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May 29, 1998

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FCC MAIL ROOM

Magalie R. Salas, Secretary
Federal Communications Commission
1919 M Street NW, Room 222
Washington, D.C. 20554

RE: CC Docket Nos. 96-45, 97-160, Selected Issues Regarding the Forward-Looking Economic Cost Mechanism for Universal Service Support, DA 98-848, Comments of the Washington Utilities and Transportation Commission.

Dear Ms. Salas:

Pursuant to the Federal Communications Commission's Public Notice in the above referenced proceeding, enclosed for filing are ~~an original and five~~ SIXTEN copies of the Washington Utilities and Transportation Commission's Eighth Supplemental Order in WUTC Docket No. UT-960369. This document is submitted as an informational comment. We are also filing copies with International Transcription Services, Inc. and Ms. Sheryl Todd in the Common Carrier Bureau

Please contact Tom Wilson at (360)-664-1293, *tomw@wutc.wa.gov,* if you have any questions about this filing.

Sincerely,

GREGORY J. TRAUTMAN
Assistant Attorney General

GJT:kll
Enclosures

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BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale	DOCKET NO. UT-960369
In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale for U S WEST COMMUNICATIONS, INC.	DOCKET NO. UT-960370
In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale for GTE NORTHWEST INCORPORATED	DOCKET NO. UT-960371

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EIGHTH SUPPLEMENTAL ORDER INTERIM ORDER ESTABLISHING COSTS FOR DETERMINING PRICES IN PHASE II; AND NOTICE OF PREHEARING CONFERENCE (MAY 11, 1998)

BACKGROUND

On November 21, 1996,[1] the Commission initiated the proceedings in these consolidated matters to consider cost and pricing issues arising out of the Commission's October 23, 1996 Order[2] in several arbitration dockets, and its obligations under the Telecommunications Act of 1996[3] to establish rates for interconnection, unbundled network elements, transport and termination, and resale. 47 U.S.C. § 252(d).[4]

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[1] Order Instituting Investigations; Order of Consolidation; and Notice of Prehearing Conference, Docket Nos. UT-960369,-960370,-960371 (November 21, 1996) (Generic Cost Case Order).

[2] Order on Sprint's Petition to Intervene and to Establish Generic Pricing Proceeding, Docket Nos. UT-960307,-960309,-960310,-960323,-960326,-960332 (October 23, 1996).

[3] Telecommunications Act of 1996, 47 U.S.C. § 151 *et seq.* (1996) (Act).

[4] While this proceeding implements the 1996 Act, the Commission also acts under authority of Title 80 RCW and Title 480 WAC. See, Fourth Supplemental Order, Docket No. UT-941465, *et seq.*

SUMMARY

Scope of Proceedings: The Generic Cost Case Order commenced and consolidated three separate investigations, to be addressed by the Commission in two distinct phases of this proceeding. The first phase of this proceeding is a "generic" investigation to develop an appropriate and consistent cost methodology with which to determine the costs of providing certain telecommunications services. The second phase of this proceeding is an investigation of two local exchange companies (LECs), U S WEST Communications, Inc. (U S WEST), and GTE Northwest Incorporated (GTE), to determine, using the cost methodology and costs we establish in the instant Order, the proper level of prices to be charged by these companies for interconnection, unbundled network elements, transport and termination, wholesale and resale discounts, and interim number portability and collocation.

The instant Order accomplishes the Commission's goals of establishing a cost methodology and costs for use in the second phase of this proceeding. In Phase II, we will establish prices or price ranges based upon the cost methodology and costs. Those prices or price ranges will apply to agreements approved by the Commission in various arbitrated, negotiated, and adopted agreements executed by incumbent local exchange companies (ILECs), U S WEST and GTE, and various new entrant competitive local exchange companies (CLECs), and to all such future agreements executed between ILECs and CLECs registered to provide local exchange service in this state.

The Commission believes the instant Order is a seminal event in the implementation of the Act. The telecommunications industry and consumers must concur given the interest attending Phase I of this proceeding. The parties included fifteen telecommunications companies and three associations, in addition to Commission Staff and Public Counsel. In addition to over fifteen thousand pages of written testimony and exhibits, cost studies, and post-hearing briefs, the record includes over three thousand pages of transcribed hearings.

The Commission conducted eight days of evidentiary hearings before Commissioners Richard Hemstad and William R. Gillis, and Administrative Law Judge Terrence Stapleton, including a marathon 16½ hour hearing on the final day. The proceeding also included two pre-hearing workshops with cost modeling experts and the parties' subject matter experts, and one post-hearing workshop in response to a Commission bench request.

The Commission gratefully acknowledges the significant effort, substantial resources, and enormous contribution of the parties in Phase I of this proceeding. We also acknowledge the contributions of the developers of the Hatfield Model and Benchmark Cost Proxy Model who, while not a direct party in name, nonetheless through their sponsoring parties, contributed significant amounts of time and resources to this proceeding.

Later in this Order, we notice Phase II of this proceeding, the pricing phase of these consolidated matters. The notice names the date for convening a pre-hearing conference, and requires U S WEST and GTE to distribute at that time the written testimony and exhibits and tariffs on which the Companies will rely in the pricing phase of this proceeding.

Parties: The following parties and their representatives appeared in Phase I of this proceeding: Richard E. Potter and John Williams for GTE Northwest Incorporated (GTE); Richard Finnigan for Washington Independent Telephone Association (WITA); Edward T. Shaw, Lisa Anderl, John Devaney, and Doug Owens for U S WEST Communications, Inc. (U S WEST); Carol Matchett for Sprint Communications Company, L.L.P. (Sprint); Seth M. Lubin for United Telephone Company of the Northwest (United); Clyde H. MacIver and Brooks Harlow for MCI Telecommunications Corporation (MCI), MCImetro Access Transmission Services Inc. (MCImetro), WorldCom Inc. d/b/a LDDS WorldCom (WorldCom), and Telecommunications Resellers Association (TRA); Elizabeth Thomas for Shared Communications Services, Inc. (SCS); Sara Siegler Miller for Frontier Telemanagement (Frontier); Gregory J. Kopta and for TCG Seattle (TCG) and NextLink Washington LLC (NextLink) and Debbi Waldbaum for TCG Seattle; Arthur A. Butler for Telecommunications Ratepayers for Cost-based and Equitable Rates (TRACER); Dan Waggoner, Mary Steele, and Susan Proctor for AT&T Communications of the Pacific Northwest, Inc. (AT&T); Ellen Deutsch and Rob McMillin for Electric Lightwave Inc. (ELI); Richard Rindler and Douglas Bonner for MFS Communications Company, Inc., and GST Telecom of Washington, Inc.; Gregory J. Trautman and Shannon E. Smith for Staff of the Washington Utilities and Transportation Commission (Commission Staff); and Robert F. Manifold for Public Counsel Section of the Office of the Attorney General (Public Counsel).

Commission: The Commission orders the following costs: (1) U S WEST loop cost of $17.00 and GTE loop cost of $20.00; (2) monthly port cost for both GTE and U S WEST of $1.29, and per minute of use cost of the switch of $0.00136 for GTE and $0.00115 for U S WEST; (3) general wholesale discount for U S WEST of 14.69%; (4) cost of interim local number portability for both U S WEST and GTE of $1.50; (5) for U S WEST, a nonrecurring loop installation cost of $30.15 and disconnection cost of $11.58.

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MEMORANDUM[5]

I. PROCEDURAL

1. On August 1, 1996, the Federal Communications Commission (FCC) adopted rules to implement the local competition provisions of the Act ("FCC Interconnection Order").[6] As the FCC notes in its Order at paragraph one:

> The Telecommunications Act of 1996 fundamentally changes telecommunications regulation. * * * In the new regulatory regime, we and the states remove the outdated barriers that protect monopolies from competition and affirmatively promote efficient competition using tools forged by Congress.

And, further, at paragraph three:

> [W]e are taking the steps that will achieve the pro-competitive, deregulatory goals of the 1996 Act. The Act directs us and our state colleagues to remove not only statutory and regulatory impediments to competition, but economic and operational impediments as well.

In this proceeding, we continue the task of addressing economic and operational impediments to competition begun in Docket No. UT-941464, *et al*,[7] collectively referenced as the Commission's "Interconnection cases."

In this Order, we use many technical terms, from both the cost modeling discipline and the telecommunications industry generally, and provide at *Appendix C -- Definitions* to this Order a glossary of terms and their meaning.

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[5] Due to the technical complexity of the economic cost models we investigate in this proceeding, the sheer volume of qualitative and quantitative assumptions, inputs, and values we analyze and address, and the scope and breadth of our decision, each separately numbered paragraph of our Order constitutes a Commission finding. We augment those findings by a series of general findings at the end of this Order.

[6] *In the Matter of the Implementation of the Local Competition Rules of the Telecommunications Act of 1996*, CC Docket 96-98, First Report and Order (August 8, 1996), Appendix B - Final Rules.

[7] Washington Utilities and Transportation Commission v. U S WEST Communications, Inc., Docket No. UT-941464; TCG Seattle and Digital Direct of Seattle, Inc., v. U S WEST Communications, Inc., Docket No. UT-941465; TCG Seattle v. GTE Northwest Incorporated, Docket No. UT-950146; and Electric Lightwave, Inc. v. GTE Northwest Incorporated, Docket No. UT-950265

II. INTRODUCTION

2. On February 8, 1996, the President of the United States signed into law the Telecommunications Act of 1996 (Act). This law promotes development of competition in the telecommunications industry, particularly in the provision of local exchange services. The Act requires all states to allow competition in previously protected local exchange markets. As part of this process, each state regulatory commission must develop pro-competition rules in accordance with the guidelines that are established by the Federal Communications Commission (FCC).

3. Pursuant to Section 252(b)(1) of the Act, if the parties to an interconnection arrangement are unable to reach agreement on the terms and conditions for interconnection, a requesting carrier may petition its state regulatory commission to arbitrate any unresolved issues by voluntary negotiation. A number of companies were unable to reach complete agreement with U S WEST and GTE, and exercised their right to arbitration, pursuant to Section 252(b)(1) of the Act. In those arbitration proceedings, the Commission established interim prices for interconnection, unbundled network elements, transport and termination, and the wholesale avoided cost discount pending this cost and pricing proceeding. The prices resulting from Phase II of this proceeding will replace those interim prices.

4. This proceeding is conducted essentially under our statutory authority to set prices for interconnection, collocation, unbundled network elements, and resale. The permanent costing and pricing decisions which result from this proceeding, however, also must comport with the applicable cost and pricing standards set forth in the Act.

5. Just and reasonable rates for interconnection[8] and unbundled network elements are to be based upon the cost of providing interconnection or the network element. The cost is to be determined without reference to a rate-of-return or other rate-based proceeding. The prices established may include a reasonable profit. 47 U.S.C. § 252(d)(1)(A).

6. Charges for the transport and termination of traffic are to be on a reciprocal compensation basis, the terms and conditions of which are to be just and reasonable. 47 U.S.C. § 251(b)(5). Just and reasonable terms and conditions allow each carrier to recover the costs associated with the transport and termination of calls

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[8] The term 'network element' means a facility or equipment used in the provision of a telecommunications service. Such term also includes features, functions, and capabilities that are provided by means of such facility or equipment, including subscriber numbers, databases, signaling systems, and information sufficient for billing and collection, or used in the transmission, routing, or other provision of a telecommunications service. 47 U.S.C. §153.

that originate on another carrier's network. §252(d)(2)(A). The terms and conditions must determine the costs on the basis of a reasonable approximation of the additional costs of terminating such calls.

7. The costing (and pricing) standard for establishing a wholesale discount pursuant to the Act is contained in Section 252(d)(3): "[f]or the purposes of section 251(c)(4), a State commission shall determine wholesale rates on the basis of retail rates charged to subscribers for the telecommunications service requested, excluding the portion thereof attributable to any marketing, billing, collection, and other costs that will be avoided by the local exchange carrier."

8. With regard to collocation[9], local exchange companies are required to provide "rates, terms, and conditions that are just, reasonable, and nondiscriminatory." §251(c)(6).

9. The FCC's Interconnection Order provides guidance on many costing and pricing issues, but its recommendations are largely non-binding. *Iowa Utilities Board v. FCC*, 120 F.3d 753 (8th Cir. 1997). The FCC has provided valuable guidance for the costing of unbundled network elements. In its Order, the FCC stated that total element long-run incremental cost (TELRIC) should be used to estimate the cost of unbundled network elements. The analysis is explained in paragraphs 674-740 of the FCC's Order. All parties in this case advocate the TELRIC methodology as the appropriate costing analysis. U S WEST Brief at 4.

10. The TELRIC methodology 1) assumes the use of best available technology within the limits of existing network facilities; 2) makes realistic assumptions about capacity utilization rates, spare capacity, field conditions, and fill factors; 3) employs a forward-looking, risk-adjusted cost of capital; 4) uses economic depreciation rates for capital recovery; and 5) properly attributes indirect expenses to network elements on a cost-causative basis. See, for example, FCC Interconnection Order ¶¶674-703; Exh. 1 at 21-39; Exh. 112 at 12.

11. By following these cost principles, a cost floor that reflects the prospective economic costs incurred by an efficient supplier is established for each network element. In Phase II of this proceeding, the cost will be used to set the price for the network element. Historically, the justness and reasonableness of regulated rates has been judged, in part, with reference to the cost-of-service. Martin G. Glaeser, Public Utilities in American Capitalism (New York: Macmillan Company, 1957), p.196.

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[9] Physical collocation allows competitive service providers and end-users to terminate their own special access and switched transport access transmission facilities at a LECs' central offices, with the interconnecting party the LEC for central office floor space. Virtual collocation allows interconnectors to designate central office transmission equipment to be dedicated to their use, as well as to monitor and control their circuits terminating in the LEC central office. These interconnectors do not pay for the LECs' floor space and have no right to enter the LEC central office.

12. Economic efficiency dictates that the cost floor be established in a manner which maximizes society's welfare and is consistent with the Act's requirement that the rates be just and reasonable. We will set prices for unbundled network elements in Phase II of this proceeding. Setting economically efficient prices will provide the right signal to competitive local exchange carriers (CLECs). Most importantly, it will help them in making their decision either to construct their own network or to lease facilities from the incumbent local exchange carrier (ILEC). If the price of an unbundled network element is set too high, a CLEC may build facilities when society's scarce resources would be better employed if it had rented facilities from the ILEC. On the other hand, if the price of unbundled network elements is set too low, a CLEC may rent facilities from an ILEC rather than build. This would reduce society's well-being, because the least cost supplier is not the one who is building and maintaining the network facilities. In order to maximize society's welfare, resources should be directed toward the supplier that can construct a network at the lowest cost to society. Exh. 1 at 22.

13. The local loop is the most difficult facility for any potential competitive local exchange carrier to replicate. For this reason, the parties' evaluation of the competing cost models has focused on the cost estimates generated for the local loop. U S WEST uses its Regional Loop Cost Analysis Program ("RLCAP") as the basis for generating the costs it estimates for the local loop. The estimated costs for all unbundled network elements propounded AT&T/MCI were generated by the Hatfield Model. Sprint recommends that the Benchmark Cost Proxy Model (BCPM) be used to estimate the cost of the loop. GTE uses its loop technology model (LTM).

14. The evaluation of any model involves two important steps. First, do the algorithms (formulas) adequately capture the salient cost characteristics of the network? As Commission Staff has pointed out, an analytical model is a simplified representation of some aspect of the real world. Analysts use models to organize the complexity of the real world into some orderly form. Commission Staff Brief at 6. In our comparison of the different models, we consider, among other factors, the degree to which each model's cost algorithms accurately estimate the economic impact of the primary cost drivers in a network.

15. After the algorithms are established, values must be set as inputs for the cost models. While considerable attention has been given to the reasonableness of the different models' algorithms, the parties have spent the majority of their time presenting evidence on the reasonableness of the inputs to the various models. See, for example, Exhs. 48, 53, and 162. Their efforts are reflected in our findings *infra*. While we spend some time discussing the reasonableness of the different models' algorithms, most of the discussion concerning the cost of the loop focuses on what constitutes reasonable input values for the different models. The cost estimates generated by the parties' cost studies tend to converge when the same inputs are used in the various models. See, for example, Exhs. 48 and 162.

16. The second primary issue in this proceeding is the wholesale discount provided pursuant to Section 252(d)(3). The Act requires that telecommunications services be made available for resale at a discount which reflects costs that are avoided in a wholesale environment. §251(c)(4). Here, too, guidance is provided by the FCC Interconnection Order; however, as with the costing and pricing of unbundled network elements, the FCC's findings are not binding.

17. Finally, the FCC recommends that state regulatory commissions identify costs that are directly avoided when the ILEC is no longer the contact point for retail customers. These directly avoided costs are then "loaded" for expenses that are indirectly related to the provision of retail services. For example, in a wholesale environment, the ILEC may no longer billing end-users. This results in a reduction of direct costs, such as postage, as well as indirectly related costs, such as the computer system which is used for retail billing. The directly and indirectly avoided costs are used to determine the avoided cost discount.

III. COST METHODOLOGY: PRINCIPLES

18. The objective of Phase I of this proceeding is to establish costing procedures and cost levels for unbundled network elements, interconnection, transport and termination, physical and virtual collocation, and the resale of telecommunications services. In addition, we must establish the cost of interim local number portability. In Phase II of this proceeding, we will establish prices for unbundled network elements and the price for wholesale telecommunications services. These pricing and costing procedures will be used for U S WEST and GTE.[10]

19. We previously have observed the importance of establishing appropriate costing and pricing levels: "For consumers to have competitive choice, the U S WEST network must be opened up at terms that are fair to both U S WEST and new entrants. A key part of that process is determining the costs and prices for U S WEST's services." Fifteenth Supplemental Order, Docket No. UT-950200 (April 11, 1996), at 9.

20. The costs for unbundled network elements established in Phase I of this proceeding will serve as the price floor for network elements. Although, as Commission Staff notes, this does not apply to all cost determinations, *e.g.*, the cost of interim number portability. Commission Staff Brief at 6. In Phase II of this proceeding, we will determine the extent to which there should be uniform or varying "mark-ups" for different network elements.

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[10] GTE also urges the Commission to address implementation costs, universal service support costs, and stranded costs. GTE Brief at 7.

21. Phase I has focused on the analytical models used to estimate the cost of unbundled network elements and wholesale discounts. As the Commission Staff has noted, an analytical model is a simplified representation of some aspect of the real world. Analysts use models to organize the complexity of the real world into some orderly form. Models are, by definition, simplifications or abstractions which omit some information. A model can be a very powerful analytical tool. It can act as a microscope or a telescope which may enable the analyst to focus in on the key aspects of a situation and thereby to solve problems that, in the absence of a model, would be hopelessly complex. Commission Staff Brief at 6.

22. The analytical models on the record in this case are computer models designed or used to estimate the cost of constructing and operating the public-switched telephone network. That network is exceedingly involved and complex. It encompasses millions of access lines and hundreds of switches, interoffice transmission facilities, signaling links, and other elements. Cost models are used to sort through the complexity of that network. They help to organize it into similar elements that have similar costs, and to estimate the cost of those elements. These cost models lend themselves to two basic purposes. First, they can be used to measure the cost that would be incurred should it be necessary to reconstruct the network under certain specified conditions, such as the "scorched node" assumption. Second, they can be used to disaggregate the otherwise undifferentiated costs of the network into various element costs, so that the price of a loop can be separated from the price of a switch, and the cost of a 10,000-foot loop in an exchange of a certain size can be separated from the cost of a 10,000-foot loop in an exchange of different size. In other words, one might use a model to estimate what it would cost to build a portion of the network or to rebuild the entire network. *Id.* at 7.

23. The parties basically agree that the cost levels established in Phase I should be based upon open, reliable, and economically sound cost models and cost inputs. See, for example, AT&T Brief at 9-10; Sprint Brief at 9-10; Commission Staff Brief at 11; TRACER Brief at 11. There is also basic agreement that costing should be performed in sufficient detail so that the resulting prices would lead to economically rational entry decisions by competitors, as well as efficient utilization of the incumbent local exchange company's network. Sprint Brief at 6. Such a policy would ensure that prices are set neither too high nor too low, which would best serve the public interest. (Exh. 152 at 4). We concur with the parties regarding the criteria for this costing exercise, but we note that there is disagreement among the parties over the degree to which the filed cost studies satisfy these criteria.

24. We believe that an open[11] model is in the public interest in that it provides all parties with an opportunity to fully explore the advantages and the limitations of the different cost models. Furthermore, we believe that models should be open in order for the public to have the opportunity to evaluate the information which is used to set rates. Fifteenth Supplemental Order, Docket No. UT-950200 (April 11, 1996), at 86; Fourth Supplemental Order, Docket No. UT-941464 *et al.* (October 31, 1995), at 93 (Interconnection cases).

25. An open or transparent model would provide an interested person with the opportunity to review both the compiled and uncompiled source codes. Furthermore, support for input values, and a narrative description of how the model operates, should be available. In addition, the model should be susceptible to modification and sensitivity analysis. Ninth Supplemental Order, Docket No. UT-950200 (October 19, 1995), at 2.

26. None of the models filed in this proceeding fully meet our criteria for openness. At one extreme we have the Bellcore Models. These models are largely closed. Bellcore has placed restrictions on access to and review of its models. *Seventh Supplemental Order - Supplemental Protective Order*, Docket Nos. UT-960369, *et al.* (July 11, 1997). The Hatfield and the Benchmark Cost Proxy Models (HM and BCPM, respectively), on the other hand, come the closest to being open models. While the cost algorithms are largely transparent, both proxy models use data that are not in the pubic domain. Consequently, they are difficult to audit. For example, the Hatfield Model uses data that have been collected and processed by PNR. Neither the raw data nor the processing algorithms have been made available. The sponsors of BCPM have collected cost input data from incumbent local exchange companies and have not placed the survey responses in the public record.

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[11] We have on other occasions defined what we mean by an open cost model:

> The Commission has on numerous occasions, most recently in the "term loops" order, expressed its frustration with its inability to penetrate U S WEST's calculation of costs . . . the Commission will require a transparent, rational, stable, consistent, and understandable approach, that will continue to be viable and applicable in determining costs for services in the foreseeable future . . . to allow parties to proceedings involving cost issues to have the ability to understand assumptions used, to review and analyze the effect of inputs and outputs, and to modify and model different inputs and assumptions.

Ninth Supplemental Order, Docket No. UT-950200 (October 19, 1995), at 2.

27. In judging the soundness of the cost inputs, we believe that U S WEST has proposed a useful standard: the inputs "must be *realistic, accurate estimates* of all of the *actual* costs a provider would incur if it built out a new network using the least cost, forward-looking technology." U S WEST Brief at 5.

28. The parties concur that a cost model should be used to estimate the forward-looking cost of a network element. Furthermore, most parties agree that the cost estimates for unbundled network elements should be based upon the cost of satisfying the total demand for the elements, rather than some smaller level of incremental demand. See, for example, AT&T Brief at 12, 14-15; Tr. 1007; U S WEST Brief at 14; Sprint Brief at 11.

29. WITA witness Meitzen argues that the cost estimates should not be based upon total demand. Rather, Meitzen claims that the cost models should measure the cost of satisfying some smaller level of incremental demand. Meitzen argues that using a lower level of demand better reflects the costs that local exchange companies would incur while satisfying the demand for unbundled network elements. Exh. 100 at 12; Exh. 100, MEM-2 at 6-10.

30. WITA believes that a firm's actual costs should be measured by a cost model, because these are the expenditures that must be reflected in the market price for unbundled network elements. In a competitive market, the costs incurred by an efficient supplier, not an inefficient firm, determine the market price. WITA Brief at 13; Tr. 1461-63.

31. WITA did not sponsor a cost model. Instead, it supported the adoption of both the U S WEST and GTE cost models. WITA Brief at 8. Paradoxically, both of these companies have used total demand to estimate the cost of unbundled network elements.

32. A forward-looking cost model does not measure the embedded cost-of-service. Sprint Brief at 9. The model should estimate the economic or prospective costs of providing services or elements. Fifteenth Supplemental Order, Docket No. UT-950200 (April 11, 1996), at 80; FCC Interconnection Order at ¶¶ 704-707.

33. As Sprint points out, forward-looking cost measurements require capturing the future costs of network facilities. The use of current wire center locations, along with the most efficient technology available to determine forward-looking economic costs, is the approach that most reasonably balances the interests of ILECs, CLECs, and consumers. ILECs need prices that will recover their forward-looking economic costs. CLECs need to be provided with the opportunity to compete on an equitable basis with the ILEC. Consumers benefit most when there is facility-based competition. Sprint Brief at 15-16. See, also, Commission Staff Brief at 13.

34. GTE argues that "[t]he most important and overriding criteria for any cost model is that it is accurate and has been validated." It adds that transparency and ease of use are not sufficient conditions for accepting a model. The integrity of a model is best determined by the degree to which its inputs and outputs are shown to be accurate. GTE Brief at 7.

35. Based upon the evidence presented in this case, we conclude that none of the current versions of the models should be adopted for use in future proceedings. All of the models are going through an evolutionary process. Consequently, it would serve no purpose to adopt versions of the models presented in this proceeding as a Commission "sanctioned" model. Rather, as suggested by U S WEST, we believe that the models filed in this proceeding should be used to establish a reasonable range of costs that can be used as the basis for setting prices in Phase II. U S WEST Brief at 6-7.

36. Our decision not to endorse a particular model should not be interpreted as a reversal of policies adopted in recent cases. Specifically, we continue our endorsement of open models. The two loop proxy models, BCPM and HM, allow parties to closely review the algorithms without being subject to the constraint of restrictive proprietary agreements. We believe that open models allow for a fuller discussion of each model's advantages and disadvantages. For this reason, we believe that, to the greatest extent possible, models presented to the Commission in future proceedings should be open.

37. We concur with GTE that the inputs to the cost models need to be validated. We agree, in part, with GTE's position that model outputs need to be validated. For some cost elements, it is possible to validate the outputs. For example, periodically new switching machines are acquired which provide service to an entire wire center. When such an acquisition is made, facilities are installed to satisfy total demand. Hence, the amount recently paid for a new switch provides a good metric of the prospective economic cost of a switching machine. But for the loop, neither GTE nor any other party has provided a useful method for validating the loop investment estimates. See, for example, Tr. 940-944. Validation for the loop models is more difficult, because often facilities are installed to satisfy a portion of the demand, rather than the total demand in a wire center. Consequently, the costs incurred do not correspond to the expenditures required to satisfy the total demand for loops.[12]

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[12] U S WEST did present information from its broadband experiment in Omaha, Nebraska. We concur with AT&T witness Fassett that the experience from this broadband trial does not provide a basis for modeling the construction cost of telecommunications outside plant. Exh. 6 at 8-9; Exh. 130 at 3, 38-39.

38. Economic cost models provide a useful analytical tool for evaluating the reasonableness of rates. The models presented in this proceeding were designed to estimate the total element long-run incremental cost (TELRIC). We agree that this is the correct costing standard, and that the cost estimates should be based upon the cost of satisfying the total demand for elements rather than some lesser level of incremental demand. We find, however, that none of the models satisfies the Commission's objective of being open, reliable, and economically sound. Therefore, while some parties argue that a cost model should be adopted by this Commission, we decline to do so at this time, for the reasons fully described in this section.

IV. TRANSITION COSTS

39. The Act requires ILECs to modify their networks so that CLECs may obtain such items as unbundled network elements and wholesale services through operational support systems (OSS). ILECs claim that the Act has compelled them to pay for unplanned network upgrades. The term "transition costs" is used to characterize any expenditures that ILECs make to their networks in order to comply with the statutory requirements of the Act. Second Supplemental Order, Docket No. UT-970010 (November 7, 1997). AT&T argues that "transition costs are not an appropriate part of TELRIC (*i.e.*, the costs of unbundling) because in a genuine TELRIC environment, the network would already be designed to provide unbundled network elements." AT&T Brief at 18, citing Exh. 1 at 37.

40. In this Order, we do not rule on all issues related to the recovery of transition costs. Instead, we have reserved our findings on certain topics until this matter is more fully explored during Phase II of this proceeding. Nevertheless, we do find certain areas in which ILECS are entitled to compensation for their transition costs. For example, when a local exchange company must incur costs to separate unbundled loops from retail loops through the use of AD4 channel banks, the cost of this grooming should be included in the TELRIC of a loop.

41. The Commission will consider the recovery of transition costs in Phase II of this proceeding. Second Supplemental Order, Docket No. UT-970010 (November 7, 1997), at 9. In Phase II, parties are ordered to provide testimony on both the level of transition costs and the appropriate cost recovery mechanism. We request also that the parties address the reasonableness of the proposed customer transfer cost studies.[13] We have postponed our evaluation of the customer transfer cost studies for manual intervention rate, which will be considered simultaneously with our evaluation of nonrecurring expenses related to the transition to competition through resale.

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[13]The customer transfer cost studies identify the cost of transferring an existing customer/account to a local exchange service reseller.

V. COST OF THE LOOP

A. Outside Plant Placement Costs and Structure Sharing

42. Much of the testimony in this case focused on the cost of providing a loop. Parties disagreed about such issues as the appropriate level of inputs, model algorithmic errors, the ability of the model to properly identify customers' locations, and network design. We begin our evaluation of loop costs with an analysis of the testimony on outside plant placement costs and structure sharing.

1. U S WEST Placement Costs and Sharing

43. Placement costs are the costs to install outside plant facilities. The cost of placing facilities is affected by the extent to which these costs are shared with other utilities. For example, if electric, cable television, and telephone cables are placed in the same trench, the cost of opening up the ground would be shared by the different utilities. This sharing would reduce the cost of placing telephone cables.

44. U S WEST's cost model, RLCAP, presumes that the cost of installations falls into one of two categories -- easy or difficult. Installation conditions are considered "easy" when the trenching is handled by a building developer.

45. U S WEST's RLCAP model uses as an input the cost of different activities. The cost of these activities is based upon data derived from contracts with different construction companies. The mix of these activities is based upon the judgment of U S WEST engineers. U S WEST assumes that where buried cable is installed in developed residential areas, 50% of the cable sheath is installed through boring. While other types of installation processes are utilized elsewhere, the Company is effectively assuming that approximately 21% of sheath footage is installed through boring. Exh. 114 at 12; Tr. 1965.

46. U S WEST's assumption that boring would be used widely in Washington is based, in part, upon the Company's experience with constructing a broadband network in Omaha, Nebraska. U S WEST witness Harris claimed that "[t]he outside plant placement which occurred in the Omaha trial . . . was very similar to many of the costs which would be incurred in reconstructing a local exchange network according to the FCC's TELRIC rules." Exh. 113 at 17.

47. U S WEST has emphasized the need to take into account existing obstacles such as sidewalks, driveways, and gardens. In order not to damage these structures, the cost of installing plant in developed areas is increased. Exh. 114 at 13; Exh. 112 at 26.

48. Where structures exist which would reduce the cost of installing facilities, such as conduit beneath streets, the Company states that the existence of these facilities should be ignored. *Id.* at 62-63. We find these two positions to be inconsistent and to have the effect of overstating the cost of installing a loop.

49. Both the BCPM and RLCAP models require the analyst to assume the "proper" mix of such activities as boring, trenching, and plowing. U S WEST Brief at 46. Both models estimate the per foot cost of installing facilities by multiplying the cost of different activities by the likelihood that this installation procedure will be employed. These products are then summed in order to obtain the weighted cost of installing cables. Depending upon the mix of activities selected, the weighted cost per foot of installing cables can vary substantially.

50. U S WEST is a sponsor of the RLCAP in this proceeding, but has advocated the adoption of BCM2 and BCPM in FCC and other state regulatory proceedings. Exh. 83, attachment 1, at 3; Exh. 84 at 9; Exh. 114 at 36. These three models, variously sponsored by the same Company, exhibit great variance in the claimed "proper" mix of activities. In this proceeding, U S WEST is claiming that bore cable is used 50% of the time when buried cable is installed in developed areas. BCPM, a model for which it is a co-sponsor, uses an input value of approximately two percent. Exh. 114 at 12; and Exh. 83 at 20, 36.

51. The BCPM "mix of activities" was selected by a group of local exchange engineers. Tr. 1282-84.

52. U S WEST witness Reynolds argues that his Company's engineering group has verified that the costs for different activities are reasonable. Exh. 117 at 16. The cost of the activities may be reasonable, but the Company has provided data on the mix of activities which are inconsistent between studies and relative to the deposition of its field engineering operations.

53. A manager of U S WEST's field engineering operations, Genie Cervarich, testifies that the Company employs bore cable, as opposed to burying or plowing, for approximately one percent of the buried plant installations in Washington. Exh. 130 at 4, 38-39.

54. AT&T/MCI claims that bore cable is used in urban areas for approximately 10%-15% of installations. Based upon the information provided by AT&T witness Fassett, and a deposition that pertains to U S WEST's operations in Arizona, AT&T/MCI witness Zepp recommends that "a conservatively high estimate for boring cable in difficult areas is 20%." Exh. 162 at 19.

55. Based upon the evidence of record in this proceeding, we determine for purposes of the RLCAP model that five percent of the buried cable installations in developed areas require bore cable. This value is slightly higher than the value suggested by the deposition of U S WEST's field engineer and the inputs to the BCPM.[14] The deposition of U S WEST's field engineer Cervarich clearly indicates that the Company's experiment with broadband technology in Omaha is a poor barometer of the type of installation techniques used in Washington State.

56. RLCAP assumes that U S WEST will bear 100% of the cable placement costs for underground and 82% if it needs to be buried. Exh. 117 at 19. The Company claimed that these values reflect "the present and forward-looking reality that developers provide the trench in new developments for buried facilities and accounts for the fact that U S WEST incurs no trenching cost for developer-provided trench." To support its position, U S WEST cited the deposition of its field engineer, Genie Cervarich. U S WEST Brief at 40-41.

57. The deposition of U S WEST's field engineer Cervarich is not supportive of the Company's argument. Cervarich testified that outside of the downtown core area, the placement cost of underground conduit is shared with other utilities. Exh. 130 at 91. Furthermore, when a total rebuild occurs in a developed area, the likelihood of a joint undertaking with another utility increases significantly. Cervarich testified that city officials encourage utilities to coordinate their work in developed areas. Exh. 130 at 87-88.

58. U S WEST's position that it will bear 100% of the placement costs for underground work is also contradicted by the deposition of MCI employee Mark Wingate. Wingate is the manager for MCI's outside plant engineering and construction in Washington State. He supervised the construction of MCI's outside plant facilities which provide loops to customers in this state. Mr. Wingate's testimony illustrated that when a new network is constructed, there is extensive sharing with other service providers. This sharing has occurred in developed areas and it involves the sharing of both aerial and underground structures. Among other providers, MCI has shared facilities with U S WEST. Exh. C-3 at 9, 29, 41-45, 59-68, and, Deposition. Mr. Wingate's testimony provides strong support for the proposition that in urban areas the structural cost of laying conduit would be shared by various service providers.

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[14] We are unable to vary the likelihood of bore cable by density zone because the RLCAP model uses the same placement cost assumption in all areas of Washington State.

59. U S WEST also argues that it is inappropriate for the Hatfield Model sponsors to assume that sharing will occur between telecommunications providers, while at the same time presuming that the incumbent supplier will retain 100% of the market. When a cost model assumes that the incumbent will continue to serve 100% of the market, all else being equal, the cost of a loop is reduced. U S WEST Brief at 43.

60. We agree with U S WEST that, theoretically, a loss in market share would be reflected in the estimate of the economic cost of the loop. We note though that U S WEST has not presented evidence showing that it will not be realizing the economies of scale assumed in the Hatfield Model. Furthermore, U S WEST's own cost modeling effort implicitly assumes that the number of lines it will be serving would increase due to the growing demand of customers for additional lines. Exh. 117 at 39.

61. The record suggests that more competition has occurred in urban than in suburban or rural areas. Exh. C-3. To the extent that rivalry increases the unit cost of production, the cost impact would be felt almost exclusively in the more densely populated markets. Whereas none of the models permit us to directly estimate the cost impact of market share losses in more densely populated markets, we encourage parties to address how this shortcoming in the models should be reflected in setting the prices of unbundled network elements. Furthermore, in deriving our loop costs for GTE and U S WEST, we have been mindful that a drop in market share raises the unit cost. The impact of a decline in installed loops is illustrated by our findings on special access lines, *infra*, at paragraph 204. This discussion suggests only that a decline in the number of loops does have an impact on the unit cost of production.

62. RLCAP assumes that U S WEST will bear 82% of the placement cost for buried cable. This 82% represents developed areas in which U S WEST would have to bear the entire expense of burying cable in the coming five years. Exh. 114 at 12. The assumption made in the cost study that there would be no sharing in developed areas is contrary to the Company's practices as described by Cervarich.

63. We have modified the assumption made in RLCAP that there would be no sharing in developed areas. In developed areas, we have determined that seven percent of the buried placement cost is shared with other utilities. For underground conduit, we have determined that 15% of the cost is born by others. These sharing values for developed areas, when considered along with the areas in which the building developer incurs the placement costs, result in a level of sharing that falls in the range adopted, *infra*, at paragraph 76, for the Hatfield and Benchmark Cost Proxy Models.

64. GTE's loop model does not include any underground conduit or buried cable structure sharing. Tr. 1088-1092. GTE's cost analyst made this assumption without investigating the extent to which these facilities would be shared with other utilities in new developments. Tr. 1091. The assumption of zero structural sharing is contrary to the testimony provided by U S WEST witness Cervarich, MCI employee Wingate, and our understanding of telephone operations in Washington State.

65. GTE argues that the assumption of zero sharing for buried cable is reasonable because "[s]afety concerns prohibit virtually all sharing of buried cable with an electric cable[,]" adding that when cable is plowed, sharing rarely, if ever, occurs. GTE Brief at 54.

66. The evidence in this proceeding is that electric cables are placed in the same trench as telephone cables. For example, in new housing developments, it is not uncommon for multiple utilities to share the same trench. Furthermore, AT&T/MCI witness Fassett points out that due to changes in construction practices, telephone companies are placing feeder cables in the same trenches as power company facilities. Tr. 326. In addition, GTE has not explained why its trenches could not be shared with other utilities, such as cable television providers.

67. GTE argues that it was appropriate to assume no sharing of conduit because historically it has infrequently shared conduit, and because its cost model assumes a minimally sized conduit system. GTE witness Tucek speculated that if the size of the conduit system was increased to permit sharing, the unit costs would increase. Tr. 1088; GTE Brief at 54-55. We find Mr. Tucek's speculation to be contrary to the experience reported by one competitive local exchange carrier. Exh. C-3. Furthermore, if the cost of a shared conduit system was more expensive than a stand-alone system, we would expect not to observe such strong interest by the CLECs in sharing facilities with the ILECs. In order to promote rivalry, Congress required that ILECs provide access to their ducts and conduits. 47 U.S.C. §251(b)(4).

68. The GTE loop model does not provide the user with the flexibility to alter the assumption of zero structural sharing for underground conduit or buried cable. Based upon our finding, *infra*, at paragraph 76, this lack of flexibility results in an overstatement of loop costs. In our findings regarding loop costs, we will take this cost impact into account.

69. The Hatfield Model assumes that incumbent local exchange carriers would pay only one-third of the cable placement costs which would be required to reconstruct an efficient network. The Hatfield sponsors contend that while this level of sharing has not occurred in the past, competitive market pressures would compel the ILECs to seek methods for reducing their construction costs. AT&T/MCI Brief at 45-46.

70. GTE conducted a study of the extent to which it shares pole costs with electric utilities and cable television providers. A study of its operations in Washington State found that it bears 44.5% of the total cost associated with poles. GTE does not expect the extent of sharing to increase in the foreseeable future. GTE Brief at 52-53.

71. GTE's recommended 44.5% cost assignment for poles is not unlike the 50% value recommended by U S WEST. Exh. 114 at 46.

72. GTE states that the current rate of pole structure sharing "belies" the claim of the Hatfield sponsors that under rate base regulation, ILECs "had little incentive to share their outside plant structure with other users." *Id.* at 53, citing Exh. 40, RAM-3, Appendix A.

73. Commission Staff contends that the historical rate of sharing did not result in providers minimizing their production costs. They cautioned though that the degree of sharing that takes place is constrained by the "difficulty coordinating joint facility work." Staff proposes a range for sharing "which reflects the balance between maximum achievable structure sharing and the amount of structure sharing achieved historically." Staff's proposal is also designed to reflect that opportunities for sharing would be fewer in low density areas. Exh. 104 at 8-9.

74. WITA does not agree with Commission Staff's recommendations. WITA believes that the recommended values reflect too much guess work and not a sufficient amount of "real-life experience." WITA Brief at 19.

75. TCG argues that minimal sharing assumptions should not be adopted because such values are not pro-competitive: "Imposing prices on competitors that effectively reimburse ILECs for their costs of refusing to share placement would provide additional incentive to engage in anticompetitive behavior." TCG Brief at 21.

76. For the Hatfield and BCPM scenarios we run in this proceeding, we have adopted the sharing assumptions recommended by Commission Staff. Exh. 104, TLS-3, at 4. We note that these values do not consistently fall below or above the recommendations of the ILECs. For example, both GTE and U S WEST recommend a higher degree of sharing for aerial poles in rural areas than does Staff. On the other hand, both ILECs recommend less buried and underground structure sharing.

2. GTE Placement Costs

77. The BCPM, HM, and RLCAP models use as an input the "cost-per-foot" of installing different types of cable. The GTE loop technology model (LTM), on the other hand, begins with the number of hours required to install a cable. It uses this input, along with the hourly labor rate, to determine the model's "cost-per-foot" of placing the cable. Tr. 1322; Exh. C-91.

78. Like RLCAP, but unlike BCPM and HM, GTE's LTM is not an integrated model. A user of the model would have to run a number of separate modules in order to establish the cost of a loop. For example, a fundamental input to GTE's loop model is the cost-per-foot of placing cable. The cost-per-foot for different density zones is calculated in separate computer modules. All of the results must be imported into a spreadsheet and summed, in order to obtain an estimate of the cost of a loop. See, for example, Exhibit 65, WATELRIC.XLS folder Lp_InvCost, cell E41 and Folder Loop Cost E41, and Exhibit CC-32 at 14.

79. This lack of integration makes it relatively more difficult to audit or use LTM than BCPM or the HM. Exh. 31 at 50. Furthermore, since the GTE summary spreadsheet contains the cost-per-foot within a distance band, and not the investment per foot, it is harder to compare the GTE inputs with the input values used in the other models. Data on cost-per-foot are more difficult to validate because the input is of a different form than appears in the other models, and because construction contracts are stated as an investment value, rather than an annual cost. See, for example, Exh. CC-10.

80. No party suggests any changes to the input values for the GTE placement costs. Therefore, we have made no modifications to these inputs in evidence on this record.

3. BCPM Placement Costs

81. The BCPM provides an integrated module to develop structure costs for aerial, buried, and underground installations by density group and terrain difficulty. A local exchange industry group provided most of the default input values for the model, including the cost and likelihood of different placement activities. The BCPM user can vary cost of installation activities, such as plowing, as well as alter the percentage of a construction activity by density zone. In addition, the user can change the amount of an activity that can be shared between utilities, such as the placing of poles. Exh. 83 at 10-11; Exh. 84 at 4; Exh. 90 at 6.

82. AT&T/MCI argue that the placement cost inputs to the BCPM are unreasonable, but do not propose any changes. AT&T/MCI claim that it would be difficult to modify the inputs because their values were developed through a survey. This survey was not produced by the BCPM developers and, therefore, "there is no way . . . to determine how these overstatements were introduced into BCPM." Exh. 31 at 56.

83. As with the GTE model, we have made no adjustments to the BCPM input values in evidence on this record because no party has suggested the adoption of alternative values. We do note, however, that we find troublesome the method used to develop the BCPM inputs. The input values are based upon a proprietary survey that was not made available to other parties. Furthermore, the mix of activities is based upon the opinion of an industry group. As our discussion of the RLCAP placement costs illustrates, there is a considerable difference of opinion as to what constitutes an appropriate mix of activities. We believe that the parties should have provided evidence from recent installations as support for their claimed costs. The presentation of this type of data would help illuminate the question of the appropriate mix of activities associated with cable installations.

84. U S WEST argues that data from recent installations "may not be the best and most accurate predictor of a forward-looking network, because placement activity in the present environment is mostly relative to adding new facilities in undeveloped areas." U S WEST Brief at 46. We disagree. We believe that there should be sufficient evidence in the ILECs' and CLECs' accounting records, or from other sources, such as the Rural Utilities Service, to indicate the cost of replacing or reinforcing plant in developed areas.

4. Hatfield Model Placement Costs

85. The Hatfield Model's placement costs were developed by a team of engineers who collected information from outside plant contractors. The cost of installing the plant increases with the population density.

86. Hatfield Model version 3.1 uses a different classification of density zones than the prior version of the model. This change causes a large decrease in the cost of placing facilities in the 2,500-5,000 access line density zone. U S WEST argues that the higher Hatfield Model version 2.2.2 input values should be used in this case. U S WEST Brief at 46-47.

U S WEST's objection is similar in form to a criticism that was made of an important input to one of U S WEST's loop models. In this proceeding, U S WEST changed its assumed mix of difficult and easy terrain installations compared to a recent cost study filed with this Commission. This modification resulted in an

increase in the estimated cost of a loop. Public Counsel and TRACER believe that the value from the earlier study should be used in this proceeding. TRACER Brief at 23; Public Counsel Brief at 10-12. We find that simply because an input was used in a prior proceeding does not prove conclusively that the original value was correct. Rather, the party proposing a particular input to a cost model bears the burden of proving that the input value is both appropriate and reasonable.

87. Commission Staff compared the engineered, furnished, and installed (EF&I) cable costs for the different models. The average EF&I cable cost inputs found in the ILEC models were higher than in the Hatfield Model for smaller cables and lower for larger cables. Staff proposed that the average ILEC's costs be used as inputs to the Hatfield Model. Staff Brief at 24-25; Exh. 104 at 10.

88. We do not adopt Commission Staff's proposed inputs, because we find that the values are not consistent with Staff's recommended sharing values. The data extracted from U S WEST's loop model are based upon plowing the cable into the ground, a mode of installation in which sharing is less likely to occur than with trenching. Tr. 1699-1706. If sharing of the magnitude recommended by Commission Staff is to take place, we believe that most buried cable would be placed in trenches.

89. GTE objects to the manner in which the Hatfield survey data were used. For example, GTE witness Murphy pointed out that when information was collected on the cost of installing buried drop wires, the Hatfield team excluded some of the higher price quotations. Exh. CC-54 at 7-8.

90. AT&T/MCI responds that it was appropriate to exclude the more expensive vendor prices:

> Average prices were certainly not used as the default values in the Hatfield Model 3.1. In a TELRIC, or a competitive business environment, it would not be appropriate to use averages as the default values. Whenever contracts are awarded as a result of the competitive bid process, the bidder with the lowest cost proposal that meets the requirements is awarded the contract.

Exh. 8 at 6, 8.

91. Mr. Fassett, AT&T's outside plant expert, added that the vendor price data were used to validate his and other experts' opinions. *Id.* at 4, 10, 15.