developed to support the Total Service Long Run Incremental Cost (TSLRIC) methodology, which derives costs based on services offered rather than network elements. The principles are also considered applicable to TELRIC analyses.

purchase. This principle assumes that a TSLRIC analysis should be based on the existing or planned location of switching and outside plant facilities using the least-cost, most efficient technology.

- Principle No. 7: Costs shall be forward looking.

B. The TELRIC Standard

The Telecommunications Act of 1996 (the Act) requires incumbent local exchange carriers (ILECs) such as Verizon to interconnect with any requesting telecommunications carrier at rates, terms and conditions that are just, reasonable, and nondiscriminatory, and in accordance with Section 252 of the Act. (Section 251(c)(2).) Section 252(d) of the Act sets the pricing standard for interconnection and network element charges and states that when state commissions determine a just and reasonable rate for purposes of Section 251(c)(2), the rate shall be "based on the cost (determined without reference to a rate of return or other rate-based proceeding) of providing the interconnection or network element," it shall be nondiscriminatory, and it may include a reasonable profit.

Following the passage of the Act, the FCC set forth the applicable costing standard to implement the Act in its August 1996 First Report and Order. Federal regulations provide that state commissions shall comply with the FCC's forward-looking economic cost-based pricing methodology when setting UNE rates for incumbent LECs such as Verizon. (47 C.F.R. Sec. 51.503(b)(1).) Generally, the FCC's forward-looking economic cost of a UNE equals the sum of (1) the TELRIC of the element, and (2) a reasonable allocation of forward-looking common costs. (47 C.F.R. Sec. 51.505(a).) The TELRIC of an element is "the forward-looking cost over the long run of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as

incremental to, such element, calculated taking as a given the incumbent LEC's provision of other elements." (47 C.F.R. Sec. 51.505(b).) In providing further guidance on the concept of "forward-looking economic cost," the FCC specifies that the TELRIC of an element "should be measured 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." (47 C.F.R. Sec. 51.505(b)(1).)

Finally, the FCC regulations specify that "embedded costs" and "retail costs" shall not be considered when calculating the forward-looking economic cost of a UNE. (47 C.F.R. Sec. 51.505(d).) "Embedded costs" are defined as "costs that the incumbent LEC incurred in the past that are recorded in the incumbent LEC's books of accounts." (47 C.F.R. 51.505(d)(1).) "Retail costs include the costs of marketing, billing, collection, and other costs associated with offering retail telecommunications services to subscribers who are not telecommunications carriers…" (47 C.F.R. 51.505(d)(2).)

C. Supreme Court Review of TELRIC Standard

The FCC's TELRIC methodology has been upheld by the U.S. Supreme Court following challenges to the methodology from ILECs. (*Verizon Communications Inc. v. FCC*, 122 S.Ct. 1646 (2002).) ILECs argued that the TELRIC methodology resulted in costs that are too low because it is based on a "hypothetical" and "most efficient" network rather than the incumbent's actual network. The Supreme Court rejected this argument and stated that:

> As for an embedded-cost methodology, the problem with a method that relies in any part on historical cost, the cost the incumbents say they actually incur in leasing network elements, is that it will pass on to lessees the difference between most-efficient cost and embedded cost. Any such cost difference is inefficiency, whether caused by poor management resulting in

> higher operating costs or poor investment strategies that have inflated capital and depreciation. If leased elements were priced according to embedded costs, the incumbents could pass these inefficiencies to competitors in need of their wholesale elements, and to that extent defeat the competitive purpose of forcing efficient choices on all carriers whether incumbents or entrants. The upshot would be higher retail prices consumers would have to pay. (*Verizon*, 122 S.Ct. at 1673.) (Citations and footnotes omitted.)

D. Updates to TELRIC

The FCC's Triennial Review Order (TRO)[14] and Triennial Review Remand Order (TRRO)[15] provide additional clarification on key inputs to TELRIC modeling and price floors calculations. We address the specific clarifications from the TRO and TRRO in the sections below where they apply.

E. Commission Cost Modeling Criteria

In a July 2002 ruling, the ALJ directed that all cost filings in this proceeding should adhere to the same criteria as those applied in the Commission's reexamination of UNE prices for SBC.[16] Specifically, any cost models or studies must allow parties to:

1. Reasonably understand how costs are derived by:

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[14] *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers* (CC Docket No. 01-338); Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, FCC No. 03-36, (rel. Aug. 21, 2003) ("TRO").

[15] *In the Matter of Review of Unbundled Access to Network Elements, Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers* (WC Docket No. 04-313, CC Docket No. 01-338); Order on Remand, FCC No. 04-290, (rel. Feb. 4, 2005) ("TRRO").

[16] *See* Application (A.) 01-02-024 and consolidated proceedings (hereinafter the "SBC UNE Reexamination").

a. Providing access to all interested parties to the model and all underlying data, formulae, computations, software, engineering assumptions, and outputs; and

b. Allowing interested parties to examine and modify the critical assumptions and engineering principles.

2. Generally replicate the cost model or cost study calculations; and

3. Propose changes in inputs and assumptions in order to modify the costs produced.[17]

In Section V.C below, we shall discuss whether the Verizon and HM 5.3 models adhered to these criteria.

F. Burden of Proof

As part of its implementation of the Act, the FCC adopted regulations that provide the ILEC bears the burden of proving the UNE rates it proposes do not exceed forward-looking economic cost. (47 C.F.R. 51.505(e).) In adopting these regulations, the FCC recognized there was asymmetric access to cost data because ILECs have greater access to cost information necessary to calculate incremental costs of providing UNEs. Therefore, in this proceeding, Verizon has the burden to demonstrate that the rates it proposes do not exceed forward-looking economic cost for each UNE.

The other parties that have presented proposals for TELRIC costs or inputs to cost models, bear the burden of persuading the Commission that their proposals are reasonable given the FCC's TELRIC standards and the Commission's CCPs.

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[17] *Administrative Law Judge's Ruling Revising Schedule for Setting Unbundled Network Element Rates for Verizon California*, 7/23/02, p. 4.

IV. Overview of Cost Models

In order to establish the forward-looking incremental cost of Verizon's UNEs, in compliance with the CCPs and TELRIC guidelines described above, Verizon and JCs each offered a separate cost model. The Commission has typically relied on cost models to estimate the costs to construct a forward-looking local exchange network. This allows the Commission to take a holistic view of the costs to construct a network as an integrated system, with all of the economies of scale and efficiencies derived from modeling an entire network's operations rather than the cost of a piece of equipment in isolation.

A. VZ Cost

Verizon's UNE cost proposals are based on a new model known as VzCost. Verizon describes VzCost as "a state of the art, Internet-based model that allows users to view its underlying data, assumptions, algorithms, inputs and outputs." (Verizon Panel on Recurring Costs, 11/3/03, p. 11.) According to Verizon, VzCost users can easily run scenarios with varying assumptions and data and save these results for later analysis.

VzCost has four basic modules – the investment calculators, the investment generator, the costing generator, and the report and documentation generator. The loop investment calculator within VzCost is known as VzLoop, but VzCost also includes investment calculators for switching, interoffice facilities, and Signaling System 7. (*Id.*, p. 17.)

The investment calculators within VzCost, such as VzLoop, generally begin by determining the costs of materials and equipment that are needed to provide various UNEs. The model then adds costs for engineering, installation and power. Next, annual costs for operations and maintenance, capital carrying costs such as interest, depreciation, and income taxes, as well as an allocation for

common overhead costs are modeled through the use of Annual Cost Factors (ACFs) and expense loadings. (*Id.*, p. 10.)

According to Verizon, VzLoop develops a forward-looking loop network by modeling from the ground up all of the facilities required in the forward-looking exchange network, along with the investments for those facilities. (*Id.*, p. 35.) Verizon explains that VzLoop "relies on an unprecedented collection of plant records, designed to ensure that the model takes adequate account of both the constraints of the real world (such as bodies of water and zoning requirements) and the efficiencies of existing rights of way." (Verizon Rebuttal, 11/9/04, p. 1.) Furthermore, Verizon contends VzLoop takes advantage of the context specific judgments of Verizon CA's engineers, and clarifies that "… while VzCost begins with these real-world data, it then adjusts them in significant ways to ensure that the investments and expenses relied upon in the cost studies are forward-looking and rely on the most efficient technologies that are currently available." (*Id.*, p. 2.)

Verizon maintains its cost studies are forward-looking and comport with the FCC's TELRIC principles. It alleges inputs are based on forward-looking assumptions about the network plant mix and improved operational methods using the most efficient, currently available technology mix if the network were rebuilt from the ground up. (Verizon Panel on Recurring Costs, 11/3/03, p. 13.) According to Verizon, VzCost fulfills TELRIC requirements for numerous reasons, including that it attributes costs to specific elements to the greatest extent possible, maps costs to those elements that cause the costs to be incurred, and measures incremental costs of providing a UNE based on the total quantity of the service provided. (*Id.*, p. 23.)

Finally, Verizon claims its general approach is designed to avoid double recovery of costs by identifying the discrete assets dedicated to each element and calculating the investment associated with those assets. Where some assets are used by more than one element, Verizon used modeling methodologies to assign relevant investments to each of the different elements. (*Id*., p. 15.)

B. HM 5.3

JCs offer the HAI Model, Version 5. 3 (HM 5.3), which they describe as a "bottom-up economic-engineering costing model" that models the local exchange network, assuming existing wire centers, and allows the user to change more than 2100 inputs and assumptions. (JC/Mercer Declaration (Decl.)), 11/3/03, pp. 11 and 27.) HM 5.3 begins with information provided by Verizon on the location of its business and residential customers, then constructs a network to serve the identified locations using granular information as to service demand, network component capacities and costs, and expenses. (*Id*., p. 10.)

Through this process, HM 5.3 estimates the investments required for each component of the network, and the costs associated with the investments using what JC contend are conservative assumptions regarding applicable costs. These costs include capital carrying costs, plant-specific costs, general support and overhead costs. HM 5.3 assigns these costs to UNEs according to the manner in which these UNEs use different network components, then determines a cost per unit for each UNE. In this manner, HM 5.3 calculates the forward-looking costs Verizon would incur to provide "plain old telephone service," as well as various narrowband, wideband, and broadband loops and broadband interoffice circuits. (*Id*., p. 4.) JC contend that a key asset of HM 5.3 is that it deals with UNEs associated with all of the components of the local exchange network, and thereby

recognizes the relationships and synergies between the different components of the network. (*Id*., p. 11.)

One of the key attributes of HM 5.3 is its customer location process. According to JC, HM 5.3 is designed to model a least-cost, forward-looking network with all necessary components to provide local exchange service and UNEs. The model does this by incorporating the most specific and detailed demand data available from Verizon. (JC/Murray Decl., 11/3/03, p. 26.) One of the inputs to HM 5.3 is a customer location database prepared by a third-party vendor, Taylor Nelson Sofres (TNS). TNS created the database by taking Verizon's current customer address information and "geocoding" the precise location of these customers by assigning each a longitude and latitude. Once geocoded, TNS grouped these current customers into logical serving areas, or "clusters." (JC/Mercer, 11/3/03, Attachment RAM 4, pp. 19-24.)

JC claim that HM 5.3 complies with the Commission's CCPs and the FCC's TELRIC costing standards in several ways. We discuss only a few of these below. First, in compliance with CCP 3 and TELRIC, HM 5.3 models the total demand for network elements from both Verizon and other sources, including competitors that lease UNEs. According to JA, HM 5.3 captures all economies of scale and scope in the provisioning of retail services, UNEs, universal service, and interconnection services. (JC/Murray, 11/3/03, pp. 25-26.) HM 5.3 assumes a network that can accommodate both current and reasonably foreseeable demand by assuming sufficient capacity to allow for defective equipment and some "churn" in the locations at which demand will occur. (*Id*., p. 24.)

Second, JC contend that HM 5.3 is a forward-looking approach in compliance with CCP 6 and TELRIC rules because it reflects reasonable expectations of actual, achievable forward-looking costs savings that can be

expected to occur as Verizon moves from today's embedded facilities to a more efficient technology mix and a forward-looking network design. (*Id*., p. 33.) While JC admit that HM 5.3 does not use actual outside-plant routes as alluded to by CCP 6, they contend that the FCC's TELRIC rules, issued after the Commission's CCPs, do not require the use of actual plant routes and only constrain cost models to the use of existing wire center locations. (JC/Murray, 11/9/04, p. 13.)

Third, JC maintain that HM 5.3 uses inputs and assumptions that reflect long-run costs, as required by the CCPs and TELRIC, because it does not treat any of Verizon's existing facilities as fixed other than the location of Verizon's wire centers. (JC/Murray, 11/3/03, p. 22.)

V. Analysis of Models

We first examine which model better complies with TELRIC, the Commission's CCPs, and our modeling criteria. Parties have filed extensive critiques of the two models at issue and there is a long litany of alleged flaws. It is often a daunting task to sift through and delineate critical flaws from superficial ones. The following section examines the more significant flaws that parties have alleged.

A. Flaws in the Verizon Model

Beginning with the Verizon model, JC, TURN, ORA and XO contend VzCost is seriously flawed and does not adhere to FCC, TELRIC or Commission modeling criteria. While Verizon claims its model replicates its existing network while updating equipment and operating costs, JC and others criticize Verizon's model as "part fish, part fowl." They contend VzCost artificially distorts current network design and creates a network with structural flaws resembling nothing that was or ever will be built. (JC, 11/9/04, p. 3.) Ultimately, the parties allege

the Verizon model does not adhere to TELRIC because it is too linked to Verizon's embedded network, and fails the Commission's cost modeling criteria. JC, ORA, TURN, and XO describe the following significant flaws in the Verizon model:

1) VzLoop is not forward looking because it replicates Verizon's existing network of distribution areas and cable routes and does not size facilities to meet demand,

2) VzLoop contains preprocessing structural flaws that result in inefficient and overlapping distribution areas (DAs) and equipment,

3) The components of Verizon's model are not integrated, which leads to duplicative feeder and distribution networks, lack of structure sharing, and unnecessary model complexity,

4) The model contains flaws in expense modeling, and

5) Verizon's switching model is not open and reviewable and relies on extensive preprocessing, and can't modify assumptions of new vs. growth lines.

These five flaws are discussed in greater detail below.

1. Verizon Models a Network that is Not Forward-Looking

The FCC's approach to TELRIC modeling requires the least cost configuration using the existing location of incumbent's wire centers. This is often referred to as a "scorched node" approach because existing network facilities are assumed to be non-existent except for the wire centers, or "nodes." According to JC, Verizon violates this approach by replicating its embedded network configuration and performing a loop investment analysis that makes no effort to efficiently size and deploy current technology. (JC/Donovan-Pitkin-Turner Decl., 8/6/04, paras. 100-102, 310-317, 380-386.)

First, according to JC, Verizon's model does not start with the forward-looking approach of sizing facilities to meet current and reasonably foreseeable future demand. Instead, Verizon's loop model attempts to replicate Verizon's existing network by using existing distribution areas and cable routes. These routes and distribution areas were designed decades ago, when demand, technology, and plant design were quite different from what engineers would consider if reconstructing a forward looking network today. (*Id*., paras. 377-379.) JC contend that a network design that mimics the current network bears no resemblance to a forward-looking network that an efficient engineer would design today, taking into account real-world constraints. (JC, 8/6/04, p. 52.)

Specifically, Verizon relies on its embedded network configuration for the sizing and placement of serving area interfaces (SAIs), digital loop carrier (DLC) equipment, and distribution areas. Then, Verizon overlays modern equipment onto this embedded framework. JC contend this produces meaningless and massively inefficient results because it is forcing modern equipment into fixed network locations and routes selected decades ago for older equipment or for other purposes. JC contend this has the effect of creating a "super-sized" network that is always adding to, but never subtracting from, the plant and equipment Verizon has in place today. Verizon maintains all existing equipment and then adds more to meet new engineering requirements, without considering the possibility of configuring existing equipment or distribution areas more efficiently. (*Id*.) In JC's view, Verizon's embedded approach leads it to model very small distribution areas, over half of which are less than 200 lines. As a result, JC allege that Verizon's model bulks up the network by increasing SAI investment 25% and DLC investment 600% above embedded base, dramatically

overstating the number of DLC systems required in a forward-looking environment. (JC/Donovan-Pitkin-Turner, 8/6/04, para. 380.)

TURN echoes this complaint that distribution areas and clusters in the VzLoop are not forward-looking. As TURN explains, TELRIC requires cost models to be based on the most efficient technology and lowest cost network configuration, which requires a cost model to allow users the flexibility to choose from a menu of efficient equipment and to vary the line size of the cluster. TURN argues it is critical that the size of the distribution area should be an output of the model process, not an input to a TELRIC model. (TURN, 11/9/04, p. 7.) TURN's witness Loube found that "VzCost is incapable of producing TELRIC-compliant costs, because the distribution areas in the model are pre-determined by Verizon's embedded network." (*Id.*, p. 3.) TURN asserts that because VzCost retains embedded network design instead of constructing the most efficient network possible, it does not comply with the FCC's requirement that models reflect the "long run" where all inputs are variable. (TURN, 8/6/04, p. 7.)

As an example, TURN notes VzCost associates each distribution terminal with the SAI with which it is currently connected, and therefore, VzCost designs a network that retains the basic design of the embedded local network instead of constructing the most efficient network possible. (*Id.*, pp. 6-7.) TURN maintains the placement of SAIs drives the placement of other equipment, such as DLC systems, and thereby drives total cost in the model. The impact of Verizon's modeling approach is that VzCost places more and smaller DLCs than HM 5.3, thus generating higher costs. (*Id.*, p. 8.)

XO provides its own analysis questioning whether VzLoop produces forward-looking results. According to XO, VzLoop produces basic loop,

DS1 and DS3 loop rates that range from 100% to 145% higher than average rates in 38 to 40 areas served by major ILECs. XO contends the Verizon model is suspect because Verizon's California operations make it the tenth larges ILEC in the U.S. which should exhibit significant economies of scale rather than rates more than double national averages. (XO, 8/6/04, p. 11.) XO hypothesizes that Verizon loop rates are high because the model relies on embedded network characteristics. (*Id*., p. 13.) Further, XO claims that the failure of Verizon's model to aggregate demand for DLC equipment significantly overstates DLC investment. (*Id*., p. 21.)

Second, despite Verizon's claims it modeled masses of embedded data to ensure that its model replicates "actual" routes from its existing network, JC contend VzLoop fails to reflect actual routing in Verizon's current network. JC maintain that while Verizon has attempted to reflect its "real network," its underlying data is neither sufficiently detailed nor accurate enough to reflect even its embedded plant and it has not validated the data to ensure it reflects forward-looking design considerations. (JD/Donovan-Pitkin-Turner, 8/6/04, paras. 71-76, 89-90.) ORA questions whether Verizon's model actually captures the "real-world constraints" Verizon claims to model. While Verizon states constraints such as land usage plans, zoning maps, and landscape features should be incorporated into a cost model, it does not explicitly provide data demonstrating how particular constraints are reflected in its inputs. (ORA/Watts-Zagha, 11/9/04, p. 5.) Verizon itself admits that the systems it relied on for data do not always reflect the actual location of its equipment. (Workshop Tr., 1/13/04, at 3308-3311.) According to JC, Verizon prepared maps intending to show that HM 5.3 does not mirror Verizon's current network. These maps indicate the Verizon model "fails to reach many customers and forces

modern telecommunications equipment onto embedded network layouts that it is ill-suited to serve." (JC, 11/9/04, p. 22.)

Finally, JC contend Verizon's model does not accurately calculate the economically efficient cross-over point from copper to fiber. To determine the efficient cross-over point, one must evaluate the loop distance at which the combination of high cost fiber electronics plus low cost fiber cable is less costly than the per mile cost for copper cable. Verizon admits that its attempt to include a cross-over analysis in VzLoop includes errors which are not yet corrected. (Verizon Rebuttal Panel on VzCost and VzLoop, 11/9/04, pp. 60-65.) JC contend that the cross-over analysis logic in VzLoop is structurally flawed and that turning the feature off actually lowers loop costs. (JD/Donovan-Pitkin-Turner, 8/6/04, paras. 339-342.)

In response to all of these criticisms, Verizon claims there is value in using real network locations as the starting point for its cost studies because use of existing location information reflects the context-specific judgments of Verizon's engineers who make decisions based on geographical and other constraints. (Verizon, 11/9/04, p. 62.) Verizon contends its loop routes are far superior to those generated by HM 5.3 (Verizon Rebuttal/Tardiff-Murphy-Dippon, 11/9/04, p. 45.) Verizon defends its method of locating loop facilities such as distribution terminals, DLCs and SAIs, contending that even if all JCs' comments were accepted at face value, they would have only minimal impact on costs. (Verizon, 11/9/04, p. 68.) Verizon describes how the network data it used as a starting point for its model could be reinterpreted, relying only on customer locations, existing roads, and existing wire centers. (Verizon Rebuttal on VzCost and VzLoop, 11/9/04, p. 211.) According to Verizon, when the data is reclustered into new distribution areas under this approach it results in total investment only

14% less than that proposed by Verizon. (*Id.*, pp. 212-214.) Moreover, Verizon contends JC have erroneously interpreted Verizon's data to conclude that 29% of DAs have fewer than 50 lines. Rather, Verizon contends that a correct interpretation of its data shows only 13% of DA's have fewer than 50 lines. (*Id.*, pp. 206-207.)

With regard to the criticism that Verizon's modeled network does not follow current network routes, Verizon admits it had to rely on "surrogate data" in limited instances where there is not sufficient reliable data to model a particular aspect of the network. For example, Verizon describes how data for six of its 275 wire centers was either missing or "not producing a logically constructed modeled network," so it modeled costs for these wire centers by reference to modeled unit costs from wire centers with similar characteristics. (*Id.*, 11/9/04, pp. 192-193.) Verizon claims any discrepancies between SAI locations in VzLoop and the real world lead to insignificant changes in loop costs. (Verizon, 11/9/04, p. 67.)

On the third criticism that Verizon's model does not calculate an economically efficient cross-over point, Verizon admits that corrections to the economic cross-over analysis have been identified and could be reflected in any compliance filing ordered by the Commission. (Verizon Rebuttal Panel on VZCost and VzLoop, 11/9/04, p. 60.) According to Verizon, the net effect of these corrections is a 2% decrease in modeled investment because the reduction in DLC investment is largely offset by increases in copper feeder investment. (*Id.*, p. 64.)

We find merit in the criticism of JC, TURN, ORA and XO that Verizon has not modeled a forward-looking network. Our main concern is that Verizon has attempted to replicate its existing network rather than reconfigure and re-size

facilities to meet current and reasonably foreseeable future demand. Verizon's model starts with a layout to serve today's customer base, but it has layered on new equipment without considering more efficient network configurations. As a result, VzLoop assumes it would now require vastly more equipment to serve current demand, namely a 25% increase in SAI investment and 600% increase in DLC investment found by JC. While some of this increased SAI and DLC investment may be explained as forward-looking replacement of Verizon's currently deployed network, the increases are troubling when coupled with Verizon's modeling of such small DAs.

We consider it a key flaw that Verizon is using today's network layout with new equipment rather than considering more efficient configurations. We agree with JC this is backward looking and inefficient, and fails to consider the efficient alternative of reducing the amount of equipment by aggregating smaller distribution areas into larger ones. (JC/Donovan-Pitkin-Turner, 8/6/04, para. 381.) Essentially, VzCost models the SAIs that currently exist in its network rather than considering network reconfiguration with fewer and larger SAIs. Verizon's SAI placement drives the placement of DLC plant. Because VzCost places more DLCs for smaller distribution areas than HM 5.3, the smaller DLC systems generate higher costs than HM 5.3. (TURN, 8/6/04, pp. 7-8.)

Second, we are concerned that even though Verizon has attempted to model its current network routes, it has not done this entirely successfully. Although Verizon touts its use of current network routes as a superior feature of its model, we cannot actually rely on these claims because Verizon itself admits it has had to use some surrogate data and make certain adjustments. Verizon admits it could not model its actual network in all respects, but its main response is that these differences will have an insignificant impact on the modeled costs.

So we are left with a model that attempts to replicate the network today, and claims this is a superior feature, but does not actually do so in all respects. We are unwilling to rely on Verizon's assertions from its rebuttal comments that these discrepancies are insignificant.

Finally, Verizon admits its model contains errors in its cross-over analysis, which is part of the forward-looking analysis that a carrier would undertake in constructing a local exchange network. It would be unreasonable to rely on the Verizon model when such a critical economic variable, namely the point at which the network should be built with either copper or fiber, is not operating correctly.

2. Preprocessing Structural Flaws

JC contend Verizon uses embedded data that is preprocessed and used as a modeling input, and that errors in this preprocessed data lead to structural flaws in the model.

First, Verizon's model indicates a very high percentage of collocated distribution terminals, which raises suspicions over whether the resulting modeled network is truly efficient or forward-looking. JC contend that in one instance, Verizon models over 100 distribution terminals at the exact same location and this indicates serious problems either with Verizon's data or the way in which Verizon processed the data. Multiple small terminals at the same location suggest Verizon has inefficiently undersized distribution terminals or that it failed to properly model the location of terminals. An appropriately designed network would model a single, larger terminal for economies of scale rather than multiple smaller ones. (JC/Donovan-Pitkin-Turner, 8/6/04, para. 78.) In response, Verizon contends many of these are separate terminals that would be required in any network to serve a multi-tenant environment such as an apartment complex or trailer park. (Verizon, 11/9/04, p. 69.)

Second, Verizon's use of embedded data leads to overlapping and inefficient distribution areas. Specifically, Verizon has modeled distribution routes where cable from one distribution area extends far into another distribution area to serve a location that cable in the second distribution area could have more efficiently served. JC maintain this results in significant amounts of overlapping cable between different distribution areas that is not efficient and not forward-looking. JC surmise this result occurs because Verizon has either made errors in the preprocessing of its location data, or it is using embedded, overlapping routes that may actually exist in its network today but that an efficient carrier would not replicate. (JC/Donovan-Pitkin-Turner, 8/6/04, paras. 81-82.)

Verizon acknowledges this overlap, but contends the impact of this overlap has not been quantified, is likely insignificant, and it cannot easily remove such small, inconsequential overlaps. (Verizon Rebuttal on VzCost and VzLoop, 11/9/04, pp. 176-177.) Verizon contends that while removal of some of these overlaps is possible, "this level of perfection is unnecessary to accurately model engineering constraints and loop costs and … is also unachievable in any cost modeling process that relies on geocoding." (Footnote omitted.) (*Id.*, p. 180.)

Third, JC allege Verizon's SAI locations are inefficient because they are either far outside the distribution areas they serve, or multiple SAIs appear stacked at the same location. (JC/Donovan-Pitkin-Turner, 8/6/04, paras. 89-90.) Thus, it appears that Verizon's preprocessed data is not capable of identifying actual outside plant locations as Verizon intended. JC maintain the result of inefficient and inaccurate SAI placement is an overstatement of distribution cable and a corresponding impact on feeder investment as well. Ultimately, if SAIs are not in real world locations, Verizon's criticism of HM 5.3 applies equally to its

own model, which appears to not accurately model facilities where they actually exist today.

VZ responds SAI investment is a small part of total investment, and any minor discrepancies in SAI location can be addressed in a compliance filing. Verizon contends its modeling approach is sensible, particularly when compared to the HM 5.3 approach, which always places the SAI in the center of a distribution area. (VZ Rebuttal Panel on VZCost and VZLoop, 11/9/04, pp. 181-187.)

Fourth, JC contend the network Verizon models will not actually operate or work as Verizon intended. JC maintain Verizon admits various errors in its VzLoop model, such as the surrogate data and cross-over analysis errors described above, as well as errors in how VzLoop limits the maximum copper loop length. Indeed, Verizon admits VzLoop models loops with copper segments more than 18,000 feet due to an error in one of its programs. Verizon maintains it did not have time to correct this error, despite its claims to have limited copper segments to a maximum of 12,000 feet. (*Id.*, p. 142.) According to JC, this error is significant and results in 22% of wire centers with loops exceeding 18,000 feet, which will not provide an acceptable level of basic phone service. (JC/Donovan-Pitkin-Turner, 8/6/04, paras. 318-321.)

In response, Verizon claims HM 5.3 is equally, if not more, at fault with regard to loops violating the 18,000-foot copper limit. Verizon contends that 66% of HM 5.3's wire centers have copper lengths in excess of 18,000 feet. Verizon estimates if this were fixed in HM 5.3, it would raise loop rates 6%. (Verizon/Tardiff-Murphy-Dippon, 11/9/04, p. 47.)

Again, we are concerned with the issues JC and other parties have raised with the preprocessed data and how it is used by the Verizon model. Parties

raise numerous issues with multiple, overlapping facilities and distribution areas and the likelihood that this has increased local loop plant investment above and beyond a level that a forward-looking network design should incorporate. The criticisms call into question the extent to which Verizon's model accurately depicts the current local exchange network, which Verizon considers an advantage of its model. Verizon does not deny that the examples provided by its critics exist as described. Instead, its main defense centers around its assertion that these errors, once corrected if so ordered by the Commission, will lead to insignificant changes in the rates. Verizon's response is not reassuring because it primarily falls back on claims that corrections would be insignificant, errors can be fixed later, or JC has not quantified the error.

Given our experience with Verizon cost models over the past several years, including our prior requests for Verizon to fix modeling problems in the prior OANAD proceeding, we are not amenable to ordering corrections and waiting for the results. We prefer to choose between the models as filed rather than ask either model proponent to make corrections, forcing yet another round of critique of the supposed fixes. Verizon provides no support for its claim that any preprocessing errors lead to insignificant rate changes. We recognize neither model is perfect so we must asses which model best embodies forward-looking principles combined with ease of use.

3. Lack of Integration

Several parties maintain the various components of the Verizon cost model lack integration, which can lead to several modeling problems.

First, lack of integration in VzCost means it may not model the most efficient, forward looking network design. JC claim "Verizon's disjointed array of disconnected models for each component of its network contributes to its

failure to properly account for costs of the entire network." (JC, 8/6/04, p. 35.) Specifically, JC allege Verizon's failure to integrate feeder and distribution in its model causes the model to install duplicative cable and structure. In other words, JC contend Verizon models costs as if a carrier would build feeder structure down a street and then build additional distribution structure right on top of the existing feeder structure. (JC/Donovan-Pitkin-Turner, 8/6/04, para. 270.) While Verizon's model accounts for some sharing of poles by feeder and distribution facilities, it does not in any way reflect sharing of buried or underground structure or routes. (*Id*., paras. 273-5.) JC contend this structural flaw cannot be fixed because it is buried in model code. Verizon admits that it uses different approaches to model feeder and distribution routes, but contends the two approaches produce duplicative feeder and distribution only in a rare number of instances. (Verizon, 11/9/04, p. 79.) Additionally, Verizon claims that in the real world, feeder often runs underground while distribution runs in aerial structure. (*Id*.)

Second, parties charge that lack of integration makes it difficult for a user to work with and change inputs in the Verizon model. As an example, JC contend that multiple steps in the loop costing process require extensive manual effort. JC describe 50 steps and an alleged three day process to change DLC material costs. (JC/Donovan-Pitkin-Turner, 8/6/04, paras. 16-18.) Also, JC allege Verizon does not provide even a basic flow chart or otherwise provide documentation to help an experienced professional understand the model's logic in linking input data to output. (*Id*., para. 19.)

TURN agrees that it is significantly more difficult to work with the Verizon model and change model inputs, than with HM 5.3. TURN notes that while Verizon and JC each criticize the other for offering a model that is difficult to

work with, Verizon's complaints focus on the clustering process which is an input to HM 5.3, while the problems JC focus on in the Verizon model occur at each stage of the modeling process. (TURN, 11/9/04, p. 4.) For example, TURN explains that a relatively simple change to the cost of equity input requires 12 steps and an hour to complete, while the change can be made in one step and much less time in HM 5.3. TURN also notes that VzCost is not integrated across all modules. Depending on the module, VzCost generates either per-line results or total investment levels. TURN comments that these varying results make "apples to apples" comparisons difficult, and hamper the ability to audit the results and ensure the various network pieces add-up logically. (*Id.*, p. 6.)

Similarly, XO maintains the Verizon model contains unneeded complexity and fails to integrate critical network assumptions. For example, XO points out that the Verizon model relies on eight proprietary software and database systems from six different vendors. (XO, 8/6/04, p. 4.) Moreover, the Verizon model contains numerous disaggregated inputs for business and residential network characteristics that create unneeded complexity and lead XO to question whether Verizon improperly modeled business and residential demand when it could have aggregated it. (*Id.*, p. 26).

In response, Verizon defends its model as complex and highly sophisticated "in order to assimilate and process the massive amounts of information regarding Verizon CA's real-world network that must be reflected in a forward-looking cost study." (Verizon, 11/9/04, pp. 70-1.) Verizon claims that if VzLoop were simplified, it would not successfully account for real world attributes of routing and topography. Further, Verizon maintains its modeling inputs are entirely transparent and can easily be modified. In general, Verizon contends its model is no more complicated or less integrated than HM 5.3.

We are troubled by the parties' claims that lack of integration in Verizon's models cause them to install duplicative facilities and fail to capture the economies and efficiencies that a forward-looking analysis should entail. Again, Verizon says this is a minor problem which occurs only rarely. However, it is unclear how to test this assertion, particularly when lack of integration makes it difficult or impossible to test various outcomes or modify inputs. During the course of this proceeding, Commission staff met numerous times with Verizon to understand how to run VzCost. We find the amount of time invested in learning how to run the Verizon model impractical for quick UNE updates. Ultimately, when we compare the time required to master and manipulate VzCost and HM 5.3, we conclude that the Verizon model requires too many resources and is not "user-friendly." The time required to run learn the model and master sensitivity analyses to test input changes is simply not reasonable. On the other hand, Commission staff has familiarity with HM 5.3 from its use in the SBC UNE reexamination proceeding and staff is able to run multiple scenarios quickly and without excessive guidance from outside modeling consultants provided by the parties.

4. Expense Modeling Flaws

JC allege numerous flaws with how Verizon models the expenses that must be incorporated into forward-looking network modeling. First, JC criticize the Verizon model because of difficulty adjusting expense factors that rely on poorly documented data and untraceable calculations. (JC/Brand-Menko, 8/6/04, paras. 84-105.) As JC explain, adjusting expenses in Verizon's element specific cost studies requires manipulating multiple files and a complicated sequence of steps. As a result, it is difficult to audit the results and verify the change was made correctly. (*Id.*, paras 89-97.) Verizon responds that these

assertions should be rejected because it has fully explained its studies and supporting data. (Verizon, 11/9/04, p. 56.)

Second, JC maintain Verizon's expense modeling methodology is flawed because it starts with 2002 embedded costs and adjusts them with a "Forward-Looking Calibration" (FLC) factor. The factor has the effect of restating expenses at 2002 booked levels despite any projected decrease in forward-looking investment. JC claim that Verizon's FLC factor maintains Verizon's embedded expense levels and fails to capture network efficiencies that it has experienced or will experience. (JC/Murray, 8/6/05, p. 38.) The FLC works to ensure that embedded inefficiencies are carried forward into UNE cost results. (JC/Brand-Menko, 8/6/04, paras. 50-63.) Therefore, the VzCost is not based on a least-cost, most efficient technology.

TURN also criticizes the FLC factor for failing to produce expenses that are forward-looking. As Loube explains, Verizon's methodology is circular because when the formulas used in Verizon's expense to investment factors are compared, it becomes clear that embedded expenses equal forward-looking expenses. (TURN/Loube, 8/6/04, pp. 28-29.) In an arbitration involving Verizon Virginia (often referred to as the *Virginia Arbitration Order*[18]), the FCC's Wireline Competition Bureau found Verizon's FLC factor circular and flawed, and it instead recommended the use of ratios similar to those used in HM 5.3. (*Virginia Arbitration*, paras. 139-140.)

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[18] *In the Matter of the Petition of WorldCom, Inc. Pursuant to Section 252(e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia, Inc., and for Expedited Arbitration,* CC Docket No. 00-218, Memorandum Opinion and Order, DA 03-2738, (rel. Aug. 29, 2003.) ("Virginia Arbitration").

Verizon responds its use of the FLC is appropriate because Verizon starts with book investments and forward-looking expenses in developing its cost factors. The FLC simply converts booked investment into forward-looking investment so that the cost factor expresses the correct relationship: forward-looking expense to forward-looking investment. (Verizon Recurring Cost Testimony, 11/3/03, pp. 156-161.) Verizon says it must make this conversion using the FLC because it would be inappropriate to compare forward looking expenses to booked investment. (Verizon, 11/9/04, p. 48.)

Verizon explains that without the FLC, expenses would be distorted because TELRIC investment is typically lower than book investment. For example, Verizon illustrated that if a switch with a book cost of $40,000 has forward looking maintenance costs of $1,000, the unadjusted cost factor would be .025 ($1000/$40,000). If the TELRIC price of the switch is $10,000, use of the .025 cost factor leads to the assumption that forward looking maintenance expenses for the switch are only $250. However, forward-looking maintenance costs should equal $1000. (*Id.*, p. 49.)

Finally, JC give further examples of why Verizon's expense modeling approach merely perpetuates its embedded expense levels and fails to calculate forward-looking expense estimates. Specifically, Verizon ignores cost savings from employee reductions, projected productivity gains, and forward-looking building space requirements, and instead, uses 2002 actual expense levels. (JC/Brand-Menko, 8/6/04, pp. 99-111.) Furthermore, JC maintain that Verizon's expense methodology fails to remove numerous non-UNE related expenses such as those for non-regulated services, pension costs, retail marketing costs, costs related to affiliate transactions, and DSL and broadband-specific investments. (*Id.*, paras. 19-21 and 212-228.) While Verizon claims it has made forward-

looking expense adjustments, JC take issue with this claim. They note that most of the reductions Verizon claims to have made merely remove costs that should never have been included in a recurring UNE study in the first place such as non-recurring costs, and expenses associated with obsolete plant. (*Id.*, para. 21.)

Verizon contends its cost studies do not reflect embedded expenses because although it started with 2002 booked expenses as a starting point, Verizon made significant adjustments to those expenses to make them appropriately forward-looking, such as reductions in copper maintenance costs, merger costs, and retail-related costs. (Verizon, 11/9/04, p. 36.) These adjustments reduced 2002 booked expenses by over 22%. Verizon then made further adjustments to reduce expenses another 6% to account for lower expenses associated with forward-looking technology. (*Id.*, p. 37.) The FCC itself stated in its rulemaking on TELRIC that the best method of projecting expenses in a UNE cost proceeding is to make forward-looking adjustments to actual expenses. (*Id*,. p. 37.)

We find criticisms in this area valid. First, we agree that the expense portion of Verizon's model is difficult to audit and verify because it relies on numerous factors that are difficult to trace and changes to the factors require multiple steps. Second, the key problem with the entire FLC debate is that Verizon states it has determined the level of forward-looking expenses, and starts with those before adjusting investments to match expenses. The problem we find is that Verizon does not explain how it deduced the level of forward-looking expenses. In fact, the usual purpose of E:I ratios is to use the relationship of current expenses and investments to deduce forward-looking expenses. Verizon starts by apparently knowing the answer and creates a ratio that will provide a plug number to always produce the level of forward looking expenses

that it has determined are proper. This is indeed circular, as the FCC found in the FCC's Virginia Arbitration.

The HM 5.3 model, in contrast, looks at the relationship of current expenses and investments, and applies that ratio to forward looking investments under the assumption that there is a correlation between expenses and investments, and as investments change, expenses will change as well. Verizon's FLC factor has the opposite result of assuming that expenses will remain at current levels even as investments change. In support of its method, Verizon argues that "it costs the same amount, for example, to dry clean a cheap suit as it does to dry clean an expensive one." (Verizon/Jones Decl., 11/9/04, p. 53.) This example, however, assumes that suits and highly sophisticated switching and loop equipment are analogous. There may be plenty of reasons why it can be more expensive to dry clean silk than cotton, and it can be more expensive to clean a 50-year old wool or silk suit that needs special handling than a brand new, machine-washable microfiber suit that never needs dry cleaning at all. Verizon's analogy is too simplistic and fails to capture the reality that as telecommunications technology advances, operational and maintenance expense savings may be realized.

Third, we agree there is uncertainty whether Verizon has properly made forward-looking adjustments to its expenses. Our own review suggests that some of these categories still require adjustment, particularly productivity, building space requirements, and non-UNE related expenses for DSL and broadband. The complexity of the ACFs used in the Verizon model do not lend themselves to modifying these expense levels easily.

5. Switching Model Flaws

Verizon uses two complex and data intensive models to determine switching costs. The SCIS model determines investments for Lucent 5ESS and Nortel DMS switches, while Verizon's own Costmod analyzes investment for GTD5 switches. According to JC, both SCIS and Costmod are fatally flawed in cost model design and methodology, and the model inputs cause severe switch cost overstatements. The complexity and rigidity of these proprietary cost models make it impossible to correct all aspects of the cost study. The primary flaws in the Verizon switching models are that they are difficult to modify and change assumptions regarding pricing inputs and equipment, and that they rely on a hypothetical switch configuration from Verizon's national data rather than California specific inputs. These are discussed in greater detail below.

First, the model methodology and structure is not open, reviewable, and able to support sensitivity analyses. According to JC and ORA, Verizon uses an array of several massive investment cost models to develop switching costs and changing a fundamental input requires a monumental effort. JC contend that as a result, it is difficult to modify assumptions regarding the percentage of new and growth line purchases and the technology mix and price of switches. Specifically, critical assumptions in SCIS are developed in a pre-processing program called the "partitioning process," which contains the basic intelligence of the model. JC complain this partitioning process is proprietary, and its results are hard-coded data items in the model's investment tables. Thus, the true intelligence of the model was not available for review. (JC/Pitts, 8/6/04, para 30, ORA/Lehman, 11/9/04, pp. 3-4.)

As an example, Verizon's proposed UNE switching prices are dominated by GTD-5 switch costs. Specifically, Verizon's switching cost studies assumes a mix of 63% GTD-5 switches, 22% Lucent supplied switches, and 15% Nortel

switches. (Verizon Switching Rebuttal, 11/9/04, p. 23.) In contrast, Pitts uses only a mix of Lucent and Nortel switches to match the switch purchase data provided by Verizon. Verizon defends its GTD-5 assumptions because it expects to use the GTD-5 technology for the foreseeable future and it deploys different switch types for functional and strategic considerations. (Verizon Recurring Cost Testimony Verizon 11/3/03, p. 79; Verizon 11/9, p. 84.) Pitts claims the critical question is whether Verizon would purchase GTD-5 switches today if it were purchasing new switches. According to Pitts, the GTD-5 switch is not forward looking because evidence shows Verizon purchased only one since 1990, while it has purchased 42 Lucent and Nortel switches since 1991. (JC/Pitts, 8/6/04, p. 25.) TURN and ORA echo support for removal of GTD-5 switches from the cost studies. (TURN/Kennedy, 8/6/04; ORA/Lehman, 11/9/04.)

Moreover, JC contend the Verizon switching models use no information concerning Verizon's actual cost for new switches or growth line switching costs. (JC/Pitts, 8/6/04, para 20.) Instead, Verizon uses a complex calculation to back into the "discount" level it uses to convert list prices into what it actually pays its vendors. (*Id*.) Moreover, little of the data Verizon uses relates to new switch purchases. Instead, 98% of the investment relied on to calculate switch costs relates to Verizon's purchases to add growth lines to its embedded switching base. (*Id*., paras. 57-58.)

JC's witness Pitts attempted to modify the critical input of switch price but found prices are entered only as a discount off list price. Verizon admits that in order to change switch pricing inputs, one must use a "work around" to accommodate a change in switch price. Pitts contends that without the work around, changing investment discounts would require 13,000 manual data entries. (*Id*., pp. 9-10.) The work around adjusts output results rather than

modifying the switch price discount inputs. Pitts considers this an inferior approach and less reliable than changing pricing inputs directly.

Furthermore, JC and ORA contend it is difficult to modify Verizon's switching models to reflect forward-looking technology. Specifically, the Verizon models are based on an outdated version of SCIS that is not forward looking because it relies on switch components that are no longer offered and excludes newer, more efficient switch components. (*Id*., pp. 2 and 18; ORA/Lehman, 11/9/04, p. 4.) Pitts maintains that amending SCIS to incorporate forward-looking switch components would be extremely burdensome.

Verizon responds that JC's criticisms are hard to understand since their primary witness, Ms. Pitts, was a primary designer of Verizon's switching cost model, SCIS, and she was able to manipulate SCIS to restate its outputs. (Verizon, 11/9/04, p. 80.) Verizon claims it provided the source code for SCIS to the parties and they have failed to use it to perform any analysis. Verizon defends its switching model as detailed and technical for good reason because its network is very complex and requires significant engineering design. (*Id*., pp. 81-82.) Verizon also discounts the criticism that an older version of SCIS was used, stating that each new version makes very little changes to the basic model structure and any outcome differences are inconsequential. (*Id*., pp. 82-83.) As further support for this claim, Verizon performed a comprehensive analysis of switch components and their prices from 2000 to 2003 and claims that changes in components and prices since 2000 do not have a major effect on Verizon's switching cost analysis. (Verizon Switching Rebuttal, 11/9/04, pp. 10-11.) Verizon contends its calculations of switch discounts are based solely on recent purchase data. (*Id*., p. 86.)

Second, JC and ORA maintain the Verizon switching models are flawed because they are based on a hypothetical switch configuration from Verizon's nationwide network. Verizon did not use the models as they were designed to be used, but instead entered input data into switch models for a small sample set of fictional "representative" switch configurations, then adjusted generic cost outputs using outboard calculations in an attempt to estimate California specific investments (JC/Pitts, 8/6/04, p. 6; ORA/Lehman, 11/9/04, p. 3.) According to JC's witness Pitts, the SCIS and Costmod models are designed to accept user input data for each switch in the network and produce detailed results about each switch. Verizon, however, did not enter data about actual individual California switches, but developed theoretical switches to represent all switches in the entire Verizon footprint and ran these theoretical switches through its investment models. Verizon then uses a true-up process to attempt to modify the SCIS output to reflect California switches. Pitts maintains this approach produces unreliable results because the unit costs calculated by SCIS and Costmod do not accurately reflect each California switch and are, therefore, incorrect. The true up cannot produce accurate results because it is using incorrect unit costs. (JC/Pitts, 8/6/04, pp. 18-21.)

Verizon responds that its representative office approach closely matches Verizon's California switches, is more manageable and less time consuming than modeling every office, and does not significantly impact results. (Verizon Switching Rebuttal, 11/9/04, p. 15.) Further, Verizon counters that only a finite set of switching model inputs have any significant impact on investments. Verizon ran hundreds of sensitivity runs of its switching models to verify which inputs are significant. These are the inputs that Verizon varied in its model office runs to capture the investment differences between different switches.

(*Id.*, p. 14.) Finally, changes to the Verizon switching models are not unduly burdensome because the process has been simplified by using the representative office approach and changes can easily be input to the key cost drivers to see immediate results. (*Id.*, p. 16.)

We find that Verizon's switching model is indeed highly complex and difficult to manipulate. Our main concern is that due to the model complexity and hard coding of input data, it is difficult to run sensitivity analyses with varying assumptions for the percentage of new and growth lines and switch discounts. We agree with JC that using a work around approach is less reliable than actually changing model inputs. If Verizon has introduced a truly superior, albeit complex, model, then the Commission should be able to run it and test changes in inputs rather than performing outboard calculations to mimic input changes. Furthermore, we agree with JC that the GTD-5 is not a forward-looking switch technology because Verizon has purchased only one since 1990. We find it unduly burdensome to change the technology assumed in the switching model and remove the GTD-5 switch.

Verizon claims that using an updated version of SCIS or using actual switch data rather than its hypothetical approach would lead to an inconsequential difference in results. This has been a popular response from Verizon and one that we are asked to take at face value without the ability to actually test the assertion. We are reluctant to accept Verizon's claims without testing them and we are reluctant to rely on a model that requires outboard calculations to run scenarios rather than actual model runs.

6. Summary of Verizon Model Flaws

In summary, we find five major flaws with Verizon's model. First, Verizon models a network that is not forward-looking because it attempts to replicate its

embedded network configuration, albeit not always successfully. In so doing, Verizon fails to efficiently size and deploy current technology. By overlaying modern equipment on an embedded network, Verizon models numerous small distribution areas that produce inefficient results, with SAI and DLC investment far exceeding current levels. In addition, Verizon's loop model does not effectively calculate the economically efficient cross-over point from fiber to copper facilities.

Second, Verizon's model appears to contain errors in preprocessed data due to a high percentage of collocated distribution terminals, overlapping distribution areas, and inefficient SAI locations.

Third, lack of integration in the various modules in Verizon's cost model increases the likelihood duplicative facilities are modeled, and makes the model cumbersome if not impossible to test input sensitivity.

Fourth, Verizon's expense modeling is difficult to adjust and based on a flawed FLC factor.

Finally, the structure of Verizon's switching model makes it difficult to modify and test varying inputs, particularly for purchases of new and growth lines and equipment technology.

B. Flaws in HM 5.3

Verizon's criticisms of HM 5.3 are very similar to SBC's criticisms of HM in the SBC UNE Reexamination, completed in 2004. Verizon's essential criticisms of HM 5.3 are:

1) It contains errors in the customer location process leading to hypothetical clusters that do not resemble real world distribution areas;

2) It ignores engineering standards and network design principles by sizing for current demand and not allowing enough spare capacity;

3) It assumes unrealistic efficiencies from ubiquitous network replacement, unreasonable labor and productivity rates, and understated expenses;

4) It relies on unreasonable expert opinions; and

5) It results in unrealistic investment levels compared to Verizon's current network.

In the SBC UNE case, the Commission examined virtually the same arguments by SBC along with SBC's claim that as a result of these flaws, HM 5.3 produced a network that is unrealistic because it has far less outside plant than SBC's actual network today. (*See* D.94-09-063, Section V.B.) In particular, SBC alleged HM 5.3 modeled a network with fewer distribution areas, less distribution pairs, less fiber equipment, less trunks, and less interoffice network equipment than SBC's current network. The Commission reviewed SBC's criticisms in depth in D.04-09-063 and found merit to some of SBC's criticisms, but not all of them. The Commission concluded that many of SBC's criticisms could be addressed with input modifications to HM 5.3, particularly in areas relating to engineering and design standards, spare capacity, and expense levels. The Commission did not agree with all of the assumptions built into the HM 5.3 customer location process and expressed concern that it was not possible to modify this area and test various scenarios. Nevertheless, the Commission found that HM 5.3 complied with TELRIC and could be relied on to set SBC's UNE rates. In addition, the Commission agreed that many of the "expert judgments" underlying HM 5.3 were questionable and appeared biased to produce low results. However, the Commission found it could replace many of these expert judgments with assumptions and inputs from SBC's own model, although it was not possible to fully replace assumptions regarding labor costs.

Finally, the Commission found that criticisms of the HM 5.3 transport model were valid. (*Id.*, p. 108.)

In this case, the version of HM 5.3 that we are asked to examine is virtually identical to the version in the SBC case, although with a different clustering database based on Verizon specific data. Given the similarity in arguments, our findings are similar to those in the SBC case and we will review them here only briefly in the sections below.

We will not rely on the rebuttal version of HM 5.3 filed by JC on November 9, 2004 to set UNE rates for Verizon. In its rebuttal, JC provided numerous corrections and changes to HM 5.3. Verizon objected that the scope and magnitude of the HM 5.3 model changes were sweeping and should be stricken. (Verizon Motion to File Surrebuttal Testimony, 12/3/04, p. 2.) JC defended their rebuttal filing of HM 5.3 as appropriate, claiming all changes were made in response to criticisms by Verizon. The ALJ directed JCs to file a summary table describing all modeling changes in the rebuttal version of HM5.3 including citations to the original criticism and to a description of the modeling change in JC's rebuttal filings.[19]

Verizon responded to this summary table on March 15, 2005, stating the vast majority of modeling changes listed in the summary table were not described in JC's rebuttal filing, not responsive to a specific criticism levied by Verizon, or not implemented in such a way as to be responsive. In addition, Verizon claims JC failed to disclose a number of significant changes to the rebuttal version of HM 5.3 with regard to model platform, inputs, and

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[19] *Joint Commentors' Filing of Summary Table Pursuant to ALJ's Ruling*, 1/21/05.

preprocessing. Verizon requests the Commission strike all the modeling changes in the rebuttal version of HM 5.3.

After review of the summary table and the response, the ALJ determined that the rebuttal version contained some changes that were not responsive to Verizon's criticisms or were not reasonably explained in the JC rebuttal filings. For example, JC modified code in HM 5.3 relating to ADSL lines, admitting it was not responsive to any criticism by Verizon. (Summary Table, 1/21/05, p. 3) Further, the rebuttal version contains new hard-coded information on switching, updated cost factors, and an increase in the number of customer locations without an adequate description. (Verizon, 3/15/05, pp. 19, 21, and 24.) While some changes in the rebuttal version were responsive and reasonably explained, other changes would require significant resources to examine adequately. Therefore, it is not appropriate to rely on the entire package of changes which comprise the rebuttal version. Instead, we will use the original filing of HM 5.3, as amended on February 6, 2004, for our model runs. To a limited extent, we may use minor corrections to HM 5.3 suggested by JC in their rebuttal filing, without relying on the entirety of the HM 5.3 rebuttal version. If any rebuttal corrections are used, this is noted in the text of this order.

1. Inability to Modify Customer Location Process

Similar to SBC's criticisms of HM 5.3 in the SBC UNE proceeding, Verizon criticizes HM 5.3 for relying on a cluster input database developed by a third-party vendor, TNS. Verizon contends the hypothetical customer clusters developed by TNS bear no resemblance to any reasonable depiction of real world distribution areas. Further, because these clusters are a proprietary input, they cannot be modified.

Verizon provides several examples of specific problems it sees with the HM 5.3 clusters. First, Verizon alleges the clusters are not realistic because they assume customers are uniformly spread in rectangular shaped clusters, with parcels of equal size and shape. (Verizon/Tardiff, 8/6/04, pp. 26-27.) Second, HM 5.3 uses a simplistic design of distribution cables in a grill pattern throughout these rectangular serving areas, which undersizes cables. (*Id*., p. 31.) Further, Verizon maintains the HM 5.3 clustering data ignores existing rights of way and physical obstructions (e.g., freeways and bodies of water). (Verizon/Dippon, 8/6/04, pp. 4, 30-36.) In sum, Verizon contends that despite the use of data precisely locating existing customers with a longitude and latitude, HM 5.3 underestimates costs and fails to model plant to any existing customer locations. (*Id*., pp. 27-28.)

JC respond that HM 5.3 does not ignore real world obstacles, but instead uses "right angle routing" to ensure that more than enough loop plant is designed to accommodate existing rights of way, easements, and obstacles. As a result, HM 5.3 produces an average loop length that exceeds loop lengths modeled by Verizon. (JC, 11/9/04, p. 28.) In addition, JC maintain FCC regulations require that the TELRIC of an element "should be measured 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." (47 C.F.R. Sec. 51.505(b)(1).) The FCC has consistently held that "existing incumbent LEC plant is not likely to reflect forward-looking technology or design choices." (JC, 11/9/04, pp. 24-5, citing FCC's 5th Report and Order, para 66.) JC admit HM 5.3 does not model Verizon's embedded network, but an exact replica of the current network is not required by TELRIC. As final support, JC cite the Supreme Court's admonishment in its

review of TELRIC that "regulation does not and should not guarantee full recovery of embedded costs." (*Id.*, p. 29, citing *Verizon v. FCC* at 1681.)

Our findings with regard to a comparison of HM 5.3 and VzLoop mirror those from the SBC UNE case where we considered these same criticisms. While we do not agree with all aspects of HM 5.3's customer location and loop modeling, it is no more a "black box" than Verizon's own preprocessed network information and input modeling assumptions related to the VzLoop. Both HM 5.3 and VzLoop lack transparency, limit the Commission's ability to test various scenarios, and can be faulted for the accuracy of their customer location process. HM 5.3 is based on a detailed examination of current customer locations, and makes simplifying assumptions not unlike the assumptions underlying VzLoop. The HM 5.3 model ultimately ignores customer locations when modeling loop plant. As a result, although HM 5.3 starts with current customer location data, it does not model all loops in the exact locations where they exist today. Nevertheless, HM 5.3 has one advantage over VzLoop because it starts with actual customer locations to cluster customers into efficient groupings, whereas VzLoop makes no attempt to determine efficient customer groupings based on current population density characteristics.

We find that the method used by HM 5.3 to model customer locations, create forward-looking customer clusters, and estimate the costs of reconstructing Verizon's loop network falls reasonably within TELRIC guidelines, even if the reconstructed network does not follow Verizon's actual outside plant routes. We find the approach used in HM 5.3 more forward-looking and in compliance with the Commission's CCPs and TELRIC than Verizon's approach. Verizon assumes all existing distribution areas are unchanged and attempts to replicate its existing network, although not entirely

successfully. As noted in Section V.A.1 above, we concluded Verizon's approach overstates DLC and SAI equipment investment and does not mirror existing customer locations in all instances.

This does not mean there are not other valid criticisms of the clustering process underlying HM 5.3. Significantly, we were unable to run our own analyses to test HM 5.3's sensitivity with different clustering inputs. We would have preferred to test the results of different cluster sizes. At the same time, our inability to run sensitivity analyses of cluster sizes is not unlike our inability to run sensitivity of VzLoop's preprocessed cluster assumptions. In other words, both models involved extensive preprocessing of data that, for various reasons, was difficult to modify. Thus, we find that both models contain aspects of their loop modeling that we were unable to modify to our satisfaction.

2. Ignores Engineering Standards

Verizon maintains that HM 5.3 ignores widely accepted engineering standards and deviates from well established network design principles. Although Verizon provides numerous examples, its criticisms boil down to three major claims.

First, Verizon maintains that HM 5.3 focuses solely on current demand and ignores requirements for additional spare capacity. According to Verizon's witness Tardiff, HM 5.3 excludes costs by modeling insufficient capacity for fluctuations in demand over time. (Verizon/Tardiff, 8/6/04, pp. 13-15.) JC respond that HM 5.3 does not ignore growth, customer churn or fluctuations in demand. Rather, JC contend that HM 5.3 uses real-world engineering guidelines to install sufficient capacity for growth and changing conditions and uses cable sizing factors based on a reasonable projection of actual total usage, consistent with FCC requirements.

Verizon's criticism mirrors SBC's criticism of HM 5.3 in the SBC UNE proceeding. In that case, we agreed with the proponents of HM 5.3 that the model should not build to "ultimate demand," as suggested by SBC. We discussed how the FCC's TELRIC guidelines clarify that model inputs should reflect current demand, defined as a "reasonable amount of excess capacity to accommodate short term growth." (D.04-09-063, *mimeo.* at 74.) Here, as in the SBC case, we find that we can ensure HM 5.3 provides reasonable spare capacity for growth by reviewing the fill factors used in the model, which are discussed further in Section VI.D below.

Second, Verizon claims the distribution clusters in HM 5.3 are too large, and would be inefficient and unmanageable in the real world. The use of these overly large clusters produces fictitious economies of scale through the use of unrealistically large equipment and the modeling of cables that are larger than those typically deployed. (Verizon/Tardiff , 8/6/04, pp. 32-33.) JC respond Verizon is relying on outdated guidelines, and Verizon's newer guidelines call for larger distribution areas. (JC, 11/9/04, p. 31.) JC's witness Donovan defends HM 5.3 for accumulating demand in clusters using a bottom-up approach, and criticizes Verizon for confusing detailed engineering designs and their myriad requirements, with TELRIC cost modeling. Donovan maintains that a TELRIC model attempts to provide a reasonably conservative estimate of costs but does not attempt to precisely locate each piece of outside plant equipment or right of way. (JC/Donovan, 11/9/04, pp. 3-5.) Donovan further claims that Verizon's own data indicate a large discrepancy between Verizon's alleged engineering practices (i.e., distribution areas between 200 and 600 households) and its cost study, (i.e., thousands of clusters below 200 lines and larger clusters in urban areas). (*Id.*, p. 17-22.)

This disagreement is again reminiscent of the SBC case. There, we expressed concern with the larger distribution areas modeled by HM 5.3, and we suggested a preference to run our own scenario with smaller clusters, although not as small as those modeled by SBC. We found SBC's cluster sizes based on a limit of 200 to 600 households too restrictive because a forward-looking network configuration would most likely recognize today's dense customer groupings and the availability of larger equipment sizes. Thus, a forward-looking network would likely contain distribution areas larger than SBC's historic configuration. We concluded we would have preferred a middle ground between the two extremes, although we were not able to modify the clustering process used as an input to HM 5.3 to accomplish this. (D.04-09-063, *mimeo.* at 90-92.)

Our conclusion here is exactly the same. While we are unable to modify the somewhat large distribution cluster assumptions used as an input to HM 5.3, we note Verizon's model has numerous unrealistically small clusters we cannot modify. While we would have preferred to run HM 5.3 with different, slightly smaller cluster assumptions, neither can we rely on Verizon's approach rooted in distribution area limits that, according to witness Donovan, Verizon does not follow itself. We prefer a model with larger clusters based on a forward-looking reconfiguration to take advantage of technology advances, rather than an approach that appears to rebuild today's existing network configuration with fixed distribution areas incapable of maximizing the efficiencies of forward-looking equipment technologies.

Verizon's third engineering criticism involves numerous alleged flaws in HM 5.3, including the assumption that a stand-alone loop can be unbundled using IDLC technology and insufficient pole investment. (Verizon/Tardiff, 8/6/04, p. 56.) Regarding the use of IDLC technology, we are somewhat

perplexed by Verizon's criticism since it runs its own model with a 90% IDLC technology, discussed in more detail in Section VI.C below. Regarding pole investment, a similar criticism was levied in the SBC UNE case, and it is not difficult to change input assumptions in HM 5.3 to increase pole investment accordingly. Overall, we find the problems identified in HM 5.3 can be remedied more readily than the problems we find in the Verizon model. Specifically, it is easier for the Commission to modify engineering assumptions such as pole spacing, fill factors, and structure sharing in HM 5.3 than in the Verizon model.

3. Efficiency and Productivity Assumptions

Verizon criticizes HM 5.3 for its aggressive interpretation of TELRIC that assumes ubiquitous replacement of the network, with the assumption of efficiencies unattainable in the real world by a real-world carrier.

According to Verizon, HM 5.3 contains numerous flawed assumptions, particularly for inputs related to structure sharing, labor costs, and switching inputs, which lead to unrealistically low UNE rates.

Specifically, Verizon claims structure sharing inputs in HM 5.3 ignore Verizon's actual experience and assume all networks, including those of other utility and cable providers, are rebuilt simultaneously so that each entity shares structure costs. (Verizon, 8/6/04, p. 63.) In addition, HM 5.3 contains understated labor costs and labor productivity assumptions that do not remotely resemble values actual carriers can attain. (*Id.*, pp. 69-72.) With regard to switching, HM 5.3 estimates switching costs based on the unrealistic assumption that over 90% of equipment is purchased at the new switch discount price. (Verizon/Tardiff, 8/6/04, pp. 16-17.)

JC defend the level of sharing assumed in HM 5.3 as based on rational economic behavior. (JC, 11/9 pp. 57-8.) Regarding labor costs, JC counter that

vast portions of Verizon's own placement and productivity assumptions are not supported by anything other than subject matter expert input, and Verizon does not supply data from its own operations to support its complaints that HM 5.3 values are too low. (*Id*., p. 60.) JC asserts Verizon relies on unrealistic timelines for installation that include "wait time" and other bureaucratic inefficiencies rather than a pure estimate of efficient installation time. (JC/Donovan, 11/9/04, p. 74.)

Regarding switching inputs, JC contend low prices for new switch purchases are not isolated, but have been available from 1995 through at least 2002. (JC, 11/9/04, p. 61.) Further, since Verizon switch discounts are based on volume, one would expect even lower prices if larger volumes of new switches were purchased. Moreover, JC allege Verizon's plan to replace digital switches with all new packet switches contradicts Verizon's assertions it anticipates paying only "growth prices" for switches in the future. (*Id*., p. 63.)[20]

Similar to our findings in the SBC UNE case, Verizon's criticisms of HM 5.3 principally highlight questionable modeling inputs, but do not indicate HM 5.3 violates TELRIC requirements overall. Verizon suggests HM 5.3 inappropriately assumes a network is built overnight. While we agree this may be an unrealistic assumption, every cost model must make simplifying assumptions. We find HM 5.3 falls reasonably within TELRIC guidelines by modeling the location of existing wire centers coupled with forward-looking technologies and network configuration. We find that Verizon's criticisms regarding specific inputs can be remedied with input changes and do not

[20] In D.05-09-045, the Commission addressed issues relating to Verizon's intent to replace circuit switches with packet switches.

prevent us from using HM5.3 to set UNE prices. Specifically, we can modify labor costs, structure sharing, switching inputs, and other assumptions to address Verizon's concerns.

4. Expert Opinions Require Adjustment

Verizon contends the Commission should reject HM 5.3 because of its extensive reliance on unsubstantiated opinions. Verizon contends that HM 5.3 relies too heavily on dubiously supported "expert judgments" for a large share of modeling inputs, which renders the model's UNE cost estimates suspect. According to Verizon, the opinions are offered with little analysis or back up documentation, and often ignore empirical data that is readily available. (Verizon/Murphy, 8/6/04, pp. 118-20.) For example, Verizon contends JC's inputs for labor costs have declined without explanation, despite Verizon data that labor costs have steadily increased. (*Id*., pp. 123-126.) According to Verizon, it supplied detailed cost data to JC for numerous inputs such as engineering, cable placement and support structures which JC ignored in favor of other sources. (*Id*., pp. 132-33.) Verizon runs HM 5.3 with new input assumptions, which results in a loop cost of $32.10. (Verizon/Tardiff-Murphy-Dippon, 11/9/04, p. 26, and Attachment TMD-9.)

JC respond that Verizon inappropriately equates its actual cost data with JC's estimates of forward-looking costs based, in many instances, on data supplied by Verizon. (JC, 11/9/04, p. 42.) Moreover, Verizon itself uses numerous expert opinions and unnamed sources for its own inputs and assumptions. (*Id*.)

Once again, SBC levied the same criticism against HM 5.3 in the SBC UNE proceeding. There, we found that the use of expert judgments in HM 5.3 was usually adjustable. (D.04-09-063, *mimeo.* at 94-95.) We make the same finding

here. We do not consider the reliance on expert opinions a fatal flaw in HM 5.3 because we can modify the inputs, as Verizon itself did when it re-ran HM 5.3 for its rebuttal filing. In fact, as we discuss in Section VI below, we accept many of the suggested input changes that Verizon offers.

5. Investment Level Comparisons

Verizon contends the investment and expense levels in HM 5.3 defy common sense and sound economic reasoning. Even with technological advancements and efficiencies, Verizon claims there is no basis to conclude it Verizon could rebuild its entire network for only a small fraction of its current cost. Specifically, Verizon finds it implausible that HM 5.3 results suggest deployment of a brand new network at investment and expense levels far below Verizon's current experience. Specifically, Verizon faults HM 5.3 for proposing:

- Investment levels only 25% of reproduction cost
- Expense levels only 30% of Verizon's current levels
- Total investment of $2.9 billion
- Total labor force only one quarter of the current labor force.[21]

Verizon maintains these results defy common sense, particularly given that Verizon has been subject to price-cap regulation for over 13 years.

JC respond that HM 5.3 cost estimates have been validated against real world data and the experience of other industries that have transitioned to a competitive environment. (JC/Klick, 11/9/04, paras. 20-33.) For example, JC's witnesses contend HM 5.3 incorporates real-world information by ensuring sufficient distribution cable is modeled to connect all customer locations in a

[21] See Verizon/Tardiff, 8/6/04, pp. 6 and 50-59.

cluster to each other and to the SAI serving that cluster. (JC/Mercer-Pitkin-Turner, 11/9/04, pp. 4-5.) Further, simply because Verizon has been operating under price caps does not mean its embedded costs reflect the forward-looking efficiencies required by TELRIC. (JC, 11/9/04, p. 40.) JC contend price cap regulation is not as effective as competition in forcing incumbents to become efficient. (JC/Klick, 11/9/04, p. 12.) In sum, the "real world" test incumbents advocate is neither meaningful nor consistent with TELRIC.

Similar to our findings in the SBC UNE case, we find Verizon's comparisons of HM 5.3 modeling results to Verizon's current expense and investment levels are not meaningful. In our SBC UNE decision, we found SBC's arguments that HM 5.3 results were unrealistic echoed the ILECs unsuccessful arguments to the U.S. Supreme Court, where ILECs attempted to invalidate TELRIC. (D.04-09-063, *mimeo.* at 76-77.) Where Verizon has provided useable information regarding its actual network experience, we have attempted to incorporate that information into our HM 5.3 model runs. For example, in Section VI below, we modify labor inputs, switching, and asset lives based on Verizon specific information.

6. Summary of HM 5.3 Flaws

In summary, we find the method used by HM 5.3 to model customer locations, create customer clusters, and estimate the costs of reconstructing Verizon's loop network falls reasonably within TELRIC guidelines. While we were unable to modify the distribution clusters used as an input to HM 5.3, we found that compared to the smaller cluster assumptions in the Verizon loop model, the cluster sizes in HM5.3 were based on a forward-looking network configuration and maximized the efficiencies of new equipment technologies. Moreover, we find that HM 5.3 can be modified to overcome many of its alleged

flaws. Specifically, the model can be modified to use different input and engineering design assumptions, spare capacity can be increased, labor rates can be increased, and expense assumptions can be modified to increase expenses such as cost of capital and depreciation. We do not agree that HM 5.3 contains unrealistic investment levels, particularly after key inputs are modified.

C. Adherence to Commission Modeling Criteria

Both parties made admirable efforts to comply with the Commission's cost modeling criteria, namely that the models allow the user to reasonably understand how costs are derived, replicate model results, and modify inputs and assumptions. Nevertheless, both models contain areas of concern.

With regard to the Verizon model, several parties commented that the model should be rejected because it is internet-based and not actually filed with the Commission. JC claim the Verizon model is not officially on the record because it resides on the internet, which means it is owned, controlled and maintained in Verizon's custody with access strictly limited. JC contend this could present a problem in the event of subsequent court review. (JC, 8/6/04, pp. 16-17.) They further claim that parties and staff cannot review or modify source code or run sensitivity tests of coding changes, and the model is hard to use and adjust because it lacks integration and extensive manual effort is required for input changes. (*Id.*, pp. 19-21.)

First, we are somewhat troubled by the fact that Verizon's model is internet based. Our main concern mirrors the one raised by JC, that as Verizon issues updates to its model, old versions that reside only on the internet, and are not documented in the Commission's record, may not always be available for subsequent UNE pricing proceedings or court challenges to this decision. Second, we are not able to modify preprocessed network information used as an

input to the VzLoop module. Third, it is difficult and time-intensive to run sensitivity analyses of the Verizon model.

As for HM 5.3, we have a similar concern that it does not allow modification of preprocessed customer location information leading to the clustering of customers into distribution areas. In addition, we are not able to reasonably understand the components of interoffice transport modeling in order to test criticisms of its demand assumptions and ring architecture.

Since both models exhibited areas of concern with regard to the modeling criteria, we did not eliminate either model based on these criteria.

D. The Commission Should Rely on HM 5.3 Because It is Less Flawed than VZCost

The analysis above describes why we have concluded that both HM 5.3 and the Verizon model contain flaws that we cannot correct completely. Verizon models a network that is not forward-looking because it replicates the embedded network configuration and fails to efficiently size and deploy current technology. Verizon's loop configuration assumes fixed distribution areas, based on its current network, which are not capable of maximizing the efficiencies of forward-looking equipment. Other troubling aspects of the Verizon model include numerous small distribution areas, excessive SAI and DLC investment compared to current levels, overlapping distribution areas, and a lack of integration between the various modules of the Verizon model that leads to potentially duplicative cable and structure and makes it difficult to test input sensitivity. Further, Verizon's model contains many inputs and assumptions that we conclude are not forward-looking – such as the FLC factor, switching equipment, structure sharing, cost of capital, and overhead markup.

Overall, we found the lack of integration in the Verizon model made it difficult to change numerous input assumptions quickly and efficiently.

Relatively simple changes to one input, such as cost of capital, require numerous manual inputs to successfully implement in the various Verizon modules. When numerous inputs are modified for a sensitivity analysis, the amount of time needed to manually change the selected inputs in the various modules and ensure the changes are correctly integrated across all modules increases significantly. The lack of flow through from one module of the Verizon model to another makes it extremely challenging to successfully manipulate and excessively prone to errors when modifying inputs. For this reason, we find the Verizon model is less user-friendly than HM 5.3 and not given to easy updates in the event future UNE price adjustments are needed. It is unduly burdensome and therefore not reasonable to use the Verizon model, which requires extensive and time-consuming manual manipulation and is prone to human error in the input adjustment process.

We did not experience the same degree of difficulty in modifying and correcting our runs of HM 5.3. In general, we were able to understand how to make the necessary modifications, implement them quickly, and after making them, we could easily and consistently replicate our results in a reasonable time frame and with a high degree of certainty. Even though we disagree with many of the input assumptions used in HM5.3 – such as the cost of capital, asset lives, structure sharing, DLC costs, labor and productivity, and switching assumptions – we can change these inputs and assumptions. In many areas, we have incorporated inputs from the Verizon model into HM 5.3, particularly in areas such as labor rates, asset lives, and certain switching assumptions. Despite these efforts, we could not cure all of the flaws we found in HM 5.3. We cannot perform sensitivity analyses on the clustering process that builds the initial

estimates of outside plant, and we do not have complete confidence in HM 5.3's interoffice transport and high capacity loop modeling.

Therefore, we will adopt HM 5.3 model results for Verizon's permanent UNE rates. We conclude this approach is reasonable given the enormous complexity involved in TELRIC modeling exercises. It is reasonable to use a model with some flaws when the alternative is another model with more significant flaws that is also difficult to operate and modify.

VI. Modeling Inputs and Other Changes

We now turn to a description of the modeling inputs that were most fervently debated by the parties in this proceeding. The sections below briefly discuss these disputes and resolve them by indicating the inputs that were selected for the Commission's run of HM 5.3.

A. Asset Lives and Depreciation

One of the expenses included in a TELRIC model is depreciation expense. In order to forecast depreciation expense, the models rely on assumptions regarding the economic lives of the assets used to provision UNEs, that is, the rate at which these assets depreciate.

The key dispute between the parties involves whether to adopt Verizon's proposed asset lives, based on the economic lives Verizon uses for financial reporting purposes, or the proposal of DOD/FEA and JC based on asset lives projected by the FCC. In 1996, the Commission endorsed the use of the economic lives used by Pacific Bell for financial reporting purposes as the appropriate forward-looking lives for UNE cost studies. In 2004, the Commission again considered whether to use the FCC's asset lives for SBC, and was not persuaded to change its earlier determination. (D.04-09-063, *mimeo.* at 137.)

The table below compares the opposing proposals for four key categories of asset lives, and also shows the lives adopted for SBC in 2004.

Table 3

Proposed Asset Lives

Asset	DOD/FEA/JC Proposed Asset Life	Verizon Proposed Asset Life	SBC Adopted Asset Life
Switching Equipment	14	12	10
Circuit Equipment	11	8	9
Metallic Cable (All)	19-25	15-17	15
Non-Metallic Cable	25	20	20

According to Verizon, the asset lives it proposes consider current network modernization strategies, the impact of technology and competition, regulatory commitments, state demographics, and wear and tear. (Verizon/Sovereign, 11/3/03, p. 9.) Verizon asserts that competition spurs technological development, shortens the economic life of existing assets, and makes them obsolete. Further, facilities-based competition diverts traffic from the ILEC's network to competitive local carriers' (CLCs) networks. (*Id.*, p. 11.) Verizon compares its proposed asset lives to those forecast by Technology Futures Inc. (TFI), an independent research organization that specializes in technology market forecasts. Verizon indicates that its proposed lives fall within the range of lives proposed by TFI. (*Id.*, pp. 20-21.)

In contrast, DOD/FEA propose that in order to set forward-looking UNE rates, the cost models should use economic depreciation rates based on the

expected economic lives of newly placed plant, often termed the "projection lives." (DOD/FEA, 11/3/03, pp. 3-4.) DOD/FEA's witness Richard Lee supports use of the projection lives prescribed in 1996 by the FCC for Verizon-Contel as the most realistic and forward-looking estimates of plant lives. Lee contends that recent trends in depreciation reserve levels indicate that the FCC's projection lives are forward-looking. (*Id.*)

JC support DOD/FEA's proposal to use depreciation lives prescribed by the FCC and dispute Verizon's assertion that competition will necessarily shorten depreciation lives. (JC, 11/3/03, p. 24.) Several JC witnesses provide analyses of other network industries that, in the face of emerging competition, put older technologies to new and different uses to extend the economic lives of various assets. (JC, 8/6/04, p. 49.) TURN agrees with the proposal of DOD/FEA, and alleges flaws with Verizon's TFI study. TURN's witness Loube contends that if the Commission agrees with Verizon that customer demand for higher speed services shortens the useful life of copper plant, the depreciation cost caused by this demand should be allocated to those high-speed services. (TURN/Loube, 8/6/04, p. 15.)

In response to the DOD/FEA proposal, Verizon contends the Commission should not rely on the asset lives prescribed by the FCC in 1996 for Contel because they predate the competitive and technological developments that have occurred since the passage of the 1996 Telecommunications Act. (Verizon, 8/6/04, p. 88.)

In our SBC UNE reexamination, we found it was appropriate to continue to use asset lives developed for financial reporting purposes as the basis for determining depreciation expense. This was the approach we had initially adopted for Pacific Bell in D.99-11-050, and we reiterated that view in

D.04-09-063. We will not deviate from that finding here. Furthermore, we agree with Verizon that reliance on asset lives the FCC prescribed in 1996 for Contel is unwise given the competitive and technological developments since that time. Verizon's witness Sovereign adequately described the methodology he used and factors he considered in developing Verizon's proposed asset lives, including the effects of technological innovation. (Verizon/Sovereign, 11/3/03, pp. 9-16.) Finally, there is little rationale for different asset life assumptions between SBC and Verizon, since forward-looking technology assumptions for the two carriers should be similar, if not identical. The lives Verizon proposes are quite similar to the lives we adopted for SBC in D.04-09-063, as shown in Table 3 above. Therefore, we have run HM 5.3 using the asset lives proposed by Verizon.

We reject TURN's suggestion that any increased depreciation expenses from shorter asset lives should be assigned to advanced services that create the need for Verizon to update its plant. We find that depreciation expense based on Verizon's asset lives properly compensates Verizon for the TELRIC costs associated with providing the UNEs at issue in this proceeding.

B. Cost of Capital

A critical input to a TELRIC cost model is the estimated cost of capital, which is the cost a firm will incur in raising funds in a competitive capital market. The cost of capital is usually expressed as a weighted average of the cost of equity and the cost of debt for the firm, or a proxy group of firms, with a similar risk profile and in the same line of business as the firm. There are several key components used to calculate the weighted average cost of capital:

- Cost of equity –The Capital Asset Pricing Model (CAPM) and the Discounted Cash Flow (DCF) analysis technique are two quantitative financial models commonly used to estimate cost of equity, also called return on equity (ROE). These methods require assumptions regarding company

growth rates, the premium that a stock of average risk commands over the risk free rate (market risk premium), the risk-free rate of return, and a measure of the risk of the company's stock (beta).

- Cost of debt – this involves estimates of the interest rates on long-term, and perhaps short-term, debt instruments.
- Capital structure of the firm – this refers to the ratio of debt and equity outstanding for the company, or proxy group.
- Proxy group – this key assumption involves the composition of the group of companies used as comparables to the ILEC's UNE business.

Federal regulations require that a "forward-looking cost of capital shall be used in calculating the [TELRIC] of an element." (47 C.F.R. 51.505(b)(2).)

In its Triennial Review Order, the FCC provides clarification on the cost of capital component of a TELRIC analysis. The FCC states that there are two types of risk that should be reflected in the cost of capital. First, a TELRIC-based cost of capital should reflect the risks of a competitive market. Specifically, the FCC says:

> Because the objective of TELRIC pricing is to replicate pricing in a competitive market, [footnote omitted] and prices in a competitive market would reflect the competitive risks associated with participating in such a market, we now clarify that states should establish a cost of capital that reflects the competitive risks associated with participating in the type of market that TELRIC assumes. The Commission specifically recognized that increased competition would lead to increased risk, which would warrant an increased cost of capital. (TRO, para. 681.) (Footnote omitted.)

Second, the FCC states that a TELRIC-based cost of capital should reflect any unique risks (above and beyond the competitive risks discussed above) associated with new services that might be provided over certain types of

facilities. The TRO specifies that states may establish UNE-specific costs of capital to reflect in UNE prices any risk associated with new facilities that employ new technology and offer new services. (TRO, para. 683.) Nonetheless, the FCC leaves states the option to adopt a single cost of capital for all UNEs. (TRO, para. 684.)

Table 4 summarizes the parties' proposals for the appropriate cost of capital to incorporate into Verizon's UNE prices. For reference purposes, the Commission adopted a cost of capital of 9.44% applicable to SBC's UNE rates. (D.04-09-063, *mimeo*. at 171.)

Table 4

Current and Proposed Cost of Capital for Verizon

Verizon Current	Verizon Proposal	Joint Commentors Proposal	XO Proposal	ORA Proposal	TURN Proposal
10.51%	14.37%[22]	7.64%[23]	No more than 8.63%[24]	7.4%[25]	7.93%[26]

[22] Verizon initially proposed a cost of capital of 15.95%, which it adjusted to 14.37% in its reply comments on 8/6/04.

[23] JC initially proposed 7.12%. The proposal was updated to 7.64% on 11/9/04. (JC/Murray, 11/9/04, p. 42.)

[24] XO, 11/9/04, p. 29.

[25] ORA's proposal is based on Murray's methodology, but excludes short-term debt. (ORA/Litkouhi, 8/6/04, p. 12.) XO calculates that ORA's methodology would result in a 7.4% cost of capital. (XO, 11/9/04, p. 28.)

[26] (TURN/Loube, 8/6/04, Exhibit RL-8, Table 7.)

While these proposals differ by almost 700 basis points,[27] the methods used by all parties are remarkably similar. Verizon, JC, and TURN offered the most commentary concerning cost of capital. These parties calculated a weighted average cost of capital based on their own unique assumptions regarding the cost of equity, cost of debt, and capital structure of the firm. We will discuss each of these components of the cost of capital calculation separately. But first we will give a brief overall description of each party's proposal.

1. Verizon

According to Verizon, the FCC has emphasized that the cost of capital in UNE cases should reflect the risks of a competitive market in which all facilities-based carriers would face the risk of losing customers to other facilities-based carriers. (TRO at para. 680.) Therefore, it proposes a cost of capital of 14.37 %, which is based on a weighted average cost of capital of 11.64% plus a risk premium of 2.74%. (Verizon, 8/6/04, p. 81, n. 425.) Verizon explains that its risk premium proposal compensates for the regulatory risks inherent in providing UNEs, particularly the risk that UNE leases may be canceled on short notice. Since a cancelable lease has an economic value, Verizon has quantified that value and reflected it in the 2.74% risk premium that it adds to its cost of capital calculations. (Verizon, 11/3/03, pp. 7-8.) Other key assumptions in Verizon's proposal are a cost of equity based on a DCF analysis of the S&P Industrials, and a capital structure of 25% debt and 75% equity based on an average market value for a proxy group of S&P Industrial companies and a group of telecommunications companies.

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[27] A basis point equals one one-hundredth of a percent.

2. Joint Commentors

JC's witness Murray proposes a cost of capital of 7.64% based on an analysis using data from a proxy group of three ILECs, including Verizon, that are subject to facilities-based competition. Murray uses the CAPM, with a beta of 1.0 to determine the cost of equity, and corroborated her results with a three stage DCF analysis based on data for the three RBOCs. She develops long and short-term debt costs using forward-looking yield to maturity for publicly-traded debt of the Verizon companies. For capital structure, she uses a target capital structure based on the average of market and book capital structure for the three firms in her proxy group. (JC/Murray, 11/3/03, pp. 69-70; JC/Murray, 11/9/04, p. 3.)

3. TURN, XO, and ORA

TURN proposes a cost of capital of 7.93%, derived using the same method as JC's witness Murray, with updated inputs. (TURN/Loube, 8/6/04, p. 85.) Specifically, Loube updates short and long-term interest rates, using those published by the Federal Reserve on June 1, 2004. (*Id.*, pp. 70-86 and Exhibit RL-8.) TURN opposes Verizon's proposed cost of capital because it relies on a cost of equity method the FCC rejected in the Virginia Arbitration. (*Id.*, p. 78.)

XO disagrees with Verizon's proposed risk premium, claiming that Verizon falsely characterizes the competitive and UNE pricing environment as posing unusual risk for the company. XO maintains Verizon faces no different conditions than any firm in a fully competitive market and has not provided any actual data to show Verizon faces risk from cancellation of UNE orders. In other words, XO contends Verizon has not shown CLCs purchase UNEs for a shorter time period than Verizon's retail customers. (XO, 8/6/04, p. 45.)

ORA recommends the Commission adopt a cost of capital similar to one adopted for SBC because Verizon and SBC are similarly situated companies. (ORA/Litkouhi, 11/9/04, p. 2). The Commission should reject Verizon's proposed cost of capital as unreasonably high, overstating the degree of demand and competitive risk, and inappropriately including a risk premium adder. ORA prefers the method suggested by JC's witness Murray, but removes short-term debt from Murray's weighted average cost of capital calculations.

4. Discussion

Despite the large variance in cost of capital proposals, all parties essentially used the same financial modeling techniques, but with differing inputs and assumptions. We analyze each of their positions on the various components of the financial models below in order to determine the most reasonable inputs for financial modeling of the cost of capital. A summary of the financial modeling with the inputs we select is found in Section VI.B.5.

It is important to note that while we will review the financial modeling presented by the parties, particularly where it estimates the cost of equity, we will use judgment as well as the models to render our decision. As we stated in our order in 2002 where we established a return on equity for the four major energy utilities:

> In the final analysis, it is the application of informed judgment, not the precision of financial models, which is the key to selecting a specific ROE estimate. We affirmed this view in D.89-10-031, which established ROEs for GTE California, inc. and Pacific Bell, noting that we continue to view the financial models with considerable skepticism. (D.02-11-027, *mimeo.* at 19.)

Finally, although the FCC's TRO discusses the option to set unique costs of capital for each UNE, we will establish one cost of capital for all UNEs because we have no record to do otherwise.

We now turn to an examination of the inputs to the financial models used by the parties.

a) Cost of Equity

Verizon, JC and TURN use different approaches to estimate the cost of equity. Verizon uses the DCF methodology to estimate the cost of equity, while JC and TURN use the CAPM approach.

According to Verizon, the DCF model is often used by economists to estimate a firm's cost of equity based on the assumption that the market price of a firm's stock is equal to the present value of the stream of cash flows that investors expect to receive from owning that stock. (Verizon/Vander Weide, 11/3/03, p. 17.) The DCF method requires assumptions about the future dividends and growth rate of the companies being studied to forecast the future cash flows that will accrue to shareholders into the indefinite future. (JC/Murray, 11/3/03, p. 59.)

Verizon uses the DCF methodology applied to a proxy group of over 100 S&P industrial companies. Verizon justifies using this proxy group because there are no publicly-traded companies solely in the business of operating a telecommunications network to provide UNEs. Verizon believes a well-known sample of companies operating in competitive markets is the best available proxy. The proxy group includes a broad array of S&P companies as diverse as 3M Company, Avon Products, Coca Cola, Gap Inc., Halliburton, Marriot International, and Procter & Gamble. According to Verizon, although the proxy companies do not have subsidiaries in the UNE business, this is not

important as long as they are of similar risk to the entity whose cost of capital is being estimated. (Verizon/Vander Weide, 8/6/04, p. 33.) Using the DCF method, Verizon calculates a weighted average cost of equity of 13.46% for its proxy group of S&P Industrials. (*Id.*, p. 70.)

JC, ORA, TURN and XO claim Verizon's proxy group and DCF analysis are flawed. JC's witness Murray notes the extreme diversity in the proxy group and claims Verizon's witness Vander Weide offers no sound explanation for why such diverse firms form an appropriate proxy group for a cost of capital analysis. (JC/Murray, 8/6/04, pp. 49-50.) XO echoes these concerns noting that Verizon's proxy group is based on a subset of S&P 500 companies, none of which are telecommunications carriers or are primarily involved in the telecommunications industry. Further, Vander Weide excludes S&P companies that he defines as outliers, including those with negative growth and companies with low equity costs. (XO, 11/9/04, p. 25.) ORA claims Verizon's approach contradicts the outcome of the SBC UNE decision, where the Commission looked to a group of companies in a similar line of business to determine capital structure, cost of equity, and cost of debt for SBC. (ORA/Litkhouhi, 11/9/04, p. 3.) JC and TURN criticize Vander Weide's constant growth assumptions that underlie his DCF analysis. According to TURN, Vander Weide's average growth assumptions are 11.26%, while current estimates of the growth of the U.S. economy are only 6%. (TURN/Loube, 8/6/04, p. 79.)

JC propose a cost of equity of 9.14%. (JC/Murray, 11/9/04, p. 43.) To arrive at this cost of equity, Murray employs the CAPM, which requires

assumptions regarding the historical and forward-looking market risk premium, risk-free interest rates, and beta.[28]

Murray performs several CAPM analyses with differing assumptions for these three main inputs and averages the results. For all her CAPM calculations, Murray uses a beta of 1.0 because the FCC's Virginia Arbitration rejected the use of ILEC specific betas below 1.0 as outdated and from the period when ILECs were predominantly near-monopolies whereas they now face increased competition for long-distance, local services, and broadband markets. (JC/Murray, 11/3/03, p. 53.) For her CAPM analysis based on historical inputs, Murray uses an estimate of the market risk premium from Ibbotson Associates ranging from 7.2% to 8.6%, resulting in a cost of equity of 11.17%. She then performs a second CAPM analysis based on an average of forward-looking estimates of the market risk premium, resulting in a cost of equity of 7.11%. The average of these two CAPM analyses results in Murray's proposed cost of equity of 9.14%. (JC/Murray, 11/9/04, Exh. TLM-REB-3.)

As a check on the reasonableness of her analysis, Murray performs a three stage DCF analysis using data for Verizon and two comparable ILECs, BellSouth and SBC. The three stage DCF model is a common alternative to Verizon's one-stage DCF model, and it assumes three stages with distinct growth rates that converge toward the future rate of overall economic growth. Murray's three stage DCF model provides a cost of equity of 9.41% (JC/Murray, 11/3/03, pp. 61-63.)

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[28] The CAPM formula is:

Cost of equity = Risk free rate + (Market risk premium) x (Beta)

Verizon responds that Murray's three stage DCF is inferior to the single stage DCF model that Vander Weide used, primarily because it produces counterintuitive results wherein higher risk companies garner lower returns. (Verizon/Vander Weide, 8/6/04, p. 51.) Regarding Murray's CAPM analysis, Verizon criticizes the interest rates Murray uses as too short-term. Verizon also contends Murray should use a beta greater than 1.0, in line with the betas of other competitive telecommunications firms such as Level 3 and AT&T, with betas in the range of 1.5 to 2. (*Id.*, p. 62.) Finally, Verizon expresses general reservations with CAPM as not capturing all the risks that affect cost of equity and containing significant problems in estimating the model's basic inputs, i.e. the risk-free rate, the beta, and the expected return on the market portfolio. (*Id.*, p. 63.)

TURN reviewed both Murray's and Vander Weide's cost of equity analyses and contends that Murray's analysis is closer to FCC guidance from the Virginia Arbitration because it uses CAPM and a beta of 1.0. TURN performs its own analysis using CAPM, updating the short and long-term interest rates in Murray's analysis to arrive at a cost of equity of 9.04% (TURN/Loube, 8/6/04, Exh. RL-8, Table 5.)

The debate over cost of equity first hinges on whether we should use CAPM or DCF. We have already faced this issue in the SBC UNE decision, where we discussed our reservations with the DCF model, which relies heavily on growth forecasts for firms. The growth forecasts can lead to a large disparity in DCF results depending on the time period and forecasters selected. We found the DCF model too dependent on this one forecasted input and opted instead to rely on CAPM results to set the cost of equity for SBC. (D.04-09-063, *mimeo*. at 159.) Here, we find the same issue arises again. Verizon proposes a cost of

equity based solely on the DCF approach, using growth forecasts for a group of 100 S&P Industrials, and providing little explanation of how the growth forecasts were selected. Furthermore, Verizon provides scant information on why this particular proxy group of non-telecommunications firms was deemed to have the same risk profile and growth forecast as Verizon.

JC's witness Murray performs her own variation of a DCF analysis, using growth forecasts for her proxy group of three telecommunications firms, and arrives at a significantly lower cost of equity 9.41%, 405 basis points lower than Verizon's. Thus, we again see huge disparities in DCF results depending on the proxy group and growth forecasts. As in the SBC case, we will not rely on any DCF results to set the cost of equity for Verizon. We are comfortable ignoring the DCF analyses provided by both parties, because as TURN points out, the FCC Wireline Competition Bureau also chose to ignore DCF analyses, noting that "Verizon's use of the constant growth DCF model to estimate the cost of equity…stretches the reasonable limits of its use." (*Virginia Arbitration*, para 73.)

Even if we were open to using the DCF approach, we disagree with Verizon's choice to use a proxy group for its analysis that has no connection at all to the telecommunications industry. Verizon assumes that the companies in its proxy group have the same risk as a firm building a telecommunications network. Even though the companies in Verizon's proxy group are in competitive industries, Verizon has not provided any plausible support for its assumption that the risk of building a facilities-based telecommunications network equates to the risks faced by Marriot, Coca Cola, Halliburton, or any of the firms in the proxy group. When choosing a proxy group for a cost of equity analysis, we find it significantly more reasonable to choose a proxy group of firms in the same industry as Verizon. This allows comparison of what investors

require for returns on telecommunications firms facing the same technological and regulatory conditions. Verizon's choice of a non-telecommunications industry proxy group leads us to reject Verizon's cost of equity DCF analysis.

Now that we have rejected the parties' DCF analyses, we turn to the CAPM analyses provided by JC and TURN. The CAPM is the approach we relied on in the SBC case to set a cost of equity of 11.78% for SBC.[29] In the SBC case, we relied on an historical estimate of the market risk premium to arrive at this result.

After reviewing the CAPM analyses provided by JC and TURN, we find it appropriate and reasonable to use SBC's 11.78% cost of equity for Verizon as well. The CAPM analyses provided here by JC and TURN corroborate and support this 11.78% figure. JC's Murray calculates a 12.03% long-term CAPM cost of equity, based on an historical market premium of 7.2%. This is almost identical to the CAPM analysis in D.04-09-063. However, Murray takes the additional step of averaging her 12.03% projection with further CAPM analyses involving short-term and forward-looking inputs. We have less confidence in Murray's short-term and forward-looking CAPM results because we find a longer-term, historical approach more reliable and consistent with our analysis in the SBC case. Plus, forward-looking estimates of interest rates and market returns vary greatly and are highly disputed among financial experts, and a long-term projection of the cost of equity better matches the long-term investments required for a telecommunications network. The effect of Murray's additional CAPM runs is to water down her overall projection with lower

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[29] The cost of equity for SBC was calculated as follows: (7.4% market risk premium x .93 beta) + risk free rate of 4.9% = 11.78%. (*See* D.04-09-063, *mimeo*. at 159.)

estimates of the cost of equity based on disputed inputs. Therefore, we will use a cost of equity of 11.78% for Verizon, as we did for SBC, based on JC's historical and long-term CAPM results of 12.03% which support this outcome.[30]

In comments on the draft decision, the Joint CLCs[31] contend the Commission ignores Murray's CAPM analysis using an intermediate horizon historical risk premium, as described in her rebuttal declaration. (JC/Murray, 11/9/04, para. 91.) Murray's intermediate horizon proposal relies on five-year Treasury bond yields in the CAPM equation, which Murray contends reasonably match the time horizon over which the UNE prices adopted in this proceeding will be in effect. Verizon responds that the cost of capital should reflect investor expectations over the life of Verizon's assets, not simply until Verizon's UNE rates are reset. (Verizon, 12/21/05, p. 7.) We agree with Verizon that CAPM analyses based on short term investor expectations are not appropriate when setting a cost of capital for a longer life telecommunications assets. We make no changes to the cost of equity analysis in the draft decision.

b) Cost of Debt

Verizon's witness Vander Weide uses a 6.15% cost of debt for his analysis, based on the yields on Moody's A-rated industrial bonds as of April 2004. (Verizon/Vander Weide, 8/6/04, p. 70.) He contends this benchmark interest

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[30] Although Verizon criticizes Murray's CAPM analysis for not using a higher beta coefficient for telecommunications carriers, we find a beta of 1.0 in line with FCC guidance from the Virginia Arbitration and similar to the beta we used for SBC. Further, Verizon's criticism lacks credibility given it did not use comparisons with telecommunications firms for its own DCF analysis.

[31] The Joint CLCs are Cbeyond Communications LLC, Covad Communications, DMR Communications Inc., MPower Communications Corp, Navigator and XO, as explained in more detail in Section XI, Comments on the Draft Decision.

rate best approximates what Verizon would actually pay on debt issued to finance the construction of a new telephone network. He does not include short-term debt because Verizon does not generally finance investments in its long-term assets in this manner. Murray criticizes Verizon's approach as not industry specific and based on a bond maturity of 30 years, substantially longer than the average 17-year asset life Verizon has used in its cost studies. (JC/Murray, 11/9/04, pp. 75-77.)

In contrast, JC's witness Murray developed long-term and short-term debt costs using the forward-looking yield to maturity for publicly-traded debt of the Verizon companies, similar to the approach used in the Virginia Arbitration. (JC/Murray, 11/3/03, p. 64.) She uses a long-term debt rate of 4.99% and short-term debt of 2.77% (*Id.*, 11/9/04, p. 43.) Murray supports her use of short-term debt by noting that SBC and BellSouth both recently announced or completed debt issuances that are quite similar to the data on Verizon and include a mixture of short and long-term debt maturities. (*Id.*, p. 78.)

Verizon criticizes Murray's use of short-term debt, contending it would not use it to finance the construction of a new telecommunications network and claiming Murray ignores the reality that Verizon's current long-term debt is near maturity and trading as short-term debt. (Verizon/Vander Weide, 8/6/04, p. 45.) Further, Verizon contends Murray ignores the average asset life of 17 years assumed in Verizon's TELRIC analysis. (*Id.*, p. 44.)

TURN urges the Commission to reject Verizon's cost of debt because Vander Weide relies on the industrial cost of debt rather than debt associated with the telecommunications industry. (TURN/Loube, 8/6/04, p. 79.) For its own analysis, TURN proposes a debt rate of 5.69%. This rate is calculated using

Murray's short-term debt rate and an updated long-term debt rate of 6.57% based on 2004 telephone bond rates. (*Id.*, p. 83.)

We find it most reasonable to use the long-term debt cost for industrial companies proposed by Verizon, which is the 6.15% rate on Moody's A-rated industrial bonds cited by Verizon's witness Vander Weide in his update of August 6, 2004. Vander Weide's declaration attests that telecommunications companies such as Verizon are considered A-rated industrial companies and the 20-year average term to maturity on the bonds is close to the 17 year average economic life of Verizon's forward-looking network. (Verizon/Vander Weide, 11/9/04, p. 26-8.) We prefer this rate because the longer term of this debt is a closer match to the asset life assumptions incorporated into our model runs.

We decline to use Murray's analysis, which includes short-term debt costs because, as we stated in the SBC UNE case, we are not convinced that short-term debt has a place in a TELRIC-based cost of capital analysis where we prefer to use long-term financing assumptions to match asset lives. (D.04-09-063, *mimeo.* at 166.) Similarly, we decline TURN's proposal because it includes short-term debt.

c) Capital Structure

Verizon recommends use of a market value capital structure, similar to the approach used in the Virginia Arbitration. According to Verizon's witness Vander Weide, a market value capital structure is more forward looking than book value because investors look only to the future to determine the value of their stocks and bonds, whereas book value is based on the embedded or historical costs of a company's assets. (Verizon/Vander Weide, 11/3/03, p. 40.) Based on his review of market value capital structures for both a proxy group of S&P Industrials and a group of telecommunications companies, he recommends a capital structure for Verizon of 25% debt and 75% equity. (*Id.*, p. 41.)

Murray opposes using a market value approach, stating it does not provide the best guide to Verizon's forward looking target capital structure. (JC/Murray, 11/3/03, p. 65.) Generally, Murray criticizes Verizon's approach on the basis that a historical review of market valuations of S&P Industrials does not represent the best available information concerning investors' expectations about how Verizon would finance forward-looking investments in UNE operations. (*Id.*, 8/6/04, p. 61.)

For her own analysis, JC's Murray cites several financial economists' views that ideally, a firm's target or optimal capital structure should be used in weighting the cost of equity and cost of debt. (*Id.*, 11/3/03, p. 66; 8/6/04, p. 62.) Murray says respected researchers, such as Prof. R. Glenn Hubbard and Dr. William H. Lehr, have found evidence that, in the long run, market equity tends to move toward book equity. (*Id.*, 8/6/04, pp. 62-63.) On the other hand, high market-to-book ratios predict future book profitability. Thus, on balance, this suggests the best prediction of a firm's target capital structure incorporates both book and market information. Murray, therefore, gives equal weight to the market and book capitalization of the companies in her proxy group. She recommends a capital structure of 66.44% equity, 28.63% long-term debt and 4.93% short-term debt. (*Id.*, p. 43.) Murray provides information that this capital structure is highly consistent with the publicly stated target capital structures of other major ILECs, corroborating the reasonableness of her approach. (*Id.*, 11/3/03, p. 69 and 8/6/04, p. 63.)

Verizon opposes Murray's approach, stating that economic research does not support the theory that market and book values of companies converge. (Verizon/Vander Weide, 11/9/04, p. 34.) Further, Verizon argues that target

capital structures of other ILEC's have been misinterpreted by Murray. (*Id.*, 8/6/04, p. 42.)

TURN supports use of the target capital structure, as proposed by Murray, rather than a capital structure based solely on market value. (TURN/Loube, 8/6/04, p. 77.) ORA and XO support JC's proposal to average market and book value capital structure for a comparable group of companies, excluding short-term debt. (ORA/Litkouhi, 8/6/04, p. 11.) Both ORA and XO claim that Verizon's witness Vander Weide gives no support for his proposed capital structure of 75% equity and 25% debt. (*Id.*, p. 4; XO, 11/9/04, p. 25.)

Similar to the approach we used in setting a cost of capital for SBC, we adopt JC's approach of averaging market value and book value information for a proxy group of companies. As stated in D.04-09-063, we reject a capital structure based entirely on market value as too volatile and subject to fluctuations in stock prices. Rather, we have previously found that a forward-looking capital structure for a firm is based on a firm's target capital structure, and the best predictor of target capital structure for a firm uses both market and book value information, just as investors might do in valuing a company's assets. (D.04-09-063, *mimeo*. at 169.) JC have convincingly shown that the target capital structures of other telecommunications companies compare reasonably to the proposed capital structures developed from book and market value information for Murray's proxy group. Based on this evidence, we find Murray's proposed capital structure reasonable, although we will exclude short-term debt. As we did in the SBC case, we decline to adopt a capital structure that includes short-term debt. Instead, we will make a simplifying assumption that all debt is held at the long-term rate, consistent with our assumptions regarding asset lives. Therefore, we adopt a capital structure of 66.44% equity and 33.56% debt.

d) Risk Premium Adder

Verizon proposes an adder of 2.74% to its cost of capital to compensate for the regulatory risks in providing UNEs. Vander Weide arrives at this adder amount by estimating the risk Verizon assumes in providing UNEs through a cancelable lease arrangement. According to Verizon, cancelable operating leases involve significantly higher risk for Verizon because its network investment is large, long-lived and largely sunk and its investments and operating expenses will remain the same even if CLCs are able to cancel their UNE leases as lower-cost substitutes become available. This increases the risk that Verizon will be able to earn a fair return on its UNE investments. (Verizon/Vander Weide, 11/3/03, pp. 48-49.) Verizon provides examples of the risk involved in facilities-based network investments by citing investments by WorldCom, Global Crossing, Qwest, Teligent, and Covad where these companies have found telecommunications demand was overestimated and the companies have lost 80% to 100% of their market values. (*Id.*, p. 51.)

JC counter Verizon's UNE risk adder by maintaining there is no need for such an adder and that similar proposals by Verizon and other ILECs have been rejected numerous times. JC provide key reasons that Vander Weide's analysis of the risks of UNE leases is faulty, including (1) investors have presumably reflected this risk in the prices they are willing to pay for Verizon securities, (2) any risk, if it did exist, is retail rather than wholesale, because Verizon does not incur sunk investment costs specifically for UNEs, (3) if there is no risk adder to Verizon's retail cost of capital, there is no need for one for the UNE cost of capital, and (4) Verizon's network assets have other revenue generating uses that Vander Weide has ignored in his lease cancellation analysis. (JC/Murray, 8/6/04, p. 66.) Moreover, Murray notes that other agencies have found that any regulatory risk is captured by the market-based cost of capital. Murray cites as

examples several FCC orders, this Commission's earlier OANAD decision for SBC (D.99-11-050), and decisions by other state commissions. (*Id.*, pp. 67-69.)

TURN opposes Verizon's risk premium adder because cost of equity analyses already incorporate assumptions about competition. (TURN/Loube, 8/6/04, p. 80.) Further, Loube contends Verizon's justification for requiring a risk premium is speculative and unsupported, relying on assumptions that may not occur in the future. (*Id.*, p. 77.)

ORA and XO both note the Commission has already rejected the idea of a risk adder for Pacific Bell in the earlier OANAD proceeding. (*See* D.99-11-050, *mimeo*. at 37-43.) In D.99-11-050, the Commission described how Pacific Bell's arguments for a "sunk cost" adder were really a collateral attack on the TELRIC methodology and inconsistent with a federal court ruling finding that an adder such as the one proposed by Pacific in OANAD was inconsistent with the basic pricing standards contained in Section 252(d)(1) of the Act. (*Id.*, pp. 37 and 43.) Further, the decision found that Pacific Bell had not shown that an adder for future stranded plant is appropriate. (*Id.*, pp. 42-43.)

We agree with Murray that Verizon has not justified a premium over the market based cost of capital calculated using CAPM and a weighting of the portion of debt and equity in the company's capital structure. We maintain the view that quantitative models, such as CAPM, do a reasonable job of capturing investors' views of the risks facing Verizon in the UNE market. Further, we agree with Murray that any risk from UNEs is no greater than the risk Verizon faces in its retail operations, particularly since Verizon does not have to incur "sunk investments" solely for UNE purposes. As pointed out by ORA and XO, the Commission has already rejected previous risk adder proposals. Verizon's arguments here echo Pacific Bell's proposal that was rejected in D.99-11-050.

Therefore, we reject Verizon's proposal for a risk adder of 2.74% to its cost of capital.

5. Summary of Weighted Average Cost of Capital

The results of our cost of capital analysis are summarized in the table below. In short, we derive the capital structure for our analysis based on Murray's proposed 50/50 weighting of market and book values for her proxy group of firms, although we exclude Murray's use of short-term debt and will consider all debt as long-term. We use an 11.78% cost of equity based on Murray's long-term, historical CAPM analysis and our findings in the SBC UNE case. We give no weight to the parties' DCF analyses. The 6.15% cost of debt is based on Moody's A-rated industrial bond yields. Altogether, these inputs result in a weighted average cost of capital for Verizon of 9.89%.

Table 5

Weighted Average Cost of Capital

Component	Percent of Total	Cost	Weighted Cost
Equity	66.44%	11.78%	7.83%
Debt	33.56%	6.15%	2.06%
	100%		9.89%

C. IDLC/UDLC

A key modeling input involves the technology choice for digital loop carrier electronics. Digital loop carriers (DLCs) are the electronics that connect fiber feeder cable to copper distribution cable, and which allow telecommunications services to pass from copper to fiber and back, and between the fiber feeder and the switch.

JC propose that all DLC systems should be modeled as "integrated" or IDLC systems. In an IDLC system, voice signals remain digital all the way from

the remote terminal to the switch. JC contend that IDLC is the more recent and forward-looking technology, and is more efficient and reliable than "universal" (UDLC) systems. (JC/Donovan-Pitkin-Turner, 8/6/04, p. 116.) According to JC, an IDLC system can be used to provision a stand-alone unbundled loop at the DS-1 level using an interface known as GR-303. (*Id*., p. 118.) JC claim that this capability exists today in the DLC systems Verizon has deployed throughout its network. (*Id*., p. 119.)

In contrast, Verizon has modeled a portion of its DLC systems as UDLC. Specifically, Verizon assumes use of 90% IDLC systems, and 10% UDLC systems. (Verizon Recurring Costs Testimony, 11/3/03, p. 50.) In a UDLC system, voice signals are converted from analog to digital at the remote terminal, then converted back to analog at the central office. Verizon incorporates some UDLC into its model under the theory that a forward-looking network must allow a carrier to provide unbundled loops to its competitors and it is not technically feasible in a multi-carrier environment to provision a single, or "stand-alone" unbundled loop using an IDLC system. (Verizon, 8/6/04, p. 57.) Verizon contends that various unresolved problems prevent provisioning of stand-alone loops over IDLC systems, including operational, security, and administrative concerns. (*Id*., p. 57.) Essentially, Verizon says it is unclear how different switches owned and operated by competing carriers can connect to one DLC system.

In the SBC UNE case, we found that IDLC was the forward-looking technology choice to include in our models runs, but that we should incorporate a portion of UDLC to account for operational issues yet to be resolved with provisioning single unbundled loops to CLCs. We used a mix of 60% IDLC and 40% UDLC, assuming that 40% of loops would need UDLC available for

unbundling purposes. Here, Verizon has assumed that a forward-looking network can operate with only 10% UDLC equipment. JC continue to propose, as in the SBC case, that the network can operate with 100% IDLC.

We will use Verizon's input assumptions of 90% IDLC and 10% UDLC for our model runs for the same reasons elaborated in the SBC case, namely that some portion of UDLC may be required for unbundling purposes until operational issues are resolved. If Verizon believes that 10% UDLC is adequate in the forward-looking environment, we see no reason to use the 40% level adopted in the SBC case. We do not agree with JC's assessment that the network can operate with 100% IDLC for the same reasons articulated in the SBC UNE decision. (D.04-09-063, *mimeo*. at 173-175.)

D. Fill Factors

The parties have varying proposals for the amount of spare capacity that should be designed in a forward-looking local exchange network. In TELRIC cost models, designing a network with spare capacity entails use of a "fill factor," or utilization level, as a modeling input. For example, a fill factor of 40% means that 40% of the physical plant is in use, while 60% is available for maintenance, customer churn, and growth. (*See* D.96-08-021, *mimeo.* at 23.)

As the FCC stated in 1996 in its First Report and Order:

> We conclude that, under a TELRIC methodology, incumbent LECs' prices for interconnection and unbundled network elements shall recover the forward-looking costs directly attributable to the specified element, as well as a reasonable allocation of forward-looking common costs. Per-unit costs shall be derived from total costs using reasonably accurate "fill factors" estimates of the proportion of a facility that will be "filled with network usage); that is, the per unit costs associated with a particular element must be derived by dividing the total cost associated with the element by a reasonable projection of

the actual total usage of the element. (First Report and Order, para. 682.)

Key fill factors in HM 5.3 determine the appropriate investment for copper distribution cable, fiber feeder facilities, copper feeder facilities, DLC equipment, serving area interfaces (SAIs), and premise termination equipment. These fill factors are usually hotly disputed in TELRIC models because the lower the fill factor, the more spare, or excess, capacity will be included in the cost study. If fill factors include more spare capacity than is needed for a reasonable projection of forward-looking demand, plant costs will be inflated. Conversely, if modeling assumptions minimize excess capacity and lead to high achieved fill rates, costs of excess plant may be minimized at the expense of adequate spare plant to achieve reasonable service quality and service to new connections.

In the SBC UNE case, we reviewed the proposed fill factors in great detail. The fill factors that were adopted after that review are largely the same as those proposed here by JC, except for DLC and SAI fill levels. SBC proposed lower fill factors, which were largely rejected because they were derived from SBC's current network operations and were not considered forward-looking. (D.04-09-063, *mimeo*. at 183.) The table below shows the "achieved" fill factors[32] adopted in the SBC UNE proceeding, those proposed here by JC and Verizon, and a summary of the fill factors adopted in this order.

[32] The term "achieved fill" represents the spare capacity "achieved" after the model is run, as opposed to the "input fill," or sizing factors, which are model inputs. These inputs size the network for spare and growth and lead to an output, or "achieved fill."

Table 6

Comparison of Fill Factors[33]

	SBC Adopted Achieved Fill Factor	JC Proposed Achieved Fill Factor	Verizon Proposed Achieved Fill Factor	Adopted Fill Factors
Copper Distribution	51.6%	51.7%	38.76%	52%
Fiber Feeder	79.6	79.6	95.5	80
Copper Feeder	76	77.3	65.99	76
DLC Common	62	78.8	83	65
DLC Plug In	75	89.9	100	75
SAI	67.8	55.9	42.3	56

We briefly discuss the fill levels we adopt for our HM 5.3 model run below.

1. Copper Distribution

Copper distribution fill relates to the amount of copper facilities, or line pairs, that are modeled in the distribution network. JC propose almost the identical 52% fill level that we adopted for SBC in D.04-09-063. Verizon proposes a fill factor of 38.76%. JC contend that Verizon's low fill is at odds with what was considered forward-looking for SBC and very likely reflects the historical practice of substantially overbuilding the distribution network. (JC/Donovan, 11/9/04, pp. 92-93.) In contrast, JC maintain their proposed inputs result in an achieved fill of approximately 50%, which provides facilities to serve almost twice the current demand level. (JC/Donovan, 11/3/03, p. 23.) Verizon alleges

[33] *See* Joint Comparison Exhibit, 9/2/05, admitted into the record by *ALJ's Ruling on Additional Exhibit and Submission of Case*, November 8, 2005.

JC's sizing inputs provide minimal spare copper distribution plant that will lead to longer downtimes and poor service quality. (Verizon, 8/6/04, pp. 61-62.)

A fill level similar to the one Verizon proposes here was deemed to include excessive spare capacity in the SBC UNE case, while a fill level identical to the one JC now propose was considered reasonable to provide adequate spare capacity for customer churn, maintenance, and growth. (D.04-09-063, *mimeo*. at 189-90.) We continue to find that a fill factor that reserves close to 50% of capacity as spare is reasonable, particularly in light of Verizon's admission that Verizon, SBC and BellSouth have seen business and consumer access lines fall 3.6%, 4.1% and 3.2%, respectively, in 2002, with wireless substitution seen as a significant factor. (Verizon, 11/9/04, p. 5.) Therefore, we will adjust JC's proposed modeling inputs to achieve a fill factor of approximately 52%.

2. Fiber Feeder

JC propose sizing factors for HM 5.3 that achieve a fill level for fiber feeder of approximately 80%, identical to what was adopted in the SBC case. As they explain, the inputs are based on an assumption of 4 fibers per DLC site, or two redundant fibers for each two fibers in service. (JC/Donovan 11/3/03, pp. 27-28.) This is identical to the modeling we adopted in the SBC case, and we will use it here as well. Verizon proposes six strands per DLC terminal, which we consider excessive spare capacity.

3. Copper Feeder

HM 5.3 sizing factor inputs provide an achieved fill rate of 77.3% for copper feeder, almost identical to the 76% adopted in the SBC UNE case. (D.04-09-063, *mimeo*. at 192.) Verizon uses almost identical sizing factor inputs in its model, but the achieved fill in the Verizon model is 66%. We see no reason to deviate from the 76% achieved fill rate that we adopted in the SBC UNE case,

and we have adjusted HM 5.3, as we did in the SBC case, so that the sizing factors achieve that fill level.

4. DLC Plug-In Equipment

JC propose a fill level for DLC plug-in equipment, i.e. line cards, of 89.9%. This is the same fill level that we rejected in the SBC UNE case as too high. Instead, for SBC UNE pricing, we assumed a 75% fill factor based on the finding that a level approaching 90% ignored real world constraints such as inventory management and travel time. (D.04-09-063, *mimeo*. at 199.) In Verizon's model, DLC equipment achieved fill factors are outputs, not inputs. Verizon did not use fill factor or breakage assumptions for DLC plug-in equipment. Thus, its achieved fill factor is 100%. Because of the different modeling approaches of Verizon and JC, it does not make sense to substitute Verizon's achieved DLC fill factors into HM 5.3. Rather, for the same reasons we discussed in the SBC case, we prefer to assume a lower fill level than the one proposed by JC. It is reasonable to assume Verizon would face the same inventory management and travel constraints that we assumed for SBC's utilization of DLC equipment. Therefore, we will run HM 5.3 to achieve a fill level of 75% for DLC plug-in equipment.

5. DLC Common Equipment

In the SBC UNE case, we learned that fill level for DLC common equipment is a modeling output that depends on the chosen level of DLC plug-in equipment. (D.04-09-063, *mimeo*. at 198.) Since we have adopted a 75% plug-in fill factor, the resulting DLC common equipment fill is 65%, nearly identical to our results in the SBC UNE case.

6. Premise Termination

Premise termination equipment refers to the equipment that terminates a local loop at each customer location and includes the drop-wire from the distribution network to the "network interface device" (NID) on the customer premise.

The HM 5.3 model assumes a 2-pair NID for each residence that is not in a multiple dwelling unit, and a 6-pair NID for each business location. Verizon contends that a 2-pair NID assumption for each residence is inadequate because many customers will ultimately demand more than two lines and extra costs will be incurred when additional field visits are made to replace the 2-pair device when more lines are ordered. (Verizon Rebuttal Panel on VzCost and VzLoop, 11/9/04, p. 73.)

In the SBC UNE proceeding, we found that the assumption of a 2-pair NID per residence left no room for spare, but that a 6-pair device inflated loop costs by installing more equipment than necessary. To resolve the dispute, we increased the labor component of NID installation by lengthening the assumed install time for the NID to one hour to conservatively account for travel and set up time for multiple NID installations. (D.04-09-063, *mimeo*. at 204.) As we discuss in greater detail below in Section VI.H, we have chosen to run HM 5.3 with specific labor input changes suggested by Verizon. These changes include modified NID labor inputs and achieve the same result as the changes we made in the SBC case, namely increasing NID installation costs. While we will use Verizon's NID labor inputs, we will adhere to the 2-pair NID assumption, as we did in the SBC case. We consider this reasonable because by increasing labor assumptions, we account for the possibility that a second visit to enlarge the 2-pair NID may be required in certain circumstances.

7. SAI Equipment

A Serving Area Interface (SAI) is the equipment in the loop network that connects feeder and distribution facilities. JA initially proposed a fill factor for SAI equipment of 90.3%, then adjusted this fill factor on rebuttal to 56% in response to criticism by Verizon that the SAIs modeled in HM 5.3 did not have sufficient capacity to terminate all feeder and distribution pairs. (JC/Mercer-Pitkin-Turner, 11/9/04, p. 118.) Verizon's model achieved an SAI fill factor of 42.3%, based on the distribution areas in Verizon's model. Since we are not using the Verizon model for costing purposes, Verizon's fill level is not relevant.

The JC's SAI fill factor results from modeling assumptions of 3.5 lines per residential living unit, and 2 lines per business. (JC/Mercer, 11/3/03, Exh. RAM-4, p. 41.) These are identical assumptions to those we adopted in the SBC UNE proceeding, although the resulting fill factor is lower than what we adopted for SBC because SAI sizes and clusters are unique to Verizon. We will adopt the inputs for HM 5.3 that lead to an SAI achieved fill of 56%, based on the changes presented by JC in their rebuttal version of HM 5.3.

E. Structure Sharing

"Structure sharing" refers to the modeling assumption that poles and conduit modeled in a forward-looking network may be shared with other utilities. It also refers to the assumption that even within one company's network, feeder, distribution, and interoffice facilities may share the same poles and conduit. In the cost models, a lower structure sharing percentage indicates less costs are borne by Verizon because more structure costs are shared with other utilities.

For its model, Verizon assumes that forward-looking structure sharing will match the levels that are reflected in its current network experience. (Verizon

Recurring Cost Testimony, 11/3/03, p. 55.) Specifically, Verizon assumes pole sharing reflects Verizon's actual inventory of poles it owns versus those it shares, and it assumes no sharing of buried placement costs based on its current experience. (*Id.*, pp. 54, 57.) In contrast, JC contend that state regulatory commissions and the general public may require more structure sharing among utilities in the future, to reduce costs and prevent disruptions from excavation and other construction. Thus, JC contend that on a forward-looking basis, Verizon's engineers will implement more structure sharing than Verizon's current network experience. (JC/Donovan, 11/3/03, pp. 54-55.) HM 5.3 also reflects sharing of structure between feeder and distribution cable by assuming a default value of 55% for sharing of feeder and distribution facilities. (*Id.*, p. 55.)

JC criticize Verizon's structure sharing assumptions as dramatically understated and merely invoking its embedded network. (JC/Donovan-Pitkin-Turner, 8/6/04, p. 146.) TURN also criticizes Verizon's structure sharing inputs for assuming there will be little opportunity to increase sharing percentages. TURN recommends the Commission look to structure sharing inputs used by the FCC in its Virginia Arbitration, noting both AT&T and Verizon accepted elements of the FCC inputs as reasonable in that case. (TURN/Loube, 8/6/04, p. 51.) Specifically, TURN recommends a 50% sharing assumption except in the three lowest density zones, where TURN recommends the Commission use the FCC inputs. (*Id.*, p. 52.)

In contrast, Verizon criticizes JC's structure sharing assumptions because they ignore Verizon's actual experience and rely on speculation by JC's witnesses. JC erroneously assume that all networks, including those of utility and cable providers, are rebuilt simultaneously, so that each provider would be ready and willing to share structure costs with the hypothetical new entrant in a

TELRIC model. Specifically, JC assume that other service providers will finance up to 75% of pole costs, up to two-thirds of Verizon's underground construction costs, and 75% of the cost to bury cable. (Verizon, 8/6/04, p. 63.)

In the SBC UNE decision, we found fault with the proposals of both SBC and the competitive carriers with regard to structure sharing input percentages. Instead, we found it reasonable to use the percentages relied on by the FCC for its Synthesis Model. (D.04-09-063, *mimeo*. at 210.) In this proceeding, Verizon has proposed structure sharing percentages that match its current network experience, whereas JC propose inputs based on assumptions on the amount of sharing in a forward-looking environment. After reviewing these inputs, we once again prefer to adopt a middle ground between Verizon's historical experience and JC's optimistic assumptions. TURN has suggested a 50% sharing assumption coupled with inputs used by the FCC in the Virginia Arbitration for the lowest density zones. Upon review, we find TURN's approach is overly simplistic and assumes more sharing of buried and underground plant than our SBC inputs. Further, it appears TURN's proposal does not exactly mirror all the Virginia Arbitration sharing inputs, just some of them.

We find it reasonable to use the structure sharing inputs we used for SBC in D.04-09-063, which are based on the FCC's Inputs Order, rather than TURN's interpretation of and modifications to the Virginia Arbitration. We find this approach a reasonable compromise to the other structure sharing proposals on the record.

With regard to intra-network structure sharing, we find that JC's assumption of a 55% sharing percentage between feeder and distribution networks is realistic on a forward-looking basis, and within the range of percentages adopted in other states and by the FCC. Verizon produced evidence

that only 12% of cable segments share feeder and distribution, and aerial sharing between feeder and distribution is no higher than 41.2%. (Verizon Loop Rebuttal, 11/9/04, pp. 150-52.) We do not consider Verizon's historical practice appropriate to use for TELRIC modeling purposes. As TURN notes, the 55% sharing assumption in HM 5.3 is based on evidence that 75% of feeder routes follow distribution routes. (TURN/Loube, 8/6/04, p. 55, citing JC/Mercer, 11/3/03, Attachment RAM-5, p. 56.) We adopted this percentage in the SBC UNE case and we continue to find it reasonable to assume that on a forward-looking basis, an ILEC would make efforts to maximize sharing on networks that it controls. We will adopt this assumption for our runs of HM 5.3.

In comments on the draft decision, Verizon criticizes the use of FCC sharing inputs, stating that only inputs based on California data are appropriate. We disagree. We are not precluded from using the FCC's national data on inter-utility sharing of poles, trenches and conduit for guidance. Verizon itself has used or referred to nationwide data for other input assumptions, such as DLC and switching costs, and it is reasonable for the Commission to use its discretion and look to other states for recent analyses of forward-looking practices, depending on the input involved.

F. Plant Mix

"Plant mix" assumptions refer to the percentages of aerial, buried, and underground plant assumed in the loop network.

Verizon contends HM 5.3 assumes a plant mix that could never be achieved in California because it assumes away the constraints faced by providers operating in the real world. (Verizon, 8/6/04, pp. 67-68.) According

to Verizon, JC rely on statewide ARMIS[34] data, then allocate it across density zones based on the opinion of JA's witness Donovan. Further, JC rely on averages of data dating back eleven years rather than more recent data. This results in JC understating the amount of underground facilities that could reasonably be expected on a forward-looking basis given new local ordinances that mandate "out-of-sight" placement of new telecommunications outside plant construction. JC's assumptions are counter to recent trends toward greater use of underground facilities throughout California. (*Id.*)

In response, JC note that Verizon erroneously assumes the HM 5.3 plant mix is based on eleven year old ARMIS data, as was proposed in the SBC case. JC clarify that in this proceeding, HM 5.3 plant mix assumptions are based on percentages that Verizon supplied to JC in discovery, and Verizon is attacking its own current data. (JC, 11/9/04, p. 59; JC/Donovan, 11/3/03, para. 112.) Furthermore, JC defend their plant mix inputs as recognizing that dense areas will have a higher percentage of underground structure. (JC/Donovan, 11/9/04, paras. 44-47.)

In the SBC proceeding, we used plant mix assumptions provided by SBC, noting that we were uncomfortable relying on HM 5.3 inputs based on eleven year old ARMIS data. Here, JC have updated the HM 5.3 inputs with current information from Verizon. Therefore, we find it reasonable to use JC's proposed plant mix assumptions in our run of HM 5.3.

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[34] ARMIS refers to the FCC's "Automated Reporting Management Information System" that was initiated in 1987 for collecting financial and operational data from the largest carriers.

G. DLC Costs

Both models assume a forward-looking design that incorporates digital loop carrier (DLC) electronics into the loop plant. The parties dispute the installation costs for DLC systems that serve as inputs to the TELRIC model.

In the SBC proceeding, the Commission found it could not rely on the DLC installation costs provided by SBC, nor those suggested by AT&T and MCI. Instead, the Commission based HM 5.3 inputs on an average of actual cost information provided by SBC for 50 recent DLC installations, 25 for remote terminals (RTs) and 25 for controlled environmental vaults (CEVs). (D.04-09-063, *mimeo*. at 180.)

In this proceeding, Verizon contends the DLC costs in HM 5.3 are understated because more DLC systems are needed if the network employs the IDLC technology. Furthermore, the DLC inputs in HM 5.3 assume labor costs that are too low, and ignore costs of site acquisition, site preparation, and testing. (Verizon, 8/6/04, pp. 59-61.) For example, Verizon notes DLC labor costs adopted in D.04-09-063 are four times higher than those assumed in HM 5.3. (*Id*., p. 72.) As an alternative, Verizon develops an average DLC installation cost per dollar of material investment based on data from DLC installations it has performed over a two year period from its nationwide footprint. (Verizon, 11/9/04, p. 77.) It then confirmed this average cost based on a sample of 17 recent Verizon California DLC work orders. (*Id*.) Verizon proposes replacing the DLC and SAI costs in HM 5.3 with inputs based on these average costs. (Verizon/Tardiff-Murphy-Dippon, 11/9/04, Attachments TMD-8 and 9.)

JC deny Verizon's claim that an IDLC assumption requires the installation of more DLC systems. (JC, 11/9/04, p. 55.) In addition, JC respond that its DLC installation cost inputs are reasonable because they are based on a bottom-up approach that identified the engineering labor for each type and size of DLC

configuration, similar to the approach used by the FCC for its Synthesis Model. (JC/Donovan-Pitkin-Turner, 8/6/04, p. 126.) JC contend Verizon's witness Richter exaggerates the complexity of DLC installation by customizing each installation at a higher cost and inflating the length of time for each installation project. For example, Verizon bases cost estimates on the total days it might take to get an engineering document processed through a department rather than the actual engineering review time. JC's witness Donovan contends that standardized DLC installations can be installed more quickly and efficiently, and the actual install time is much lower than the padded wait times Verizon has assumed. (JC/Donovan, 11/9/04, pp. 73-75.)

Moreover, JC maintain Verizon's DLC cost inputs based on its nationwide sample are flawed. Specifically, they charge Verizon has created "linear loading factors" that are multipliers applied to material costs. Hence, Verizon's approach inappropriately assumes installation costs increase proportionately with material cost increases. (JC/Donovan-Pitkin-Turner, 8/6/04, p. 121.) Further, JC contend Verizon's analysis inappropriately relies on embedded data and piece-meal replacement projects rather than new installations and larger-scale projects that are customarily associated with a TELRIC study. (*Id.*, pp. 122-125.) With regard to Verizon's California sample of DLC costs, JC maintain Verizon developed its cost factor using the wrong type of DLC equipment. (*Id.*, p. 129.)

We do not find it reasonable to rely on Verizon's proposed DLC installation costs. Verizon's costs rely on the assumption that installation cost is directly related to material cost, and we do not find this a reasonable assumption. Moreover, JC have pointed out numerous other pitfalls in Verizon's DLC cost factors, leading us to question whether these factors are based on the correct equipment and appropriate projects. We are also wary of Verizon's contention

that the use of IDLC technology requires installation of more DLC systems. We did not find it necessary to increase the number of DLC systems modeled in the SBC case even though we assumed the use of IDLC technology there. Further, JC have presented reasonable arguments that unbundling over IDLC is unlikely to require the installation of additional DLC systems.

On the other hand, we will not rely on the DLC cost inputs proposed by JC for HM 5.3. In the SBC case, we found that HM 5.3 inputs assumed least cost installation scenarios that were below SBC actual costs for a sample of 50 recent installation projects. Given that similar or lower inputs are proposed in this case by the same witness,[35] we find it more reasonable to use the actual costs developed in the SBC case as a proxy for forward-looking DLC installation costs. We find this a reasonable approach because SBC and Verizon are similarly-sized ILECs operating in the same state and, thus, facing similar labor and other local installation costs. Although Verizon provided national data on DLC installation costs, the flaws in its analysis enumerated by JC dissuade us from relying on Verizon's loading factors. Because SBC operates in the same California labor market as Verizon, we find SBC's installation costs present a reasonable proxy. Therefore, we will use the DLC installation cost inputs from D.04-09-063 in our run of HM 5.3.[36]

In comments on the draft decision, Verizon claims it is arbitrary and capricious for the Commission to use SBC's DLC costs rather than Verizon's own national data. (Verizon, 12/14, 05, pp. 8-10.) The decision was augmented to

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[35] See JC/Donovan, 11/9/04, Attachment JCD-REB-14.

[36] Remote terminal costs are $22,814 per site and controlled environmental vault installation costs are $49,569 per site. (D.04-09-063, *mimeo*. at 180.)

explain why we found Verizon's analysis using national data flawed and why it is reasonable to use data from a similarly situated California carrier.

A secondary issue related to DLC costs involves Verizon's claim HM 5.3 misallocates DLC costs to DS-1 service based on the relative space occupied by the DS-1 plug in unit, rather than the relative proportion of circuit capacity used. (Verizon, 8/6/04, p. 60.) As a result, Verizon contends HM 5.3 subsidizes DS-1 service by shifting costs away from DS-1 loops onto basic loops. (*Id*.) JC respond that Verizon proposes shifting DLC costs to DS-1 from basic loops using a voice grade equivalent (VGE) approach that assigns costs based on capacity used rather than space for the equipment. JC maintain this VGE approach was rejected by the Commission in the SBC UNE proceeding. (JC, 11/9/04, p. 56.) We agree with JC that the VGE approach to DLC cost allocation was rejected when setting UNE rates for SBC. (*See* D.02-05-042, *mimeo*. at 26-28.) For consistency, we will not use Verizon's proposed VGE method here either.

H. Labor Costs

A critical input in TELRIC modeling exercises involves the forward-looking cost of labor to install, operate and maintain the network. Labor costs are generally manifested in TELRIC models through hourly wage rates and assumptions regarding crew size and the time it takes to perform a given task. We now address the key criticisms of the labor cost assumptions in HM 5.3.

Verizon claims HM 5.3 understates labor costs by relying on the expert judgment of JC's witness Donovan without backup documentation or other explanation of the derivation or reasonableness of the proposed inputs. Verizon questions why Donovan used his opinion and quotes from outside vendors spread throughout the country when Verizon-specific data was available. (Verizon, 8/6/04, pp. 30-31.) Verizon alleges the resulting HM 5.3 labor inputs

do not remotely resemble values that actual carriers operating real world networks can attain. For example, Verizon contends HM 5.3 undersizes the crews necessary to install network equipment and assumes they can achieve unrealistic productivity levels, particularly for cable placement and splicing. (*Id*., p. 70.) Moreover, Verizon asserts JC's witness Donovan misuses data from Verizon's Engineering Construction Records Information System (ECRIS) database, which is the system Verizon uses to estimate construction costs. Verizon contends Donovan inappropriately looks at crew sizes for discrete tasks rather than an entire placement project. (Verizon, Richter Surrebuttal, 1/28/05, p. 6.) In addition, Verizon complains HM 5.3 labor cost inputs are reduced from prior versions of HM, without sufficient justification for the assumption that labor costs in California have declined. (*Id*., p. 71.)

JC respond that Verizon unfairly attacks Donovan's use of expert judgment when Verizon's own modeling inputs rely to a significant degree on the undocumented opinions of "subject matter experts." (JC, 11/9/04, p. 60.) Further, JC claim that Verizon's witness Richter misinterprets and selectively uses ECRIS data to support his contentions that JC's HM 5.3 inputs are inadequate. (JC/Donovan, 11/9/04, pp. 64-65.) In contrast, JC's analysis shows that non-selective use of ECRIS data affirms HM 5.3 inputs. (JC, 11/9/04, pp. 60-61.)

In the SBC proceeding, the Commission chose to substitute SBC's fully loaded hourly wage rate, wherever possible, rather than rely on the opinion of AT&T and MCI's witness Donovan regarding wage rates. Thus, SBC hourly wages were used for cable installation, SAI investment, and terminal and splice investment. (D.04-09-063, *mimeo*. at 216.) The Commission also agreed with SBC that certain crew size assumptions in HM 5.3 were understated. Therefore, crew

sizes for cable installation were increased, although crew sizes for splicing and NID installation were not modified. The Commission accepted Donovan's assumptions regarding time estimates for installation activities such as cable installation per day and splicing time. (*Id*.)

In this proceeding, we are relying on the same model we used in the SBC case, and JC have proposed labor inputs similar to, and in some cases lower than, those we modified in D.04-09-063**.** For example, JC proposed lower hourly engineering labor rates, and lower total labor costs for pole labor and DLC vaults. (JC/Donovan, 11/9/04, Attachment JCD-REB-14.) It is not reasonable to rely on JC's proposed HM 5.3 labor inputs when we found similar, and sometimes higher, inputs unsatisfactory in the SBC case. Specifically, since we increased crew sizes in the SBC case and used a higher hourly wage rate, we should do the same here. The reasonable approach would be to modify the hourly wage rate similar to our modifications in the SBC case, using a fully loaded hourly wage rate supplied by Verizon. Unfortunately, Verizon's model does not provide us with a fully loaded hourly wage rate. Instead, it uses factors for labor costs. Verizon, however, attempted to transform its model inputs and translate them into an alternative set of selected inputs for HM 5.3. (Verizon/Tardiff-Murphy-Dippon, 11/9/04, p. 26.)

Without accepting all of Verizon's proposed labor changes, we can use certain categories of Verizon's alternative inputs for our run of HM 5.3. In particular, we will use Verizon's proposed labor inputs for installed copper and splice, installed fiber and splice, installed poles and spacing, SAI investment, installed manhole, pullbox and spacing, and drop and NID. (*Id*., Attachment

TMD-8.)[37] We find it reasonable to use these inputs provided by Verizon, based on the labor costs it used in its own model, and run HM 5.3 with these changes. By using these suggested inputs, we are in effect modifying the labor rate and crew sizes in HM 5.3 similar to our modifications in the SBC case. Therefore, we will run HM 5.3 with the labor inputs suggested by Verizon in TMD-8 and 9 for the categories listed above.

Finally, we will not rely on references to Verizon's ECRIS data for crew size or other labor information. We find the selective presentations made by the witnesses on both sides do not provide a sufficient basis on which to make an informed decision.

In comments on the draft decision, Joint CLCs criticize the Commission's use of Verizon's proposed HM 5.3 labor inputs as inappropriate for several reasons. First, Joint CLCs claim the inputs increase both labor and material costs even though the decision only discusses the intent to make labor cost changes. Joint CLCs maintain that using these inputs "smuggles" much higher materials costs into the HM 5.3 model, often higher than material inputs used in the SBC proceeding, without any discussion or justification and without adequately describing how these inputs were developed. (Joint CLCs, 12/14/05, pp. 2-8.) Second, Joint CLCs claim Verizon presented these inputs as rebuttal to a TURN

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[37] In using Verizon's labor inputs, we had to adjust cable prices in HM 5.3 to avoid double counting. HM 5.3's labor inputs were zeroed out and its cable material cost inputs were replaced with Verizon's combined cable material and labor inputs. Joint CLCs comment that using Verizon's cable inputs inappropriately changes all cable to 24-gauge size. (Joint CLCs, 12/14/05, p. 6.) Verizon responds that its cable gauge assumptions avoid maintenance problems and do not limit deployment of advanced services. (Verizon 12/21/05, p. 9.) We find Verizon's cable gauge assumptions reasonable and we will use them.

proposal, and never recommended their use to set UNE rates. (*Id*., p. 4.) Finally, Joint CLCs maintain that using these inputs, which were only introduced to highlight alleged flaws in TURN's inputs, imports the flaws of Verizon's model into HM 5.3. (*Id*., pp. 8-12.) TURN joins in criticizing the use of Verizon's labor inputs to HM 5.3 and suggests revisions to remove inflated material costs for poles, NIDs, drops, copper manholes and pullboxes. (TURN, 12/14/05, pp. 6-8.)

Verizon defends the Commission's decision to use inputs Verizon presented in rebuttal testimony, stating Verizon criticized material and labor inputs and it is appropriate for the Commission to revise both. (Verizon, 12/21/05, p. 2.) Verizon disagrees that it "smuggles" revised material costs into the inputs, stating its filings present separate material and labor inputs for various inputs, and its HM 5.3 inputs are based on the material and placement costs shown in the VzLoop model. Verizon contends its inputs are based on its actual contracts for installation labor costs which are documented on the record of the proceeding and are superior to generalized labor rates, crew sizes, and activity times assumed by JC's witnesses. (Verizon, 12/21/05, p. 3.)

We have made minor modifications to the labor inputs based on comments. We acknowledge the criticism of Joint CLCs that using Verizon's HM 5.3 inputs modifies material as well as labor costs. We were aware of this with regard to cable materials, but apparently the effect was more widespread than we initially understood. In comparing the various options, we find it preferable to use Verizon's inputs, even though they bring with them some material cost changes, because they are based on Verizon specific information from its contracts rather than the speculation of JC's witnesses. We find it preferable to use Verizon specific information for labor costs, even if the inputs come with some material cost increases, in lieu of speculative information offered by JC.

This type of modeling adjustment is within our discretion and parties had adequate notice the Commission would adjust modeling inputs and assumptions. The fact that some inputs were pulled from rebuttal testimony does not limit our ability to use them, just as we use JC's DS-3 and interoffice modeling inputs from rebuttal filings in Section VI.K below. TURN suggests revisions to remove allegedly inflated material costs from Verizon's rebuttal inputs. We have made the changes TURN suggests to poles, NIDs, drops, copper manholes and pullboxes.

I. Cross-over Point and Maximum Copper Loop Length

The cross-over point refers to the feeder route length at which fiber feeder facilities become less costly than copper feeder. In the SBC UNE case, we modeled a cross-over point from copper to fiber at 12,000 feet. (D.04-09-063, *mimeo*. at 218.) In other words, we ran HM 5.3 assuming copper feeder loop segments longer than 12,000 feet convert, or "cross-over," to fiber after 12,000 feet. We find no reason to deviate from this modeling approach and we will employ 12,000 feet as the cross-over point in our model run of HM 5.3 in this proceeding.

The parties also dispute the maximum copper loop lengths in HM 5.3. According to Verizon, copper loops in excess of 12,000 feet are not consistently capable of supporting many services such as DSL, and longer loops introduce inefficiencies into the provisioning process. (Verizon, 8/6/04, p. 41.) Verizon claims that an 18,000-foot loop, as modeled in HM 5.3, cannot provision all the UNEs at issue in this proceeding and would present compatibility problems by not adhering to industry equipment standards. (*Id.*, p. 42.) JC maintain that a limitation of 12,000 feet is unnecessary for the UNEs modeled in this proceeding and inefficiently increases loop costs. (JC, 8/6/04, p. 60.)

In the SBC UNE proceeding, we resolved this same dispute by finding that FCC rules require a TELRIC model to design a network that assumes the provision of other ILEC services. (*See* 47 C.F.R. Section 51.505(b).) Therefore, we ran HM 5.3 for SBC with a maximum copper loop length of 12,000 feet. For the same reasons, our run of HM 5.3 will use the same modeling assumption of a 12,000 foot maximum copper loop length.

J. Switching Inputs

1. Price per Line

In modeling forward-looking costs for the unbundled switching UNE, HM 5.3 uses as an input the cost of switching investment on a price per line basis. The price per line depends on the vendors from whom switches are purchased and whether the lines relate to new switch installations or growth to existing switches.

JC's witness Pitts develops a price per line based on information provided by Verizon California regarding its actual switch purchases for new lines and growth hardware. Pitts also includes a "switch installation multiplier" that accounts for additional investment associated with the main distribution frame, power, ILEC engineering and installation costs, and sales tax. (JC/Pitts, 11/3/03, pp. 4-5.)

Pitts claims her analysis is conservatively high because it is based on switch purchase data from the 1996 and 1998 time frame that most likely overstates costs compared to current switch prices. Further, the information relates solely to digital circuit switching, thereby failing to reflect the economies of forward-looking packet switching technology. (*Id.*, p. 16.) Pitts explains that she analyzed the percent of remote switches and host or standalone switches in Verizon's California network to calculate a melded new host/standalone-remote

price per line for new switch lines. She then takes this result and melds it with price estimates for growth lines to arrive at a melded new/growth price per line. (*Id.*, p. 11.) Pitts assumes 92.6% of lines purchases are new, while 7.4% of line purchases are for growth. (*Id.*, p. 13 and Attachment CEP-6.) Pitts contrasts her assumptions with what she considers Verizon's unreasonable assumption that 100% of switch lines are purchased at the growth price. (JC/Pitts, 8/6/04, p. 2.)

Not surprisingly, Verizon counters that Pitts's assumption that 92.6% of switches will be purchased at the discounted "new" switch price is unrealistic. According to Verizon, it would not be able to purchase virtually its entire switching network at the new switch discount because vendors only offer the new switch discount for a small portion of lines, expecting carriers to purchase a larger percentage of growth additions at relatively higher prices. (Verizon, 8/6/04, p. 73.) Verizon suggests it is more realistic to assume 64% of switching equipment is purchased at growth prices, and 36% is purchased at new prices based on Verizon's actual switch purchases from 1997 through 2002. (*Id.*, p. 74.)

Similar to JC, TURN disagrees with the high percentage of growth lines assumed in Verizon's switch cost studies. TURN proposes the Commission rely on the analysis of the FCC's Wireline Bureau in its Virginia Arbitration order, where it assumed new line installations at 88% and growth additions at 12%. (TURN, 8/6/04, p. 46.)

In the SBC case, we found that HM 5.3 had assumed too high a percentage of lines could be purchased at the new switch discount. In both D.99-11-050 and D.04-09-063, the Commission frowned on the assumption that switch vendors would sell over 90% of the lines needed for a forward-looking network at the discounted "new" switch price that is offered to large incumbent carriers such as SBC and Verizon for only a small percentage of purchases. (D.09-4-09-063,

mimeo. at 223.) For SBC's UNE switching prices, we found it reasonable to rely on a mix of new and growth lines that included a higher percentage of growth line purchases to reflect that in a forward-looking environment, a carrier would not be able to purchase all of its switches at the new line discount and would incur upgrade and growth costs. (*Id*.) Thus, we ran HM 5.3 in the SBC case using a weighting of new and growth lines based on SBC's actual purchases over a recent five year period. (*Id*.)

For the same reasons discussed in the SBC UNE case, we will not adopt Pitts' assumption that over 90% of switch lines can be purchased at the new switch discount. Instead, we will use the mix of new and growth purchases that Verizon has shown in the last five years, which is the same measure we used for SBC. We prefer to rely on actual switch purchase information rather than the assumptions of either JC or TURN that the majority of lines will be purchased at a highly discounted price. Thus, based on Verizon's information, we will apply a mix of 36% new and 64% growth purchases. This mix of new and growth purchases will then be applied to the prices per line that Pitts has developed in her testimony. Although we will not use Pitts' recommended mix of new and growth purchases, we find Pitts' price per line methodology logical and reasonable to rely on, in contrast to the price per line developed from the Verizon model.

Our rationale for not using the Verizon switching models is discussed at length in Section V.A.5 above, but a key reason we will not use Verizon's price per line is that it is dominated by GTD-5 switch costs, and we have found the GTD-5 is not a forward-looking switch. Specifically, Verizon's switching cost studies assumes a mix of 63% GTD-5 switches, 22% Lucent supplied switches, and 15% Nortel switches. (Verizon Switching Rebuttal, 11/9/04, p. 23.) In

contrast, Pitts uses only a mix of Lucent and Nortel switches to match the switch purchase data provided by Verizon. We find the assumed mix of Lucent and Nortel switches more reasonable.

Finally, with regard to switch feature pricing, JC's witness Pitts contends the switch prices she used in her modeling include feature-specific hardware costs. Thus, feature costs are included as part of the switching port cost. (JC/Pitts, 11/3/03, p. 8.) We find this explanation satisfactory and for this reason, we will not set individual feature prices.

In comments on the draft decision, TURN contends the FCC rejected Verizon's switch purchase assumptions in favor of the assumption of 88% new switch purchases and 12% growth. (TURN, 12/14/05, p. 9.) TURN also notes that prices for circuit switching has dropped precipitously with the introduction of packet switching. Verizon responds that TELRIC circuit switching costs should not depend on the cost of a new technology that is not required to be unbundled. (Verizon, 12/21/05, p. 10.)

We will not alter our determination to base the new/growth mix on data from Verizon's last five years of purchases. Although TURN alleges it is unjustified to assume a higher mix of growth purchases than new switches, we find it unsupported to assume switch vendors would sell 88% of their switches at the new switch price that JC propose. Instead, we use the percentage mix from Verizon's recent purchase history coupled with prices developed by JC. This is intended to approximate the composite price that switch vendors would offer in a forward-looking environment based on the prices they offered in the past. Therefore, our approach is different from the Verizon proposal the FCC rejected.

Verizon comments that the draft decision errs by relying on the "switch installation multiplier" in HM 5.3. Verizon claims the multiplier is completely

undocumented and understates costs. Further, Verizon contends the Commission cannot rely on inputs from other states without sufficient evidence that Verizon has similar costs. We disagree with Verizon's claims. We find JC's witness Pitts provided adequate documentation of how she derived the multiplier, using data from the FCC's Synthesis Model. (JC/Pitts, 11/3/03, pp. 14-15.) Further, we are not limited to using only Verizon California inputs, particularly when witnesses demonstrate that Verizon's inputs reflect costs that are not forward-looking. (JC/Pitts, 8/6/04, pp. 59-63.) Verizon's stance is puzzling given its assertion the Commission should use nationwide DLC installation cost data rather than information from another California carrier. We have used Verizon's nationwide data for new and growth switch purchases, thus we see find it reasonable to use national data for the switch installation multiplier.

2. Rate Structure

JC propose a flat-rated port pricing structure as more representative of the way Verizon incurs switch costs. (*Id*., 3.) According to JC's witness Pitts, the current generation of end office digital switches has little or no equipment that can exhaust based on usage and the vast majority of switch costs do not vary with respect to minutes or usage. (*Id*., p. 19.) While earlier generations of analog and some digital switches did have switch processors that were limited and could exhaust their call processing capacity, the current generation of digital switches have processing capacity far exceeding the volumes that lines or trunks could generate. The current Lucent 5ESS can handle 2.5 million call completions per hour, and Verizon's data shows statewide average processor utilization is far below this level. Further, forecasted subscriber calling behavior on landline

switches is stable or declining. Thus is it not expected that the current generation of digital switches will exhaust. (*Id.*, p. 19-20.)

Verizon opposes the idea of a flat port rate, claiming Pitts ignores the fact that switches are engineered up front to avoid exhaust situations. (Verizon, 8/6/04, p. 76.) Verizon contends that switches are traffic limited and the design efforts to avoid exhaust should not be construed as evidence that costs are not usage based. (*Id.*) Moreover, Verizon argues that a flat switching rate violates the principle of cost causation by subsidizing competitors who target high usage business customers, allowing them to avoid usage charges, while competitors who supply low volume carriers will pay a higher flat rate than might otherwise be necessary. (Verizon, 11/9/04, p. 88.)

TURN agrees with Verizon in opposing a flat port charge rather than minute of usage charges. In TURN's view, network engineering has been driven by the needs of high volume users and it is reasonable to impose usage charges to recover the costs of providing excess capacity from those who most benefit from it. (TURN, 8/6/04, p. 48.)

In the SBC proceeding, AT&T and MCI made the same proposal for a flat monthly price per port to cover switching costs formerly collected in minute of use rate elements. In D.04-09-063, the Commission found that since switch costs incurred by SBC were set based on a flat price per line based on a 10-year usage forecast, and since it was unlikely SBC would exceed that usage forecast, it was reasonable to set switch rates on a flat per port basis. (D.04-09-063, *mimeo*. at 239-241.) In the SBC UNE case, we also retained a usage-based rate that interconnecting carriers could rely on, if needed, where interconnection contracts specified compensation for using another carrier's network, otherwise known as "reciprocal compensation." (*Id.*, p. 242.)

For the reasons articulated in D.04-09-063, and given JC's data showing Verizon's statewide average processor utilization levels and the low probability of switch exhaustion, we will adopt a flat-rated port pricing structure for Verizon as we did for SBC. As in the SBC case, we will run HM 5.3 to calculate usage rates for reciprocal compensation purposes. Those rates are shown in Appendix B.

K. High Capacity Loop and Transport Inputs

One particularly thorny area of cost modeling involves the inputs and assumptions relating to high capacity loops and interoffice transport. Verizon questions the JC's expert opinions on inputs for these portions of the HM 5.3 model. Specifically, Verizon maintains that the transport and high capacity loop modeling in HM 5.3 is premised on faulty engineering assumptions, unrealistic network designs, and inappropriate demand assumptions. (Verizon/Murphy, 8/6/04, p. 98.) For example, Verizon contends HM 5.3 overlooks the total demand associated with high capacity loops and the total volume of interconnection trunks. According to Verizon, total demand is essential to the proper sizing and design of high capacity loop and transport systems. (*Id*., pp. 97-100.) In addition, Verizon criticizes HM 5.3 for omitting certain optical equipment. (*Id*.) Finally, Verizon's own analysis indicates the interoffice ring architecture in HM 5.3 is insensitive to both demand and costs for fiber cable and electronics. (Verizon/Tardiff, 8/6/04, pp. 89-90.) Thus, Verizon questions whether the model truly optimizes the interoffice ring architecture when demand and material inputs are changed.

JC respond that Verizon misunderstands the approach used in HM 5.3 to derive interoffice demand and that HM 5.3 does include the proper optical interface equipment in the switches that are modeled. (JC/Mercer-Pitkin-Turner,

11/9/04, pp. 169-171.) In response to the charge HM's ring architecture modeling is flawed, JC maintain Verizon's analysis is based on the faulty assumption that the architecture will change when demand changes. JC contend the predominant costs in the ring architecture are not subject to variation based on demand. (JC, 11/9/04, p. 70.)

Many of the identical criticisms were made in the SBC UNE proceeding with regard to the modeling of transport and high capacity services. There, we found flaws with HM 5.3 interoffice transport and DS-3 loop rates and were unwilling to rely on them solely to set SBC's UNE rates. (D.04-09-063, *mimeo*. at 100.) Indeed, we found that for DS-3 related UNEs, HM 5.3 inexplicably yielded cost results higher than those requested by SBC. Therefore, we adopted SBC's proposed rates for DS-3 related UNEs. (*Id*., p. 245.)

In this proceeding, our early efforts to run HM 5.3 also indicated inexplicably high cost results for DS-3 loops and interoffice transport, more than double the DS-3 loop rates adopted for SBC in 2004. Specifically, our early run produced a DS-3 loop rate of $1352, compared to SBC's rate of $573. When we compared these results to the rates proposed by Verizon, we found Verizon had proposed even higher rates.

Although we used SBC's DS-3 loop rates as a fallback in the SBC UNE proceeding, we will not take a similar approach here. We will not rely on Verizon's transport and high capacity loop rates because JC's criticisms in this area convince us that would be unwise. First, JC contend that Verizon's methodology for transport and high capacity loop modeling does not reconstruct an efficient, forward-looking interoffice network. According to JC, Verizon relies on an over-simplified "capacity costing" approach that ignores the use of the most efficient technology and does not reflect the demand associated with a

properly sized interoffice network. (JC, 8/6/04, p. 61.) Second, JC allege Verizon's modeling results in proposed increases for transport and high capacity loop rates of as much as 451% over current rates. JC maintain any cost increases for these services are ludicrous given industry trends toward lower costs. (*Id.*, p. 62.) We agree that rate increases for transport and high capacity loops, as proposed by Verizon, are not in keeping with industry trends.

Given that we reject Verizon's modeling, and that HM 5.3 produces results that we consider unreasonable, we must consider modifying inputs in HM 5.3 related to high capacity loops and transport. Conveniently, the rebuttal version of HM 5.3, which we decline to use for our model run, contains updated inputs in this area. We can extract those updated inputs, examine them, and if reasonable, insert them into the version of HM 5.3 that we are using to set UNE rates.

JC provided several updated inputs in the rebuttal version of HM 5.3 in response to Verizon's extensive criticism of HM 5.3's high capacity and interoffice modeling. MCI contends these updated inputs are derived from data provided by Verizon to JC after the initial November 2003 cost filings in this proceeding. In MCI's motion requesting hearings, it describes four recommended input modifications to HM 5.3 based on data provided by Verizon. (MCI motion, 5/5/05, pp. 7-8.) MCI admits JC "inadvertently failed to describe" these changes in the rebuttal filing of HM 5.3. (*Id.*, p. 6.) While we do not accept any of the modeling revisions in the rebuttal version of HM 5.3, we can isolate these four updated equipment inputs and consider placing them into the earlier version of HM 5.3. MCI enumerates four input categories, but we will only consider changing the first two input categories MCI describes which relate to revised equipment costs. The two input categories we consider are (1) revised

prices for SONET multiplexer and Digital Cross-Connect (DCS) equipment based on current Verizon supply contracts, and (2) a revised input fraction for interoffice circuits requiring inter-ring connections based on Verizon's data for interoffice equipment costs.[38] Verizon responds that these input changes were not adequately described in JC's rebuttal testimony and should be stricken. (Verizon response to MCI motion, 5/24/05, p. 3.)

While we are troubled that JC did not provide a more detailed description of these input changes in rebuttal testimony, we find that the changes were made in response to Verizon's criticisms of HM 5.3 high capacity and interoffice transport modeling. Further, the input changes are based on updated equipment price information provided by Verizon to JC, and which JC did not receive in time to use in its initial cost filings. In using these revised inputs, we do not accept any of the modeling or algorithm revisions in the rebuttal version of HM 5.3. Rather, we merely substitute updated equipment cost inputs, provided by Verizon, into the initial HM 5.3 model. We find the revised inputs reasonable and filed in response to Verizon's criticisms. We adopt these modified inputs for our HM 5.3 model run. When these modified inputs are inserted into our adopted version of HM 5.3, the resulting DS-3 loop rate is $ 592.73. This result compares favorably to the DS-3 loop rate of $573 adopted for SBC. While we are not able to adjust all aspects of the HM 5.3 interoffice transport modeling and address all of the concerns cited by Verizon, we will use the HM 5.3 results for interoffice transport and high capacity loops because it is appropriate to use one model throughout for consistency in inputs and assumptions.

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[38] MCI motion, 5/5/05 p. 7-8, and HM 5.3 Rebuttal version, 11/9/04, Switching IO Module, Tandem and STP investment worksheet, cell P30.

In comments on the draft decision, Verizon contends use of these updated inputs violates due process because the changes were submitted on rebuttal and cherry-picking input changes from the rebuttal version is arbitrary and capricious. Verizon contends it was denied discovery and hearings on these input changes. (Verizon, 12/14/05, pps. 10-11.) Furthermore, Verizon alleges that in using these inputs, the Commission inappropriately excluded installation costs relating to these inputs. (*Id.*, pps. 12-13.)

XO/Cbeyond respond that the input changes in dispute are based on Verizon's own contracts as reflected in Verizon's own cost study. The JC rebuttal filing containing these inputs provides precise references to Verizon's own cost study as the source of the input changes. (XO/Cbeyond, 12/21/05, p. 7.) Moreover, XO/Cbeyond claim the inputs include installation costs as shown in JC's rebuttal testimony. (*Id.*, p. 8 citing JC/Donovan, 11/9/04, Exh. JCD-REB-14, "Input Tables for HIP" tab, cells D455:F466.)

We disagree with Verizon's claim of a due process violation. The inputs at issue were provided in rebuttal based on Verizon's own cost data and in response to Verizon's criticism of HM 5.3. While description of these input changes was not provided, cites were provided indicating Verizon as the information source. Again, we emphasize that we are not relying on any new modeling algorithms or formulas in accepting these inputs. We merely substitute these cost inputs for those in the initial HM 5.3 filing because they represent the newest cost information for Verizon based on actual Verizon data. Verizon does not dispute that this is its actual cost information, although it claims installation costs were removed. After review, we find that installation costs are included in these inputs and we can use them.

While Verizon has not been granted hearings or additional discovery to further litigate these inputs, it has been given the opportunity to comment on their use. Indeed, Verizon defends our use of changes it presented on rebuttal to labor rates. (Verizon, 12/21/05, p. 5.) We see little difference between the updated labor inputs and updated DS-3 cost inputs, both provided on rebuttal, and continue to believe that use of either is appropriate in this proceeding. Moreover, the Commission frequently exercises discretion in choosing modeling inputs as long as they are reasonable and supported by the record.[39] Verizon should not be surprised the Commission is now choosing from competing modeling inputs since the Commission's modeling criteria specifically required that "cost studies must allow parties to modify inputs and assumptions." (*ALJ's Ruling Revising Schedule*, 7/23/02, p. 4.)

Although we will rely on HM 5.3 interoffice transport modeling, we will use the rate design suggested by Verizon for these UNE rate elements. JC proposed flat-rates rather than per-mile charges for all interoffice transport UNEs. According to JC's witness Mercer, since interoffice circuits are now implemented on rings rather than as point-to-point circuits, there is only an indirect relationship between the air distance and the route miles required to provide the circuit. (JC/Amended Declaration of Mercer, 2/6/04, para. 60.) Verizon modeled these UNEs with a fixed plus a per-mile rate component.

In the SBC UNE proceeding, we adopted rates that were a blend of fixed and per-mile charges. Here, we are using the same model that we used to set

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[39] *See* D.04-09-063, mimeo at 249, which describes how "…the initial Proposed Decision exercised a great deal of judgment in reviewing the models' flaws, correcting them where possible, and selecting numerous modeling inputs."

SBC's UNE rates. We are not persuaded to suddenly shift to a flat rate design for interoffice transport UNEs, particularly when the ring architecture assumed in both proceedings is largely the same. Verizon's proposal is similar to the rate design we adopted in the SBC proceeding, and we prefer to keep a somewhat consistent rate design for these rate elements.

L. Miscellaneous Adjustments to HM 5.3

In addition to the input modifications already discussed, we made other minor adjustments to HM 5.3 based on our familiarity with the model from the SBC UNE proceeding. These minor modifications were made to mirror changes we made to HM 5.3 in setting SBC UNE rates, and described in D.04-09-063. The changes are the following:

- Pole Spacing—we modified HM 5.3 to assume pole spacing of 150 feet for all density zones of the distribution network. (D.04-09-063, at 125.)
- Drop Terminal—we modified HM 5.3 to assume 85% buried drop terminals and 15% aerial. (*Id.*)
- Switch Fill—we adjusted the switch port administrative fill to 82%. (*Id.*)

In comments on the draft decision, Joint CLCs claim the draft erred by ignoring the pole spacing testimony of JC's witness Donovan. (*See* JC/Donovan 11/9/04, pp. 45-50.) Verizon responds that its witness Richter showed the spacing suggested by Donovan does not meet safety guidelines. (Verizon/Richter, 8/6/04, p. 38-39.) Our decision to use a pole spacing assumption of 150 feet does not mean that we find Verizon's witness more credible than JC's witness. Both witnesses present credible arguments that pole spacing depends on the weight of the cable and the height at which cable is attached to the pole. Both witnesses have the relevant qualifications to express opinions on this topic. Rather than dissect each distribution area for cable weight

and pole height requirements, we prefer to use a blanket assumption of 150 foot pole spacing throughout the model as a conservative measure. We realize this may inflate pole costs to some extent, but it avoids analyzing each modeling segment to ensure safety guidelines are not violated.

Regarding Drop Terminal, TURN comments that Commission staff erred in its model run of HM 5.3 by altering the buried drop *sharing* fraction rather than the buried drop *structure* fraction. (TURN, 12/14/05, p. 6.) We have corrected this error in the final decision.

M. Shared and Common Cost Markup

TELRIC based UNE prices are designed to recover both the costs directly attributable to UNEs and a "reasonable measure" of forward-looking overhead costs. (FCC First Report and Order, para. 336.) Thus, a critical component of final UNE rates is an adder to recover overhead costs. This overhead component has come to be known as the "shared and common cost markup," or simply "markup." It is generally a percentage added to TELRIC costs to recover costs attributable to a group of UNEs but not specific to any one UNE, as well as costs that are common to all outputs offered by the firm. (*See* D.95-12-016, Appendix C.)

Verizon proposes a markup of 14.5 %, which is comprised of a 9.08% common overhead loading, a 1.68% marketing loading, and a 3.25% other marketing support loading. (Verizon/Jones, 11/9/04, p. 72.) These loading percentages are derived from various categories of expenses in Verizon's general ledger. (Verizon Recurring Costs Testimony, 11/3/03, p. 148.) According to Verizon, 12.5% of total company costs were attributed to support and common costs and form the basis of the loadings it proposes. (Verizon/Jones, 11/9/04, p. 69, n. 109.)

JC claim Verizon's proposed markup exceeds direct costs to an unreasonable extent. Specifically, JC witnesses Brand and Menko claim Verizon's proposed overhead loadings are an unreasonably high percentage of the total expenses allocated to wholesale services. (JC/Brand-Menko, 8/6/04, p. 42.) JC provide corrections to Verizon's proposed cost studies revising the shared and common cost markup to 9.12%, only a slight increase from Verizon's proposed common cost markup of 9.07%. (JC, 8/6/04, p. 76.) Verizon rebuts JC's analysis by claiming Brand and Menko base their calculations on the wrong set of numbers and mischaracterize how Verizon develops its overhead cost loadings. (Verizon/Jones, 11/9/04, p. 68.)

TURN raises concern with the process Verizon uses to develop its proposed markup. Specifically, TURN comments that Verizon does not reduce its general support costs to take retail services into account. (TURN, 8/6/04, p. 41.) TURN also expresses concern with Verizon's method of forecasting overhead expenses based on current costs. TURN alleges that Verizon's method ensures Verizon will recover its current expenses no matter what is varied in the rest of the model. This fixed recovery does not allow corporate overhead to fluctuate as the network increases or decreases. (*Id., p*. 43.)

For HM 5.3, JC propose a markup of 8.93%. (JC/Brand-Menko, 11/3/03, para. 89.) They note this is comparable to the 8% markup adopted by the FCC's Wireline Competition Bureau in the Virginia Arbitration. (*Virginia Arbitration*, para. 143.) Moreover, they explain that this markup factor is not comparable to markup factors adopted in prior Commission UNE pricing proceedings because the costs to which HM 5.3 applies the markup already include a portion of costs that prior UNE cost studies recovered through the markup. In other words, HM

5.3 assigns more costs directly to UNEs, leaving fewer costs "left-over" to be considered overhead. (JC/Brand-Menko, 11/3/03, p. 42.)

JC forecast overhead costs based on the relationship between corporate operations expenses and total operating revenues less corporate operations expenses. They derive their markup using data specific to Verizon's California operations. (*Id.*, pp. 42-43.) JC's 8.93% markup excludes retail, non-recurring costs and other non-UNE costs. (*Id.*) JC also removed what it identified as extraordinary one time charges that were primarily merger related and not expected to recur in the future for an efficiently operating firm. (*Id.*, p. 48.)

Verizon asserts an 8.93% markup is grossly understated and calculates overhead expenses of about one-quarter Verizon's actual overhead expenses in 2003. (Verizon, 8/6/04, p. 81.)

We find JC have provided a more rational and coherent explanation of how they developed their overhead common cost markup. While Verizon describes the various cost categories it includes in its loadings, it then provides the generic statement that "the expenses are adjusted to make them forward-looking before they are used in the calculation of each loading." (Verizon Recurring Costs Testimony, 11/3/03, p. 148.) Verizon fails to provide an adequate explanation of this forward-looking "adjustment." Later, in the final round of comments, Verizon explains that 12.5% of its total company costs were used to develop the loadings, leading to a total markup of 14.5%. This leads us to wonder why Verizon's forward-looking overhead expenses would be higher than today's overhead costs. The answer might lie in the forward-looking adjustments that Verizon fails to adequately describe. Furthermore, if today's 12.5% of costs that cannot be attributed directly to UNEs was used as a proxy starting point for calculating a markup, the final markup should be lower than

12.5% once retail, non-recurring, and other non-UNE common costs are removed. As TURN notes, Verizon does not provide assurance that its common and support expenses are adjusted to remove retail service costs. Overall, we are not satisfied with Verizon's explanation of how it calculated its three loading factors that together form the 14.5% markup it proposes.

In contrast, JC's witnesses Brand and Menko give a thorough explanation of the data they used to calculate their 8.93% markup, using data specific to Verizon California. They also provide reasonable explanation and support for the adjustments they make to their data, primarily to reflect unique one-time merger expenses. Interestingly, the 8.93% markup proposed by JC is remarkably close to Verizon's proposed common cost loading of 9.08%, and similar to Brand and Menko's 9.12% restatement of Verizon's calculations. The chief difference between the proposals of Verizon and JC is that Verizon proposes its common cost loading of 9.08%, then it layers on two separate markup factors for "Marketing and "Other Marketing Support," for a total markup of 14.5%. Verizon fails to provide assurance that retail-related marketing and marketing support have been removed from its loadings. Therefore, we reject Verizon's proposals and instead rely on the analysis of Brand and Menko to adopt a common cost markup of 8.93%.

VII. Price Floors

A. Background

As part of this proceeding, the Commission must establish price floors for Verizon's Category II services, i.e., those retail services offered by Verizon that are partially competitive because Verizon retains significant, though perhaps declining, market power. (*See* D.89-10-031 ("NRF Decision"); 33 CPUC 2d 43 at 125.) Price floors were intended to prevent incumbent local exchange carries

such as Verizon from squeezing competitors out of the market by charging unreasonably low retail prices that deny a competitor purchasing inputs from the incumbent any reasonable opportunity to earn a profit.

The Commission's price floor methodology establishes minimum prices for the incumbent's retail services. These price floors recover what the incumbent charges competitors for any service components that the incumbent controls (referred to as "monopoly building blocks" or MBBs) plus all of the incumbent's relevant forward-looking costs for other components of the service. The requirement that price floors include the price of MBBs is known as the "imputation rule," which ensures that incumbents "impute" the price of any MBBs into the price of their own retail service just as if they purchased the MBB at the prevailing wholesale price. (33 CPUC 2d at 121.)

The Commission's original price floor formula was:

Price Floor = MBB price + LRIC of competitive elements of retail service[40]

The Commission developed an alternate version of this formula known as the "contribution formula," which is:

> Retail Service Price Floor = MBB contribution[41] + volume sensitive TSLRIC (of the retail service at issue)[42]

In D.94-09-065, the Commission found that the original formula and the contribution formula achieve the same result and are algebraically equivalent. (56 CPUC 2d 117, at 233.) In D.99-11-050, the Commission set price floors for

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[40] D.94-09-065 ("IRD Decision"), 56 CPUC 2d at 232.

[41] "Contribution" has been defined by the Commission as the TELRIC-based price of an MBB minus the volume sensitive TSLRIC of the MBB. (D.99-11-050, *mimeo*. at 207.)

[42] D.99-11-050, *mimeo*. at 267, Conclusion of Law 80.

SBC using the contribution formula and designated loops, switching and white page listings as MBBs. (D.99-11-050, *mimeo*. at 206-7.)

In D.99-12-018, the Commission granted interim pricing flexibility to GTEC for its Category II services, based on a methodology using GTEC's pending 1997 OANAD cost studies. Despite that decision, advice letters to implement Verizon's price floor proposals were unable to gain Commission approval. Finally, the Commission reexamined the interim pricing flexibility and implemented interim price floors for Verizon in D.03-03-033. In that order, Verizon requested, and the Commission approved, use of the volume sensitive TSLRIC figures in Verizon's 1997 cost study filing, along with updated UNE rates, in setting interim price floors. (D.03-03-033, *mimeo*. at 49-52.) The Commission found that because the interim UNE rates adopted in D.03-03-033 were significantly lower than the UNE costs and TSLRICs filed by GTEC in 1997, Verizon should substitute the new interim UNE rates and reduce the volume sensitive TSLRICs in the price floor formula by the same percentage that its current UNE rates are reduced. (*Id*., p. 52.)

In the sections that follow, we will first address a request by Verizon to modify the price floor formula. Following that, we will address the specific price floor proposals offered by the parties.

B. Petition to Modify MBBs

On April 1, 2005, Verizon filed a petition to modify the finding in D.99-11-050 that switching is an MBB.[43] Verizon states that the FCC's Triennial

[43] Verizon claims it has good cause for filing beyond the one year deadline in Commission Rule 47(d), because the change in law at the federal level in 2005 is sufficient reason to waive the one year time limitation for petitions to modify.

Review Remand Order (TRRO)[44] eliminated the requirement that ILECs provide competitors with access to unbundled mass market switching, effective March 11, 2005, based on the conclusion that CLCs are not impaired in the deployment of switches and it is feasible for CLCs to use competitively deployed switches to serve mass market customers throughout the nation. (TRRO, para. 204.) Given this finding, Verizon requests the Commission remove switching as an MBB for price floor imputation purposes.

Verizon supports its request by explaining the Commission used a four point standard to classify MBBs in D.99-11-050. A facility was deemed "essential," and thereby an MBB, based on:

1) Control of the essential facility by a monopolist
2) A competitor's ability practically or reasonably to duplicate the essential facility
3) The denial of the use of the facility to a competitor, and
4) The feasibility of providing the facility [to the competitor][45]

Verizon comments that when the Commission classified switching as an MBB, it explicitly recognized that "in time, this situation may change" based on growth in the number of CLC owned switches and greater access to collocation space. (*Id*., p. 237.) According to Verizon, the FCC's TRRO now finds switching does not meet the FCC's unbundling standard, citing a substantial increase in CLC switch deployment since 1999 and the conclusion that a lack of collocation space

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[44] *In the Matter of Review of Unbundled Access to Network Elements, Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers* (WC Docket No. 04-313, CC Docket No. 01-338); Order on Remand, FCC No. 04-290, (rel. Feb. 4, 2005) ("TRRO").

[45] D.99-11-050, *mimeo*. at 218.

does not hinder CLCs ability to deploy competitive switches because an efficient competitor does not have to be collocated in every ILEC central office to serve customers in that wire center. (Verizon Petition to Modify D.99-11-050, 4/1/05, pp. 3-4, citing TRRO paras. 205, 206, and 224.) Verizon argues that if switching does not meet the FCC's unbundling standard, it cannot meet the essential facilities standard used by the Commission in D.99-11-050. Therefore, the Commission should remove switching as an MBB from the price floor formula. (*Id.*, p. 4.) Verizon suggests this action will benefit consumers by removing artificial price umbrellas that inhibit robust price competition. (*Id.*, p. 7.)

SBC supports Verizon's petition, noting the Commission has already found that not all UNEs are MBBs because they are not "essential to local competition." (SBC Response, 5/2/05, p. 1, citing D.99-11-050, *mimeo*. at 221.) Thus, SBC asserts that the test for MBBs is stricter than the test for UNEs, and that nothing found to fail the UNE test can be an MBB. Thus, the circumstances that led the Commission to deem switching an MBB are no longer valid. (*Id.*, p. 2.)

ORA, TURN, Anew Telecommunications Corporation and Navigator Telecommunications (jointly Anew/Navigator) oppose Verizon's request. ORA and TURN recommend denial of Verizon's request, claiming not all affected parties have received notice and an opportunity to comment on the proposal.[46] Rather, the Commission should open a rulemaking with all companies operating

[46] According to Verizon, its petition was served on the service list for the Verizon UNE phase of OANAD where price floor issues are being addressed. Additionally, Verizon also served the parties in SBC's UNE Reexamination with its petition since that is the proceeding where SBC UNE issues have been considered on a going forward basis.

under the Commission's "New Regulatory Framework" (NRF)[47] as respondents to consider California-specific data regarding switching. There, the Commission can assess local competition in California and access to mass market switching. ORA and TURN contend there is no link between the FCC's determination that switching is no longer a UNE and this Commission's adoption of certain facilities as MBBs. (ORA/TURN, 5/2/05, p. 5.) Instead, MBB findings require a factual analysis of market conditions in California. They maintain that recent evidence from the Commission's staff report to the FCC on TRO issues indicates "no CLC is currently providing mass market service, at service quality similar to the ILECs', using switching that is a substitute to ILEC switching, in any wire center in California." (*Id.*, p. 9, citing the Commission's TRO Staff Report at 89.) Moreover, ORA and TURN assert the status of CLC switching will change drastically should acquisitions by SBC and Verizon of AT&T and MCI, respectively, receive approval. They estimate that the proposed mergers may remove as many as two-thirds of all CLC switches in the state. (*Id.*, p. 10.)

Anew and Navigator agree with ORA/TURN that before taking any action, the Commission must consider that current state of competition in California, particularly in light of the proposed mergers. They contend the TRRO assumes collocation is established, but in California permanent collocation provisions were never completed. Thus, CLC remain subject to the ILEC's interpretation of collocation obligations, including inconsistent application of collocation rates among CLCs. (Anew/Navigator, 5/2/05, pp. 8-9.) Anew/Navigator assert that federal law does not preempt the Commission's

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[47] The NRF-regulated companies are SBC, Verizon, Surewest Telephone and Citizens Telecommunications of California.

ability to identify local switching as an MBB, as long as such regulations are not inconsistent with the Act. (*Id*., p. 10-11, citing 47 U.S.C. Section 251(d)(3).)

Verizon responds that the FCC removed switching from the UNE list based on a comprehensive analysis of market data, therefore switching cannot meet the "essential facilities" test for MBB qualification. Furthermore, the Commission's TRO staff report used "a lopsided methodology proposed by MCI that 'screened out' some UNE-L competitors, including cable companies, in order to conclude that 'there are no markets (defined by wire centers) that contain at least three CLECs with self-deployed switches providing UNE-L mass-market service.'" (TRO Staff Report, 10/4/04, pp. 8 and 62.) According to Verizon, the TRO staff report was never endorsed by the Commission and was rejected by the FCC, which found a substantial increase in CLC switch deployment since 1999 and no operational impairment for CLCs with respect to availability of collocation space. (TRRO, para. 224 and n. 619.)

We find that given the FCC's TRRO findings regarding mass market switching on a nationwide basis, switching no longer meets the "essential facilities" test we relied on in D.99-11-050. As the FCC found, competitors have the ability to duplicate switching facilities to serve customers. Therefore, we shall remove switching as an MBB and no longer require UNE switching prices to be imputed into the price floor formula. We will not explicitly address SBC's argument that if an item is not a UNE, it cannot meet the MBB test. There may be circumstances where the Commission, based on circumstances specific to California, finds that a facility is essential to local service even if it is not a UNE.[48]

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[48] Indeed, the Commission has noted that "the [FCC's] First Report and Order makes imputation a matter of state law and regulation…" (D.99-11-050, *mimeo*. at 232-233.)

With regard to switching, however, the FCC's extensive record regarding competitors' ability to duplicate switching facilities leads to our finding that switching does not pass the MBB test.

We disagree with the proposals of ORA/TURN and Anew/Navigator to review California market conditions regarding switching and collocation. The FCC has only recently performed a comprehensive review of switching and we will not revisit those conclusions at this time. Finally, we find Verizon gave proper notice of its petition to modify and interested parties have had adequate opportunity to comment.

C. Price Floor Proposals

1. Verizon

Verizon's initial cost filing in November 2003 included cost studies to support the calculation of price floors, but did not include actual price floor proposals. Verizon planned to submit a compliance filing containing proposed price floors after the Commission adopted UNE costs from Verizon's cost model. At the ALJ's request in a ruling of February 3, 2004, Verizon submitted a supplemental filing on February 17, 2004 to calculate price floors for over 125 retail services. On April 2, 2004, Verizon submitted Supplemental Panel Testimony on Recurring Costs with what Verizon claimed were minor changes to its UNE and price floor cost studies.

Verizon's proposed price floors are founded on the price floor methodology described in D.99-11-050 and applied to SBC. The components of that methodology are the volume sensitive TSLRIC of the given retail service, the TELRIC-based UNE price of the three designated MBBs if they are relevant to the retail service in question, and the volume-sensitive TSLRIC of the relevant MBB so that contribution can be determined. (VZ Supplement on Recurring Costs,

4/2/04, p. 16.) Verizon's TSLRIC cost estimates come from a set of retail cost studies that are part of the VzCost model. The retail cost studies use many, but not all, of the same inputs and assumptions used by Verizon to calculate UNE costs and prices. In particular, the retail cost studies use a lower cost of capital than the UNE cost studies. (Verizon Price Floor Rebuttal, 4/1/05, p. 13.)

2. MCI

In contrast to Verizon's price floor proposals, MCI recommends the Commission treat all existing UNEs as MBBs. (MCI/Murray, 1/28/05, p. 39.) MCI calls this the "sum of the MBBs" approach and maintains it is simply the original price floor approach, adopted in D.89-10-031, updated to use forward-looking costs of competitively provided components of retail services. To implement its sum of the MBBs approach, MCI proposes price floors based on the UNE rates calculated by HM 5.3, although it modifies some of the inputs to include general support costs. (MCI/Bryant, 1/28/05, pp. 4-5.)

According to MCI, it is reasonable to expand the list of MBBs to all UNEs because the Commission's determination in D.99-11-050 that there are only three MBBs is over five years old. Moreover, the FCC has scrutinized its UNE list in recent years to ensure they are both necessary to compete against an incumbent and that competitors are impaired without access to them. (*Id.*, p. 39.) Finally, MCI contends its sum of the MBBs approach is consistent with D.04-11-022, in which the Commission reviewed price floors for SBC and specifically directed that UNE prices be used in determining the cost floor for basic service.[49]

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[49] *See* D.04-11-022, *mimeo*. at 6 and Attachment A at 1. MCI also cites Conclusion of Law 13 of D.04-11-022 which states:

Footnote continued on next page

3. AT&T

AT&T endorses MCI's approach to price floor calculations and asserts the Commission has the freedom to expand the list of MBBs beyond the three adopted in D.99-11-050. (AT&T, 4/1/05, p. 2.) AT&T supports MCI's interpretation of recent Commission action related to price floors, and notes that according to the Commission, price floor rules are fundamentally intended to ensure that "the prices charged to competitors" are included in the incumbents' rates. (D.04-11-022, *mimeo*. at 9-10.) Based on this quote, and the Commission's edict that "the UNE-P rate" must be used to develop the price floor for residential basic and business service, AT&T supports MCI's proposal to use UNE prices as the basis for Verizon's price floors. (AT&T, 4/1/05, p. 3.)

4. TURN

TURN supports use of the price floor methodology provided by JC witness Murray, but provides some modifications to the actual calculations based on updated inputs. (TURN, 4/1/05, p. 2.)

5. ORA

ORA alleges Verizon's price floor model suffers from the same maladies as the Verizon model devoted to UNE pricing. If the Commission cannot rely on Verizon's TELRIC cost studies for setting UNE rates, the use of Verizon's cost studies as a framework for setting price floors is questionable. (ORA, 1/28/05, p. 2.) According to ORA, Verizon's proposed TSLRIC price floors start from the same assumptions and inputs as Verizon's TELRIC model and flow through the

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To the extent an incumbent offers Category II services that use the UNEs with rates updated by D.04-09-063, the updated rates, including any add-ons as needed (e.g., service features and usages), should be used in the demonstration of cost recovery using the imputation rules.

Verizon model in a unified way until the TSLRIC calculations diverge from the TELRIC ones. Thus, any complications and problems with the UNE inputs and assumptions also affect the price floor outputs. (*Id.*, p. 12.)

In addition, ORA criticizes Verizon for proposing increases in price floors over their current levels, and far above the current price for residential flat rate service.[50] ORA claims it is not credible for Verizon to request a price floor increase when it has posted positive rates of return in the 12% to 20% range from 1997 to 2003. (*Id.*, p. 4.)

In lieu of using the Verizon model for price floor purposes, ORA recommends the Commission adjust the interim price floors set in D.03-03-033 based on the percentage difference between Verizon's interim UNE rates and the final rates adopted in this order. (*Id.*, p. 5.) Specifically, the Commission could adjust the volume sensitive TSLRIC figure in the price floor formula by the same percentage that its current UNE rates are adjusted, similar to the method used in D.03-03-033. (*Id.*, p. 22.)

6. Discussion

The debate over price floors centers on which methodology to use. Verizon seeks to apply the method used for SBC, but MCI disagrees with Verizon's price floor calculations, asserting Verizon has not implemented the contribution formula correctly and alleging numerous flaws and inconsistencies in the components of Verizon's price floor proposals. Specifically, Verizon's access, UNE, and retail studies are not consistent, use differing methodologies, and the direct costs of MBBs and the corresponding components of retail services

[50] While price floor calculations are proprietary, Verizon proposes a 129% increase in the price floor for residential flat rate service.

are not equal. (MCI, 1/28/05, p. 7.) As a result, the direct costs of MBBs in the Verizon UNE cost studies are generally higher than direct costs for the same functions in the retail cost studies. For example, Verizon's UNE cost studies use a higher cost of capital. Second, Verizon's retail cost studies reclassify many direct UNE costs as "shared," thus eliminating them from the retail cost studies.

Echoing the criticism by MCI, TURN contends Verizon's proposed price floors do not comply with forward-looking standards because Verizon has not properly calculated the TSLRIC component of the price floor formula. The VzCost model, which forms the basis of the TSLRIC retail cost studies, is flawed because it relies on embedded network design, includes embedded expenses, includes non-incremental portions of the network, and fails to develop service-specific retail costs. (TURN, 1/28/05, p. 2.)

In contrast to Verizon's approach, MCI suggests a new methodology where all UNEs should be converted into MBBs. Verizon implies MCI suggests this approach because HM 5.3 cannot support the traditional price floor formula. Specifically, HM 5.3 cannot identify the volume sensitive TSLRIC costs associated with retail services. Thus, the only price floor methodology that HM 5.3 is capable of implementing is the "sum of the UNEs" method that the Commission expressly rejected in D.99-11-050 on the grounds that simply adding UNE prices "results in price floors which include far more shared and common costs than any firm in a competitive environment would have to bear..." (Verizon, 4/1/05, pp. 3-4, citing D.99-11-050 *mimeo*. at 210.) Rather, D.99-11-050 found only three UNEs qualify as MBBs, namely loop, port, and white page listings. In Verizon's view, MCI inappropriately asks the Commission to disregard D.99-11-050. Furthermore, the MBB list should not be expanded at the

same time that the FCC is reducing the number of UNEs. (*Id.*, pp. 8-9, citing TRRO, para. 204.)

With regard to D.04-11-022, Verizon contends its conclusions do not override D.99-11-050 and render the contribution method obsolete. The explicit focus of D.04-11-022 was to maintain consistency with the principles of IRD and its progeny. (*Id.*, p. 7, citing D.04-11-022 *mimeo*. at 4.) In other words, the only prices to competitors that should be included in price floor calculations are for those functions deemed to be MBBs, not all UNEs as MCI suggests.

ORA does not support the MCI approach of using the "sum of the UNEs" to calculate price floors, contending the Commission should have a more thorough record before changing price floor methods and should examine a "sum of the UNEs" approach for all NRF ILECs at the same time. ORA proposes a separate rulemaking or investigation for this purpose. (ORA, 4/1/05, p. 20.)

Quite simply, there are few good options before us. Theoretically, we could choose to mirror the price floor methodology and formula we used when setting price floors for SBC. However, in order to do so, we must use the VzCost model and its myriad inputs and assumptions that we have we have rejected for UNE costs. On the other hand, we can use MCI's approach which was explicitly rejected in D.99-11-050. Neither option is appealing.

First, we find it is unreasonable to adopt Verizon's proposed price floors. While we do not take issue with the contribution formula Verizon has used or its description of the methodology, we have rejected use of the Verizon cost model and its inputs and assumptions. We have not used the Verizon model to set UNE rates, and it would be improper to rely on it to set price floors, particularly when we have found Verizon's cost inputs and assumptions are not forward-looking.

Second, we are not persuaded by MCI's arguments to abandon the contribution method in favor of MCI's "sum of the MBBs" approach. JC acknowledge HM 5.3 does not calculate the volume-sensitive TSLRICs we need for the contribution price floor formula. It appears MCI proposes this alternative "sum of the MBBs" methodology to compensate for the lack of TSLRIC information in HM 5.3. Implicit in MCI's proposal is the concept of accepting all UNEs as MBBs. This idea was considered in D.99-11-050 and rejected.

While MCI and AT&T cite D.04-11-022 as support for using all UNE prices for price floors, we agree with Verizon that the Commission's instructions on price floor calculation in D.04-11-022 were intended to maintain consistency with the principles of IRD and do not override D.99-11-050 and its list of MBBs. While D.04-11-022 approves the "Total of the Floors" approach to add price floors together for bundles of retail services, it should not be construed as modifying how price floors are calculated. The direction that UNE-P rates should be used merely directs the use of updated UNE rates "using the imputation rules." (D.04-11-022, *mimeo*. at 27, Conclusion of Law 13.) Thus, if a UNE is a MBB under current imputation rules, its updated rate will figure into the price floor, but the list of MBBs is not expanded. Further, we agree with Verizon that given current market conditions and the FCC's recent refinement of the UNE list, it is inappropriate to enlarge the list of MBBs. We adhere to the MBB findings of D.99-11-050, as modified in this order to remove switching from the MBB list. We will not include all other UNE prices as MBBs in our calculation of price floors. Therefore, we reject MCI's proposed price floors.

Third, ORA proposes that for the interim, we should continue to use the same price floors adopted on an interim basis in D.03-03-033, with updates to reflect the new UNE prices adopted in this order. ORA suggests these interim

price floors can remain in effect while the Commission orders Verizon to file new price floor studies or opens a further investigation into the use of MCI's approach for all ILECs. Given that we have rejected the Verizon cost studies and therefore reject using them for price floors, and that HM 5.3 does not provide the TSLRIC information we need for our price floor formula, ORA's interim proposal is appealing. Furthermore, we note that in the Commission's rulemaking assessing and revising its regulation of telecommunications utilities (R.05-04-005), the Commission is considering, among other issues, whether to continue the price floor concept for partially competitive services. Without prejudging the outcome of that rulemaking, we acknowledge that changes to the current price floor system are under consideration. Therefore, it would be unreasonable to open a rulemaking on price floors as ORA suggests, or spend a great deal of resources perfecting the current price floor proposals of either Verizon or MCI.

Instead, we shall direct Verizon to file a compliance filing modifying the interim price floors adopted in D.03-03-033, as ORA recommends. Specifically, price floors shall be calculated using the same approach that was described in D.03-03-033 except that Verizon should substitute into its calculations the UNE rate adopted in this order for the loop monopoly building block. Verizon should also adjust the volume-sensitive TSLRIC data used in the price floor formula, similar to the adjustment ordered when interim price floors were adopted. (D.03-03-033, *mimeo*. at 52.) Specifically, the $13.65 average basic loop rate adopted today is 18.8% less than Verizon's former UNE rate of $16.81, the rate that was in effect when the 1997 cost studies were filed. Therefore, the loop's volume-sensitive TSLRIC should be reduced by this percentage.

Although ORA suggests a short extension of the interim price floors, we are inclined to adopt them on a more permanent basis. The interim price floors are based on cost studies that Verizon's predecessor GTE filed in 1997 -- cost studies that the Commission has never reviewed or approved. As noted in D.03-03-033, Verizon itself proposed use of these price floors on an interim basis and has made do with them since March of 2003. They are based on cost studies that yielded UNE rates higher than those we adopt in today's order. It is reasonable to conclude that if the 1997 cost studies could somehow be modified to produce the UNE rates we adopt today, the corresponding price floors would be far lower than the interim price floors. Thus, we conclude that if anything, the interim price floors that we will now rely on permanently err on the high side. Indeed, Verizon's proposed price floors are much higher than the ones we put in place today. If Verizon was willing to compete with floors much higher than the ones we adopt herein, then it should be satisfied these price floors are not inflated and will not disadvantage Verizon in the competitive marketplace.

VIII. Geographic Deaveraging

When setting UNE rates, the Commission has generally adopted loop rates by geographic zones rather than one statewide average rate. The process of establishing zone rates is termed "geographic deaveraging."

JC propose three zones based on the loop costs per wire center from HM 5.3. Verizon also proposes three zones based on costs per wire center, but it groups the wire centers in a different manner, resulting in different zone rates than those proposed by JC. Both methodologies attempt to minimize the differences between average zone costs and individual wire center costs.

JC contend their deaveraging methodology results in a reasonably uniform distribution of wire centers among the three zones, whereas Verizon's

methodology is designed to load the majority of lines in a single zone while leaving a handful of wire centers with the highest costs isolated in very high cost zones. (JC, 11/9/04, p. 83.)

In contrast, Verizon claims HM 5.3 zone estimates are based on a flawed deaveraging methodology that ignores higher cost wire centers and results in relatively few wire centers in the lowest cost zones. (Verizon, 8/6/04, p. 90.) Verizon claims JC's deaveraging proposal increases the likelihood of economically inefficient rates because the approach is biased towards minimizing the deviations in Zone 1 at the expense of greatly increased deviations in the other zones. (*Id.*, and Verizon/Tucek, 8/6/04, p. 9.)

We reviewed the deaveraging methodologies of both JC and Verizon. The JC's method appears to group wire centers into the three zones based on an arbitrary cut-off of loop costs per wire center. Moreover, JC provide little, if any, explanation of their wire center groupings. While JC's methodology results in a fairly uniform distribution of wire centers between the three zones, the groupings appear to ignore the natural breaks between low and high cost wire centers that appear when the wire center cost results are graphed. In effect, the uniform groupings suggested by JC bias the Zone 3 rate downward.

Verizon provides a lengthier description of how it grouped wire centers into three zones based on a statistical technique to minimize the deviations in the zone. (Verizon/Tucek, 8/6/04, pp. 7-9.) The zones that result from Verizon's methodology group a few of the highest cost wire centers into Zone 3, with the bulk of wire centers grouped into Zones 1 and 2. As a result, Verizon's methodology leads to a significantly higher Zone 3 rate than JC's method.

We find the method proposed by Verizon better minimizes the deviations in wire center costs. It is reasonable to group only a few of the highest cost wire

centers into Zone 3, rather than create more uniformly grouped zones that show a wider dispersion in the wire center costs in that zone and artificially lowers the zone's average rate. While we are not using the Verizon model to set rates, we can use Verizon's methodology to create zones based on the cost results from our HM 5.3 model run. We graphed the wire center costs for our run of HM 5.3, and found that two wire centers had significantly higher costs and were outliers on the graph of average wire center costs. (*See* Appendix C of this order which includes a graph of zone rates and a list of Verizon's wire centers by zone.) We conclude it is reasonable to isolate these two outlier wire centers into a fourth zone, rather than the three suggested by Verizon. This avoids these two high cost wire centers skewing the Zone 3 rate. Thus, our resulting zones are similar, but not identical to, the groupings suggested by Verizon. The table below shows UNE rates by zone for basic, four-wire, and DS-1 loops.

Table 7
Loop Rates by Deaveraged Rate Zones

	Zone 1	Zone 2	Zone 3	Zone 4
Basic Loops	$12.07	46.96	135.04	524.22
4-Wire Loop	$22.60	88.38	254.74	993.36
DS-1 Loops	76.49	170.02	297.77	678.08

We will not adopt deaveraged rates for DS-3 loops because we are not confident that either party's deaveraging methodology works appropriately for DS-3 loops. When we tested both Verizon's and JC's deaveraging methodologies on DS-3 loops, our results indicated a significantly higher cost in Zone 1 than in Zone 3. These results were illogical. Due to these deaveraging difficulties, we will adopt one average rate for DS-3 loops, as Verizon itself proposed.

For four-wire loops, HM 5.3 did not calculate zone rates. We have calculated deaveraged rates for four-wire loops by looking at the relationship between the average basic loop rate and the zone rates, and using that same relationship for four-wire loop zone rates.

Finally, it should be noted that Verizon's interim UNE rates were divided into two geographic zones, rather than the four zones we adopt today. As a result, interim loop rates by zone do not match up directly with permanent loop rates by zone. At the urging of parties in comments on the draft decision, we will not dictate how the billing adjustments by zone should be calculated. Rather, Verizon and other parties should propose a method for implementing billing adjustments given that the interim and permanent zones are not identical. This issue will be considered in the true-up phase of this proceeding, discussed in Section IX below.

IX. Billing Adjustment Issues

As set forth in D.03-03-033, Verizon must adjust, or "true-up" the interim rates it has charged since March 2003 for loops and switching to the new rates adopted in this order. In other words, Verizon must calculate whether its interim rates are higher or lower than today's newly adopted rates, and whether it has over or under-collected the appropriate revenues for any UNEs it sold at interim rates.

In the SBC UNE proceeding, a similar true-up process was required to adjust interim rates to permanent levels. In that order, the Commission recognized that because UNE permanent rates were in many cases higher than the interim rates that had been in place for over two years, competitive carriers who had purchased UNEs at the lower interim rates owed SBC a substantial sum. (D.04-09-063 *mimeo*. at 254.) The Commission stayed the effectiveness of

any true-up payments pending a review of the size of the actual true-up and consideration of mitigation measures.

In this order, we note that the average 2-wire loop rate has increased from an interim level of $11.62 per month (later modified to $11.36 in D.05-01-057), to the new permanent rate of $13.65. Thus, for UNE loops alone, the permanent statewide average rate has increased 17.5% from the initial interim rate (in effect from March 2003 through January 2005), and 20% from the current interim rate (in effect February 2005 through the date of this order). UNE switching rates will also require a true-up, and the net effect of these two UNE rate changes must be considered. The initial statewide average interim UNE-P rate was $17.14 per month, increased in February 2005 to $17.62, and is now $17.10 per month. Thus, any UNE-P billing adjustments should consider the changes in UNE-P rates from interim to permanent levels.

On December 5, 2005, the U.S. District Court vacated interim rates established by D.03-03-033 and reinstated UNE rates originally adopted for Verizon in D.97-01-022. Those rates are $16.81 per month for an average 2-wire loop, $4.58 for a basic port plus switch usage per minute of use, and an average UNE-P rate of $29.02. Thus, any billing adjustments must also consider the effect of this court action on UNE rates.

Within 90 days of the date of this order, Verizon should calculate any billing adjustments owed to or by interconnecting carriers based on the modification of interim rates set in D.03-03-033, and revised in D.05-01-057, and the court's decision vacating interim rates.[51] For the same reasons noted in the

[51] We give Verizon 90 days because that is the same length of time granted to SBC to calculate its "true-up" payments following D.04-09-063.

SBC UNE order, we will stay the effective date of any true-up until its amount can be calculated and further proceedings held to determine payment options or consider other mitigations to minimize negative financial effects of the true-up on competitive carriers. The ALJ will issue a ruling within 30 days of this order setting a prehearing conference to initiate the true-up phase of this proceeding.

X. Reexamination Process

When the Commission set UNE rates for SBC in D.99-11-050, it established a procedure for determining which UNE costs should be reexamined. Specifically, if a carrier believes that a UNE price lower than the one adopted for SBC is justified for a particular UNE, based upon a reduction in the costs for that element of at least 20%, the CLC may nominate that UNE as a candidate for reconsideration. The nomination should be made in an application submitted between February 1 and March 1 of each year and should include a brief summary of the evidence supporting the asserted cost reduction. SBC may also nominate UNEs for reexamination during the same window if it believes a higher price is justified owing to an increase in costs of at least 20%. The Commission stated it would choose no more than two UNEs for annual reexamination. (D.99-11-050, *mimeo*. at 168-9.)

In D.04-09-063, the Commission modified the reexamination process for SBC, noting that the idea of a quick update proceeding had given way to "the reality of modeling difficulties, protracted discovery battles, and various delays." (D.04-09-063, at 246.) The Commission suspended further UNE nominations for SBC until February 2007, citing the benefits of pricing and market stability. (*Id*.)

In a November 2005 motion, CALTEL requests the Commission allow for further consideration of a process for modification of Verizon's UNE rates. CALTEL notes that it presented a comprehensive proposal for a wholesale price

cap plan for Verizon UNE rates in the Verizon/MCI merger proceeding.[52] The proposal is designed to avoid resource-intensive cost modeling proceedings by allowing adjustment of UNE rates through an annual compliance filing to adjust Verizon's UNE rates based on inflation and productivity factors. CALTEL contends the Commission should provide certainty to carriers how future UNE price adjustments will be made. Therefore, CALTEL requests the Commission consider its price cap proposal in the next phase of this proceeding. TURN supports CALTEL's request.

Verizon opposes CALTEL's motion, noting that CALTEL's wholesale price cap proposal was rejected by the Commission in the Verizon/MCI merger decision. (D.05-11-029, p. 115.) Further, Verizon maintains that the FCC's TELRIC rules do not contemplate the use of inflation or productivity factors to replace forward-looking cost modeling. (Verizon, 12/7/05, p. 4.)

While we initially considered establishing a procedure for reexamination of Verizon's UNE rates identical to the procedure we have used for SBC, there is no dispute that cost modeling proceedings have expended vast resources and industry changes make it difficult for carriers to litigate these proceedings. It is time to consider other ideas. We agree with TURN that competitive carriers and other parties need some regulatory certainty as to how UNE rates will be treated by this Commission going forward. Thus, we will grant CALTEL's motion and consider other options, such as CALTEL's price cap proposal, in the next phase of this proceeding along with billing adjustment, or "true-up" issues. In this next phase, when the Commission considers CALTEL's proposal, it may also consider

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[52] *See* Testimony of Joseph Gillan on behalf of CALTEL and Covad, filed August 15, 2005, A.05-04-020, at pages 34-44.

adoption of a reexamination procedure similar to the one that has been in place for SBC, consolidation of review with SBC, and reexamination limited to updated inputs and assumptions to the HM 5.3 adopted in today's order. Whatever the outcome of this next phase, it will apply to UNE price adjustments that will take place no sooner than February 2008. Verizon has committed to the FCC as a condition of its merger with MCI that it will not seek any increase in state-approved UNE rates for two years from its merger closing date, except for rates deemed invalid or remanded to a state commission in connection with currently pending appeals.[53] Thus, a delay in any UNE reexamination until 2008 matches the timing of this commitment.

XI. Comments on Draft Decision

The Commission mailed the draft decision of the ALJ in this matter to the parties in accordance with Section 311(g)(1) and Rule 77.7 of the Rules of Practice and Procedure. Comments were filed by the California Association of Competitive Telephone Companies (CALTEL), ORA, TURN, Verizon, and jointly by a group of competitive carriers (collectively "Joint CLCs"[54]). Reply comments were filed by Covad/Mpower, DMR/Navigator, TURN, Verizon, and XO/Cbeyond.

The comments allege numerous technical and legal errors in the draft decision and suggest corrections to the Commission's UNE modeling. Detailed

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[53] Verizon made this commitment in an October 31, 2005 *ex parte* letter to the FCC regarding its Application for Consent to Transfer Control filed by Verizon Communications, Inc. and MCI Inc., WC Docket No. 05-75.

[54] The Joint CLCs are Cbeyond Communications LLC (Cbeyond), Covad, DMR Communications Inc. (DMR), MPower Communications Corp. (MPower), Navigator and XO.

technical comments are addressed in the section of the order pertaining to the specific topic. Where comments reargued earlier positions or attempted to introduce new facts, they are not discussed. Below we discuss comments that raised general issues affecting the entire decision.

General Modeling Issues

Verizon criticizes the draft decision for "repeated and extensive reliance on the findings of an earlier case considering SBC's costs, instead of the record in this case, which differs in critical respects." (Verizon, 12/14/05, p. 1.) Moreover, Verizon criticizes the draft decision for rejecting VzCost, claiming it is improperly labeled as an "embedded" model when it actually models actual right of way and plant routes. Verizon claims the Commission ignores corrections to VzCost offered by Verizon, which reflects a clear predisposition to select the flawed HM 5.3 model, even when its two principal proponents, AT&T and MCI, have now withdrawn from the proceeding and it is unclear whether there will be a party capable of supporting the model in the future.

TURN responds that claims about future support of HM 5.3 are sheer speculation, and it is unclear whether Verizon will maintain support for VzCost. Covad/Mpower join TURN in commenting that while the Commission controls and has possession of HM 5.3, Verizon's internet-based model is, by Verizon's own admission, "continuously updated" and there is no guarantee of the continued availability of the specific form of the Verizon studies used to generate UNE costs and prices in this proceeding. (Covad/Mpower, 12/21/05, p. 6.)

In addition, Covad/Mpower respond that the record of the case indicates Verizon has made inflated claims that VzCost replicates real plant routes. Specifically, maps of the networks modeled by HM 5.3 and VzCost show Verizon's studies produce a network design that does a poor job of following

rights-of-way and does not resemble Verizon's actual network or any other plausible, efficient network. (Covad/Mpower, 12/21/05, p. 4, and n. 15; citing JC Rebuttal, 11/9/04, pp. 1-5.) Further, none of Verizon's proposed corrections to its study are on the record because Verizon withheld the corrections until the record closed, then asked the proceeding to be extended so it could file model corrections after the rebuttal round. (*Id.*, p. 5.) Finally, Covad/Mpower claim the Commission's reliance on SBC inputs is more state-specific, and supported by the recent order in *Verizon v. Peevey*, than Verizon's proposals to use nationwide, Verizon-specific inputs. (Id., p. 8.)

We have not modified the determination in the draft decision to reject Verizon's cost model and look to the SBC UNE proceeding for guidance on some modeling inputs. We painstakingly reviewed the record in this case, but still find it appropriate to use some SBC inputs for specific areas. This is within our discretion and supported by the record in this case. Where we refer to the SBC case, we do so only after considering the positions and record evidence provided in this proceeding. SBC inputs are used to corroborate findings from this record, or where the record is found to have shortcomings. We consider our use of the SBC case as guidance to be reasonable.

Rate Structure Issues

Verizon alleges the draft decision should correct several rate structure issues. First, Verizon claims the draft fails to include rates for several UNEs that Verizon offers and that were included in Verizon's model. Second, the draft decision adopts rates for UNEs that Verizon is no longer required to provide and these should be removed. Third, Verizon claims the draft decision changed the rate structure for several UNEs by using HM 5.3. Verizon contends it is "enormously complicated, time consuming and costly to implement California-

specific structural (as opposed to rate) changes to Verizon's billing systems…." (Verizon 12/14/05, p. 21.) Verizon suggests conversion of these rates into its proposed rate structure. Finally, Verizon recommends several rates be stricken from the draft decision because HM 5.3 provides no explanation of what services they are intended to cover.

DMR/Navigator oppose Verizon's rate structure recommendations, claiming Verizon is improperly attempting to slip into the final decision numerous additions, modifications, and deletions to the HM 5.3 model. They claim Verizon should have raised any rate structure issues in reply comments so they could be properly addressed on the record. (DMR/Navigator, 12/21/05, p. 8.)

XO/Cbeyond also oppose the request, claiming that through these comments, Verizon is attempting to win establishment of a new charge for "clear channel capability" (CCC) on CLCs that use DS-1 UNEs. XO/Cbeyond contend the clear channel capability is simply a setting for a standard feature on a DS-1 UNE circuit and it would be improper to charge CLCs for CCC when Verizon provides the feature at no charge to its retail customers. (XO/Cbeyond, 12/21/05, p. 2.) Further, XO/Cbeyond claim Verizon's rate structure suggestions are inappropriate attempts to double-count costs by adding rate elements for costs that are already captured elsewhere in HM 5.3. Likewise, there is no need to remove rate elements for UNEs Verizon no longer provides because the rate may be necessary for true-up purposes and the existence or absence of a price does not affect Verizon's obligations under federal law.

We agree with DMR/Navigator and XO/Cbeyond that Verizon's rate structure suggestions are, for the most part, procedurally inappropriate. If UNEs were omitted from HM 5.3, Verizon should have highlighted this in reply

comments. Plus, XO/Cbeyond provided convincing testimony early in reply comments that Verizon's proposed CCC rate was inappropriate because it attempts to impose an extra charge for a standard feature that is provided to retail customers at no extra charge. (XO, 8/6/04, p. 27, n. 39.) We will not remove UNEs that are no longer offered because the rate may be necessary for true-up purposes. We decline Verizon's request to modify the rate structures that emanate from our use of HM 5.3. Rate structures were litigated during the proceeding and Verizon should have supplied its preferred rate structures for HM 5.3 in reply comments. Finally, we will not strike any of the UNEs produced by HM 5.3 because Verizon should have objected to them in reply comments if it felt the definitions were inadequate. Verizon's last minute "rate structure" comments are too late and deny other parties an opportunity to respond to these new proposals.

Dark Fiber

Verizon claims the Commission erred in its calculation of the "dark fiber" UNE rate. Specifically, Verizon alleges the Commission neglected to divide the rate by twelve to convert the annual cost into a monthly cost. In addition, Verizon contends the rate is too low because it is based only on maintenance expenses associated with dark fiber and ignores the costs for physical infrastructure to support the fiber. (Verizon 12/14/05, p. 19.) Verizon notes that SBC's dark fiber rate is $11.10 per strand plus a per strand foot charge. *(Id.)* XO/Cbeyond oppose Verizon's effort to increase the dark fiber rate. They maintain the rate properly includes only maintenance expenses because dark fiber is spare fiber and the cost of spare fiber has already been included in UNE rates through the use of fill factors that build in spare capacity. XO/Cbeyond

agree with Verizon that the annual rate should be divided by twelve. (XO/Cbeyond, 12/21/05, p. 9.)

We agree that we erred in not dividing the annual dark fiber rate of 41 cents per mile by twelve to convert it to a monthly charge of 3.5 cents per mile. Verizon's comment that the new dark fiber rate is less than one percent of SBC's rate concerns us. Although XO/Cbeyond contend dark fiber costs should be based on maintenance expenses only, we are not convinced it would be double counting to charge users of dark fiber for some spare capacity investment. We have very little record in this proceeding on other dark fiber proposals. Therefore, in order to adopt a rate today, we find it reasonable to use SBC's rate as a proxy since it is a similarly situated California ILEC that likely faces similar forward-looking dark fiber costs. Therefore, we adopt SBC's dark fiber rate, as shown in D.03-07-023, for Verizon.

XII. Assignment of Proceeding

Michael R. Peevey is the Assigned Commissioner and Dorothy J. Duda is the assigned Administrative Law Judge in this proceeding.

Findings of Fact

1. In D.95-12-016, the Commission adopted a set of Consensus Costing Principles that it has applied in TSLRIC and TELRIC cost proceedings.

2. The Commission must comply with the FCC's TELRIC methodology when setting UNE rates for Verizon.

3. The Commission established cost modeling criteria for this proceeding in a July 2002 ruling.

Verizon Model

4. Verizon's model replicates its existing network and does not reconfigure or re-size facilities to meet current and reasonably foreseeable future demand.

5. Verizon's loop model assumes the use of new equipment without considering more efficient network configurations, and without aggregating small distribution areas into larger groupings.

6. Verizon's loop model overlays modern equipment on an embedded network design, resulting in investment levels far above current levels.

7. Verizon attempts to follow current network routes, but admits it had to rely on surrogate data in some instances and there are discrepancies between equipment locations in the model and Verizon's actual network.

8. Verizon's model contains an error in calculating the economically efficient cross-over point from fiber to copper facilities.

9. VzLoop contains a high percentage of collocated distribution terminals and overlapping distribution areas.

10. The Verizon model is not fully integrated because it uses different approaches to model feeder and distribution, and it requires multiple steps to process model input changes.

11. The expense portion of Verizon's model is difficult to audit and verify because it relies on numerous factors that are difficult to trace and changes to the factors require multiple steps.

12. Verizon does not explain how it arrived at the level of forward-looking expenses it uses in its FLC factor.

13. Verizon's FLC factor assumes expenses will remain at current levels even as investments change.

14. Verizon uses two data-intensive switching cost models that make it difficult to run sensitivity analyses with varying assumptions for the percentage of new and growth lines, switch discounts, or switch types.

15. Verizon has purchased only one GTD-5 switch since 1990.

HM 5.3 Model

16. The rebuttal version of HM 5.3 contains some changes that were not reasonably explained in JC's rebuttal filings.

17. HM 5.3 relies on a cluster input database developed by a third party vendor.

18. HM 5.3 starts with actual customer locations to cluster customers into efficient groupings, but does not model all loops in the exact locations where they exist today.

19. Both HM 5.3 and VzLoop use preprocessed network information that cannot be modified as a modeling input.

20. Both HM 5.3 and VzLoop lack transparency and limit the Commission's ability to test scenarios.

21. HM 5.3 models the location of existing wire centers coupled with forward-looking equipment and network design.

22. The inputs and assumptions in HM 5.3 can be modified more readily than those in the Verizon model.

Asset Lives

23. Verizon's proposed asset lives are similar to those adopted for SBC in D.04-09-063.

Cost of Capital

24. Verizon proposes a cost of equity based solely on the DCF approach, using forecasts for a proxy group of S&P Industrials.

25. JC use the CAPM method to calculate a 12.03% long-term cost of equity, similar to the analysis used to set an 11.78% cost of equity for SBC in D.04-09-063.

26. JC propose a cost of debt based on both long and short-term debt costs.

27. In D.04-09-063, we found that a forward-looking capital structure for a firm is based on a firm's target capital structure, and the best predictor of target capital structures uses both market and book value information.

28. Target capital structures of other telecommunications companies are similar to the capital structure proposed by JC.

29. The Commission has generally excluded short-term debt when determining a capital structure and a cost of capital for utilities.

30. Verizon's proposed risk adder of 2.74% is similar to a proposal rejected by the Commission in D.99-11-050.

IDLC/UDLC

31. UDLC loops are required for circuits that cannot be provisioned over an IDLC system.

32. In D.04-09-063, the Commission found that while IDLC is the forward-looking technology choice, operational issues remain to be resolved regarding the provisioning of unbundled loops over IDLC.

Fill Factors

33. JC's proposed distribution and feeder fill factors are similar to those adopted for SBC in D.04-09-063.

34. Verizon, SBC, and BellSouth have seen business and consumer access line reductions since 2002.

35. JC's proposed SAI fill factors assume 3.5 lines per residential living unit and 2 lines per business, identical to assumptions the Commission adopted in the SBC UNE case.

DLC Costs

36. Verizon proposes DLC installation costs based on a nationwide sample and a review of 17 Verizon California projects, while JC propose DLC cost inputs the same or lower than those the Commission rejected in D.04-09-063.

Labor Costs

37. JC have proposed labor inputs similar to, and in some cases lower, than those the Commission rejected in D.04-09-063.

38. Verizon developed an alternative set of HM 5.3 labor inputs based on cost data from the Verizon model.

Switching Inputs

39. The Commission has twice rejected the assumption that switch vendors would sell over 90% of lines at the discounted "new" switch price.

40. Verizon's switch price per line assumes that 63% of switch purchases are GTD-5 switches.

41. The current generation of digital switches has call processing capabilities that far exceed current call volumes. Forecasted call volumes are stable or declining.

High Capacity Loops and Transport

42. In D.04-09-063, the Commission found flaws with HM 5.3 interoffice transport and high capacity loop rates and did not rely on them to set SBC's rates.

43. Unless inputs are modified, HM 5.3 produces a DS-3 loop rate more than double the rate adopted for SBC.

44. Verizon proposes significant increases to its transport and high capacity loop rates.

45. The rebuttal version of HM 5.3 contains updated inputs relating to interoffice and high capacity costing and derived from Verizon data.

46. For SBC, the Commission adopted interoffice transport rates that blend fixed and per-mile charges.

Shared and Common Cost Markup

47. Verizon proposes a 14.5% shared and common cost markup composed of three separate loading factors.

48. JC propose an overhead markup based on the relationship between corporate operations expenses and total operating revenues and using data specific to Verizon California. JC exclude retail, non-recurring costs, and other non-UNE costs from their markup calculations.

Price Floors

49. In D.03-03-033, the Commission approved interim price floors for Verizon using figures from Verizon's 1997 cost studies.

50. The FCC's Triennial Review Remand Order found that CLCs are not impaired in the deployment of switches and, therefore, eliminated the requirement that ILECs provide competitors access to unbundled mass market switching.

51. Verizon's price floor proposals are based on retail cost studies that are part of the VzCost model and use many, but not all, the same inputs and assumptions used by Verizon to propose UNE costs and prices.

52. In D.99-11-050, the Commission rejected a "sum of the UNEs" approach to setting price floors.

53. In D.04-11-022, the Commission directed the use of updated UNE rates when calculating price floors under current imputation rules. D.04-11-022 does not expand the list of MBBs.

54. The $13.65 average basic loop rate adopted in this order is 18.8% less than Verizon's 1997 UNE rate of $16.81.

Geographic Deaveraging

55. JC's deaveraging methodology ignores the natural breaks between low and high cost wire centers.

56. Verizon's deaveraging methodology minimizes the deviations in wire center costs.

57. When Verizon's deaveraging methodology is used, two wire centers show significantly higher costs than all other zones.

58. The zones adopted for interim rates do not match the zones adopted for permanent rates.

Billing Adjustment

59. To implement a "true-up" of interim rates, Verizon must calculate whether its interim rates are higher or lower than the rates adopted in this order, and whether it has over or under-collected the appropriate revenues for UNEs sold at interim rates.

Annual Reexamination

60. In D.99-11-050, the Commission established a process for the annual review of SBC's UNE rates.

Conclusions of Law

Verizon Model

1. Verizon has not modeled a forward-looking network because it attempts to replicate the current network configuration, fails to economize by aggregating smaller distribution areas into larger ones, and does not efficiently size and deploy current technology.

2. Verizon's loop model contains anomalies in preprocessed input data which indicate multiple, overlapping facilities and distribution areas. These potential input errors raise doubt as to whether VzLoop accurately depicts the current local exchange network.

3. The lack of integration in the various modules of Verizon's model increases the likelihood of modeling duplicative facilities and makes it difficult to test input sensitivity.

4. Verizon's model contains many inputs and assumptions that are not forward-looking such as the FLC factor, GTD-5 switches, structure sharing, cost of capital and overhead markup.

5. It is unduly burdensome and unreasonable to use the Verizon model, which requires extensive and time-consuming manual manipulation and is prone to human error in the input modification process.

6. Verizon's FLC factor is circular because it creates a ratio that produces the level of forward-looking expenses that Verizon has determined are appropriate.

7. Verizon's FLC factor ignores the possibility that telecommunications technological advancements may reduce operations and maintenance expenses.

8. The GTD-5 switch is not a forward-looking switch technology.

9. The structure of Verizon's switching model makes it difficult to modify and test varying inputs.

HM 5.3

10. It would be inappropriate to rely on the rebuttal version of HM 5.3 because of the resources required to examine all modeling and algorithm changes that were not adequately described.

11. The customer location process in HM 5.3 creates distribution areas based on current population characteristics, unlike Verizon's model which makes no attempt to reconfigure distribution areas.

12. The customer location process in HM 5.3 is TELRIC compliant even if the reconstructed network does not follow Verizon's actual outside plant routes.

13. Both HM 5.3 and the Verizon model contain aspects of loop modeling that the Commission was unable to modify.

14. The fill factors in HM 53 can be adjusted to ensure reasonable excess capacity for short-term growth.

15. It is reasonable to rely on a model with larger clusters based on a forward-looking configuration using currently available technologies, rather than an approach that uses fixed distribution areas incapable of maximizing the efficiencies offered by forward-looking equipment.

16. Efficiency and productivity assumptions in HM 5.3 can be remedied with input changes such as revised labor costs, structure sharing percentages, and switching inputs.

17. It is inappropriate to compare HM 5.3 modeling results to Verizon's current expense and investment levels.

18. HM 5.3 allows the user to make modifications, implement them quickly, and consistently replicate the results in a reasonable time frame with a high degree of certainty.

19. It is reasonable to use a model with some flaws when the alternative is another flawed model that is difficult to operate and modify.

Asset Lives

20. It is unreasonable to rely on asset lives the FCC prescribed in 1996 for Contel, given the competitive and technological developments since that time.

21. Verizon's proposed asset lives are supported by the study of its witness Sovereign, similar to those adopted for SBC, and should be used in the Commission's HM 5.3 model run.

Cost of Capital

22. The Commission should ignore Verizon's proposed cost of equity because Verizon fails to justify why a proxy group of non-telecommunications firms has a similar risk profile and growth forecast as a telecommunications firm.

23. It is reasonable to use an 11.78% cost of equity to set Verizon's cost of capital based on JC's CAPM analysis.

24. A 6.15% debt cost based on Moody's A-rated industrial bonds is reasonable because the term of this debt is similar to the asset life assumptions incorporated into the Commission's model runs.

25. It is reasonable to assume a forward-looking capital structure of 66% equity and 34% debt, based on averaging market value and book value information for a proxy group of companies, particularly since this capital structure comports with the target capital structures of other telecommunications utilities.

26. The risk of providing UNEs is no greater than Verizon's retail risk because Verizon does not have to incur sunk investments solely for UNE purposes.

27. Verizon's proposed risk adder should be rejected because quantitative models, such as CAPM, reasonably capture investor's views of the risks facing Verizon in the UNE market.

IDLC/UDLC

28. The Commission should adopt an assumption of 90% IDLC and 10% UDLC, as proposed by Verizon, because UDLC may be required until operational issues with IDLC are resolved.

Fill Factors

29. A copper distribution fill factor of 52% is reasonable because it reserves close to 50% of copper lines as spare capacity at a time when wireless substitution indicates less demand for access lines.

30. A fiber feeder fill factor of approximately 80% is reasonable, based on an assumption of four fibers per DLC site.

31. The copper feeder fill factor proposed by JC is reasonable and should be adopted. The DLC fill factors in HM5.3 should be adjusted to account for inventory management and installation constraints, similar to the adjustments in D.04-09-063.

32. It is reasonable to assume a 2-pair NID for premise terminations, along with increases to the labor assumptions for NID installation.

33. JC's proposed SAI fill factors are reasonable and should be adopted.

Structure Sharing

34. It is reasonable to adopt structure sharing input percentages identical to those we relied on in D.04-09-063 when setting UNE rates for SBC.

Plant Mix

35. JC's proposed plant mix assumptions are reasonable because they are based on current information provided by Verizon.

DLC Costs

36. It is reasonable to use DLC costs developed for SBC in D.04-09-063 as modeling inputs because Verizon's data is nationwide and JC's inputs were previously rejected. It is reasonable to use SBC costs as a proxy because SBC and Verizon are similarly-sized ILECs operating in the same state, facing similar labor markets. Verizon's data unreasonably assumes installation cost is directly related to material cost and may not be based on the correct DLC equipment.

Labor Costs

37. The Commission should run HM 5.3 with certain categories of labor inputs proposed by Verizon, rather than the labor rates and crew sizes proposed by JC that were rejected in D.04-09-063.

Maximum Copper Loop Length

38. We should assume a maximum copper loop length of 12,000 feet in our model runs for the reasons articulated in D.04-09-063.

Switching Inputs

39. For switching inputs, the Commission's model run should assume a mix of 36% new and 64% growth switch purchases based on Verizon's purchases over the last five years.

40. The Commission should rely on the price per line proposed by JC because Verizon's price per line is dominated by GTD-5 switch purchases and we have found the GTD-5 is not a forward-looking switch.

41. A flat-rated port pricing structure is more representative of the way Verizon incurs switch costs.

42. It is reasonable to adopt a flat-rated port pricing structure, similar to the one adopted in D.04-09-063, because Verizon's switch processor utilization data indicates a low probability of switch exhaust.

High Capacity Loops and Transport

43. Verizon's transport and high capacity loop modeling is unreasonable because it produces rates significantly higher than current rates when industry trends indicate declining costs for these facilities.

44. The updated inputs for high capacity loops and transport in the rebuttal version of HM 5.3 are reasonably based on Verizon data and responsive to Verizon criticism. These updated inputs should be incorporated into the Commission's model run using the earlier filed version of HM 5.3.

45. Verizon's proposed interoffice rate design, which involves fixed and usage-based charges, is reasonable and consistent with the approach adopted for SBC.

Shared and Common Cost Markup

46. Verizon does not adequately explain its forward-looking expense adjustments that flow into its markup calculations and does not adequately show that retail, non-recurring, and non-UNE costs are removed.

47. The 8.93% markup proposed by JC is reasonable because it is based on Verizon California data and excludes retail, non-recurring, and non-UNE costs.

Price Floors

48. Switching should no longer be classified as a monopoly building block when calculating price floors because competitors have the ability to duplicate switching facilities to serve customers.

49. The Commission should not use Verizon's price floor proposals if it rejects the Verizon model, and its inputs and assumptions, for UNE costing purposes.

50. In D.04-11-022, the Commission maintains consistency with the principles of IRD and does not override the MBBs prescribed in D.99-11-050.

51. MCI's proposal to treat all UNEs as MBBs should be rejected, consistent with D.99-11-050 and recent FCC actions refining unbundling requirements.

52. Verizon should calculate price floors using the methodology approved in D.03-03-033, except Verizon should substitute into its calculations the UNE rate adopted in this order for the loop MBB and reduce its volume sensitive TSLRIC for loops by 18.8%.

Geographic Deaveraging

53. When creating geographically deaveraged zone rates, two high cost wire centers should be isolated into a fourth rate zone.

54. Verizon and other parties should propose a method for implementing billing adjustments given that the interim and permanent rate zones are not identical.

Annual Reexamination

55. The Commission should establish a procedure for reexamination of Verizon's UNE rates in the next phase of this proceeding by considering CALTEL's price cap proposal, the adoption of a procedure similar to the one established in Ordering Paragraph 11 of D.99-11-050, or the use of updated inputs and assumption to the HM 5.3 model.

56. The Commission should not reexamine the UNEs adopted in this order before February 2008.

O R D E R

IT IS ORDERED that:

1. The recurring prices for unbundled network elements (UNEs) offered by Verizon California (Verizon) that are set forth in Appendices A and B to this decision satisfy the requirements of Sections 251(c)(2), 251(c)(3), and 252(d)(1) of the Telecommunications Act of 1996 and are hereby adopted.

2. Pursuant to Commission Resolution ALJ-181 (adopted October 5, 2000), Verizon shall prepare amendments to all interconnection agreements between itself and other carriers. Such amendments shall substitute the recurring UNE prices set forth in Appendices A and B for the UNE prices set forth in such interconnection agreements. Such amendments shall be filed with the Commission's Telecommunications Division, pursuant to the advice letter process set forth in Rules 6.1 and 6.2 of Resolution ALJ-181, within 30 days after the effective date of this order. The amendments do not require a signature of the carriers involved as long as the amendments are limited to substituting the UNE rates adopted in today's order. Unless protested, such amendments shall become effective 30 days after filing. The flat per port switching rates adopted in

this order shall not apply in the context of reciprocal compensation between carriers. The rates shown in Appendix B shall be used for reciprocal compensation purposes.

3. The UNE prices adopted in this order shall be effective on the date this order is effective. Verizon shall make all billing adjustments necessary to ensure that this effective date is accurately reflected in bills applicable to these UNEs. Verizon shall have 60 days from the date of this order to complete the billing program changes necessary to reflect in bills the recurring prices for UNEs adopted in this order. Upon completion of said billing program changes, Verizon shall notify the Director of the Telecommunications Division in writing that all of the necessary billing program changes have been completed.

4. Within 90 days of the effective date of this order, Verizon shall calculate any billing adjustments owed to or by interconnecting carriers based on the modification of interim rates originally established in Decisions (D.) 03-03-033 and D.05-01-057 to the rates in this order, but payment of any billing adjustments, or "true-up," is stayed pending the outcome of further proceedings in this docket to consider payment options or other mitigations to lessen any negative effects of the true-up. The administrative law judge shall issue a ruling within 30 days of this order setting a prehearing conference to initiate these proceedings.

5. CALTEL's November 22, 2005 motion for consideration of a process for future modification of Verizon UNE rates is granted in part. The Commission shall establish a procedure for reexamination of Verizon's UNE rates in the next phase of this proceeding by considering CALTEL's price cap proposal, the adoption of a procedure similar to the one established in Ordering Paragraph 11 of D.99-11-050, or the use of updated inputs and assumptions to the HM 5.3

model. The Commission shall not reexamine the UNE rates adopted in this order before February 2008.

6. Verizon's petition to modify D.99-11-050 and remove switching as a monopoly building block in the price floor calculation is granted.

7. Within 30 days of the effective date of this order, Verizon shall file an advice letter calculating its Category II price floors as set forth in this order. Verizon's compliance advice letter shall include workpapers that show how it has derived its price floors. This advice letter shall be subject to protest in accordance with General Order 96-A.

8. This proceeding shall remain open pending resolution of true-up payment issues and consideration of a procedure for reexamination of the UNE rates adopted in this order.

9. The motion to intervene filed by Cbeyond Communications LLC is granted.

This order is effective today.

Dated _____, at San Francisco, California.

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Appendix A

Adopted UNE Rates *

Unbundled Network Elements			Adopted UNE Rate
Loops			
Basic 2-wire, statewide average		$	13.65
Zone 1		$	11.69
Zone 2		$	45.70
Zone 3		$	131.74
Zone 4		$	513.71
4-wire, statewide average		$	26.40
Zone 1		$	22.60
Zone 2		$	88.38
Zone 3		$	254.74
Zone 4		$	993.36
Coin option		$	1.93
ISDN option, statewide average		$	16.15
DS-1/HDSL, statewide average		$	77.16
Zone 1		$	66.20
Zone 2		$	139.33
Zone 3		$	541.80
Zone 4		$	669.42
DS-3, statewide average		$	585.03
ADSL on copper loop		$	6.57
ADSL on DLC loop		$	16.21
Subloops			
NID		$	0.52
Basic 2-wire distribution		$	8.65
Basic 2-wire feeder		$	4.48
4-wire distribution		$	17.90
DS-1 distribution		$	31.90
DS-1 feeder		$	45.26
DS-3 distribution		$	349.40
DS-3 feeder		$	235.64
Entrance Facilities			
DS1		$	58.48
DS3		$	382.40
Multiplexing			
DS0 to DS1	per DS-0	$	3.10
DS1 to DS3	per DS-1	$	5.51
DS-1 to OC-3	per DS1	$	5.68
DS-3 to OC-3	per DS3	$	111.02
EC-1 to OC-3	per EC1	$	111.02
DS-3 to OC-12	per DS3	$	46.41
EC-1 / STS-1 to OC-12	per EC1	$	46.41
Switching			
Ports			
Basic		$	3.11
DID Port		$	7.16
ISDN BRI Port		$	5.33
ISDN PRI Port		$	161.97
DS1 Port		$	158.86

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Appendix A (cont.)

Unbundled Network Elements			Adopted UNE Rate
Switch Usage			
Tandem Switching			
setup per completed message		$	0.000213
holding time per MOU		$	0.000303
Trunk Port Termination			
End Office Termination		$	165.67
Tandem Termination		$	165.67
Interoffice Transmission Facilities			
Switched Transport - Common			
common per mile per MOU		$	0.000000
common fixed per term		$	0.000052
Dedicated Transport - DS1			
DS-1 transport per mile		$	0.13
DS-1 fixed per termination		$	9.66
Dedicated Transport - DS3			
DS-3 transport per mile		$	3.58
DS-3 fixed per termination		$	270.39
Additional Elements			
SS7 Links			
56 Kbps	per month	$	5.09
DS1	per month	$	33.96
STP Usage	per signaling message	$	0.000036
Database Query			
800 Database-per Query		$	0.000390
Line Identifier Database (LIDB) - per Query		$	0.000390
Digital Cross-Connect System (DCS)			
Multiplexing			
DS0 / DS1 per Channel		$	3.10
DS1 / DS3 per Channel		$	5.51
Dark Fiber			
Interoffice, per strand ***		$	11.10
Interoffice, per foot***		$	0.00017
Loop, per strand***		$	10.98
Loop, per foot***		$	0.00011
Sub-Loop Feeder, per strand***		$	10.98
Sub-Loop Feeder, per foot***		$	0.00011
Cross Connection			
IOF to CO		$	3.65
Feeder to CO		$	0.91
At RT		$	0.91
UNE-P **		**$**	**17.10**

* All rates include a 8.93% markup for shared and common costs.

** UNE-P calculated based on usage assumption of 1400 voice 300 toll.

*** Dark fiber price based on SBC rates adopted in D.03-07-023, Appendix A, p. 4.

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Appendix B

Switching Rates Based on Minute of Use *

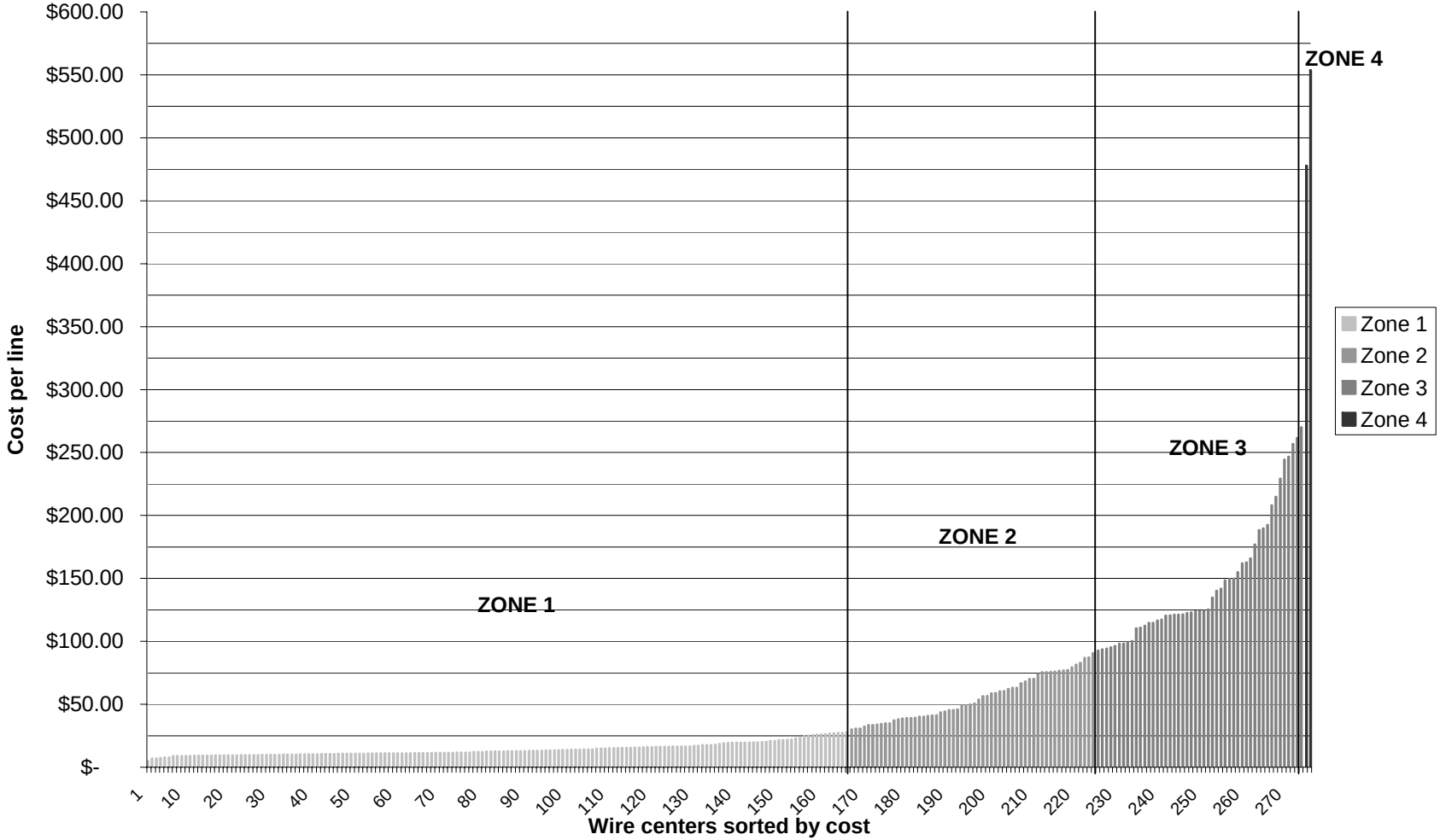
Unbundled Network Elements	Adopted UNE Rate **
Switch Usage	
Interoffice - Originating	
Setup per Message	$ 0.001270
Holding Time per MOU	$ 0.001164
Interoffice - Terminating	
Setup per Message	$ 0.001270
Holding Time per MOU	$ 0.001164
Intraoffice	
Setup per Message	$ 0.001377
Holding Time per MOU	$ 0.001164

* Based on a 70 / 30 split of traffic sensitive / non-traffic sensitive costs.

** All rates include a 8.93% markup for shared and common costs.

Appendix C

Wire Centers by Zone



Appendix C (cont.)

Wire Centers by Zone

Clli	Zone	Clli	Zone	Clli	Zone	Clli	Zone	Clli	Zone
ADLNCAXF	1	DSHGCAXF	2	LGBHCAXF	1	NWBRCAXF	3	SNJCCAXG	1
ALPGCAXF	2	DSKNCAXF	1	LGGTCAXF	3	NWPKCAXF	1	SNJQCAXF	2
ALPNCAXF	3	DSPLCAXF	2	LKHGCAXF	2	OASSCAXF	2	SNLDCAXF	1
ANZACAXF	2	DSPLCAXG	3	LKISCAXF	1	OLNCCAXF	3	SNMGCAXF	3
APVYCAXF	1	DSSHCAXF	2	LMCVCAXF	2	ONTRCAXF	1	SNMNCAXG	1
ARHDCAXF	1	DWNYCAXF	1	LMLNCAXF	1	ONTRCAXG	1	SNMNCAXJ	1
ARTSCAXF	1	DWNYCAXG	1	LMPCCAXF	1	ONTRCAXM	1	SNNGCAXG	3
AZUSCAXF	1	EDMTCAXF	1	LMPCCAXG	1	ORCTCAXG	1	SNPLCAXF	1
BBCYCAXF	1	EGMTCAXF	3	LNBHCAXF	1	ORLNCAXF	3	SNTMCAXF	1
BBLKCAXF	1	ELMGCAXF	3	LNBHCAXG	1	ORMACAXF	3	SNYMCAXF	1
BDGRCAXF	3	ELRICAXF	1	LNBHCAXH	1	OXNRCAXF	1	SPLVCAXF	1
BELRCAXF	1	ELSNCAXF	1	LNBHCAXL	1	OXNRCAXG	1	SRMDCAXF	1
BGPICAXF	3	ELSNCAXG	1	LNBHCAXM	1	PACMCAXF	1	STMRCAXF	2
BGRVCAXF	3	ELWDCAXF	1	LNBHCAXS	1	PCPLCAXF	1	SURFCAXF	2
BLFLCAXF	1	ETWNCAXF	1	LNBHCAXT	1	PCRVCAXF	1	SVYFCAXF	2
BLGRCAXF	1	EXTRCAXF	1	LNCSCAXF	2	PDRYCAXF	1	SYLMCAXF	1
BLPKCAXF	1	FLWSCAXF	2	LNCSCAXG	1	PERSCAXF	1	TAFTCAXF	2
BLYTCAXF	2	FRTNCAXF	3	LNDNCAXF	2	PHLNCAXF	2	THOKCAXF	1
BNNGCAXF	1	FTIRCAXF	1	LNDSCAXF	1	PIRCCAXF	3	THOKCAXH	1
BNTNCAXF	3	FWLRCAXF	2	LNPNCAXF	3	PLDSCAXF	1	THPLCAXF	1
BORNCAXF	3	GDLPCAXG	1	LNWDCAXF	2	PLSPCAXG	1	THRMCAXF	2
BRDNCAXF	1	GGVGCAXF	3	LSALCAXF	2	PLVRCAXF	3	TMCLCAXG	1
BRMSCAXF	4	GLNDCAXF	1	LSGTCAXA	1	PNCKCAXF	3	TMCLCAXH	1
BRPTCAXF	3	GLRYCAXF	1	LSGTCAXF	1	PNYNCAXF	2	TMCVCAXH	3
BRSWCAXH	1	GLVLCAXF	3	LSGTCAXG	1	POMNCAXF	1	TPNGCAXF	1
BRSWCAXJ	1	GOLTCAXF	1	LSHLCAXF	3	PRDMCAXD	2	TRNCCAXF	1
BSHPCAXG	2	GRHLCAXF	1	LSSRCAXF	1	PRFDCAXF	4	TRNCCAXG	1
BTNWCAXF	2	GRVLCAXF	2	LTHPCAXF	1	QUVYCAXF	1	TRNQCAXF	3
BUMTCAXF	1	HEMTCAXF	1	LVNGCAXF	3	QZHLCAXF	1	TRONCAXF	2
CCHLCAXF	1	HMLDCAXF	2	LVRNCAXF	1	RBNSCAXG	2	TVVYCAXF	2
CCMNCAXF	1	HMVYCAXF	2	LYVLCAXF	3	RDBHCAXF	1	TWPLCAXF	2
CEVLCAXF	3	HNBHCAXF	1	MALBCAXF	1	RDGCCAXG	1	TWPLCAXG	2
CFCYCAXF	2	HNBHCAXG	1	MALBCAXG	1	RDLDCAXF	1	UPLDCAXF	1
CHLKCAXF	2	HNBHCAXH	1	MCFACAXF	2	RDLYCAXF	1	VLVSCAXF	1
CHNOCAXF	1	HNBHCAXL	1	MCKTCAXF	3	RIPNCAXF	1	VTVLCAXA	1
CHSPCAXF	3	HOPACAXF	2	MDRVCAXF	3	RLHLCAXF	1	WDFRCAXF	3
CLCYCAXG	1	HRBHCAXA	1	MECCCAXF	2	RNBGCAXF	3	WEMRCAXF	2
CLEMCAXF	2	HSPRCAXF	1	MENTCAXF	1	RNCACAXF	1	WHTNCAXF	3
CLFXCAXF	2	HVSUCAXF	3	MMLKCAXF	1	RNMGCAXF	1	WHTRCAXF	1
CLMSCAXF	1	HYFKCAXF	3	MNBHCAXF	1	RNSPCAXF	1	WHTRCAXG	1
CLMTCAXF	1	IDYLCAXF	2	MNRVCAXG	1	SERNCAXG	2	WHTRCAXH	1
CMRLCAXF	1	INDICAXG	1	MNTCCAXG	1	SLBHCAXF	1	WHTRCAXJ	1
CNCKCAXF	3	INDPCAXF	3	MNTTCAXF	1	SLCYCAXF	3	WLANCAXF	1
COVNCAXF	1	INYKCAXF	3	MRCPCAXF	3	SLGBCAXF	1	WLANCAXG	1
CRCRCAXF	2	JNLKCAXF	3	MRHLCAXF	1	SLVNCAXG	1	WLANCAXH	1
CRLKCAXF	3	JSTRCAXF	2	MRMNCAXF	3	SNBBCAXF	1	WLANCAXJ	1
CRLNCAXF	1	KNLDCAXF	3	MRVYCAXF	2	SNBBCAXG	1	WLDNCAXF	2
CRPRCAXF	1	KNWDCAXF	1	MSCYCAXF	1	SNBRCAXH	1	WLNTCAXF	1
CUYMCAXF	3	KRVLCAXF	2	MUGUCAXF	1	SNBRCAXK	1	WMNSCAXF	1
CVELCAXF	3	LAHBCAXF	1	MURTCAXF	1	SNBRCAXL	1	WRWDCAXF	1
CZDRCAXG	2	LAPNCAXF	1	NEDWCAXF	2	SNBRCAXN	1	WVVLCAXG	2
DHSPCAXF	1	LAPNCAXG	1	NOVTCAXF	1	SNCYCAXF	1	WWCKCAXF	2
DMBRCAXF	1	LAPNCAXL	1	NRWLCAXF	1	SNDMCAXF	1	YCVYCAXG	1
DNLPCAXF	2	LAQNCAXG	1	NRWLCAXG	1	SNFNCAXG	1	YERMCAXF	2
DSCTCAXG	2	LCVYCAXF	2	NSHRCAXF	2	SNGRCAXF	1	YUCPCAXF	1

(END OF APPENDIX C)

Appendix D
Glossary of Acronyms

ACF	Annual cost factor
ARMIS	Automated Reporting Management Information System
CAPM	Capital asset pricing model
CCPs	Consensus Costing Principles
CEV	Controlled environmental vault
CLC	Competitive local exchange carrier
DA	Distribution area
DCF	Discounted cash flow
DLC	Digital loop carrier
DSL	Digital subscriber line
ECRIS	Engineering Construction Records Information System
FCC	Federal Communications Commission
HM 5.3	HAI Model, Version 5.3
IDLC	Integrated digital loop carrier
ILEC	Incumbent local exchange carrier
IOF	Interoffice facilities
MBB	Monopoly Building Block
NID	Network interface device
NRF	New Regulatory Framework
OANAD	Commission Rulemaking 94-04-003 regarding "Open Access and Network Architecture Development"
POTS	Plain old telephone service
RBOC	regional bell operating company
ROE	return on equity
RT	Remote terminal
SAI	Serving area interface
SS7	Signaling System 7
TELRIC	Total element long run incremental cost methodology
TSLRIC	Total service long run incremental cost methodology
TNS	Taylor Nelson Sofres
TRO	FCC's Triennial Review Order
TRRO	FCC's Triennial Review Remand Order
UDLC	Universal digital loop carrier
UNE	Unbundled network element
UNE-P	Unbundled network element platform
VGE	voice grade equivalent

(End of Appendix D)

APPENDIX E

LIST OF APPEARANCES

Respondents: Elaine Duncan, and Rudolph M. Reyes, Attorneys at Law, for Verizon California, Inc.; Preston Gates Ellis & Rouvelas Meeds LLP, by Christopher S. Huther and Megan H. Troy, Attorneys at Law for Verizon California, Inc.; Wilmer Cutler Pickering Hale and Dorr LLP, by Catherine Kane Ronis and William R. Richardson, Jr., Attorneys at Law for Verizon California, Inc.

Interested Parties: Regina Costa, Representative, and Christine Mailloux, Attorney at Law, for The Utility Reform Network; David Discher, Attorney at Law, for SBC California; Joseph S. Faber, Attorney at Law, for California Association of Competitive Telephone Companies; William C. Harrelson, Attorney at Law, for MCI, Inc.; Richard E. Heatter, Representative, and Marilyn H. Ash, Attorney at Law, for Mpower Communications Corp.; Kimberly M. Kirby, Attorney at Law, for Cbyond Communications LLC; David J. Miller, Attorney at Law, for AT&T Communications of California, Inc.; Katherine Mudge, Attorney at Law, for Covad Communications Company; Earl Nicholas Selby and Michael A. Morris, Attorneys at Law, for XO California, Inc.; Terrance A. Spann, Attorney at Law, for United States Department of Defense and All Other Federal Executive Agencies; Glenn Stover, Attorney at Law, for Anew Telecommunications Corporation and Navigator Telecommunications, LLC;

Office of Ratepayer Advocates: Natalie Billingsley, Representative, and Natalie D. Wales, Attorney at Law.

(End of Appendix E)