BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of Determining Costs for Universal Service	)	DOCKET NO. UT-980311(a)
	)	TENTH SUPPLEMENTAL ORDER
	)	ORDER ESTABLISHING COSTS

Universal Service. The Washington State Legislature in C.337, L.1998,[1] directed the Washington Utilities and Transportation Commission (Commission) to present a report to the Legislature containing an estimate of costs and a specific proposal for funding telecommunications service to telephone subscribers in "high cost" locations. The topic of the required report is generally referred to as "universal service" because the program provides a means to assure that all residents and business, including those in high cost locations, continue to receive service priced at a reasonable and affordable level as well as the benefits of competition in an era of increasing competition. The Commission held this hearing to comply with the legislative direction. An overview of the hearing and its result begins on Page 5.

Commission Decision. This order addresses the cost-related matters and decisions necessary to produce reliable cost estimates that the Commission may use in this docket to prepare its report to the Legislature. The Commission in this order determines the cost of service for purposes of providing the estimate that the legislation requires. The Commission determines, however, that the cost estimates based on this record are not sufficient to support actual assessments or disbursements within a fund, and that additional information and additional model refinement are needed before the results may be used as the basis for actual operation of a universal service fund.

Hearings. The Commission divided its inquiry into three parts: this adjudicative phase, to develop the cost information needed for other decisions; a rulemaking proceeding, contemplated by the law, that will use the information developed in the adjudicative phase in making sound practical and policy choices; and the report to the Legislature that is required in the legislation. The Commission began this hearing at Olympia, Washington on September 9, 1998. The Commission held hearing sessions on eight days before Chairwoman Anne Levinson, Commissioners Richard Hemstad and William Gillis, and Administrative

[1]We may also refer to the law in this order as "the State USF law" or ESSB 6622, its designation when the Legislature passed it. Provisions of the law are codified in chapter 80.36 RCW, in sections 610 through 630 and in revisions to existing sections 310 through 330.

Law Judges C. Robert Wallis and Karen Caille. In addition, the Commission held evening hearing sessions to hear comments from members of the public. Based in Lacey and Spokane, Washington, two evening public hearing sessions also served persons in Seattle, Vancouver, Yakima and the Tri-Cities by interactive television link.

Participants. Participants in this adjudicative proceeding included the following representatives and parties. Gregory J. Trautman, Asst. Attorney General. Olympia, represented Commission Staff. Simon J. ffitch, Asst. Attorney General, Seattle, acted as Public Counsel; Lisa A. Anderl and Douglas N. Owens, attorneys, Seattle, for U S WEST Communications, Inc.; Richard E. Potter, Everett, Lewis Powell, attorney, Richmond, Virginia, Christopher Huther and Barry Nigro, attorneys, Washington D. C., represented GTE Northwest, Inc.; Richard A. Finnigan attorney, Olympia, represented the Washington Independent Telephone Association and individual Association members.[2] Robert S. Snyder, attorney, Olympia, represented Whidbey Telephone Company, et al.;[3] Arthur A. Butler, attorney, Seattle, represented TRACER;[4] Rogelio E. Peña, attorney, Denver, and Clyde MacIver and Brooks Harlow, attorneys, Seattle, represented MCI Telecommunications Corp. and MCImetro Access Transmission Services, Inc. Ann Wilkinson, attorney, Las Vegas, Nevada, and Judith Endejan, attorney, Seattle, represented Sprint/United Tel. Co. of the Northwest; Susan D. Proctor, attorney, Denver, represented AT&T Communications; Gregory J. Kopta, attorney, Seattle, represented Nextlink Washington LLC; Anthony D. Keating, Asst. Atty. General, Olympia, represented Washington State Dept. Of Information (DIS); Ronald Roseman, attorney, Seattle, represented the American Association of Retired Persons.

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[2]Mr. Finnigan represents the following parties: Asotin Telephone Company; Century Telephone of Cowiche; Ellensburg Telephone Company, Lewis River Telephone Company; McDaniel Telecom, Inc., Century Telephone of Washington, Century Telephone of Inter Island, Toledo Telephone Company, Inc., Yelm Telephone Co., Mashell Telecom, Inc., and Pend Oreille Telephone Company.

[3]In addition to Whidbey, Mr. Snyder represents Hat Island Telephone Company, Hood Canal telephone Co., Inc., Tenino Telephone company, Kalama Telephone Company, Inland Telephone Company, Pioneer Telephone Company, St. John Cooperative Telephone and Telegraph Company, and Western Wahkiakum County Telephone Company.

[4]TRACER stands for Telephone Ratepayers for Fair and Equitable Rates.

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OVERVIEW

1. **The Telecom Act.** The Federal Telecommunications Act of 1996[5] is changing the nature of telecommunications regulation in the United States. Later in this order we will discuss several of the interrelated elements of the Commission's response to the Act and the circumstances that it has engendered. To begin this introduction, we need only say that the Telecom Act requires the Federal Communications Commission (FCC) and the states to open telecommunications markets to competition.

2. **Implicit Support.** At the present time, rates for local telecommunications service are averaged. This means that service in low cost areas tends to be priced higher than cost and service in high cost areas tends to be priced lower than cost. In addition, some services have historically been priced farther above cost than others. The result is that on average, a regulated company recovers its costs and earns a profit. The higher price for low-cost services provides "implicit" support – that is, it is not set out or identified anywhere as support for the high-cost services even though it serves that function.

3. **Effects of Competition.** Opening telecommunications markets to competition means that prices for services will tend to become more cost-based. If they do not, high-margin services will provide economic incentive for competitive entry, removing the likelihood that prices can be sustained higher than cost over the longer term. If incumbents lower their prices in competitive, low-cost markets, the price reductions will reduce or eliminate the support that is currently provided to high-cost customers. The alternative may be no more attractive to the incumbent: if prices to low-cost customers are not reduced, there is a greater likelihood that competitors will be able to attract the incumbent's

[5]The Federal Telecommunications Act of 1996, Pub.L.No.104-104, 110 Stat. 56, codified at 47 USC Sections 151, et seq. The Act will be referred to simply as "the Telecom Act" in this order.

customers. These competitive losses will also eliminate an important source of support to high-cost customers. To the extent that competitive entry occurs, policies that require companies to charge average rates disadvantage incumbent carriers and may not be sustainable.

4. **Competition is Mandated.** We have no choice about whether to allow competition. Both the Telecom Act and Washington State's own Regulatory Flexibility law[6] mandate a shift from regulated monopolies for the provision of telecommunications services to reliance on competitive markets. The "reg flex" law not only directs us to nurture competition, it promotes the diversity of services and companies and anticipates steps toward universal service. We agree with the principle underlying the statutes that competition can be an effective market regulator and that the benefits of robust competition -- including lower prices, innovation and improved service quality -- outweigh the possible burdens from lack of regulatory protections.

5. **Access Charges and Unbundled Elements.** The diminished ability of incumbents to average rates is not the only factor affecting their ability to maintain low prices for high-cost services. In other proceedings, the Commission is addressing pricing for access charges and unbundled network elements. Some companies operating in high-cost areas have set prices higher than the incremental cost for access, that is, for allowing long-distance telecommunications companies to reach and be reached by the local company's customers. With access charge reform and the emergence of competition, however, the ability to charge prices above cost may be reduced, removing another source of implicit support.[7] Another element in the overall picture is the pricing of unbundled wholesale network elements, or UNEs. Incumbent local exchange companies (ILECs) are required under terms of the Telecom Act to unbundle their network and to provide the retail services on a wholesale basis to competitive companies (CLECs) . The averaging of prices for those wholesale elements has offered the same kind of benefit for support of high-cost areas average cost pricing for retail telecommunications service,[8] and it

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[6]Regulatory Flexibility Act of 1985, Chapter 450, Laws of 1985, codified at RCW 80.36.300 et seq.

[7]The Commission began the process of access charge reform in Washington State in Docket No. UT-970325. The Commission's Order adopting rules in that docket describes the practical and philosophical issues that culminated in the rule.

[8]The Commission has addressed wholesale unbundled network element cost issues in a "generic" cost docket, UT-960369, et al., and is now engaged in that docket in hearings aimed at implementing those cost decisions in the pricing of UNEs. When we use the term "Eighth Supplemental Order" or "Ninth Supplemental Order" in this order without further citation, we refer to those orders in the generic cost docket. The Eighth Supplemental Order is fully cited as Eighth Supplemental Order Interim Order Establishing Costs for Determining Prices in Phase II, Docket Nos. UT-960369, 9360370, and 960371. (May 11, 1998; In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale.)

now presents an analogous vulnerability to competition and loss of implicit support.

6. **Universal Service.** The quandary that is set upon us by all of the forces described above, driven by the competition that is mandated in both state and federal legislation, is the erosion of two of the main sources of implicit support for high cost service, averaged rates and access charges. Both the Telecom Act and the policy of the State favor preserving universal service, which not only adds to the value of the network for all customers but also provides an essential communications lifeline that connects families and businesses with emergency response and with employment and commercial markets. The question is how to ensure that all citizens and businesses in the state share in the benefits emerging from competition for local telecommunications service.

7. **Preliminary Cost Estimates.** The Commission last year undertook preliminary estimates of the costs of service in some exchanges throughout the State, and found that costs of basic local service in some high cost exchanges might exceed $400 per month. Those estimates have in general terms been confirmed in this docket. Clearly, if some means is not found to provide service at more modest prices, fewer persons will subscribe to service, the goal of universal service will be eroded, many families and businesses will be without adequate – or without any – service, and the lack of telecommunications service at affordable rates may make large portions of the state undesirable places to live, work, and conduct business. In addition, the state may be out of compliance with Section 254 of the federal Telecom Act, requiring prices to be affordable and reasonably comparable.

8. **Federal Universal Service Fund.** The FCC is proceeding under terms of the Telecom Act to prepare and implement a federal Universal Service Fund to assure that competition among providers of *interstate* service does not adversely affect universal service and, as the Act requires, to assure affordable, quality service at reasonably comparable prices for high-cost subscribers, primarily in rural areas. The Telecom Act requires that states do the same in ways that are not inconsistent with FCC rules. In Washington State, the Commission probably lacks the necessary statutory authority to implement an inter-company fund consistent with the federal universal service fund[9].

9. **The State USF Act, Ch. 337, L. 1998.** The 1998 Legislature perceived the impending universal service problem. In the USF Act, chapter 337, laws of 1998, the Legislature directed the Commission to report to the Legislature in late 1998 on universal service. The statute requires the Commission to

> (1) . . . plan and prepare to implement a program for the

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[9] See, Washington Independent Tel. Assn. v. TRACER, 75 Wn. App. 356, 880 P.2d 50 (1994).

preservation and advancement of universal telecommunications service which shall not take effect until the Legislature approves the program. The purpose of the universal service program is to benefit telecommunications ratepayers in the state by minimizing implicit sources of support and maximizing explicit sources of support that are specific, sufficient, competitively neutral, and technologically neutral to support basic telecommunications services for customers of telecommunications companies in high-cost locations.

(2) In preparing a universal service program for approval by the Legislature, the commission shall:

(a) Estimate the cost of supporting all lines located in high-cost locations and the cost of supporting one primary telecommunications line for each residential or business customer located in high-cost locations;

(b) Determine the assessments that must be made on all telecommunications carriers, and the manner of collection, to provide support for [all lines and a single line per customer only]; * * *

(d) Adopt or prepare to adopt all necessary rules for administration of the program; * * * .

(3) The commission shall report by November 1, 1998,[10] to the Legislature on these steps taken to prepare for implementation and shall inform the Legislature of the estimated cost to support all lines located in high-cost locations and the estimated cost to support only one primary line for each residential or business customer located in high-cost locations under a universal service program.

The overall purpose of this Docket is threefold:[11] to prepare a program for implementing a universal service fund; to estimate the cost of the proposed universal service program; and to present a report to the Legislature containing the required product.

10. **Organization of This Docket.** The Commission opened this Docket to focus efforts on the Legislative tasks. In reviewing the information that would be needed and the resources available to obtain the

[10]After consultation with legislative leaders, the Commission is preparing to present the report to the Legislature on November 30, 1998.

[11]The results may also be used for other purposes consistent with the Commission's authority.

information, evaluate it and prepare the product for the Legislature, the Commission split the docket into three phases.

a) *The adjudicative phase* – this phase, in which the Commission uses an adjudicative process under the State Administrative Procedure Act (APA) to determine costs of service. The adjudicative phase permits receiving information under oath, permits direction in a familiar setting to parties to provide information, and facilitates the exchange of information. It also permits the protection of proprietary information.

b) *The rulemaking phase* – in the rulemaking phase the Commission has had the opportunity to receive wide comment and to determine the discretionary and policy questions inherent in establishing a universal service fund – questions such as the definitions of high cost and the benchmark determining eligibility for funding.

c) *The Report* – The Report to the Legislature will merge the cost information developed in the adjudicative phase with the discretionary decisions in the rulemaking phase. The report will present a program, and an estimate of the costs of implementing the program, in compliance with the legislative direction.

11. **The Challenges.** The Commission faced two principal challenges in its task of estimating costs of service. First was the challenge of obtaining the needed data or inputs affecting cost. The second challenge was selecting a methodology for making the cost estimates.

12. **Cost/Revenue Data Issues** Issues related to cost/revenue data involved the details of calculating costs in some instances, the production of needed revenue information that is available only to companies offering it and, with reference to the rural companies, included the question of whether to use historical ("embedded") costs or forward-looking costs. In some instances, data were available to companies but not in a form useful to the result of the hearing.

13. **Methodology Issues.** Parties to this proceeding offered the Commission three choices for determining costs. Large incumbent local exchange companies generally preferred a model called BCPM 3.1 (Benchmark Cost Proxy Model) while Interexchange carriers (IXCs), CLECs, TRACER and Commission Staff generally favored the HAI 5.0a model. The rural incumbent exchange companies expressed concern that neither of those models fairly expressed the realities faced by small, rural, high-cost companies. Instead, they favored the phased approach adopted by the FCC that would continue funding for such companies on the existing basis, while work continues on the evaluation and

refinement of appropriate cost models for small rural companies. Commission Staff urged use of the HAI 5.0a model for estimating the rural companies' costs. The FCC has recently adopted[12] a third model, the Hybrid Cost Proxy Model or HCPM, for future use in estimating costs for "non-rural" companies and has participated in establishing a task force to recommend an appropriate cost approach for estimating the costs of small rural companies.

14. **Commission Conclusions.** In this adjudicative phase, the Commission has studied the parties' proposals for cost methodologies, the information they provided, and their arguments. To the extent possible, the Commission has corrected for the cost study deficiencies that we identify in this order. We have identified costs that are reasonable for the estimates required by the State USF Act. The accurate and precise determination of costs of state universal service must await the refinement of cost model platforms and achievement of adequate input data.

15. In summary, the Commission's principal conclusions are the following:

Cost models and cost information

a) Both cost proxy models are flawed. Neither the BCPM 3.1 model nor the HAI 5.0a model at present produces sufficiently accurate results to base actual program charges or payments.

b) All models that the parties submitted contain flaws that prevent Despite the flaws, after making the adjustments that the Commission believes necessary, the models' results give a reasonable indication of relative costs of service. Even though we acknowledge that flaws remain that cannot be corrected on this record, we believe that the cost study results provide an indication of costs that is within a relatively narrow range of the "accuracy" that will be produced after the correction of model flaws.

c) Despite the flaws, after making the adjustments that the Commission believes necessary, the models' results give a reasonable indication

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[12]The FCC adopted the HCPM in CC Docket Nos. 96-45, 97-60, FCC 98-279, October 28, 1998. Critics alleged that HAI 5.0a designed a network that was not capable of providing high-speed modem access on long loops. The FCC recently rejected this criticism: "[P}roponents of the BCPM, HAI and HCPM have demonstrated that their models can allow 28.8 kbps modems to work at reasonable rates, which will permit all customers to have access to high-speed data transmission." Par. 67, Fifth Report and Order, In the Matter of Federal-State Joint Board on Universal Service, CC Docket No. 96-45 (October 28, 1998). Based on the record in this proceeding, we agree with the FCC that the HAI 5.0a engineering algorithms permit all customers to have access to high-speed data transmission.

of relative costs of service. Even though we acknowledge that flaws remain that cannot be corrected on this record, we believe that the cost study results provide an indication of costs that is within a relatively narrow range of the "accuracy" that will be produced after the correction of model flaws.

d) Results of the cost model estimates are set out in Appendix B to this order.

e) The FCC has decided to use a third cost model, the HCPM or Hybrid Cost Proxy Model. The Commission should consider its advantages and disadvantages not only to consider consistency with the federal program but also to determine whether the model is superior to the models offered in this docket for use in Washington State proceedings.

f) The Commission has identified a number of areas in which corrections must be made to the cost models or model inputs before results can be relied upon. These include assumptions or information about customer locations and expense estimates. Both the HAI 5.0a and BCPM 3.1 models fail the Minimum Spanning Tree (MST) test for the validity of model assumptions in the lowest density zones. The models may be used nonetheless, but must be adjusted by comparison with actual loop lengths. US WEST's drop length study may be used for purposes of this proceeding, but must be corrected for any future use.

g) Neither the BCPM 3.1 nor the HAI 5.0a model is open to complete review. Both use algorithms or input data that are proprietary. Restrictions on access to information impede the evaluation of the models and impede the understanding of the models' efficacy. If the BCPM 3.1 or HAI 5.0a models are proposed for use in future proceeding, the Commission will consider requiring model sponsors to provide all parties meaningful access to all aspects of the model and model inputs.

h) Parties generally provided the minimum cost information needed to meet Commission requirements, but failed to provide adequate revenue information. Availability of adequate cost and revenue information is essential for effective operation of a fund and must be provided.

Other Significant Issues

i) Washington State must not wait for the development of competition to establish a universal service fund. Lack of a fund will impede the development of competition, and federal law does not condition its

requirements upon the development of competition.

j) If the Legislature authorizes the creation of an explicit universal service fund, the Commission will initiate a proceeding at the time of implementation in which it will consider simultaneously implementing the de-averaging of prices of retail services and of wholesale unbundled network elements, and further reducing access charges.

k) Washington State should not wait for FCC action before acting on universal service issues. Absence of a state fund impedes competition, and changes may be made if needed after FCC action to assure that the State's program is consistent with FCC rules.

Rural Companies' Issues

l) Forward-looking cost models have been developed largely in the context of large-company operations. Consequently, they are not demonstrated to be valid in evaluating the costs of small rural companies. The FCC in addressing this concern at the national level has adopted a phased approach to implementing the use of forward-looking cost studies. The Commission accepts the phased approach that allows further FCC and WUTC study.

LEGAL PRINCIPLES

STATE LAW

Ch. 337, L. 1998

16. The Commission described above the state law requiring this proceeding.

17. The state and federal laws are consistent and the Commission intends to implement a program that is fully consistent with state and federal statutes and with sound policies.

Relationship Between This and Other Dockets, Including UT-960369

18. Three Commission dockets address interrelated aspects of the exceptionally complex situation in telecommunications in the United States brought on by the Telecom Act, state laws, and the changes that they mandate in furtherance of competition.

a) First is a proceeding called the Generic Pricing Proceeding or "the Generic", Docket No. UT-960369, et al., in which the Commission is addressing the wholesale pricing of unbundled network elements or "UNEs".

b) Second is the "Access charge" proceeding, Docket No. UT-980325, a rulemaking in which the Commission set the tariff structure for access charges -- the charges that local exchange companies may make to originate or terminate calls made by customers of the interexchange toll carriers.

c) Third is this proceeding, called the Universal Service Fund or USF proceeding, Docket No. UT-980311. We have described its scope and origins above.

The forces operating on and within telecommunications at present in the United States are complex. Each of these dockets focuses on one element or set of elements of a complex, interrelated set of issues.

19. The dockets – particularly the adjudicative aspects of the dockets – are independent. The Commission is constrained by the Administrative Procedure Act from considering evidence beyond the record in a single adjudication. However, the Commission is aware that it is dealing with related elements of a single complex situation and to the extent possible provides consistent perspectives to the resolution of each aspect. Consequently, the Commission is making every effort to deal with these interrelated matters in a rational and consistent manner to effect sound overall public policy.

Need for an Explicit Directive for Universal Service Action

20. Commissions in many other states have the authority to implement a multi-company universal service fund. In Washington State, however, the case of WITA v. TRACER, cited above, may be read by analogy to have ruled that this Commission does not have the statutory authority to order creation of such a fund. This makes legislative action – creating such a fund or authorizing the Commission to do so – essential if Washington State is to comply with the federal law [13]

[13]The Commission has authority to implement other measures that will further universal service and competitive choice. The recently-promulgated Access Charge rule, in Docket UT-960325, is illustrative.

Need for Consistency Between the Universal Service Fund Proceeding and the Price of Unbundled Network Elements.

21. In the generic cost docket, UT-960369, *et al.*, the Commission agreed with Commission Staff and the other parties who contended that questions of how, and the extent to which, wholesale network element costs are calculated on a deaveraged basis should be addressed in the context of universal service reform, deaveraged retail prices, and the extent of competitive activity in Washington State. In that docket, we chose not to deaverage wholesale UNE and interconnection rates. Eighth Supplemental Order at paragraph 274.

22. U S WEST contends that there is no need to address the pricing of unbundled network elements in this docket. It argues that the Notice of Proceeding and Notice of Prehearing Conference by citing Ch. 337, L. 1998 and the Federal Telecommunications Act as authority for the proceeding, we are barred from considering its relationship with other proceedings.

23. Sprint agrees with the Eighth Supplemental Order that UNE deaveraging and universal service reform should be coordinated. Sprint recommends that the Commission "revisit its UNE cost determinations to ensure consistency with its USF determinations." Sprint Brief at 7.

24. AT&T and MCI contend that if the Commission maintains a company-wide average price for unbundled network elements, the size of the universal service fund should also be calculated on a study-area basis. If the fund is calculated on study-area basis, "then there will not be a *need* for high cost support because the state-wide average cost for universal service will not exceed the national average revenue benchmark estimated by the FCC regardless of which cost proxy model is employed." Brief at 13-14. The two companies argue that a fund is only required when competition develops.

25. NEXTLINK and Public Counsel join AT&T and MCI in the argument that the need for universal service reform does not arise in advance of local exchange competition and that such competition does not yet exist in Washington.

26. US WEST responds that the legislative mandate is clear -- the Commission has been directed to determine the cost of supporting lines that are used to provide basic service in high cost areas, and prepare a program to support those lines. It points out that the Legislature has not required that competition be "'enabled'" before the WUTC determine the cost of service in high cost areas.

27. The Commission agrees with U S WEST that the Legislature did not suggest that the establishment of the fund was contingent on the development of competition. The Federal Act requires the Commission to establish the cost of providing support in high-cost areas in order to ensure that affordable, quality service is available at comparable prices to rural subscribers. Neither Congress

nor the Legislature suggested that the maintenance of universal service was contingent on the development of competition.

28. The Commission concludes that the establishment of a fund should not be contingent on the development of competition. In fact, a fund is one of several necessary elements which must be in place to enable efficient entry into the market. CLECs who are eligible telecommunications carriers must be able to obtain a similar level of support in high-cost areas as is available to incumbent local exchange carriers. If parity is not established, competition in both high-cost and low-cost areas will be impeded and likely will not occur at all.

29. At the same time, the ILECs' ability to compete with entrants in low cost areas should not be impeded by implicit support mechanisms. The record in this proceeding shows that, currently, high-cost areas receive implicit support from low-cost areas. The federal Telecom Act requires that support provided to high-cost customers be provided explicitly and in a competitively and technologically neutral manner. If competitive and technological neutrality is not established, the most efficient supplier will not serve customers.

30. In opposition to AT&T and MCI's proposal that the fund be calculated on a company basis, U S WEST correctly asserts that such a mechanism would be contrary to the plain language of Ch. 337, §1(1), L. 1998. U S WEST, argues that the State USF law "requires that implicit sources of support for basic service in high cost areas be minimized, and explicit sources which are sufficient, specific, and technologically and competitively neutral, be maximized." The Company points out that aggregating cost across an ILEC's entire serving area perpetuates the implicit sources of support that exist in the current rate structures.

31. Other parties note that the same logic also applies to wholesale rates. If unbundled network element rates continue to be averaged, the implicit support currently provided by low-cost areas will be perpetuated.

32. The Commission agrees with this logic, and determines that if the Legislature authorizes the creation of an explicit universal service fund, the Commission will initiate a proceeding at the time of implementation in which it will consider simultaneously de-averaging the prices of retail services and unbundled network elements, and further reducing access charges.

33. TRACER suggests that the Commission consider deaveaging UNE prices before a deaveraged USF program is implemented. TRACER contends that "the availability of geographically deaveraged UNE prices will enhance the pace at which economically efficient, facilities-based competition will be able to develop in Washington."

34. We disagree with TRACER's argument. Recognizing the interrelated nature of each element, we believe that the development of sustainable competition requires us to maintain our policy that deaveraged UNEs should be implemented

in the context of universal service reform, deaveraged retail prices, and the extent of competitive activity in Washington state.

35. AT&T and MCI argued that the Commission's cost model effort in the generic cost docket is being rendered moot in this proceeding and that the Commission should be relying upon those estimates to develop the cost of providing universal service. NEXTLINK and TRACER join AT&T and MCI in recommending that the UNE prices, along with an allowance for reasonable, forward-looking retail costs, be used to estimate the cost of providing universal service.

36. The Commission disagrees. First, the cost information presented in UT-960369 is inadequate for use in this proceeding. The costs of retail and wholesale services differ. Furthermore, AT&T's and MCI's sponsorship of HAI 5.0a, rather than Hatfield 3.1, suggests that better information for policy decisions is available today than was available when we entered our Phase 1 Order in Docket UT-960369. We consider both BCPM 3.1 and HAI 5.0a to be much better cost models than their predecessors. Finally, all parties have made great use in this proceeding of the Commission's findings in the UT-960369 to the end that issues are reduced and the focus is on resolving new issues.

FEDERAL LAW

37. The parties generally agree, and we affirm, that the chief mandate of federal law governing a state universal service fund is that the state program must not be inconsistent with FCC rules.[14]

38. Parties cite to Sec. 254(k) for the proposition that universal service support must not subsidize competitive services; to 254(b) for principles as to quality and rates and access to advanced services, access in rural and high cost areas, equitable and nondiscriminatory contributions, and development of a predictable support mechanism. AT&T and MCI cite Sec. 254(d), (e) and (b) for principles (also noted by SPRINT) that now include the FCC-added provision of competitive neutrality in operation of a fund.

39. States are free to act as long as they do so consistently with law and the FCC rules. Because we are not implementing a program at present, it is premature to do more than state our intention that we will avoid inconsistencies with federal law and rules when we do implement a universal service fund and program. We acknowledge not only the requirements of the federal provisions but the policy and legal soundness of propositions that the parties cite to us.

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[14] See, Sec. 254[f], which preserves states' right to act.

POLICY ISSUES

Purpose of the Proceeding

40. We have discussed above the purpose of the proceeding and its interrelationship with legislative and federal action and with other related Commission proceedings. We will address one additional matter here, the question of timing of a universal service fund.

41. The Commission agrees with Sprint, and finds that a fund should not await the development of competition. First, an explicit fund is required by state and federal law, neither of which say anything about the presence of competition as a prerequisite to USF funding. Second, as Dr. Calnon notes, the establishment of an explicit USF is necessary to promote competition and to mitigate arbitrage opportunities. We are confident that any inconsistencies that could result from state action in advance of FCC action can be resolved quickly after the federal action is taken. Washington State should not wait for FCC action or for the development of competition to begin operation of a universal service fund. We believe that the absence of such a fund will retard the development of competition and the achievement of the benefits that flow from competition. We understand that competition occurs unevenly and that the transition to competition may not be smooth. But it will be substantially impeded, and in some areas may not occur at all, in the absence of universal service funding. A state universal service fund offers a mechanism that would allow competitive choice to flourish where it is feasible, while minimizing potential economic harm to companies and customers in places where competition may be slow to develop.

COST MODELS

Selection of a Cost Model

Why use a Cost Model?

42. The State USF law directs the Commission to estimate the cost of supporting all lines located in high-cost locations and the cost of supporting one primary telecommunications line for each residential or business customer located in high-cost locations. One way to do so is through the use of a cost proxy model. The law requires the Commission to "estimate the cost of supporting all lines located in high-cost locations and the cost of supporting one primary telecommunications line for each residential or business customer located in high-cost locations." Chapter 337, Laws of 1998, Sec. 2(a). The cost of service

in high-cost locations can be calculated by multiplying the average cost per line in an exchange by the number of supported lines. The number of supported lines, as suggested by the legislature, can be either all lines or one primary telecommunications line for each residential or business customer located in high-cost locations.

43. The FCC and a Federal-State Joint Board have concluded that a cost proxy model provides an efficient method of determining forward-looking economic costs and that a cost model is therefore an appropriate tool for estimating the cost of universal service. As staff at the FCC have pointed out, use of cost proxy models "enable regulatory authorities to estimate the forward-looking cost of network facilities and services without having to rely on detailed cost studies, prepared by incumbent local exchange carriers, that otherwise would be necessary. In addition, a publicly available cost proxy model could be useful to regulators by providing an independent check on the accuracy of incumbent LEC cost studies."[15]

44. In the Eighth Supplemental Order, we noted at Par.21 that

> 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.

45. The analytical models on the record in this case, the HAI 5.0a and the BCPM 3.1, are computer models designed and used to estimate the cost of constructing and operating the public switched telephone network. That network is exceedingly involved and complex. Just within Washington state, 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.

46. 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"

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[15] *The Use of Computer Models For Estimating Forward-looking Economic Costs; A Staff Analysis*, January, 9, 1997, p.1.

assumption.[16] Second, they can be used to disaggregate the otherwise undifferentiated costs of the network into various element costs, so that the cost of a loop can be separated from the cost 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 a different size. In other words, one may use a model to estimate what it would cost to build a portion of the network or to rebuild the entire network.

47. Cost models are very useful tools for universal service support calculations in view of their ability to disaggregate the costs of the network. Accordingly, they can provide a relatively clear picture as to the specific cost drivers which determine the level of universal funding required and the specific geographic areas which are most in need of universal service funding support. Having concluded that cost models are helpful, even necessary, tools in estimating forward-looking costs, we note that the parties' proposed models produce different results and that parties variously contended that each model suffered flaws rendering it unusable to achieve an accurate rendition of costs. Our next questions, then, are how to evaluate the models, how to compare them, and then whether to select one model to estimate costs in this proceeding.

The State of the Record on the Proposed Models

48. During this proceeding, the Commission collected a great amount of valuable information about the costs of providing telecommunications services in Washington State. The record contains information on the relationship between prices and the cost of service, and has identified areas in the rate structure that provide implicit support to high cost areas.

49. The parties have pointed out asserted shortcomings in each other's preferredmodels and model inputs. Those discussions reveal that we are involved in an evolving process. We find that some of the asserted shortcomings are real and must be addressed before the models can be used to set payments and contributions for an operating universal service fund. As the cost models are refined, they will provide a more precise definition of state universal service costs.[17]

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[16]"Scorched node" assumption - what it would take to reconstruct the network under a scenario of complete destruction of a LEC's network.

[17]Models are ever-changing for two reasons. First, they change to reflect better data sources and corrections in model design to meet identified problems with model algorithms. Second, models change because they must represent a moving target -- technology in telecommunications is ever changing, and accurate models will change to reflect the new realities. We anticipate that over time, the substitution of wireless for wireline facilities may have a significant impact on our future estimates.

50. With some fine tuning, given the inherent role of judgment in such models, they are within an acceptable range for purposes of this proceeding. A major problem with the models that demands the application of judgment is customer location – how to model the actual physical geographical diversity of customers with sufficient accuracy that estimates of the costs to connect the customers model the real costs of constructing the actual telecommunications system. While advocates of cost models in this proceeding proposed surrogate methodologies to approximate at least some customer locations, all of the proposals suffer substantial limitations under close scrutiny.

51. Even with the problems we identify in this order, the Commission is satisfied that in general terms, the models provide reasonable measures of cost that we can use, with the application of judgment, to derive the cost estimates required for our report to the Legislature.

52. In the coming year, the Commission will initiate a process in which parties will be asked to address (1) whether the Commission should adopt the FCC cost proxy model, and if so, (2) whether and how the Commission should modify the model to better reflect the network in Washington and whether and how we should modify the inputs to the FCC model. In the new proceeding, parties must also address our concerns about the current cost models. We expect the parties to pay particular attention to improving the identification of customer locations and wire center boundaries, as well as insuring the models provide sufficient cable to reach households that are connected to the network.

53. In this proceeding the parties addressed the appropriateness of estimating the cost of a network that serves all households or all housing units. We find at Par. 87 that the current versions of the models should be used to estimate the cost of serving all households. We believe that the universal service fund should be used to provide support to areas that receive service. If there are areas where households do not receive service, we are inclined to conclude that support should not be provided for those areas. In the next proceeding the parties will be expected to present data that will allow them – and us – to identify the cost of service in areas that are connected to the network

54. We will also explore with interested persons the proposition that companies who withdraw money from the universal service fund may be required to provide geocoded data showing the locations of their customers. Companies must continue to gather more precise information, including customer locations, the actual length of lines needed to serve them, including drops. We expect that companies will have a great deal of useful information on customer locations in E-911 data bases, in customer records, and potentially in other resources. To the extent that the FCC has similar objectives, parties in this proceeding may find it to their advantage to coordinate with national efforts to better define

customer locations. The Commission recognizes that the benefits of this refinement will need to be weighed against its just cost.

55. For purposes of this proceeding, however, we reiterate that the cost estimates we present are the best that can be derived from current information by the use of current models. The estimates are a reasonable approximation of the costs of the current network. However, precise definition of state universal service costs -- with sufficient accuracy to set prices and required payments in a Universal Service Fund -- must be further refined.[18]

Constructing the Cost Studies

56. In the Commission's May 15, 1998 Notice of Prehearing Conference, we established several guidelines regarding cost studies and other required information. The guidelines directed parties to determine costs separately for:

a) a network that serves single and multi-line subscribers (where multi-line subscribers include non-switched loops);
b) a network that serves only multi-line subscribers; and,
c) a network that serves only single-line subscribers.

57. The guidelines identified the data that would allow the Commission to measure the size of the Universal Service Fund. The first method of obtaining costs, measuring the cost of a network that serves single and multi-line subscribers, can be used to determine the cost of service if all lines are supported as well as the cost of supporting only primary lines. The level of support is identified by first dividing the total cost by the total number of lines. This unit cost is then subtracted from the benchmark. Finally, the difference is multiplied by the number of primary (single) lines. Algebraically this involves the following steps:

A = Cost of a network that serves single and multi-line subscribers (where multi-line subscribers include non-switched loops);

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[18]The Commission Order adopting the "Access Charge" rule in Docket No. UT-970325 contemplates that the result of this proceeding will be estimates of cost that are sufficient to designate in a company's access charge tariff the charge needed to meet universal service requirements. WAC 480-120-540. Despite the problems we have identified and the uncertainties with regard to the level of costs for purpose of the fund, we accept the numbers as sufficient for those limited tariff purposes. In saying that, we recognize the opportunity available to each of the affected companies to recover the full extent of its entitlement under law by means of specific rate relief, or by setting its own rate for originating access. In addition, it is our intention as stated above that we will review USF costing issues promptly. It is ouz expectation that such a review will yield numbers suitable for use in a USF fund and that the subsequent cost estimates would be used, if adjustment is needed, for updated carrier access charge tariffs.

B = Cost of a network that serves only multi-line subscribers; and,
C = Cost of a network that serves only single-line subscribers
D = Number of multi-line loops/lines
E = Number of single-line loops/lines
F = Total number of loops/lines
G = (revenue, cost, or price) benchmark per line

Under these assumptions, the support level for all lines[19] equals [G - (A/F)] x F.

58. The other two cost scenarios, the stand-alone cost of multi-line or a single-line network, provide additional information that can be used to estimate the level of support. If two cost studies are run, one including a certain class of customers and the other excluding it, the cost difference in the two studies will be the incremental cost of serving that class. As pointed out by Public Counsel witness Johnson, "stand-alone and incremental cost studies offer some useful attributes; among other things, these types of studies can establish the costs of serving specific customers classes without relying upon cost allocation procedures (which tend to be controversial, and are necessarily somewhat arbitrary)." Ex. 383, P. 14.

59. As illustrated by the following table, the incremental cost of serving single line customers is lower than the average cost.[20] The incremental cost of serving single-line customers is calculated as follows:

Increment al cost of single-line customers = (A-B)/E

	All Lines	Total Cost	Single Lines	Stand Alone Single Lines	Multi-lines	Stand Alone Multi-lines
US WEST WA	2,610,749	$44,134,021	1,563,811	$36,498,405	1,017,300	$23,909,405
Average	$16.90		$23.40		$23.50	
Service incremental			$12.93		$ 7.41	

60. Sprint opposes estimating the incremental cost of primary lines. Sprint contends that using a model to establish costs for only some lines is contrary to other directives of the Commission and the FCC.

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[19]In this algebraic representation of the method used to estimate the level of support, no adjustment was made for lines that the Legislature may not want to support, such as private and special access lines.

[20]The data were obtained from Staff's response to Hearing Request No. 22. They are provided for illustrative purposes.

61. Sprint witness Dunbar testified that if the cost of a stand-alone network is subtracted from a network that serves all customers, the common costs are netted out. Consequently the estimated total service incremental cost excludes costs that are shared by different services. Dunbar contends that the incremental costs are small relative to the average cost of production. He advocates that the average cost of production be used to estimate the cost of universal service because all services should share in the recovery of common costs.

62. The Commission finds that incremental cost studies do provide useful information for pricing decisions. The incremental cost studies can be used to establish a price floor for a service.

63. Incremental cost studies, depending on the level of service aggregation used in the study, may exclude many shared costs. For the purpose of estimating the size of the universal service fund, we find that the support calculation should be based on the average cost of providing service. The incremental cost of primary lines is the additional cost incurred to provide primary lines when service is already provided to multi-line subscribers. The incremental cost excludes shared cost. We find that shared costs should be recovered from all services, including services that will receive support from the fund.[21]

64. Furthermore, if we adopt a revenue benchmark in the rule, we will include in the benchmark the revenues from such wholesale and retail services as access and custom calling. Since the margin on these services includes a contribution toward the firm's common and shared costs, it would be inappropriate to exclude these shared costs from the measurement of the cost of service.

65. The Commission also asked the parties to estimate the cost of a network that serves only single-line subscribers. This "stand-alone" cost establishes an upper-boundary on the cost of serving single line customers. The stand-alone cost per primary line, the value C over E, overstates the cost of providing primary lines because it does not reflect the economies of scale that exist in today's multi-product network.

Geographic Level ("Granularity")

[21]This finding is consistent with our conclusion in Docket UT-960369 that shared costs should be included in the TELRIC of an unbundled network element. Eighth Supplemental Order at Par. 172.

66. US WEST proposes that the proper geographic level for calculating the level of costs is the urbanized/non-urbanized divisions of the wire center. US WEST argues that this level of disaggregation would permit identification of relatively high and low cost areas within the wire center.

67. Sprint believes that universal support levels should be administered at the census block group level. The Company argues that by providing support at this level of granularity, the Commission will be able to target support to high cost areas.

68. GTE is concerned that administering a fund below the wire center level would be burdensome. Therefore, it proposes at this time that the cost be calculated, and the fund administered at the wire center level.

69. AT&T and MCI contend that universal service costs should be estimated at the same level of aggregation, the study area, at which UNEs have been determined. These parties claim that economic efficiency dictates that a consistent method be used to determine the cost of UNEs and providing service in high-cost areas.

70. TRACER contends that much of the critical information needed to calculate a USF reliably, such as line counts, is not available at levels below the wire center. Tracer recommends that costs for USF be calculated at the wire center level.

71. Staff recommends that the Commission determine costs at the smallest level of geography for which it has reliable information, the wire center. It adds, "[t]his is not to say that the level of support should be calculated at that level, because it may be impractical or unnecessary to vary the level of support among customers in an area." Staff Brief at 10. Public Counsel also supports calculating costs at no finer a level of granularity than the wire center.

72. The Commission has estimated the cost of service for each wire center. At this point in time, verifiable data such as line counts and loop lengths are unavailable at a finer level of granularity.[22]

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[22] It is likely that the rulemaking will determine that the level of support should be at the exchange level. In order to receive support from the federal universal service fund, a carrier must provide service to the entire exchange. We believe that the same obligation should be satisfied in order to receive support from the State fund. The level of support should be calculated at the same level of granularity at which the level of support is required. As competition develops in the State, however, a need may arise to make the support calculation at a finer level of granularity.

Impact of FCC Activities

73. WITA proposes that rural companies be treated differently from non-rural companies. WITA notes that the FCC has determined that the proxy models will not be used, at this time, to measure the rural companies forward-looking cost of providing universal service. Rather, the FCC has adopted rules that maintain existing levels of implicit support until at least January, 2001. WITA recommends that the Commission adopt a similar approach in Washington.

74. Public Counsel stresses that the creation of a hybrid model at the FCC reflects that commission's belief that BCPM 3.1 and HAI 5.0a do not adequately estimate the cost of providing service in high cost areas. Public Counsel urges that the Commission follow the path recently adopted by the Oregon Commission, and defer further action on fund issues until the FCC selects a cost proxy model.

75. The Commission concludes it is not prudent to wait to provide a reasonable estimate of universal service costs. State law requires our analysis now, the conditions requiring action exist now, and we should be prepared to implement a program as soon as the Legislature grants its approval and the Commission can obtain acceptable cost proxy model estimates. To the extent that action at the FCC proves to be inconsistent with our program, the Commission should have the power, the discretion, and the ability to eliminate any inconsistency. Moving forward now will be less burdensome on the consumers of the state than waiting until the FCC has taken final action. Any milestones that we accomplish in this proceeding or in implementing a plan are milestones that we need not repeat. We do not believe that we are required to wait for FCC action or that doing so would be sound public policy. On the other hand, it is obvious that the FCC plays a large role in USF matters and that we must be cognizant of that role. Ultimately, the state Universal Service Fund must not be inconsistent with the federal Universal Service Fund.

"Wireless Cap"

76. A wireless cap is a cap on models' depiction of wireline costs that is imposed because of the recognition that wireless technology can provide service without the need to install wires in remote or difficult terrain, and thus can provide service at a lower cost than wireline service in some situations. Use of a wireless cap is one way to recognize intertechnology competition. Proponents of a wireless cap point out that at some level of cost for installing wire line technology in harsh or remote environments, other technologies offer a less expensive solution.

77. Parties variously advocated a $10,000 or a $15,000 wireless cap, arguing that the model should cap reported or calculated investment at those levels even if the model or direct cost information demonstrate that the wireline service costs substantially more.

78. The Commission is not convinced that a wireless cap is appropriate at this stage in developing a universal service fund. It is appropriate only if wireless technology is truly available to remote customers. The difference in fund requirements from the use of the cap is small. Rejection of the wireless cap is likely to provide a stronger incentive for both wireline and wireless companies to provide service to remote customers. As with the other elements of the cost studies, we intend to look at this again as technology or investment changes over time.

Households v. Housing Units for Estimating Costs

79. The Commission must decide the appropriate measure for determining the total demand that a network must be sized to serve in estimating the cost of universal service. The choices before the Commission are (1) Housing units, which includes both inhabited and uninhabited dwelling units; (2) Households, which includes all inhabited dwelling units, or (3) Households with telephones. The HAI 5.0a model uses households as its measure, while BCPM 3.1 uses housing units.

80. Sprint, GTE, and US West argue that housing units are the appropriate measure. All three parties point out that a LEC has an obligation to provide universal service to all customers in its service territory. Sprint and US West expand on this notion by stating that "LEC that is an ETC has an obligation to provide services that are supported by the USF, to all locations in the area, and to advertise the availability of service. 47 U.S.C. §214(e)(1)(B).

81. GTE and US West also argue that housing units are the appropriate measure to use in determining the total demand for which the network must be sized because building to housing units anticipates future demand, while building only to households does not. This being the case, they argue, building to housing units is the prudent and least cost way of engineering a telecommunications network.

82. US West goes further than the other parties in advancing its belief that housing units are the appropriate measure through its contention that, "The Washington Legislature has directed the Commission to prepare a program for the preservation and *advancement* of universal service. Limiting the program to

the population of existing subscribers to telephone service, which is the effect of using households to estimate the size of the fund, would not be consistent with the goal of advancing universal service." US WEST Brief at p. 32.

83. AT&T, MCI and TRACER argue that households are the appropriate measure to use in estimating the cost of universal service. They contend that universal service support should be based on the number of customers that are actually being served, or that might require service. All three parties stress that the FCC in its Universal Service Order Par.250 states that "The cost study or model must estimate the cost of providing service for all businesses and households within a geographic region."

84. AT&T and MCI also contend that, since "uninhabited and unserved housing units are likely to be relatively more expensive to reach," using housing units to estimate universal service costs would most likely overstate the costs of actually providing service. AT&T-MCI Brief at p. 25. They contend that BCPM 3.1 compounds the overstatement "...by dividing the cost of providing service to all housing units by working lines. This is internally inconsistent; it calculates per line costs based on the construction of a network that exceeds the current scope of the LEC networks yet divides the cost only by current demand." AT&T and MCI Brief at p. 25.

85. TRACER mentions that the New Mexico State Corporation Commission (NMSCC) found that "the use of housing units, rather than households, results in a cost estimate that reflects the assumption that plant is built in areas where no one lives and for which the local exchange company has not constructed facilities." NMSCC, Findings of Fact, Conclusions of Law and Order, Docket No. 96-310-TC and Docket No. 97-334-TC, at 24-25.

86. Staff argues that "the cost of service should be determined based on actual lines in service within a given geographic area as opposed to using households or housing units." Commission Staff Brief at p. 13.

87. In regard to the contention that building to housing units anticipates future demand while building to households does not, the Commission considers the recent order of the New Mexico State Corporation Commission cited by TRACER, to state the correct analysis. In that order,[23] the NMSCC stated that:

> It is rational and cost efficient for a local exchange carrier to install plant to meet not only today's level of demand, but also anticipated growth. For this reason BCPM 3.1 does not assume

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[23] New Mexico State Corporation Commission, Findings of Fact, Conclusions of Law and Order, Docket No. 96-310-TC and Docket No. 97-334-TC, paragraph 161, at 24-25.

> that the fill rate for its distribution and feeder facilities is 100%. Rather, the model uses a lower level of utilization in order to insure that facilities are available for future growth. Additional spare is included in the model due to the fact that cables are only available in discrete sizes.[24] Consequently, the need to provide sufficient capacity for new line additions is accounted for elsewhere in the model. As a result, the use of housing units, rather than households, results in a cost estimate that reflects the assumption that plant is built in areas where no one lives and for which the local exchange company has not constructed facilities.

88. Most of the cost of current and anticipated telephone plant facilities in a developed neighborhood would be captured if households are used. This is because the estimated cost of the feeder and distribution plant required to serve that neighborhood would be reflected in the utilization ratio.

89. The NMSCC went on to find that using housing units to estimate the cost of universal service would result in an overestimation of that cost. Where this overestimation yields support for areas in which LECs incur no cost, such as unoccupied rural areas, it could undermine the preservation and advancement of universal service. NMSCC Order p. 24.

90. To gauge the magnitude of the difference between the number of households and housing units that might be found in Washington, we note that USWC witness Kevin Duffy-Deno reports that at the Easton wire center, there are 773 housing units, while only 245 of those units are occupied (households). Ex. 321T, p. 30. Clearly, using housing units to estimate the cost of universal service support to this area would result in a much greater support requirement than if the level of support were calculated using households.

91. There is evidence of a potentially large disparity between households and housing units that is unlikely to reflect pertinent growth. While it is possible that housing units reflect potential for growth, it is also possible that housing units reflect shrinking communities that may lose rather than gain households as relevant to sizing the model. The model does provide a margin to reflect growth. Consequently, the Commission adopts households as the appropriate measure for estimating the cost of service.

Items deferred to the Universal Service Report to the Legislature

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[24] Even if the utilization value for distribution plant is set at 100% within BCPM 3.1, there are spare facilities. The model assumes that two pairs are installed per housing unit. (14 Tr. 17.)

92. A number of items on the parties' briefing outline are matters that involve discretionary decisions and that are not strictly within the scope of the adjudicative phase. Those include the selection of a benchmark and identification of revenues to be included in the case of a revenue benchmark; decisions relating to surcharge; the size of the fund and reliability of fund estimates;[25] and whether to consider other sources of support when considering the size of the universal fund. The number of lines to support will not be determined in this order but will be decided at a later time based on information gathered in this proceeding. This order will identify costs of service for constructing a network serving all lines, and the Report to the Legislature will set forth the cost of supporting all lines versus the cost of supporting one line per residence and one line per business.

ISSUES THAT APPLY TO BOTH MODELS

Structure Mix and Structure Sharing

93. The parties disagree on the appropriate structure mix -- that is, the proportions of various types of facilities – to use when performing model runs.

94. US West, GTE and Sprint have populated their model runs with plant mixes that reflect their existing facilities. All three companies argue that using the existing facility mix reflecting the companies' placement decisions in the state of Washington is superior to the national default values available in the BCPM 3.1 or the HAI 5.0a model.

95. US West states that using the HAI 5.0a default values for facility mix would result in a substantial increase the amount of aerial plant from US West's current aerial plant levels. The Company contends that this is unreasonable in light of "current trends . . . to reduce, not increase the proportion of aerial facilities in response to aesthetic and safety concerns." Ex. 291T, p. 16. In addition, U S WEST's engineering testimony states that increasing the proportion of aerial facilities from the level that currently exists, as the HAI 5.0a model does, would result in increased maintenance costs. Ex. 304T, p. 17. Brief at p. 35. Sprint also states that the use of the HAI 5.0a default would lead to higher costs as the use of these values would overstate the amount of more costly underground facilities in Sprint's serving area.

96. US WEST makes the point that engineering judgement must balance cost with quality and must consider political requirements based on safety and

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[25]We do discuss the reliability of the models elsewhere in the order.

aesthetics, and that the models must under the "scorched node" approach reflect the construction of facilities in existing neighborhoods.[26]

97. AT&T and MCI, Staff, and TRACER state that reliance on an embedded, historical perspective of facility mix does not accurately represent the forward looking perspective required in cost modeling. All three of these parties argue that the HAI 5.0a default values for plant mix should be used in the models. TRACER and Staff also state that use of the HAI 5.0a default values for plant facility mix are consistent with the Eighth Supplemental Order.

98. AT&T and MCI expand upon this point by noting that "Instead of simply assuming that a standard (or existing) mix of structure types is appropriate, the model is designed to test this assumption. Finally, because the HAI 5.0a Model is built to determine dynamically which structure type is least-costly, given the particular characteristics of each distribution area, one is spared the necessity of guessing about the least-cost technology." Brief at p. 27

99. In the same vein, AT&T and MCI argue that the FCC concluded that an efficient carrier will base its plant mix according to the population density of an area. Also, it found that the plant mix assignment should reflect terrain factors. In particular, relatively more feeder and destination cable should be assigned to aerial installation for all population density groups in wire centers characterized by "hard rock" conditions. FNPRM Par. 58. Similarly, as the amount of paved surface increases (usually as population density increases), a cost-efficient plant mix will exhibit decreased use of buried cable.

100. AT&T and MCI point out that none of the ILEC-supported plant mix inputs are consistent with the FCC's findings described in the preceding two paragraphs. US West's plant mix shows slightly increased amount of aerial cable as the terrain becomes more rocky, while GTE and Sprint use the same ratios for all types of terrain.

101. Staff expresses the additional concern that the US WEST-specified plant mix cannot be correct as it contains no aerial plant for the 10,000+ density zone. Staff notes that the HAI 5.0a aerial cable in the 10,000+ density zone is

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[26] "The ratios of aerial, buried, and underground facilities reflect the impact of engineering judgment on the cost of providing basic local service. That engineering judgment, in turn must be tempered by realities of building and operating a telecommunications network. Such a network must be built in existing neighborhoods, under the "scorched node" approach to determining the TELRIC cost of providing service. There are significant impediments in the form of local government restrictions, to the deployment of additional aerial facilities in Washington. See, *e.g.*, *GTE v. Bothell*, 105 Wn.2d 579, 581, 716 P.2d 879 (1986), which recounts the policy of one Washington city to require the undergrounding of existing aerial facilities whenever the public right of way on which the facilities are located is improved, for safety and aesthetic reasons." USWC Brief at p. 34-35.

"intended to represent the extensive network of riser cable in high-rise buildings which are found predominantly in the densest urban zone. It is literally impossible to serve customers on the 60th floor of a high-rise with solely underground or buried facilities." On these grounds Staff recommends that the Commission not adopt US West's proposed structure mix. Brief at p. 14.

102. While the Commission takes cognizance of the cost minimization arguments advanced by AT&T and MCI in paragraphs 98 and 99, above, we are persuaded by US West's reasoning, cited in paragraph 96 The type of facility placed by a company is a factor of engineering economic planning which is frequently tempered by the realities of local zoning ordinances, localized weather conditions, and the like. This being the case, a reliance on purely cost minimization considerations in modeling a network would likely result in a plant facility mix that would not reflect the actual type of plant facility that would have to be placed.

103. As to AT&T and MCI's point, above, that GTE and Sprint use the same ratios for all terrain, the Commission is willing to hear suggestions on how existing plant facility mixes may be adjusted to follow more closely the FCC findings outlined in paragraph 99, above. AT&T and MCI made no suggestions on this record. If the Legislature authorizes a universal service fund, companies must address this problem for future model applications.

104. We find unpersuasive Staff's recommendation that we reject US West's proposed facility mix for asserted error from its lack of aerial plant at the 10,000+ density zone. For one thing, in this proceeding it is the cost of serving lower density zones with which we are more concerned. For another, we find cogent the reasons for US West's input values of zero as presented by Mr. Schaaf in Ex. 304T, pp. 21-23. He notes from the HAI 5.0a documentation that in the HAI 5.0a model most aerial cable in the two highest density zones is assumed to be riser cable. Mr. Schaaf claims that US West owns no riser cable, and since the HAI 5.0a model does not distinguish riser cable from regular aerial cable, US West felt that it had no option other than to zero out aerial cable in the two highest density zones for an HAI 5.0a run. Mr. Schaaf acknowledges that zeroing out aerial in these two density zones has the effect of modeling no aerial investment whatsoever in the two highest density zones, a situation which Mr. Schaaf clearly believes is wrong.

105. The reasons behind US West's decision to zero out aerial cable in the two highest zones of the HAI 5.0a model do not seem to us to undermine the validity of US West's proposed inputs for the other density zones.

106. Both TRACER and Staff argue that use of the HAI 5.0a default values for plant facility mix are consistent with our Eighth Supplemental Order. We find no explicit language concerning structure mix in that Order. We do feel, however, that enough evidence has been presented in the current proceeding to enable us to come to a decision on this issue.

107. The Commission concludes that the models should be populated with a facility mix that reflects the companies' placement decisions in the state of Washington, rather than with national default values. Use of the HAI 5.0a cost minimization option is not appropriate. We will disable it when doing HAI 5.0a runs. We have used the models accordingly.

108. In regard to structure fraction sharing we adopt the values accepted in Par. 76 of our Eighth Supplemental Order.

Cost of Money and Depreciation Rates

Cost of Money

109. US West, GTE, and Sprint have each filed cost model runs that are designed to comply with Guideline 4, which requires that:

> Cost must be measured using: (a) cost of money - each company's authorized rate of return; (b) depreciation - each company's prescribed depreciation lives and salvage values; and (c) fill factors used in the 8th Supplemental Order, Docket UT-960369, especially paragraphs 171-173.

110. However, in their briefs, US West and GTE have advocated the use of cost of capital rates differing from their authorized rates of return. This is inconsistent with Guideline 4 and it is inconsistent with what the Commission has ordered in Docket Nos. UT-960369, et. al.

111. GTE supports its cost-of-capital rates by stating that the new risks it is now subjected to as a result of the competitive environment it now faces justifies a change in its "outdated" cost of capital. We are not persuaded by this line of reasoning. GTE is currently not facing any facility-based competition in its high-cost service areas in Washington that we are aware of. Furthermore, as Staff has pointed out in its Brief at p. 32, "GTE's bond rating has been upgraded from A+ to AA- since December 21, 1994, when the Commission last set its authorized rate of return. This indicates that GTE is perceived as less risky by the financial community."

112. Furthermore, in the Fourth Supplemental Order in Docket UT-941464 at Par. 90 we stated very clearly that "The Commission does not suggest by this order that the company should, with each or any cost study, file revisions to its equity rates or capital structure. These cost levels are more appropriately set in general rate proceedings or separate rate of return proceedings." We reiterated this view in the Fifteenth Supplemental Order in Docket UT-950200 where we stated, at Par. 88, that "Any theoretical advantage of using 'pure' forward-looking values would be more than offset by the practical problems of turning every cost-based rate filing into a cost or money case." We made this point yet again in the Eighth Supplemental order at Par. 211.

113. This is not a cost-of-money docket, and we are not compelled to let it become one. Accordingly, we reaffirm our policy that the cost of money used in a cost study should be the same as the company's authorized return unless that value is patently inappropriate.

Depreciation Rates

114. As pointed out in Par.109 above, Guideline 4 requires each company to use the Commission-authorized depreciation rates in its cost model runs. US West and GTE have filed runs that conform with the Guideline, but they filed with their briefs runs that use other values.

115. At Par.217 of the Eighth Supplemental Order in Docket UT-960369 we noted that the proceedings in Dockets UT-951425 (US West) and UT-940926 (GTE) recently reviewed their depreciation rates and we concluded that "The rates adopted in those proceedings reflect our understanding of the capital lives of the assets." We adopt those same rates, service lives, and salvage values for use in this proceeding.

116. Sprint has submitted Commission-authorized depreciation rates. However, the most recent authorization for Sprint occurred prior to 1984. Given the patently outdated nature of these rates and the fact that Sprint did not file a new depreciation study more reflective of current equipment lives, the Commission chooses to follow Staff's recommendation and adopt for Sprint the HAI 5.0a model default values.

U S WEST's Drop Length Study

117. The Commission's Eighth Supplemental Order in the Generic Cost Docket, UT-960369, *et al.*, criticized the parties for failing to present studies of actual drop lengths, that is, the distance from the cable to the customer premises.

118. US WEST undertook a study in which, on certain weeks in certain exchanges, persons performing installation and repair site visits classified the location as urban, suburban, or rural and estimated the length of drops. The Company offered the results of the study for use in estimating costs in this proceeding, contending that it is the only actual study of drop length available and that parties had ample opportunity to check it.

119. Commission Staff argues that the study's organization demonstrates no tie between the study and the organization of the BCPM 3.1 or HAI 5.0a cost studies. While loop lengths were estimated by lot types "urban", "suburban", and "rural", the cost estimates are calculated by wire center and no information demonstrates the relationship between the two calculations. Staff also points out that the study fails to consider the company's requirement that customers must pay for long drops outside the base rate area. Staff contends that this is therefore not a valid, usable study.

120. AT&T and MCI point out other flaws: the study looked only at new installations and repair; it was not random; and it excluded many representative neighborhoods. It does not state whether the measured drops are optimum lengths. The drop lengths were estimated, not measured; there is no demonstrable measuring technique; and there is no way to verify accuracy.

121. The Commission accepts U S WEST's study lengths for the limited purposes of this proceeding. The Company did undertake the study, and the information is better than the cost studies' default estimates, which are based on mere opinion. Therefore we have used the US WEST recommendations as a high-end estimate. In our sensitivity studies, we reduced the lengths by ten and twenty per cent.

122. As Commission Staff , AT&T and MCI point out, however, the study is flawed. We expect that for the next cost proceeding, the Company will correct the flaws in the existing study, if that is possible, or complete a new line drop study that does not suffer the flaws. For the HAI 5.0a model, we have used the US WEST recommended values as an upward bound. We have also run the model with input values that are ten and twenty per cent less than the values sponsored by US WEST. Neither Sprint nor GTE proposed alternative inputs for the HAI 5.0a model. For these two companies, we have used the drop length estimates adopted in the generic cost docket. Eighth Supplemental Order at Par. 134.

123. None of the parties to this proceeding presented any evidence regarding values for drop sharing fractions. In its HAI 5.0a runs the Staff utilized the HAI 5.0a default values for drop sharing. We find these numbers unreasonable and so have decided to utilize the sharing fractions we adopted for buried distribution in their stead.

Loop Length Estimates and the Minimum Spanning Tree (MST)

124. A Minimum Spanning Tree (MST) is a mathematical graph theory construct used to connect a set of points at the least possible length of total connecting lines. It is commonly used in network industries such as railroads, package delivery, and telecommunications that seek to find a minimum total length of routes that will connect all desired locations. When applied to a telephone network, an MST approach may be considered to provide, with some caveats, a lower limit on the amount of distribution cable needed to serve a cluster of customers.

125. One of the limitations in using the MST in determining the forward-looking cost of a telephone network is that it does not consider the fact that additional nodes, such as drop terminals or cable junction points, may be added to the network. Since the MST is the minimum distance necessary to connect a set of points, such as customer locations, without creating any additional points, the addition of these nodes, if optimally placed, may reduce the total length of the distribution network to an amount less than that which would be obtained through a strict application of an MST.

126. For example, imagine that there are four customers in a cluster and that they are located at the corners of a 1x1 square. The MST for these four customers would be 3, as it traces out the three sides of the square. However, these four points could also be served via a node located in the center of the square which would then connect each point via a diagonal from the node to each corner. In this situation the total route length required to serve all four customers would be 2*SQRT(2), which is less than the length arrived at using the MST.

127. The second limitation of using MSTs for representing telecommunications networks is that an MST is calculated using airline miles, the straightest distance between two points. Therefore an MST does not reflect the actual route miles of cable which might be required to connect customers given such factors as geographic obstacles, zoning requirements, and right of way restrictions that affect the laying of cable. This problem is a common one in telecommunications network planning and is usually resolved by applying air-to-

route mile conversion factors to an MST. For example, applying an air-to-route mile conversion factor of 1.2 to an MST would state that the minimum possible length of cable to serve a group of customers would be approximately 20% greater than the length of the MST.[27]

128. Sprint, GTE, and US West, all contend that because the MST is a valid measure of the internal consistency of a model, a finding that a model is estimating less distribution distance than the MST distance would indicate that there is something wrong with the model. They argue that the HAI 5.0a model fails the MST test. GTE and US West, however, go on to point out that, at the lower density zones, the BCPM 3.1 model also fails this test, but not as significantly as the HAI 5.0a model does.

129. AT&T, MCI and TRACER take issue with the contention, put forth by GTE and US West, that HAI 5.0a fails the MST test more significantly than BCPM 3.1 does. All three parties argue that if MST studies are performed on both models in a consistent manner, then BCPM 3.1 falls significantly shorter of the MST distance than does HAI 5.0a.

130. AT&T and MCI state that the HAI 5.0a Model produces less distribution plant than the MST in only the least dense zone while producing significantly more plant in the higher density zones. That being the case, they contend that if the MST is judged to be an appropriate measure, then the distances in the higher density zones should be reduced if the distances in the least dense zone are increased.

131. AT&T and MCI suggest increasing drop length in the lower density zones, or extending the branch or backbone cable in those zones. Sprint and US West agree. Sprint also suggests adjusting investment dollars on a per foot-basis based on the difference between the MST and the amount of plant built. US West argued that applying a route-to-air factor should not be used as there is no evidence in this record to support any specific ratio.

132. The question the Commission must consider at this point is whether either model passes the MST test at the lower density levels. It is not enough to argue that one model fails less spectacularly than the other. If a model fails the MST test, then it fails the test. The appropriate questions then to ask are, (1) does failure of the test indicate a problem that would cause an inappropriate calculation of the Universal Service Fund for lower density zones, and (2) if so, what should be done about it.

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[27] The 1.2 factor comes from Tr. at p. 1100, L. 12 and is mentioned as the factor used by the FCC staff as an input into the HCPM.

133. It is abundantly clear that both the HAI 5.0a and the BCPM 3.1 models fail the MST test at the lowest density levels. While AT&T and MCI argue that the MST test is not an appropriate means by which to compare the estimated cable distribution generated by either the HAI 5.0a or BCPM 3.1 model, we are not persuaded of the inappropriateness of this test.

134. AT&T and MCI make the point that the MST is not the most conservative measure of the minimum distance required to connect all customer locations because it does not consider adding additional nodes, such as drop terminals or cable junction points, to the network. Those additions, as noted in Par. 125 above, may reduce the total length of the distribution network to less than would result from a strict application of an MST. While this observation is valid, no party in this proceeding has presented persuasive evidence suggesting that this explains the HAI 5.0a and BCPM 3.1 failures. Moreover, we are doubtful that sharing drop terminals as suggested in Par. 125 would be great enough in the lowest two density zones to account adequately for the size of the percentage shortfalls from the MST distance reported for these zones by both HAI 5.0a and BCPM 3.1 supporters.[28]

135. The Commission agrees with US WEST's observation that the MST shortfall in the lowest density areas cannot be corrected by using a route-to-air mile factor ratio because no evidence supporting the use of a specific ratio has been presented in this case.

136. AT&T and MCI assert that the surrogate locations created by the HAI 5.0a model disperse the customers so that an MST calculated to meet these surrogate points would overstate the amount of cable actually required to connect the customers at their physical locations. Since this is the case, their argument goes, the fact that a model estimates less distribution distance than the MST is not necessarily a concern as the MST likely overstates the required amount of cable anyway. Dr. Duncan has made the point that placing surrogate points according the HAI 5.0a methodology could either increase or decrease an MST calculated to meet those points. From Dr. Duncan's example it seems that use of surrogate points could result in either an overestimate or an underestimate of the actual cable amount required to connect customers.

137. AT&T, MCI, and TRACER did not comment on the issue raised by Dr. Duncan, and the Commission is not currently in a position to assess the validity of AT&T and MCI's assertion regarding surrogate locations and the MST test. Given the evidence currently before us, we cannot accept the premise that the surrogate location methodologies employed by either HAI 5.0a or BCPM 3.1 for non-geocoded customers overestimate the amount of cable required in a way that

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[28]See, for example, the geocoded customer locations for the Colfax wire center, Ex. 327.

offsets concerns about the models' failure of the MST test in the lowest density zones.

138. Although much testimony has been presented on which model is more in error, no model sponsor has elected to correct the problems.

139. Ex. 385 shows that the size of the MST error increases as the number of customers in a cluster decreases. Given this observation, it is apparent that if a fix to the MST problem were implemented along the lines suggested by the parties as described in Par. 131, above, it should make systematic adjustments in sync with the source of the errors. This would require an algorithm that would apply a larger correction to small clusters and a smaller correction to large clusters. Arbitrarily introducing a correction factor without considering the obvious systematic variation of the MST error would generate numbers that might or might not be better than the original values, and evaluating the change would be difficult.

140. Furthermore, at this juncture it is impossible to know how much additional cable would be required in clusters with few customers. Ex. 385 randomly generates locations in its analysis; it is not possible to know at this point whether the customer locations modeled in BCPM 3.1 and HAI 5.0a would be more or less clustered than the random point assignments suggests.

141. The model developers could not have implemented a model fix within the time frame of this docket. At this stage, implementation of the parties' suggestions described in Par. 131 would not be appropriate for the reasons outlined in Par. 139 and Par. 140, above. While we recognize that the likely result of using the models as they currently stand will be to understate the costs in the lowest density zones, at present we see no solution to this problem. Therefore, we will continue to rely on the current method of loop length adjustment, that of reconciling estimated loop lengths with actual loop lengths.

142. In the event that the Legislature does authorize the Commission to establish a universal service fund, we will expect the model sponsors to provide a remedy to this problem.

Switching investment estimates

143. A loop that is used for switched services is terminated on a local switching machine. The local switching machine provides dial tone, originates and terminates calls, and provides many enhanced services, such as call-waiting and three-way calling.

144. The HAI 5.0a Model switching algorithms were designed to estimate the cost of local switching, as well as vertical services. The HAI 5.0a Model estimates the cost of switching investment on a per-line basis.

145. GTE and Sprint object to the HAI 5.0a switching investment function. They argue that the Commission has previously found the HAI 5.0a investment function to be unreasonable.[29]

146. We find, as we did in the Eighth Supplemental Order, that the HAI 5.0a switching algorithms should not be used to estimate end-office switching investment.

147. In Par. 307 of the Eighth Supplemental Order the Commission determined that the switching investment estimates sponsored by GTE, U S WEST, and AT&T and MCI were unreasonable. In Par. 312 of the Eighth Supplemental Order, the Commission used an FCC staff study to estimate the investment per working line on a switching machine at $150.00.

148. The Commission Staff used the $150 estimate when it ran the HAI 5.0a Model in this docket.

149. GTE argues against using the $150 investment value in this proceeding. GTE claims that the FCC staff's investment function reflected 1995 costs and therefore was not forward looking.

150. Sprint also objects to the $150 investment value, arguing that the figure does not reflect how line costs are a function of switch size. Sprint contends that the per unit costs are higher on smaller switches because the fixed cost of a switch is spread over a smaller number of lines.

151. In the generic cost docket the goal of the proceeding was to estimate the state-wide average cost of providing service. The $150 value, as an average, therefore implicitly assumes that the cost of providing switched services is the same in rural, suburban, and rural areas. This assumption was reasonable for identifying the cost for a company's statewide operations. It is less reasonable in this proceeding, for, as suggested by Sprint, there is a need to identify the cost by wire center size. An appropriate switching investment function therefore must distinguish the cost of serving customers on remote and host switches.

152. Sprint, GTE, and U S WEST support using the BCPM 3.1 model for this purpose.

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[29]Eighth Supplemental Order at Par. 285.

153. AT&T and MCI respond that the BCPM 3.1 switching module is based on proprietary studies SCIS and SCM that the Commission rejected in the Eighth Supplemental Order. Eighth Supplemental Order at Pars. 302-304. We did not accept the SCIS or SCM studies because the estimates were unreasonable, were poorly documented, and were based on proprietary studies.

154. In addition to the factors identified in the Eighth Supplemental Order, the usefulness of the BCPM 3.1 switching module is greatly limited because the formula reflects only the cost of providing basic exchange service. Vertical feature costs have been excluded from the study.

155. If we include vertical services in our benchmark, as the draft rule would do, the costs associated with vertical services should also be included in the cost study.

156. U S WEST acknowledges that the Commission has previously expressed its preference to use publicly available information. The Company states that if the Commission does not use BCPM 3.1 data, the Commission should use the switching investment estimates provided in a recent National Regulatory Research Institute Report (NRRI), Exhibit 241.[30]

157. The Commission determines that the estimates provided by the NRRI report (Ex. 241, p. 124), reflect current cost levels, are appropriate, and must be used in both the HAI 5.0a and BCPM 3.1. The values are as follows:

Switching Investment Function	
Remote Getting Started	$193,962.1
Line on remote switch	$110.49
Host Getting Started	$513,083.8
Line on host switch	$107.86

158. While using the NRRI switch costs estimates is an easy matter in the HAI 5.0a model, there is no apparent way to use them in the BCPM 3.1 model. This leaves us with no choice for our BCPM 3.1 model runs except to use the switching costs proposed by the ILECs. The Commission does not support

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[30]The National Regulatory Research Institute, "Estimating the Cost of Switching and Cables Based on Publicly Available Data" David Gabel, Ph.D. and Scott Kennedy. April 1998. NRRI 98-09.

these switching costs and their use here should not be construed as support. We have previously identified a number of problems with the ILECs switching cost estimates, including finding that the investment estimates are too high. Docket UT-960369, Eighth Supplemental Order, Sec.VII, Pars. 300, 305. For the HAI 5.0a model runs, the Commission used the values in the Table above. For future use of the BCPM 3.1 model, the sponsors must provide a means to incorporate the values.[31]

159. The HAI 5.0a model uses a default switch port administrative fill factor of 98%. Page 114 of Exhibit 241 notes that line switch utilization typically ranges from 90 to 95%. Since we have decided to adopt the switch investments suggested in Exhibit 241, it seems reasonable that we also adopt the line utilization factor mentioned in this exhibit. Accordingly, we adopt for use in the HAI 5.0a model a switch port administrative fill factor of 92.5%, the average of the 90% and 95% reported in exhibit 241.

Expense Estimates (current/book ratios; nonrecurring expenses; common costs)

160. Sprint has populated its model by taking the ARMIS[32] expenses and dividing by the ARMIS investments. This approach is flawed because, as GTE witness Calnon points out, the current cost of placing a cable is frequently greater than the embedded cost of placing a cable. This being the case applying the current cost/embedded investment ratio to the current investment, as was done by Sprint, overstates the monthly cost.

161. For example, assume that current maintenance expense for buried cable is $10 and that the embedded investment in buried cable is $100. The current cost/embedded investment ratio is $10/$100 = .1. Now assume that the current cost of the cable is $200. Using Sprint's methodology, the current maintenance

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[31] In Par. 1 of its response to HR 01-003, US WEST stated that the switching function that was utilized in the UNE docket could be easily incorporated into the current BCPM 3.1 switch module. The way suggested for doing so was to input that switch function in the place of the small switch regression function and then to change the line thresholds for using the small switch regression curves to 80,000 lines. This would, it was asserted, prevent the model from calling on the large switch regression curve data. We tried this methodology using the NRRI switch cost estimates preferred by the Commission. When we did a run following the guidelines proposed by US WEST we were troubled by the fact that it appeared that the model was still drawing upon some of the large switch regression values to determine some aspects of the cost of the switch. Given the short time frame allotted to us, we were not able to track down the reason for this, or to ascertain if there was legitimate cause for its occurrence. Because of this problem it was decided that the NRRI switch cost numbers should not be used in the Commission's BCPM 3.1 runs.

[32] Automated Reporting Mechanized Information System is an information reporting system established by the Federal Communications Commission.

expense would be estimated as .1 * $200 = $20, an expense overstatement of 100%. On the other hand, using the current-to-book ratio of $200/$100 = 2 and applying this to embedded investment would result in an estimated expense factor of $10/(100 * current book ratio) = $10/(100 *2) = .05. Multiplying the $200 current investment for buried cable by this factor results in a monthly maintenance expense for buried cable of $10, which is the correct value.

162. On the other hand, if the cost of a technology is declining, as it has been for digital switching, Sprint's methodology will result in an understatement of expenses. The Commission is not willing to assume that the understatement for digital switching balances out the potential overstatement of outside plant maintenance expenses.

163. In calculating its expense factors, Sprint included expenses incurred for rearrangements and changes along with expenses incurred for the ordinary maintenance and upkeep of the network. Rearrangement and change expenses are typically, but not exclusively, associated with connecting and disconnecting a customer to the network. The cost of connection and disconnection is recovered through a nonrecurring charge (NRC).

164. In Bench Request No. 10, the Commission asked Sprint, (1) to use current-to-book ratios to adjust its embedded investment, and (2) to reconstruct its expense factors so that the rearrangement and change expenses associated with connecting and/or disconnecting a customer from the network are excluded. Sprint performed these adjustments and submitted them to the Commission on September 25, 1998. The Commission acknowledges Sprint's disagreement with these adjustments.

165. Adjustment (1) above, is required by the Commission's Eighth Supplemental Order. In Par. 242 of that order the Commission stated that future studies were to use a methodology that divided "...current expenses by current or future investment levels, not the embedded value."

166. The sponsors of the HAI 5.0a have not complied with this requirement. The HAI 5.0a model uses embedded expense to embedded investment ratios to forecast future expense levels. No party has proposed a correction for this methodological error. In future proceedings we expect the sponsors of the Hatfield Model to comply with the Commission's findings regarding the estimation of expenses.

167. In regard to Sprint's objections to adjustment (2), above, the costs of connection and disconnection are not identified as a part of universal service by

either the FCC or the Washington Legislature.[33] As US WEST states, "on a forward looking basis, nonrecurring expenses will be covered by nonrecurring charges and . . . there is no need to model these expenses." US West Brief, p. 48.

Pole Material and Installation Cost

168. The default pole size used in BCPM 3.1 is a 45-foot class 5 pole, purchased and placed by the Telephone Company.[34] The material and installation cost is given as $926.75 for hard rock and $726.75 for normal and soft rock conditions.[35] These costs do not include the costs of guys and anchors, which are included elsewhere. The HAI 5.0a Model assumes that a 40 foot, class 4, pole can be installed for $417.00. This value reflects the material and labor costs, as well as periodic down-guys and anchors. Eighth Supplemental Order, Par. 99.

169. US West submitted a flat pole cost for all placement conditions that was the lowest of all the ILECs. It was lower than the BCPM 3.1 default values. This cost included engineering, material cost of pole, and installation. It does not include the cost of anchors and guys, which are included elsewhere. US WEST states "that there is no evidence in this record of the length and class of pole that is modeled in US West's runs of the BCPM 3.1." US West states that its pole costs are Washington specific and are consistent with data used in US West's TELRIC models. Ex. 1T, p. 48.

170. Sprint submitted pole material and installation costs within the Inputs Model filed with its brief for a 45 foot, class 3 pole in the middle range of parties' stated costs. The cost estimates are lower than the BCPM 3.1 national default values. These costs do not include the costs of guys and anchors, which are included elsewhere. Sprint also asserts that its pole costs are Washington specific and were derived using an "engineering computer file used to estimate the cost of installing poles." Sprint Brief, p. 25.

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[33] *See, In the Matter of the Federal-State Joint Board on Universal Service,* CC Docket 96-45, Report and Order (May 8, 1996) at Par. 56; Ch., 337, l. 1998.

[34] *BCPM Cost Proxy Model Release 3.1: Loop Inputs Documentation*, Section 2.1.2

[35] These are BCPM 3.1 default costs taken from the Structure Inputs Tab from the BCPM 3.1 Inputs Module.

171. GTE submitted pole material and installation costs for hard rock and for normal and soft rock conditions that were significantly higher than the BCPM 3.1 default values. Ex. 142, p. 6. These costs do not include the costs of guys and anchors, which are included elsewhere. GTE states that these costs "reflect the prices that GTE pays to its pole vendors and the placement activities that are performed. These costs reflect a composite of 30-foot non-shared poles and 45-foot shared poles." GTE Brief at p. 42.

172. Staff witness Spinks proposes a total upper boundary pole cost of $541. He derived this by making a $50 upward adjustment of Exhibit CC-54 from the generic cost case "in order to bring the model cost more in line with vendor average bid information," which brings total pole cost to $541. Staff Brief at 19. Staff recommends that this value be viewed as an upper bound value for pole costs. Exhibit CC-54 was the documentation provided for the HAI 5.0a inputs provided by the model sponsors.

173. GTE takes issue with Mr. Spinks's $50 adjustment, contending that there are two problems with the proposal: "(I) The Commission found the survey results were unreliable since the questionnaires were not well defined (See Eighth Supplemental Order Pars. 93-96) - a problem averaging does not solve; and (ii) the average pole price from these survey is $790.61, not the $541 used by Staff.[36]" GTE Brief at p. 42.

174. AT&T and MCI state that the HAI 5.0a default value of $417 is reasonable, especially when compared to the NRRI report value of $423 (Exhibit 241). AT&T and MCI go on to state that data from the ILEC responses to data requests that have been posted to the FCC's website show a wide range of costs, with Sprint and Bell South reporting lower total pole costs than are used in HAI 5.0a.

175. It is unclear whether any of the ILECs' estimates appropriately reflect the cost of a major rebuild of plant. This type of installation is consistent with the TELRIC principles adopted in this order, as well as the Eighth Supplemental Order, and is likely to have lower unit costs than the cost of replacing or adding an occasional pole. The Commission infers that the high values reported by the ILECs reflect the costs of installing an occasional pole, without the economies of scale that would be available in major construction. The cost of adding an occasional pole should not be used as an input to the USF cost model since the models are estimating the cost of constructing a network that satisfies the total level of demand.

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[36] Even if the Staff used separate bids for material and labor, a practice the Commission found unreasonable, the average pole cost would be $531. This, however, does not include anchors and guys. (Eighth Supplemental Order, Par. 103; Murphy Ex. 362, p. 21)

176. In regard to pole spacing, we note that none of the parties to this proceeding objected to the Washington specific values utilized in the parties' submissions. Given the absence of contention on this issue, we adopt the parties' Washington specific pole spacing values for utilization in both BCPM 3.1 and HAI 5.0a.

177. The Commission believes that for high-cost, rural areas a 40-foot pole is sufficient. We note that in the case of US West it is unclear to what size and class of pole their submitted costs pertain. While GTE, Sprint, and US West have all stated that their costs are company-specific and specific to the state of Washington, none of these parties filed documentation supporting their claims.

178. The parties have presented the Commission with a wide range of pole costs. At the low end is the $417 advanced by AT&T and MCI. At the high end is the cost for hard rock advanced by GTE. We note that in the earlier generic cost docket GTE advocated a value of $737.00 as being representative of their pole costs, and do not see any reasons advanced for the difference. See, Eighth Supplemental Order at Par.104.

179. Given the wide range of costs reported, the lack of supporting documentation for those costs, and the fact that, for two of the parties, it is not possible to tell if the costs were estimated using the appropriate size and class of pole, we will use the pole costs found in Ex. 241, pp.54-59. We have chosen these values because; (1) they were derived from data that is in the public domain, and (2) Exhibit 241 contains a much fuller discussion and analysis of the derivation of the values then we have found obtaining among the fillings of the various parties. Furthermore, we are persuaded that the ILECS ought to be able to at least match the pole costs incurred by the much smaller companies which make up the data set used in Ex. 241.

180. We will use the values from Ex. 241, pp.54-59 in the following manner: $341.71 for normal soil conditions; $450.67 for soft rock conditions; and $523.36 for hard rock conditions. The costs for Anchors and Guys will be $36.28, $54.96 and $66.52 for the 0-100, 100-2,550, and 2,550+ density zones, respectively. We note that the values sponsored by AT&T and MCI are consistent with the RUS findings reported in Ex.241, pp.54-59.

181. While these values are relatively easy to use within the BCPM 3.1 model, putting them into the HAI 5.0a model is not as straightforward and so the HAI 5.0a model runs did not use these values. If the HAI 5.0a model is proposed in a future proceeding, its sponsors must include pertinent values and instructions on making any changes to the values that possible better future information might demand.

INCONSISTENCIES BETWEEN AND DEFICIENCIES WITH BCPM 3.1 VERSIONS

182. Along with the briefs, each party filed a CD-ROM containing the cost model they supported. In doing its own runs, the Commission used the CD-ROMs provided. While setting up these runs we noted discrepancies that are a source of serious concern to us.

183. For example, Sprint, GTE and US West were all asked to provide the Commission with runs based on their actual loop lengths and they did so. However, when we attempted to apply loop length adjustments in our own runs we discovered that Sprint had chosen to internalize the adjustment process within the BCPM 3.1 model. GTE and US West, on the other hand, chose another methodology. To apply the loop length adjustment on our GTE and US West runs we were required to run BCPM 3.1 to process some of the modules, then quit the model and apply the loop length adjustment using a program specially devised for that purpose. We then had to restart BCPM 3.1, finish the data, and report processing.

184. None of the parties provided documentation detailing how these adjustments were being applied.[37] This made it impossible to assess whether these adjustments were flowing through the model in a manner that made sense. GTE and US WEST provided a loop length adjustment program that came with outdated installation instructions.

185. During these proceedings we directed the parties to provide the Commission with runs that based the network design on households as opposed to housing units. This the parties did, but once again in a fashion that highlighted the lack of coordination among the BCPM sponsors in implementing changes to the model platform. Sprint chose one way of implementing this change while US WEST and GTE decided on a different approach. Sprint documented the approach they took while US West and GTE did not.

186. This lack of coordination among the BCPM 3.1 sponsors and the lack of adequate documentation detailing how the changes were implemented, makes it exceedingly difficult for the Commission to properly assess the impact of its requests.

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[37]Neither did the HAI 5.0a sponsors document how the adjustments were to be made in that model. The HAI 5.0a treatment of the adjustment was internal to the model and, relative to BCPM 3.1, more transparent.

187. Furthermore, the parties supplied us with different versions of the BCPM 3.1 platform. For example, prompt boxes appeared when running one party's BCPM 3.1 model that did not appear when running another party's BCPM 3.1 model. Also, we noted when we referred to the Visual Basic code on which the BCPM 3.1 model is based, one party's version of the BCPM 3.1 model had code that was not present in another party's or that another party had rendered inactive.

188. One of the parties sent us a program which had been designed to make the housing unit/household conversion. When we ran it, we discovered that the program was flawed. After running it, analysis showed that the total of the number of households reported by quadrant was, on average, 128% greater than the actual total number of households. At its greatest, the total number of households by quadrant was greater than the actual number of households by a factor of 3. Subsequent analysis has shown that the single and multiline studies which were filed using this methodology are similarly flawed. Nor was this the only example of such a flaw.

189. These inconsistencies and problems are a source of grave concern to us. GTE, US West and Sprint had represented to us that they were sponsoring "the" BCPM 3.1 model. It was our understanding that this meant that they were sponsoring a consistent BCPM 3.1 platform, which they were proposing to populate with inputs specific to their respective companies. Instead, they presented three separate BCPM 3.1 platforms that are consistent in some parts and not consistent in others. This leaves us in doubt as to the validity of meaningful comparisons between the outputs generated by the runs performed using the separate versions of the model that the parties supplied, as well as doubts about the results in light of the errors.

190. This problem is underscored by the fact that the version of BCPM 3.1 which GTE filed with the Commission has turned out to be seriously flawed. In our runs we discovered that when we apply the subsidy at the wire center level the reports generated have capped values support which are greater than uncapped values. Subsequent investigation revealed that the CBG ROLLUP module utilized in the GTE version of BCPM 3.1 was flawed.

191. In future proceedings, unless the Commission approves differences, model sponsors who choose to share a preferred platform must agree on a single platform, must coordinate model platform changes among themselves, must present a single agreed platform change for consideration by the Commission, and must verify that the model does what the party represents that it does. Furthermore, model sponsors must provide adequate documentation for the model runs and for any changes.

COST MODELS' ADVANTAGES AND FLAWS

192. The parties collectively spent more briefing space supporting their own model and challenging the other than on any other area. The advocates of each model have a catalogue of fatal flaws in the other. The models' strengths and weaknesses were explored at length at the hearing and set out at length in the briefs. The Commission in other sections of this order acknowledges that each of the models has flaws as well as strengths.

193. The following merely lists the principal points urged by the parties and is not an analysis or finding on the Commission's part. The Commission discusses elsewhere in this order its views of the models' principal flaws and the Commission's responses to them.

194. The Commission's approach to deriving costs for the Report to the Legislature, described elsewhere in the order, acknowledges that both models have strengths and weaknesses. The Commission corrects for flaws to the extent possible, and then it uses both to set parameters of costs for purposes of the required estimates. We have strong confidence that within the range lies the accurate representation of true forward-looking costs that future studies will identify.

BCPM 3.1

195. BCPM 3.1 is a model that draws support in this proceeding, as prior versions of the BCPM model have drawn support in past proceedings, from larger incumbent local exchange companies.

Arguments Offered in Support of the BCPM 3.1 Model by Proponents

196. Parties supporting the BCPM 3.1 model made a number of representations and arguments in its favor. These include the following:

197. The BCPM 3.1 model is open and no runs are confidential. BCPM 3.1 is based on proper engineering practice and deploys facilities economically. BCPM 3.1 uses the more accurate approach to approximating customer dispersion, using actual maps and roads. BCPM 3.1 incorporates reasonable sharing assumptions, which have been validated by outside engineering experts.

BCPM 3.1 uses Washington-specific inputs for loop costs and operating expenses. BCPM 3.1 is the only model that demonstrates compliance with state and federal engineering standards.

198. BCPM 3.1 produces more accurate cost estimates. BCPM 3.1 is the more accurate comparison with estimated current implicit support (GTE est. $233 million, BCPM 3.1 $275 million).[38] BCPM 3.1 produces the more accurate reflection of reported investment and expense.

199. BCPM 3.1 has the more accurate depiction of minimum distance required to connect all customer locations in an ultimate grid/main cluster with distribution route feet produced by the models (Minimum spanning tree). BCPM 3.1 is favored by the companies that actually construct facilities.

Criticisms offered of the BCPM 3.1 model by its Opponents

200. Opponents of BCPM 3.1 use a number of representations and arguments against it. These include the following.

201. BCPM 3.1 does not use actual customer locations and is incapable of doing so. BCPM 3.1 uses embedded costs for switching and signalling that overstate costs. BCPM 3.1 employs inefficient design for feeder and subfeeder facilities. BCPM 3.1's lot size assumptions are inappropriate. BCPM 3.1's feeder topology assumptions are unrealistic . BCPM 3.1 fails to serve many households. BCPM 3.1 overbuilds the network . BCPM 3.1's loop sizes are too long for reliable service. BCPM 3.1 fails the MST test more than HAI 5.0a fails it . BCPM 3.1 does not consider growth in calculating cost per line. The BCPM 3.1 model embeds inefficiencies in early stages that inflate costs. BCPM 3.1 is not open.

HAI 5.0a

202. The HAI 5.0a model carries the numerical designation showing its ancestry, but not the name. It is produced by the firm that previously produced the "Hatfield" models, which drew favor in earlier proceedings from interexchange carriers and CLECs. In its present iteration, version 5.0a, the HAI model continues to enjoy IXC and CLEC support. In this proceeding, Staff also supports it.

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[38]The difference is due to use of forward-looking rather than embedded costs.

Arguments Offered in Support of the HAI 5.0a Model by its Proponents

203. The HAI 5.0a model is imperfect, but the best available. HAI 5.0a uses actual customer locations. HAI 5.0a's approach to feeder construction is superior. HAI 5.0a more closely resembles FCC Staff's HCPM model. HAI 5.0a uses clustering algorithms rather than gridding. HAI 5.0a uses an absolute minimum copper analog distance rather than too-small carrier serving areas. HAI 5.0a uses a recommended 18,000 foot copper analog limit rather than 12,000 feet. HAI 5.0a uses efficient digital copper T1 technology rather than only using digital fiber and analog copper technologies. HAI 5.0a uses no manholes in underground distribution plant rather than including manholes in the plant. HAI 5.0a uses 2,016 digital loop carriers rather than limiting the digital loop carrier units to 1,344. HAI 5.0a excludes manholes, as those are unlikely to occur in funded territory. HAI 5.0a does not use poles in the highest two density zones, as those zones are unlikely to require USF support; and the HAI 5.0a model is open.

Motion to discount the Credibility of the HAI 5,0a Model

204. The HAI 5.0a model's sponsors were unable in this proceeding to produce information underlying preprocessing, such as would permit verifying the accuracy of preprocessing decisions and thus the placement of customers for the purpose of finding costs.

205. On motion of US WEST, the Commission directed AT&T to provide information about preprocessing. The Commission stated a preference for open information rather than a "black box," devoid of information that could be checked. AT&T, principal HAI 5.0a model sponsor, failed to do so. AT&T contends that such information is proprietary and that the proprietors of the data refuse to make it available without payment of substantial fees. US WEST and Whidbey moved formally for the Commission to assume from the failure to provide the information that it would be negative. The Commission reserved ruling on the motion.

206. We note that limited access to the underlying information has been provided in other settings and was offered to parties in this proceeding. While we believe that degree of access makes difficult a full evaluation of the data, it was nonetheless one means by which the inputs could have been subjected to analysis.

207. We deny the motion. We consider the failure as one matter to weigh in evaluating the HAI 5.0a model. Merely because US WEST moved for the production of information that had been denied to it and to others in other proceedings, is not sufficient reason to single this flaw out for "special" negative consideration.

Criticisms of the HAI 5.0a Model Offered by its Opponents

208. Opponents' arguments against the HAI 5.0a model include the following. HAI 5.0a supporters presented no substantial evidence, in that no witness with engineering qualifications testified on its behalf. HAI 5.0a is not an open model. HAI 5.0a clusters cannot be checked. HAI 5.0a's geocoding is not proved. HAI 5.0a fails the MST test. HAI 5.0a is not internally consistent. HAI 5.0a inputs are unsupported and some are unreasonable. Staff's review is unbalanced, in that Staff did not subject both models to similar reviews. No evidence supports the contention that using E-911 database would improve HAI 5.0a. HAI 5.0a supporters could use billing records to derive actual customer addresses. HAI 5.0a should use better assignment of customer locations. HAI 5.0a should not convert all lot shapes to rectangles. HAI 5.0a should not make cost calculations below the wire center level. HAI 5.0a hasn't been validated by comparison to actual plant in service. HAI 5.0a's network design is poorly engineered. HAI 5.0a excludes necessary costs and understates costs of service. HAI 5.0a is result-oriented – its results remain the same despite changes in construction from generation to generation. HAI 5.0a should account for deferred taxes, growth, and salvage.

Commission Conclusions relating to Model Selection

209. We have noted elsewhere in this order that while we acknowledge faults in both models, we believe that they are sufficient to provide by means of bracketing a reasonable representation of costs. For this proceeding we will use both models, run with the changes we require, in deriving the required cost estimates.

Cost Model Inputs

210. In this proceeding we are estimating the cost of providing service in high cost areas. At times parties have presented evidence on issues that do not pertain

to estimating the cost of providing service in high-cost areas. In such cases, the Commission sees no need to make any findings on the disputed topic. For example, US WEST witness Lent argued that the HAI 5.0a model understates placement costs in the higher density zones. 291T, pp.18-19. We conclude that there is no need to make any findings regarding the cost of installing facilities in higher density zones in the context of the immediate proceeding.

Buried Cable Structure Cost

211. In this section of the order, we discuss the cost of placing buried cable in the low density zones. Buried structure costs include the costs related to the engineering and labor required to excavate buried structure. Normal soil conditions are those in which a regular plow can be used.

212. For suburban areas, we have changed the US WEST sponsored mix of activities. The mix of activities recommended by US WEST are similar to those recommended by the Company for the costing of unbundled loops. In Docket No. UT-960369, we found that the mix sponsored by the Company was inappropriate. Eighth Supplemental Order, Pars. 50-55. Furthermore, the mix sponsored by US WEST in this proceeding, contrary to the claim of its witness Peter Copeland, results in structure placement costs that are higher than the values that would be obtained using the mix contained in the national version of the BCPM 3.1. Copeland claimed that US WEST selected the mix of activities that would minimize the cost of installing structure given the prices the company pays to contractors. As illustrated on the table below, Mr. Copeland is incorrect. The US WEST-selected mix of activities results in unit costs that are approximately 80% higher than under the BCPM 3.1 national default mix of activities.

Buried Structure, US WEST Contract Costs: Density Zone 201-650 lines

	Structure Sharing	No Structure Sharing
US WEST sponsored Mix of Activities	5.45	6.82
BCPM 3.1 sponsored Mix of Activities	3.04	3.79

Source: Ex. 5C, Pages 41-42; and Ex. 142, page 2; Ex. 143 pages 53-54.

213. For density zones other than the lowest two, when running BCPM 3.1 we have employed the mix of activities recommended by GTE, the BCPM 3.1 national defaults. Use of these values in BCPM 3.1 does not imply that the Commission approves of them or finds them reasonable. Rather, their use in this proceeding should be construed to mean only that they are the most reasonable values to use in BCPM 3.1 available for use at this time. In using them, we note also that the density zones concerned, suburban and urban areas, have little impact on the size of the universal service fund which is the object of these proceedings.

214. For the lowest two density zones, we accept the BCPM 3.1 numbers proposed by ILECs with the following exceptions:

a) For Sprint in the normal category in density zones 0-5 and 6-100 we will replace Sprint's values with values derived from Ex. 241:41 ($1.69 and $2.23 respectively);

b) For US WEST, in both the soft and hard rock categories, we replaced US WEST's values with values derived from Ex. 241:41 ($3.17 and $4.66 in the 0-5 density zone; $3.72 and $5.20 in the 6-100 lines density zone).

215. As with the Sprint data, the US WEST inputs are deemed to be proprietary. The following table shows the inputs contained in Ex. 241, as well as the values sponsored by GTE and Staff.[39]

Buried Structure Costs With Commission Sharing Inputs						
	0-5 Lines Per Square Mile			**6-100 Lines Per Square Mile**		
	Normal	Soft Rock	Hard Rock	Normal	Soft Rock	Hard Rock
GTE	$1.29	$1.96	$3.26	$1.52	$1.99	$3.48
Ex. 241 (NRRI Report)	$1.69	$3.17	$4.66	$2.23	$3.72	$5.20

[39] Sources: Sprint, Ex. 104C; US WEST Ex. 5C and response to Bench Request No. 2; GTE Ex. 143. NRRI from Ex. 241, p. 41, less $0.40 sheath cost + 10% engineering. Staff used HAI 5.0a default values for Buried Excavation, Installation, and Restoration, Ex. 254. The soft rock calculation was taken by multiplying 1.77 by 2, the HAI 5.0a soft rock placement multiplier from section 2.7.4 of the HIP. The hard rock calculation was taken by multiplying 1.77 by 3.5, the HAI 5.0a hard rock placement multiplier from section 2.7.3 of the HIP.

Staff	$1.56	$3.12	$5.45	$1.56	$3.12	$5.45

216. We make these changes because we feel that the costs suggested by Sprint for normal placement in density zones 0-5 and 6-100 and by US West for soft and hard rock placement in those same density zones are too high when compared to the values reported in Exhibit 241, which we find credible. We also find it difficult to believe that Sprint and US West would not be able to install buried cable in low density areas for less money than the much smaller RUS companies can in low density zones in their respective serving areas. Furthermore, the numbers that Sprint and US WEST used appear to be based on the arbitrary decisions of engineers rather than based in some objective measure.

217. In its HAI runs the Commission utilized the same values as Staff for buried placement costs. We did, however, change the HAI hard rock and soft rock placement multipliers to conform with values suggested by Ex.241:41. These changes are reflected in the following table.

Hard and Soft Rock Placement Multipliers						
	0-5 Lines Per Square Mile			6-100 Lines Per Square Mile		
	Normal	Soft Rock	Hard Rock	Normal	Soft Rock	Hard Rock
Gabel/Kennedy[40]	1.69	3.17	4.66	2.23	3.72	5.20
Rock Placement Multipliers		1.88	2.76		1.67	2.33
Average Soft Rock Placement Multiplier		1.77				
Average Hard Rock Placement Multiplier			2.55			

Special Access Lines

218. In the Eighth Supplemental order the Commission found that the HAI 5.0a model's treatment of special access DS-1 and DS-3 lines in terms of voice channel equivalents resulted in an understatement in the unit cost of providing a loop. Par. 200-205. GTE witness Murphy testified that HAI 5.0a continues to count DS-1 and DS-3 special access circuits on a voice channel equivalent

[40] These values were derived from Ex. 241:41.

basis, i.e., DS-1 circuits are counted as 24 lines by the Model and DS-3 circuits are counted as 672 lines by the Model.

219. GTE witness Murphy proposes to reduce the number of special access line voice grade equivalency circuits by 102,506. An adjustment this large does not make sense because the model assumes that there are only 93,075 special access lines. HAI 5.0a folder ARMIS Inputs, cell F131. Mr. Murphy has effectively assumed that there are a negative number of special access lines.

220. Nevertheless, it is appropriate to adjust the HAI 5.0a special access line count. In the Eighth Supplemental Order we adopted an adjustment proposed by US WEST. At Par. 200 of the Order we noted that US WEST had pointed out that the Hatfield method for treating special access lines resulted in a seven percent increase in the line count. We have adjusted downwards the HAI 5.0a GTE line count by approximately seven percent, 60,000 lines.

221. Staff has apparently populated the HAI 5.0a with the ARMIS special access line count.[41] It does not appear that they adjusted the special access line count downward to reflect our findings in the Eighth Supplemental Order. In our HAI 5.0a scenarios, we have adjusted the US WEST line count downwards by seven percent in order to reflect our findings in the Eighth Supplemental Order.

222. Sprint has few special access lines. We have not been presented any evidence regarding the need to adjust the HAI 5.0a Sprint special access line counts and therefore have adopted the models default values.

Cost of Drops

223. Drops connect the distribution cable to customers' premises. More specifically, the drop is the cable that extends from the terminal to the network interface device (NID). The buried drop cost input determines the per foot material and placement cost for the buried drop. The aerial drop cost input determines the per foot material and placement cost for the aerial drop. The total investment in the drop is the product of the drop cost input times the drop length.

224. The parties typically assume that a two pair cable is used for aerial installations. A three pair cable is assumed to be used for buried installations.

225. The following Table provides the input values that appear in various exhibits submitted in this proceeding.

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[41]The special access line value in the Staff run is the same as the national default value.

	aerial	buried 0-5	buried 5-100
GTE	0.89	0.89	0.89
US West			
Sprint			
Staff	0.66	1	1
NRRI Report	0.74	0.85	1.02
BCPM 3.1 National Default	0.77	0.77	0.77

Sources: GTE--ex. 142, page 8; Sprint--Ex. 104C, BCPM 3.1 Loop Cost Inputs, page 7; Staff--Ex. 254, page 1; NRRI Report, Ex.241, pages 63 & 65; BCPM 3.1 National Default --Ex. 142, page 8.

226. We exclude US WEST's and Sprint's unit costs from this table because they assert that their cost data are proprietary. US WEST's claimed costs are on the high side relative to the values reported on the table above.

227. For the running of BCPM 3.1 and the HAI 5.0a, the Commission will substitute the BCPM 3.1 national default value, $0.77, for the US WEST aerial value. US WEST proposed that the BCPM 3.1 national default be used to judge the reasonableness of its proposed inputs. This value is reasonable when judged relative to the values that GTE and Sprint sponsored.[42]

228. For US WEST's buried cable drops, the Commission will use a cost of $0.85 per foot. This value is reasonable when judged relative to the values sponsored by GTE and Sprint and is also equal to the value suggested by the Gabel/Kennedy study for the 0-5 density zone.[43]

229. For GTE and Sprint, the Commission has used in both the HAI 5.0a and BCPM 3.1 the companies' respective recommended inputs.

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[42]We encourage parties in future proceedings to reconsider the method used to develop the inputs. For example, Sprint developed its drop costs based on the assumption of a 500 foot drop. It further assumed that it would require 3.75 labor hours to install the 500 foot drop. The assumption of 3.75 hours is not reasonable in a TELRIC environment. Ex. 104C, JAH-4. See Eighth Supplemental Order at Par. 114. Furthermore, the assumption of an average drop length of 500 feet is unreasonable in light of BCPM 3.1's assumption that a customer is located within a 500 foot buffer from a road. Ex. 3, page 40.

[43]The Gabel/Kennedy values assume a ten percent loading for engineering and have not been discounted to reflect the purchasing power of large telephone companies. Ex. 241, pages 46-49. Such an adjustment may be appropriate but we find that there is no need to make an adjustment at this time.

230. The HAI 5.0a sponsors recommend material costs for aerial and buried drops of $0.095 and $0.14 per foot respectively. The remaining cost of the drop is associated with installing the cable. Hence if an aerial drop in the 0-5 density zone is 493 feet (Ex. 295, LSL-3), the placement cost is 493 feet * ($0.77 - $0.095) = $332.78.

Using BCPM 3.1 to estimate the cost of exchange service

231. The ILECs initially filed studies that estimated the cost of providing only exchange service. We find that the BCPM 3.1 estimates for only exchange service are not useful for the purpose of estimating the cost of providing universal service. In developing these estimates, the BCPM 3.1 sponsors have assumed that the cost of the loop is not a shared cost of all switched services. This proposition has repeatedly been rejected by this Commission. For example, in UT-950200, we found that

> . . . the cost of the loop is not appropriately included in the incremental cost of local exchange service. The local loop facilities are required for nearly every service provided by the Company to the customer...The cost of the local loop, therefore, is not incremental to any one service. WUTC v. US WEST Communications, Inc., Docket No. UT-950200, Fifteenth Supplemental Order, April 11, 1996, at 83-84.

232. The FCC has also concluded that when sizing the cost of supported services, it is inappropriate to only estimate the cost of basic exchange service. The FCC concluded that it was "impractical" to attempt to allocate shared costs between supported and non-supported services:

> Revenues from services in addition to the supported services should, and do, contribute to the joint and common costs they share with the supported services. Moreover, the former services also use the same facilities as the supported services, and it is often impractical, if not impossible, to allocate the costs of facilities between the supported services and other services. Par. 261. *In the Matter of Federal-State Joint Board on Universal Service*, Report and Order, Docket No. 96-45, May 8, 1997.

233. Furthermore, the ILEC's assignment of 100% of the cost of the loop to exchange service is contrary to the §254(k) statutory requirement that "services included in the definition of universal service bear no more than a reasonable share of the joint and common costs of facilities used to provide those

services." Assigning 100% of the cost of the loop to basic exchange service, as proposed by the ILECs, clearly fails the statutory requirement that "no more than a reasonable share" be recovered from supported services.

COMPLIANCE WITH COMMISSION POLICIES AND REQUIREMENTS

234. At the beginning of this proceeding, the Commission realized that it must gather a large quantity of information quickly, fully, and in parallel organization. Therefore, it issued eight guidelines for cost presentations in the Notice of Prehearing Conference of May 4, 1998. (Notice of Prehearing Conference, Docket No. UT-980311(a), May 4, 1998, at 2-3.) The Commission made clear that parties were required to file cost estimates complying with those guidelines, as follows:

> To narrow the list of contested issues, a list of guidelines is adopted, which companies must use in preparing and reporting their cost of serving customers in high-cost locations. Companies must provide cost estimates that are consistent with past Commission decisions on forward-looking cost studies, such as the 15th Supplemental Order in Docket No. UT-950200 and the 8th Supplemental Order in Docket No. UT-980369, et al., when those orders are relevant.

235. The Commission further stated:

> These guidelines do not prescribe the exclusive means of establishing cost. Any party that believes a more reasonable or accurate estimate of cost requires a different assumption, model, or methodology may also submit alternative evidence consistent with its preferred assumption, model, or methodology along with a justification for doing so, but it must submit evidence consistent with the guidelines in this notice to the extent it has or can reasonably obtain that consistent evidence.
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> Id. at 2. (Emphasis in original.)

236. Some parties did not comply with the guidelines with their initial responses. Commission Staff moved, and the Commission granted, motions to compel parties to comply. The Commission also directed Bench Requests 3, 4 and 5 and data requests and

hearing requests to the parties to bring out the information requested and to explain, clarify, and update that information. Now, at the conclusion of the proceeding, the parties have complied with nearly all the Commission's guidelines. Each will be separately addressed.

Develop Costs at Wire Center Level or Below

237. Guideline No. 1 requires that:

> Cost must be measured and reported at a geographic unit no greater than the wire center and exchange level. Companies may wish to supply cost data on smaller geographic units, such as census block groups or grids, in which case they must also calculate and present the data at the wire center and exchange level.

238. Sprint's BCPM 3.1 model runs meet this requirement. Although their original runs did not, subsequent model runs submitted by U S WEST and GTE in response to Bench Request No. 3 do meet this requirement.

Study Network of Single Lines, Multi-line, and All Lines

239. Guideline No. 2 requires that:

> Cost must be determined separately for (a) a network that serves single and multi-line subscribers (where multi-line subscribers include non-switched loops); (b) the cost of a network that serves only multi-line subscribers; and (c) the cost of a network that serves only single-line subscribers.

240. The initial BCPM 3.1 model runs of U S WEST, GTE and Sprint did not comply with guideline 2(b), because they did not include a multi-line study. The subsequent model runs submitted by these companies in response to Bench Request No. 3 meet this requirement.

Develop Forward Looking Costs/embedded for Rural Companies

241. Guideline No. 3 requires that:

> For companies other than rural companies, cost must be determined based on forward-looking, long run economic costs. For rural companies, cost may be determined based on embedded cost. Rural companies that use embedded cost must nonetheless provide a disaggregation of costs (a) at the wire center and exchange level and (b) between the first lines and additional lines.

Non-rural Companies

242. U S WEST, GTE and Sprint have submitted BCPM 3.1 model runs that purport to comply with Guideline No. 3, requiring the use of forward-looking, long-run economic costs.

Rural Companies

243. The rural companies submitted no cost estimates in their direct testimony filed July 1, 1998. Rural companies' filings only claimed revenues that they contended would be lost because of the Commission's enactment of the access reform rule. Because the companies filed no cost estimates, Staff filed a substantial number of data requests, and eventually a motion to compel, asking the Commission to direct the rural companies to file the cost estimates contemplated in this guideline. The Commission granted the motion and, pursuant to the Commission's order, the companies then filed cost estimates on August 25, 1998 based on embedded costs. Staff used these cost estimates, in conjunction with illustrative benchmarks, to develop its estimate of the amount of USF funding that would likely be required for each of the rural companies.

244. WITA contends that the embedded cost studies available to it did not permit an accurate identification of the costs of the services identified by the Legislature as "basic telecommunication services." According to WITA, through the supplemental testimony filed on August 25, 1998, and the responses to Bench Request Nos. 4 and 5, it submitted the best cost estimates that were available at the present time for the costs of "basic telecommunications services." The Commission is aware that the proxy models in this proceeding are relatively untested in the context specific to rural company cost studies. We note that the evolution and the development of proxy cost methodology at the federal level has focused exclusively on estimating costs for non-rural companies.

The FCC has indicated that it will not apply cost proxy models to rural companies until at least 2001, if then. A Rural Task Force has been established to develop recommendations on issues of platform, issues and timing for applying proxy cost models to rural companies. Consequently, the Commission declines to apply cost proxy models to rural companies and adopts the phased approach recommended by the rural companies, in parallel with the FCC. In light of the result we reach on model matters for those companies, we do not reach a decision on whether the rural companies' submissions are acceptable.

Commission-prescribed Inputs (Cost of Capital, Depreciation, Fill Factors)

245. Guideline No. 4 requires that:

> Cost must be measured using: (a) cost of money - each company's authorized rate of return; (b) depreciation - each company's prescribed depreciation lives and salvage values; and (c) fill factors used in the 8th Supplemental Order, Docket No. UT-960369, especially paragraphs 171-173.

Cost of money

246. Commission Staff acknowledges that U S WEST, GTE, and Sprint each filed cost model runs that comply with this guideline. They submitted alternative runs for Commission consideration, which the guidelines specifically allowed them to do. For reasons stated elsewhere in this Order, the Commission rejects the alternative proposals.

Depreciation rates

247. U S WEST and GTE each filed a model run that complies with this guideline. They also submitted alternatives with their own preferences. For reasons stated elsewhere, the Commission rejects the alternative proposals.

248. With respect to Sprint, Staff acknowledges that the depreciation rates used in its model runs technically do comply with this guideline. However, Staff notes that Sprint has not had depreciation rates authorized by this Commission since before 1984.

249. In Sprint's case, the Commission agrees with Commission Staff and finds that the Commission-authorized rates are no longer appropriate for use in cost modeling. We direct use of the default depreciation rates in the HAI 5.0a cost model to estimate Sprint's basic service costs.

Fill factors

250. US West, GTE, and Sprint all maintain that they have filed fill factors that comply with the Commission's Eighth Supplemental Order.

251. GTE interpreted our Eighth Supplemental Order to mean that the 60% fill factor adopted at Par.183 by this Commission for use in running the cost model specifically sponsored by GTE in that proceeding was to be used in GTE's BCPM 3.1 cost runs in this proceeding. We disagree with GTE's interpretation. The wording of the Eighth Supplemental Order, at Par.183, plainly states "We adopt the use of a 60% fill factor for the running of the GTE model in this proceeding[44]."[45] In Par.173 of that order we plainly state that; "For the Hatfield and Benchmark Cost Proxy Models, we have used their default utilization rates." Similarly, in Par.181 of the order we adjust the feeder utilization of US WEST's RLCAP[46] model to 65%. From this wording it is plainly apparent that the Commission adopted fill factors which were specific to the various models being used in that proceeding. Therefore, our interpretation of Guideline 4 is that, since GTE sponsored BCPM 3.1 in this proceeding,

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[44] Due to the closed nature of the GTE model, it is not possible to determine whether the resultant sizing of cables makes economic sense. In future proceedings before this Commission, GTE must employ a cost model that is both transparent and open. A transparent model offers the opportunity to observe how calculations are being made, even if the analyst would not change the algorithms. By open, we mean the model would be readily and easily susceptible to modification of the program algorithms.

[45] In that proceeding GTE was not sponsoring the BCPM 3.1 model. Instead they were sponsoring their own internally created model, the LCM.

[46] RLCAP stands for Regional Loop Cost Analysis Program. See, Eighth Supplemental Order, Docket Nos. UT-960369.

GTE was bound to use the BCPM 3.1 default utilization rates as required by Par.183 of the Eighth Supplemental Order.

252. US WEST states that; "The fill factors in these runs are the "default utilization rates" as prescribed in Par.173, Eighth Supplemental Order, Docket Nos. UT-960369, et al. (Id.)." Brief at p. 95. US WEST is correct in this assertion as far as its utilization rates for distribution goes. However, as far as its "default utilization rates" for feeder are concerned, US WEST is disingenuous in its assertion that these are the default utilization rates prescribed in Par.173 of our Eighth Supplemental Order.

253. Page 49 of Mr. Copeland's Ex. 3 states that "the default assumes a 75% engineering fill factor for the lowest density zone, an 80% engineering fill factor for the next two lowest density zones, and an 85% engineering fill factor for the remaining six density zones." Mr. Copeland, in Ex. 1T, p. 22, states that; "The BCPM 3.1 is filed with "default utilization rates" as instructed in paragraph 173 of the 8th Supplemental Order, Docket No. UT- 960369. These fill rates are approximately 60-70%." Mr. Copeland then testified that "We used cable sizing factors that equate to the US WEST actual fills..." and went on to state that he could not remember what the BCPM 3.1 defaults were. Tr. at 455. Mr. Delk, Tr. at 326, states that the factual support for US West's costs is to be found in Ex. 5C. An examination of Ex. 5C, p. 77-78 shows that the Density Cable Sizing Factor Table, where the values for the feeder and distribution fill utilization rates used by BCPM 3.1 normally reside, is absent from US WEST's Ex. 5C. Mr. Delk then goes on to state that US West used a fill factor of 65% and that he believed that this was the default rate. Tr. at 326.

254. U S WEST's interpretation of default utilization rate appears to be at odds with our ruling in the Eighth Supplemental Order and with its own filing. U S WEST employs several "default utilization rates" in their discussion of the term and appears to believe that use of actual fills is the same as the use of "default" fills.

255. When we stated in Par.173 of the Eighth Supplemental Order that; "For the Hatfield and Benchmark Cost Proxy Models, we have used their default utilization rates...", we intended that sponsors of the HAI 5.0a model would use the national default values of that model for fill factors and that sponsors of the BCPM 3.1 would use the national default values of that model for fill factors.

256. Sprint states that its fill factors comply with the guidelines because it used actual feeder cable fill factors and the default values for the distribution fill factors. Sprint derived its feeder fill factors by "dividing working pairs (cable pairs in service) by total pairs available, in each wire center . . . These results were then converted to fill factors by density group based on the relative proportion of lines in the various density groups in each wire center" Ex. 104C. Sprint maintains that the use of actual feeder cable fill factors comports with the Eighth Supplemental Order because; "In that order, the Commission adopted default utilization fill rates as reasonable estimates of projected actual fill. (Eighth Supplemental Order, Par. 173; Ninth Supplemental Order, Par. 56)." Brief at p. 40.

257. There is a difference between the use of actual fill factors and the use of projected actual fill factors. The default fill factors developed by the BCPM 3.1 and HAI 5.0a sponsors were derived so that the level of spare capacity was enough to meet current demand while allowing for growth. Reliance solely on a company's actual fill factors, especially when, as in Sprint's case, those calculations do not include any analysis of potential growth effects, may not provide a good estimate of the economic cost of production. Accordingly, we reiterate that our wording in Par. 173 of the Eighth Supplemental Order was intended to convey the notion that sponsors of the HAI 5.0a model would use the national default values of that model for fill factors and that sponsors of the BCPM 3.1 would use the national default values of that model for fill factors. We direct the use of those values for purposes of this proceeding.

Actual Line Counts -- Average Loop Length

258. Guideline No. 5 requires that:

> Actual line counts for each wire center and each exchange must be used in cost calculations, and the submission must include average loop lengths, by wire center and exchange.

259. According to Commission Staff, all of the companies complied with the requirement to use actual line counts for each wire center in their model runs. The second part of the guideline requires the use of "average loop lengths." When read in conjunction with the Eighth Supplemental Order, Staff believes the Commission clearly has required the use of estimated actual loop lengths, not simply the loop lengths generated by the model itself. In support of its

position, Staff cites paragraph 227 of the Eighth Supplemental Order (emphasis supplied):

> In future proceedings, we will require proxy model sponsors to address the relationship between the study's average loop length estimates and the ILEC's actual average loop length, as well as the similarity in wire center line counts. We note that the FCC has recently expressed great interest in this data in a recent notice: *State Forward-Looking Cost Studies for Federal Universal Service Support*, CC-Docket Nos. 96-45 and 97-160, DA 98-217, February 27, 1998.

260. In further support of its position, Staff references Paragraph 49 of the Ninth Supplemental Order in the Generic Cost Docket, Docket No. UT-960369, where the Commission stated that if the difference in length is substantial, the sponsor of the cost study should identify the magnitude of difference, indicate how it affects cost, and explain the basis for the difference.

261. US WEST indicates that the BCPM 3.1 produces a calculated average loop length per wire center. While U S WEST does not recommend adjusting the results of the model to reflect actual loop length, the model can accommodate such an adjustment, and US WEST did submit estimates of its actual average loop length in response to a Staff request.

262. US WEST witness Lent recommended that loop length estimates not be adjusted for actual loop lengths:

> For purposes of estimating universal service funding, average loop length comparisons can provide very misleading information about the reasonableness of a model's distribution distances. This is because the average loop length does not account for customer dispersion and, therefore, does not provide an appropriate indicator of the route miles of distribution plant necessary to reach all customers. Ex. 291T, p. 4.

263. The Commission rejects Lent's recommendation. Dispersion and length are separate issues. As her testimony illustrates, a model can have the correct loop length, but the incorrect dispersion. Conversely, a model can show the correct dispersion for a group of customers, but have the incorrect loop lengths. Tr. P. 504-06. Neither does Lent, nor any other witness, convincingly claim the current proxy models correctly model dispersion.

264. Sprint indicated that it filed cost studies that reasonably represented actual loop lengths by wire center/exchange, based on sample loop length studies that were performed for Sprint's short, medium, and long loop exchanges. Ex. 126C at 1; Tr. at 535. Sprint points out that the random sample dispersion closely matched the distances estimated by the BCPM 3.1. Sprint questions whether this adaptation to the model is necessary, other than as a one-time

validation. According to Sprint, the results of its sample study indicate that the BCPM 3.1 very closely approximates the actual loop length. The statewide average from BCPM 3.1 represented 100.2% or the sample loop length study.

265. Despite its objections, Sprint did file wire center level cost studies that did include a ratio of actual loop lengths to BCPM 3.1 produced loop lengths. While we accept Sprint's proposition that actual loop length studies may be needed only to validate the reasonableness of a model's estimated loop lengths, we find the validation that Sprint offered in this proceeding to be insufficient. Sprint has shown that for the company as a whole, the BCPM 3.1 estimated loop lengths appear to be reasonable. The level of support is not being determined based on the average cost of service for a company, however, and therefore the validation of loop lengths should be conducted at the wire center level.

266. GTE reports that its cost submission included average loop lengths by wire center and exchange. Average loop lengths are generated by the BCPM 3.1 and contained in the "Reports" Module of the CD-ROM filed with the Commission.

267. Staff interprets this guideline to require submission of actual average loop lengths and requires that differences in length between model default, average, and actual average loop lengths be identified and explained. In response, GTE argues that Staff's interpretation is belied by the first of the Guidelines' requirements: that actual line counts be used. (Emphasis supplied.) GTE maintains that had the Commission desired the submission of actual average loop lengths instead of average loop lengths, the Commission would have stated so. GTE contends that even if Staff's interpretation of this guideline as requiring actual average loop lengths is adopted, GTE's cost study submission is in full compliance since GTE's loop length study produced in response to a data request consisted of the actual measured length and count of GTE's copper and fiber/copper loops. GTE explains that this updated loop length study was filed on September 25, 1998 pursuant to an agreement with Staff counsel.

268. GTE's interpretation is incorrect. We required actual averages, others provided actual averages, and we have developed our USF estimate for GTE using the data from its actual loop length study.

269. WITA comments that these elements were understood to apply only to companies presenting their costs on a forward-looking, proxy cost model basis. However, WITA indicates that line count information is presented in Mr. Otis' Ex. 455C, and is summarized in Appendix A of its brief.

270. TRACER states that its cost runs attempt to include the latest available line counts and the Commission-required adjustment for average loop length. TRACER supports its modification based upon cost model runs, assumptions,

and inputs used by Commission Staff witness Spinks, because it understands that Mr. Spinks was attempting to comply strictly with the Commission's criteria and with the requirements of the 8th Supplemental Order in the Generic Cost Docket, Docket No. UT-960369. TRACER explains that this was done in the interests of consistency between the determination of UNE costs and USF support calculation, although TRACER continues to believe that average loop lengths are not necessarily a good measure of loop costs.

271. In summary, the Commission reiterates its prior finding that at this time it is appropriate to adjust the distance sensitive investments to reflect the actual loop lengths. In the Ninth Supplemental Order we stated:

> We agree with Commission Staff that a forward looking cost model need not produce loop lengths that are identical to the current values. For example, on a forward looking basis, a ring might be substituted for the traditional pine tree architecture. Nevertheless, where the difference in lengths is substantial, the sponsor of the cost study should identify the magnitude of the difference, indicate how it affects cost, and explain the basis for the difference. *Par. 49.*

272. In this proceeding, the difference between actual and estimated loop lengths remains substantial. No party has satisfactorily explained the basis of the difference and therefore we will continue to adjust the proxy model distance sensitive loop estimates by the ratio of actual to estimated loop lengths.

Support the Services Identified by the Act

273. Guideline No. 6 requires that:

> Cost must be measured assuming that all services identified by the FCC and by ESSB 6622 are supported.

Each of the companies has complied with this guideline.

Shared and Common Costs

274. Guideline No. 7 requires that:

> Shared, overhead, or common costs, if included, must be separately stated, and the factual support for such costs must be provided.

275. Staff asserts that neither US WEST nor GTE complied with the requirement that factual support be provided for shared and common costs. Staff notes

that while US WEST asserts that it adopted the results of a one-party, flat-rate residence service study, US WEST did not include the study in the record. With respect to GTE, Staff states that GTE has provided the data used in its calculation, but it has not provided any meaningful support.

276. US WEST responds that factual support was provided in Ex. 5C, pp. 12-13, 106-109. Brief at 96.

277. We have reviewed the cited documentation and we find it to be inadequate. The documentation identifies the overhead accounts but does not include any detailed description of how these values were developed. The process described by the documentation appears reasonable, for example, excluding expenses that are recovered through other mechanisms. Unfortunately, insufficient detail is provided to indicate how these calculations were made.

278. US WEST's cost study identifies the shared, overhead or common costs associated with providing residential exchange service. The study was not designed to reflect how these costs increase when the scope of services expand to include the products that are included in the Commission's revenue benchmark. Hence, if the reported overhead costs for residential exchange service are correctly stated, the BCPM 3.1 estimates understate the company's common costs.

279. GTE explained that its overhead cost estimates could be easily verified. GTE effectively assumed that 66.61% of its total common costs were attributable to local service. The 66.61% value is the percent of local TSLRIC to total TSLRIC. GTE contends that since its BCPM 3.1 inputs were designed to estimate the cost of local service, if other services are added to the benchmark (e.g. intraLATA toll), the proportion of common costs would have to be increased to a level greater than 66.61% to reflect the additional costs associated with the provision of these services. Staff reviewed Sprint's submissions and concluded that they did comply with Guideline No. 7.

280. The following Table provides the ILEC's recommended inputs for selected expenses:

Account	GTE	US WEST	Sprint	BCPM 3.1 National Default
Network Support Expense — 6110	0.08		N.A.	0.15
General Support — 6120	1.80		2.08	1.20

Network Operations — 6530	2.10		3.16	1.33
Marketing — 6610	1.87		1.17	0.35
Services — 6620	2.02		1.22	2.42
Executive & Planning — 6710	0.20		0.20	0.14
General & Administrative — 6720	3.35		4.14	2.15
Uncollectibles — 6790	0.41		0.28	0.17
Total Expense —	11.83	6.27	12.25	7.91

Sources: US WEST Ex. 5C, page 107 (omitted because it is designated as confidential). GTE and BCPM 3.1 National Defaults Ex. 142, page 6. Sprint's Response to Bench Request No. 1.

281. In response to a bench request, US WEST identified changes that would need to be made to BCPM 3.1 so that the costs produced would match the services/revenues proposed to be used in the revenue benchmark in Staff's draft rules. US WEST responded that it did not have time to develop a detailed study that determines the correct levels for maintenance, customer service, marketing, and overhead expenses to align them with the staff's recommendation. However, US WEST did provide its best estimate of these expenses based on 1997 operating results for Washington. The inclusion of additional services, beyond local residential service, raised the Company's estimate by $12.50 per month (an increase from $6.27 to $19.77).

282. Sprint stated in its Brief that it had discovered an error in their estimate of the marketing and customer service expenses.

283. The Sprint and GTE values are unreasonable. These two companies report exchange service costs that are significantly higher than both the BCPM 3.1 defaults and the US WEST sponsored inputs. The Sprint study results appear to be unreasonably high because the Company has treated the cost of universal service support as a residual account. Due to inadequate documentation, we are unable to identify with any great certainty the reason for the high cost estimates. But the available evidence suggests, for example, that Sprint has proposed that no overhead costs be recovered from vertical services. See, Tr. 617-618.

284. The GTE study also suffers from inadequate documentation. GTE divided its total local TSLRIC costs by its total regulated TSLRICs. The cost estimates

were derived from its 1996 arbitration with GST. We find this approach unacceptable because those cost studies are not part of this record and we did not accept the studies during the GST/GTE arbitration. Furthermore, GTE has traditionally assigned all of the shared cost of the loop to local service. Such an assignment would likely be reflected in its TSLRIC studies.[47] Since the TSLRIC studies are used to assign common costs, GTE's estimate of the common costs associated with providing exchange service is likely biased upward and in violation of §254(k).[48]

285. GTE and Sprint were also asked to identify the necessary modifications to BCPM 3.1 inputs to reflect the type of services that are identified in the proposal made by Staff in the Rule-making. Neither party provided an estimate.

286. US WEST provided no support for its estimates. Due to our concern that US WEST has included the cost of services that do not qualify for support, we will use three different values within BCPM 3.1. For all three companies we have used a low value of $7.00,[49] a medium value of $11.00 and a high-value of $15.00. In subsequent proceedings we parties must provide acceptable information on this topic.

287. The HAI 5.0a sponsors have estimated common costs as 10.4% markup above all other costs identified in the HAI 5.0a model. The figure is based on 1994 AT&T 1994 accounting data. ILECs contend that the 10.4% factor does not reflect the costs incurred by a local exchange carrier. US WEST recommended that the Commission change the overhead factor to 14.1%.

288. No party provided compelling support for its favored HAI overhead factor. For US West, Sprint, and GTE, the corporate overhead factor was changed in the various sensitivity runs in the following fashion:

a) For the Base run the Corporate Overhead Factor was left at the HAI 5.0a default value of 10.4%;

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[47]Due to the inadequate documentation, we can not say with certainty how the loop costs were assigned in the GTE study.

[48]Section 254(k) of the Telecom Act states: "A telecommunications carrier may not use services that are not competitive to subsidize services that are subject to competition. The Commission, with respect to interstate services, and the States, with respect to intrastate services, shall establish any necessary cost allocation rules, accounting safeguards, and guidelines to ensure that services included in the definition of universal service bear no more than a reasonable share of the joint and common costs of facilities used to provide those services."

[49]The US WEST value of $6.27 was for only exchange service. Because we anticipate that the rulemaking may propose a revenue benchmark, we have increased the US WEST value to $7.00 in order to reflect some or all of the costs associated with other services included in the revenue benchmark.

b) For the Mid run the Corporate Overhead Factor was set at 12.25%, the average of the HAI 5.0a value of 10.4% and the value proposed by US West, 14.1%;

c) For the High run the Corporate Overhead Factor was set at the US West proposed value of 14.1%.

Deferred Taxes

289. TRACER supports adjusting the HAI 5.0a Model to account for deferred taxes. Tracer contends that "deferred taxes are a real world incentive to invest in facilities. This incentive allows businesses to defer a portion of taxes based on accelerated depreciation." Tracer brief at 45. TRACER has modified the HAI 5.0a Model expense module to account for deferred taxes and supports using this adjustment.

290. In Paragraph 71 of the Ninth Supplemental Order in Docket UT-960369, the Commission concluded that "it is appropriate to take into account deferred taxes when estimating the economic cost of providing a service."

291. US WEST states that the adjustment proposed by TRACER is inappropriate because it does not properly take into account equal life group depreciation (ELG). US WEST argues that the person who developed the HAI 5.0a deferred taxes module was not sufficiently familiar with ELG depreciation accounting.

292. We have reviewed the modifications made to HAI 5.0a for deferred taxes. Unlike the documentation provided for HAI 5.0a, little documentation was provided that explains the manner in which the tax algorithms work. In our review of the tax algorithms, we found it especially difficult to understand the model's treatment of the double declining balance.

293. Consequently, we are unable to determine whether the module was appropriately modified and whether it correctly reflects the impact of deferred taxes. Therefore we have run the "low cost" scenario using the module, and the other two scenarios without the module.

Tracer's Proposed Growth Adjustment

294. TRACER contends that to the extent that the cost proxy model includes investment for future customers, future customers should pay a portion of the costs of these facilities.

295. In distribution plant, the HAI 5.0a Model default fill factors result in the placement of more plant that is required to serve current demand at least cost;

therefore, the HAI 5.0a Model accounts for some growth in second line penetration. The model only includes current demand in the denominator of its cost per line calculation, and, according to TRACER witness Zepp, this results in an overstatement of costs. TRACER recommends that loop cost be computed with the HAI 5.0a Model by dividing the costs to place distribution plant to meet ultimate demand by an appropriate average number of loops expected to use those facilities over the life of the facilities being placed.

296. We do not accept TRACER's proposed adjustment for growth. This matter was litigated in the generic cost docket. TRACER's proposal is essentially identical to the proposal made by AT&T/MCI witness Cornell in the generic docket. *See*, Docket No. UT-960369, ex. 1, pp. 33-35. We see no reason to change our position regarding fill rates that we adopted in the Eighth Supplemental Order at Pars. 172-73.

Costs of Administration

297. Guideline No. 8 requires:

> Each party who presents a recommendation in the rulemaking phase regarding administration of a universal service fund should in the adjudicative phase describe its proposal briefly and state in detail the expected costs of administration if its recommendation were adopted.

298. None of the parties submitted evidence to support the cost of administering a universal service fund. We do not believe that costs can only be determined once the policy framework of the universal service program has been determined. To some degree costs may vary with the complexity of the program, but the basic elements will be controlled by the number of participants and the form of administration.

299. In any event, given the lack of parties' presentations we will develop information in the other phases of this docket and will include it as part of the report to the Legislature, rather than in this order.

RURAL COMPANY ISSUES

300. In setting forth the eight guidelines for cost presentations in the Notice of Prehearing Conference of May 4, 1998, the Commission recognized that rural companies, for whom cost proxy models may not yet sufficiently be developed, could require a different approach for determining cost than the forward-looking, long run economic costs derived by the models. Accordingly, the Commission indicated that "for rural companies, cost may be determined based on embedded cost." (Notice of Prehearing Conference, May 4, 1998, at 2.)

301. WITA and Staff propose two different approaches for estimating the cost of providing basic telecommunications service. WITA advocates that the Commission follow the approach adopted by the FCC in dealing with rural companies. WITA describes this approach as placing the rural companies on a second track while the cost proxy models are reviewed for their validity in application to rural company high-cost areas. WITA proposes that, while the model validation process is occurring, the implicit support presently provided to basic telecommunications services from access charges be identified, made explicit and included in a specific, sufficient and predictable universal service fund in a revenue neutral fashion.

302. WITA argues that this approach is "not inconsistent with" and parallels FCC actions, as required by the Telecommunications Act of 1996. WITA also asserts that this approach meets the legislative directive to provide the estimate of the cost of supporting lines in high-cost locations for rural companies, as opposed to estimating the actual costs. It thereby argues that the cost of support may be developed without regard to exchange company costs merely by maintaining companies' current revenue levels.

303. WITA argues that, including its preferred approach described above, it has presented five embedded cost analyses in this proceeding. Three scenarios are described in Mr. Smith's testimony.[50] The fourth and fifth analyses are in response to the Fourth Supplemental Order in this case and the companies' response to Bench Request Nos. 4 and 5.

304. WITA contends that Staff's embedded cost methodology is seriously flawed in several respects including: use of average wire center cost as the basis for computing required support, application of the benchmark in a way which effectively averages the business and residential benchmarks, failure of the benchmark to correspond to the costs with which it is being compared and, if it is a revenue benchmark, to exclude revenues received as universal service support, assumption that universal service support will be subtracted dollar-for-dollar, and use of a capped benchmark.

305. Staff recommends using embedded cost estimates to determine the cost of providing service, and the resulting USF support, in each rural company high cost area.

306. The cost estimates that Commission Staff extracted from the companies' response to Data Request No. 27 form the basis of Staff's recommendation for determining the amount of universal service funding required for the rural companies. Staff's analysis considers the cost of providing basic services in high-cost areas, considers federal support received, considers what state

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[50] WITA notes that, given the adoption of the Commission's access charge rule, Scenario 1 should not be viewed as an appropriate estimate at this time.

support is necessary, is based on cost and compares a new total state support amount with the old to properly determine implicit subsidies that previously were unquantified. See Ex. 474C, 479C and 484C. Staff's Ex. 477C and 481C illustrate how the implicit subsidies determined from Ex. 474C and 479C may be removed from access charges and replaced through an explicit universal service funding mechanism.

307. Staff argues that from the beginning of this docket, the rural companies have advocated that their universal service funding requirements should be determined not upon an embedded cost analysis, but rather, upon the simple assertion that all of the revenues currently generated by access charges provide an "implicit subsidy" to the cost of basic service that must be replaced if "lost" because of the competition that may result from access reform. Staff witness Mr. Zawislak characterizes the overall WITA approach as an effort to keep these companies revenue neutral with regard to changes in the marketplace, and then contends that reductions in revenue due to access charge reform are implicit subsidies which should be replaced through the new explicit funding mechanism.

308. Staff maintains that the Commission's objective is not, and should not be, to guarantee the current revenue stream to the incumbent local exchange companies. In short, lost revenue, or "revenue neutrality" is not the focus of this adjudication and WITA's lost revenue approach should not be followed.

309. The Commission does not find WITA's criticisms of Commission Staff's proposal persuasive. We acknowledge the extensive effort that Commission Staff put forth. At the same time, however, we believe that at this time it would not be prudent to use an embedded cost study for rural companies to estimate the cost of providing basic local exchange service in high-cost areas. Cost proxy models for rural companies have not been sufficiently validated for reliable use. Accordingly, we believe that the prudent path to follow at this time is to adopt the approach used by the FCC with respect to rural companies, that is, to maintain the status quo pending further study.

309. Rural companies currently receive explicit state high cost fund support that is funded by a $0.00152 per minute charge on all access minutes. This is estimated to amount to approximately $10 million in 1999, based on 1997 minutes of use data provided in Ex. 445. Furthermore, the rural companies currently collect access charge revenues estimated at approximately $20 million based on 1997 minutes of use data in Ex. 445 and current rates. This generates an estimated $5 million in contribution using an assumed TSLRIC traffic sensitive cost of $0.011282 per access minute. (WITA Response to Bench Request 4 and 5). Thus our estimate of the amount of explicit support to rural companies under the status quo – based on 1997 minutes of use – is approximately $15 million.

310. Given our decision to maintain the status quo for rural carriers until more accurate cost information is developed, we will use the information filed by WITA's witness Otis that allocates existing embedded revenues to sub-wire center levels using the proportional distribution allocation implied by BCPM 3.1 to determine high cost exchanges for rural companies. The existing explicit high cost fund dollars then can be allocated to the granular level of support and made portable to competitive Eligible Telecommunications Carriers. For purposes of estimating the size of implicit support for WITA company rates today, we refer to the WITA figures. This information can only be relied upon subject to the clear understanding that these figures represent embedded revenues attributable to intrastate operations. Due to confidentiality concerns we do not publish that information in this order.

311. While the model validation process is occurring, the implicit support provided to basic telecommunications services from access charges will be identified and made explicit by the carriers' compliance with new WAC 480-120-540, adopted in the Access Charge Proceeding, Docket No. UT-970325.

Cost Sensitivity Runs

312. In the paragraphs above, we have identified three scenarios to use in model runs. We summarize them as follows:

BCPM 3.1Sensitivity Runs

Base (low) estimate

a. Increase US WEST BCPM 3.1 other expenses to reflect that BCPM 3.1 sponsored expense estimates were only for exchange service. Use $7.00 for all 3 companies.

Mid-level estimate

b. Increase BCPM 3.1 other expenses to $11 to reflect that BCPM 3.1 sponsored expense estimates were only for exchange service. Use $11.00 for all 3 companies.

High estimate

c. Increase BCPM 3.1 other expenses to $15 to reflect that BCPM 3.1 sponsored expense estimates were only for exchange service. Use $15 for al 3 companies.

HAI 5.0a Sensitivity Runs

Base (low) estimate

d. HAI common costs, 10.4%

e. For GTE and Sprint, drop lengths from the Eighth Supplemental Order. For US WEST, US WEST sponsored inputs less 20%.

f. Deferred taxes--yes--The Tracer module

Mid-level estimate

g. Common costs as the average of the HAI 5.0a and US WEST-sponsored values.

h. Drop lengths of US WEST less 10%; For GTE and Sprint, drop lengths from Eighth Supplemental Order.

i. Deferred Taxes---no.

High estimate

j. Common costs sponsored by US WEST, 14.1%.

k. For GTE and Sprint, drop lengths from 8th supplemental order. For US WEST, we use the numbers supported by the Company.

l. Deferred Taxes---no.

313. The results from the model runs are the following:

Comparison of BCPM 3.1 and HAI 5.0a Scenario Runs by Company

COMPANY	BCPM 3.1 Base Run	HAI 5.0a Base Run	BCPM 3.1 Mid Run	HAI 5.0a Mid Run	BCPM 3.1 High Run	HAI 5.0a High Run
GTE	$ 28.53	$ 19.81	$ 32.53	$ 22.22	$ 36.53	$ 22.59
Sprint	$ 41.49	$ 38.34	$ 45.49	$ 42.85	$ 49.49	$ 43.56
US West	$ 19.14	$ 17.06	$ 23.14	$ 18.99	$ 27.14	$ 19.43

314. The variation in the three BCPM 3.1 cost scenarios is due to our assumption about non-investment expenses. We conclude that for BCPM 3.1, the mid-cost scenario should be used to reflect the costs associated with products other than basic exchange service.

315. For the HAI 5.0a model, we also use the mid-level estimate. As we stated above, we find that neither the HAI 5.0a sponsors nor US WEST provided compelling arguments in support of their recommended overhead factors, 10.4 and 14.1% respectively. Therefore we have used the average of these two to estimate common costs.

316. To produce the cost estimates shown in Appendices A and B, we have given equal weighting to the HAI 5.0a and BCPM 3.1 mid-run estimates. We note that in both relative and absolute terms, the largest difference between the model estimates occurs for GTE. We suspect that the large difference for GTE is due to errors in the operations of BCPM 3.1. The cost estimates provided by GTE's version of BCPM 3.1, described above and in the appendix, are problematic.

CONCLUSIONS AND RECOMMENDATIONS

317. The Commission, with the cooperation of the parties, has performed the needed cost model runs. We have identified the policy decisions required to resolve the issues and have resolved them. We have modified the models or the inputs as appropriate. We have attached as Appendices C and D, narratives identifying the modifications we made to the models to produce the results stated.

318. We have run both models and, as set out above, we considered the high and the low results produced by the model runs, properly weighted, to bracket the appropriate number. The table attached as Appendix A summarizes the result for the three large companies, and Appendix B sets out the results of our inquiry, by exchange, for those companies. Note that we have included for informational purposes the results in the table for rural company exchanges based upon embedded costs. For the rural companies, we have adopted their preferred approach which maintains the present status quo for an interim period. This table shows the results of calculating the cost of basic universal service at the wire center level and presented as the weighted average of the wire center level costs summed to the exchange level.

FINDINGS OF FACT

319. In the text of the order, the Commission has set out the individual findings on the matters inquired into. Those findings are summarized in the following findings of fact.

320. The Washington Utilities and Transportation Commission is an agency of the state of Washington, vested by statute with authority to regulate rates, rules, regulations, practices, accounts, securities, and transfers of public service companies, including telecommunications companies.

321. U S WEST Communications, Inc., GTE Northwest Incorporated, Sprint/United Tel. Co. of the Northwest, Whidbey Telephone Co., MCI Telecommunications Corp., MCImetro Access Transmission Services, Inc., AT&T Communications, Asotin Telephone Co., Century Telephone of Cowiche, Ellensburg Telephone Co., Lewis River Telephone Co., McDaniel Telecom, Inc., Century Telephone of Washington, Century Telephone of Inter Island, Toledo Telephone Co., Inc., Yelm Telephone Co., Mashell Telecom, Inc., Pend Oreille Telephone Co., Hat Island Telephone Co., Hood Canal Telephone Co., Inc., Tenino Telephone Co., Kalama Telephone Co., Inland Telephone Co., Pioneer Telephone Co., St. John Cooperative Telephone and Telegraph Co., and Western Wahkiakum County Telephone Co., are each engaged in the business of furnishing telecommunications service within the state of Washington as a public service company.

322. Chapter 337, Laws of 1998, directed that the Commission present to the legislature a report containing an estimate of costs and a specific proposal for funding telecommunications service to telephone subscribers in "high cost" locations, including the cost of such a fund and the assessments and management than would be needed to implement it.

323. The computerized analytical models sponsored in this proceeding are economic cost models designed or used to measure the costs that would be incurred to reconstruct the network under certain specified conditions and to disaggregate the otherwise undifferentiated costs of the network into various cost elements.

324. Parties presented two cost models for consideration, the Benchmark Cost Proxy Model (BCPM 3.1) and HAI 5.0a. Both models are based upon and refined from prior model versions.

325. Neither the BCPM 3.1 nor the HAI 5.0a model at present produces sufficiently accurate results to base actual Universal Service program charges or payments. The Commission has identified a number of areas in which corrections must be made to the cost models or model inputs before results can be relied upon. These include assumptions or information about customer locations and expense estimates. Both the HAI 5.0.a and BCPM 3.1 3.0 models fail the Minimum Spanning Tree (MST) test for the validity of model assumptions in the lowest density zones. The models may be used nonetheless, but must be adjusted by the application of sound and reasoned judgment. U S WEST's drop length study may be used for purposes of this proceeding, but must be repeated with required modifications for any future use.

326. Neither the BCPM 3.1 nor the HAI.5.0a model is open to complete review. Both use algorithms or input data that are proprietary. Restrictions on access to information impede the evaluation of the models and impede the understanding of the models' efficacy.

327. Parties provided the minimum cost information needed to meet the requirements of this proceeding, but failed to provide adequate revenue information. Adequate cost and revenue information is essential for effective operation of a fund and must be provided.

328. The cost models as presented, with the corrections identified in the body of this order, enable the preparation of a reasonable estimate of costs for purposes of this Order.

329. The FCC determined to use a third cost model, the Hybrid Cost Proxy Model (HCPM) subsequent to the close of these proceedings. The FCC has adopted a phased approach to estimating the costs of rural companies of providing service.

CONCLUSIONS OF LAW

330. The Washington Utilities and Transportation Commission has jurisdiction over the subject matter of this proceeding and the parties of record in this proceeding.

331. The Benchmark Cost Proxy Model 3.1 and the HAI 5.0a proxy model are both flawed. Neither presents an accurate estimate of the costs of providing telecommunications services in the state of Washington.

332. Neither the BCPM 3.1 nor the HAI 5.0a proxy model is appropriate for application to estimate rural company costs. Embedded costs are the proper measure of rural company costs for the purposes of this proceeding.

333. The cost estimates set out in Appendices A and B of this order, based on cost proxy model runs and on the application of sound judgment, are a reasonable estimate of the costs of US WEST, GTE, and Sprint/United of providing service in the exchanges those telecommunications companies operate within the state of Washington, for the purposes of this Order.

334. Before setting actual levels of support and contribution in a universal service fund, refinements are required in the cost proxy models and in the information on which proxy model runs are made. The Commission should begin a proceeding to achieve those improvements and in that proceeding should consider use of the FCC's proposed Hybrid Cost Proxy Model.

ORDER

335. The Commission estimates the costs of providing service in the exchanges of Washington State as set out in Appendix B, attached to this order and made a part hereof, with the qualifications set out in the body of this order.

DATED AND EFFECTIVE at Olympia, Washington this 20th day of November, 1998.

ANNE LEVINSON, Chair

RICHARD HEMSTAD, Commissioner

WILLIAM R. GILLIS, Commissioner

NOTICE TO PARTIES:

This is a final Order of the Commission. In addition to judicial review, administrative relief may be available through a petition for reconsideration, filed within 10 days of the service of this Order pursuant to RCW 34.05.470 and WAC 480-09-810, or a petition for rehearing pursuant to RCW 80.04.200 or RCW 81.04.200 and WAC 480-09-820(1).

ESTIMATED COST	
GTE	$27.38
SPRINT	$44.17
U S WEST	$21.07

	ESTIMATED COST		
	COMPANY	EXCHANGE	ESTIMATED COST
1	GTE	Acme	$53.20
2	GTE	Alger	$48.18
3	GTE	Anacortes	$22.17
4	GTE	Arlington	$40.75
5	GTE	Benton City	$48.55
6	GTE	Big Lake	$71.22
7	GTE	Blaine	$26.19
8	GTE	Bothell	$24.53
9	GTE	Brewster	$43.47
10	GTE	Bridgeport	$113.33
11	GTE	Burlington	$21.98
12	GTE	Camas-Washougal	$33.31
13	GTE	Cashmere	$38.60
14	GTE	Chelan	$45.40
15	GTE	Concrete	$65.69
16	GTE	Conway	$53.61
17	GTE	Coupeville	$38.13
18	GTE	Curlew	$168.91
19	GTE	Custer	$37.92
20	GTE	Darrington	$75.86
21	GTE	Deming	$65.44
22	GTE	Edison	$51.79
23	GTE	Entiat	$67.33
24	GTE	Everett	$20.23
25	GTE	Everson	$37.93
26	GTE	Fairfield	$94.01
27	GTE	Farmington	$115.79
28	GTE	Ferndale	$24.17
29	GTE	Garfield	$112.98
30	GTE	George	$95.92
31	GTE	Granite Falls	$48.07
32	GTE	Gray Land	$40.14
33	GTE	Halls Lake	$20.77
34	GTE	Kennewick	$24.73
35	GTE	Kirkland	$19.27
36	GTE	LaConner	$31.12
37	GTE	Latah	$98.79

	ESTIMATED COST		
	COMPANY	EXCHANGE	ESTIMATED COST
38	GTE	Laurel	$34.53
39	GTE	Leavenworth	$49.35
40	GTE	Loomis	$267.65
41	GTE	Lyman-Hamilton	$70.80
42	GTE	Lynden	$28.53
43	GTE	Mansfield	$447.09
44	GTE	Maple Falls	$35.71
45	GTE	Marblemount	$171.71
46	GTE	Marysville	$25.83
47	GTE	Molson-Chesaw	$450.44
48	GTE	Monroe	$25.25
49	GTE	Moscow	$0.00
50	GTE	Mount Vernon	$19.11
51	GTE	Naches	$55.50
52	GTE	Newport	$67.30
53	GTE	Nile	$99.88
54	GTE	Oak Harbor	$24.84
55	GTE	Oakesdale	$133.03
56	GTE	Palouse	$71.67
57	GTE	Priest River	$0.00
58	GTE	Pullman	$25.02
59	GTE	Quincy	$47.45
60	GTE	Republic	$124.61
61	GTE	Richland	$21.35
62	GTE	Richmond Beach	$21.30
63	GTE	Rockford	$102.64
64	GTE	Rosalia	$174.34
65	GTE	Sedro Woolley	$30.06
66	GTE	Silver Lake	$20.32
67	GTE	Skykomish	$81.73
68	GTE	Snohomish	$26.64
69	GTE	Soap Lake	$39.83
70	GTE	Stanwood	$35.87
71	GTE	Stevens Pass	$226.81
72	GTE	Sultan	$39.17
73	GTE	Sumas	$43.72
74	GTE	Tekoa	$171.95

	ESTIMATED COST		
	COMPANY	EXCHANGE	ESTIMATED COST
75	GTE	Tonasket	$128.07
76	GTE	Waterville	$167.43
77	GTE	Wenatchee	$25.07
78	GTE	Westport	$28.11
79	GTE	Woodland	$44.26
80	**SPRINT**	Bickleton	$285.04
81	SPRINT	Brinnon	$86.12
82	SPRINT	Chimicum	$66.70
83	SPRINT	Dallesport	$68.78
84	SPRINT	Grandview	$31.87
85	SPRINT	Glenwood	$96.75
86	SPRINT	Granger	$42.29
87	SPRINT	Harrah	$76.61
88	SPRINT	Klickitat	$116.44
89	SPRINT	Lyle	$98.03
90	SPRINT	Mabton	$76.19
91	SPRINT	Mattawa	$55.51
92	SPRINT	Paterson	$126.40
93	SPRINT	Poulsbo	$29.92
94	SPRINT	Prossor	$30.29
95	SPRINT	Quilcene	$81.47
96	SPRINT	Roosevelt	$476.21
97	SPRINT	Sunnyside	$25.05
98	SPRINT	Stevenson	$69.99
99	SPRINT	Toppenish	$27.66
100	SPRINT	Trout Lake	$114.05
101	SPRINT	White Salmon	$56.27
102	SPRINT	White Swan	$125.34
103	SPRINT	Whitstran	$89.69
104	SPRINT	Willard	$98.60
105	SPRINT	Wapato	$37.67
106	SPRINT	Wishram	$84.35
107	SPRINT	Zillah	$32.76
108	**U S WEST**	Aberdeen	$26.86
109	U S WEST	Auburn	$18.84
110	U S WEST	Bainbridge Island	$22.87
111	U S WEST	Battleground	$27.55

	ESTIMATED COST		
	COMPANY	EXCHANGE	ESTIMATED COST
112	U S WEST	Belfair	$39.79
113	U S WEST	Bellevue	$17.12
114	U S WEST	Bellingham	$21.93
115	U S WEST	Black Diamond	$37.10
116	U S WEST	Bremerton	$21.28
117	U S WEST	Buckley	$31.03
118	U S WEST	Castle Rock	$53.15
119	U S WEST	Centralia	$23.27
120	U S WEST	Chehalis	$31.12
121	U S WEST	Cle Elum	$61.63
122	U S WEST	Colfax	$82.30
123	U S WEST	Colville	$52.20
124	U S WEST	Copalis	$29.37
125	U S WEST	Coulee Dam	$49.46
126	U S WEST	Crystal Mountain	$90.17
127	U S WEST	Dayton	$55.28
128	U S WEST	Deer Park	$49.49
129	U S WEST	Des Moines	$18.76
130	U S WEST	Easton	$101.97
131	U S WEST	Elk	$65.22
132	U S WEST	Enumclaw	$25.43
133	U S WEST	Ephrata	$26.84
134	U S WEST	Graham	$25.94
135	U S WEST	Green Bluff	$34.33
136	U S WEST	Hoodsport	$51.64
137	U S WEST	Issaquah	$21.46
138	U S WEST	Kent	$18.91
139	U S WEST	Liberty Lake	$35.19
140	U S WEST	Longview	$22.60
141	U S WEST	Loon Lake	$54.29
142	U S WEST	Maple Valley	$27.78
143	U S WEST	Moses Lake	$28.42
144	U S WEST	Newman Lake	$37.63
145	U S WEST	Northport	$185.53
146	U S WEST	Olympia	$22.77
147	U S WEST	Omak	$49.62
148	U S WEST	Oroville	$45.42

	ESTIMATED COST		
	COMPANY	EXCHANGE	ESTIMATED COST
149	U S WEST	Othello	$45.79
150	U S WEST	Pasco	$29.43
151	U S WEST	Pateros	$97.36
152	U S WEST	Pomeroy	$154.50
153	U S WEST	Port Angeles	$27.74
154	U S WEST	Port Ludlow	$43.07
155	U S WEST	Port Orchard	$23.45
156	U S WEST	Port Townsend	$29.71
157	U S WEST	Puyallup	$20.32
158	U S WEST	Renton	$19.31
159	U S WEST	Ridgefield	$28.85
160	U S WEST	Rochester	$40.44
161	U S WEST	Roy	$37.28
162	U S WEST	Seattle	$15.90
163	U S WEST	Sequim	$28.89
164	U S WEST	Shelton	$36.69
165	U S WEST	Silverdale	$20.73
166	U S WEST	Spokane	$20.99
167	U S WEST	Springdale	$157.05
168	U S WEST	Sumner	$19.55
169	U S WEST	Tacoma	$18.68
170	U S WEST	Vancouver	$20.33
171	U S WEST	Waitsburg	$55.54
172	U S WEST	Walla Walla	$25.96
173	U S WEST	Warden	$56.13
174	U S WEST	Winlock	$40.42
175	U S WEST	Yakima	$20.10

APPENDIX C
Changes Made to HAI 5.0a
For
Washington USF Proceedings, Docket No. UT-980311(a)

LOOP LENGTH ADJUSTMENT

All Hai 5.0a runs for all parties were done using the Loop Length adjustments provided by the parties. This was done per Par. 270.[1]

DEPRECIATION AND SALVAGE LIVES FOR US WEST

The following table illustrates the input service life values that were used in place of the HAI 5.0a model's default values for US WEST. These values were derived from service lives and net salvage value inputs that were decided in Docket UT 951425.

Table 1: US WEST Service Lives and Future Net Salvage Values

Acct.	Description	Service life	Future Net Salvage
2112	motor vehicles	9.6	16.00%
2114	Special Purpose Vehicle	14	0.00%
2115	garage work equip	14	0.00%
2116	other work equip	16	9.00%
2121	buildings	33	4.00%
2122	furniture	20	0.00%
2123.1	office equipment	15	0.00%
2123.2	company comp equip	9.9	0.00%
2124	gen purpose equip	5.8	5.00%
2211	analog equip		0.00%
2212	digital switch equipment	17	0.00%
2220	operator systems	12	0.00%
2231	radio systems	15	-3.00%

[1]Paragraph references without additional citation refer to the numbered paragraphs in the Commission's Tenth Supplemental Order in Docket No. UT-980311(a), to which this document is Appendix C..

2232 Circuit Equipment	12	1.00%
2351 public tel term equip	10	5.00%
2362 other term equip	9	0.00%
2611 pole lines	28	-75.00%
2421 Aerial cable met	24	-24.00%
2421 Aerial cable non-met	28	-24.00%
2422 Ungrd cable met	25	-22.00%
2422 Ungrd cable non-met	30	-22.00%
2423 Buried Cable met	22	-7.00%
2423 Buried Cable non-met	28	-7.00%
2426 intra bldg ca met	20	-20.00%
1426 intra bldg ca non-met	28	-20.00%
2431 Aerial wire	8.7	-124.00%
2441 conduit systems	55	-10.00%

DEPRECIATION LIVES FOR GTE

The following table illustrates the input service life values that were used in place of the HAI 5.0a model's default values for GTE. They were derived from service lives and net salvage value inputs which were decided upon in Docket UT 940926.

Table 2: GTE's Service Lives and Future Net Salvage Values

Acct.	Description	Service life	Future Net Salvage
2112	motor vehicles	9.3	20.00%
2115	garage work equip	18	5.00%
2116	other work equip	15	10.00%
2121	buildings	43	0.00%
2122	furniture	20	10.00%
2123.1	office equipment	15	10.00%
2123.2	company comp equip	8	2.00%
2124	gen purpose equip	8	5.00%
2212	digital switch equipment	16.5	3.00%
2220	operator systems	12	-2.00%
2231	radio systems	14	0.00%
2232	Circuit Equipment	12	4.00%
2351	public tel term equip	8	10.00%

2362 other term equip	10	5.00%
2611 pole lines	28	-75.00%
2421 Aerial cable met	21	-27.00%
2421 Aerial cable non-met	30	-5.00%
2422 Ungrd cable met	26	-15.00%
2422 Ungrd cable non-met	30	-5.00%
2423 Buried Cable met	23	-5.00%
2423 Buried Cable non-met	30	-5.00%
2426 intra bldg ca met	20	-30.00%
1426 intra bldg ca non-met		
2431 Aerial wire	15	-15.00%
2441 conduit systems	50	-5.00%

DEPRECIATION LIVES FOR SPRINT

For Sprint, the HAI 5.0a default values were used. Par. 248.

CAPITAL COST FACTORS

For US WEST and GTE the authorized values from the Eighth Supplemental Order at Par. 211 were used. For Sprint, the company numbers were used. Staff testified that Sprint's cost of Money and Tax Data comply with Guideline 4 and had not objected to the numbers filed with Sprint's cost study.[2]

CAPITAL COST FACTORS--USWEST

Expense Input	Current Scenario Value	Default Scenario Value
Cost of Debt	0.0727	**0.0770**
Debt Fraction	0.4800	**0.4500**
Cost of Equity	0.1180	**0.1190**

[2]For example, Staff witness Roth stated that Sprint complied with guideline 4 with the exception of fill factors. Tr. 898-902

CAPITAL COST FACTORS--GTE

Expense Input	Current Scenario Value	Default Scenario Value
Cost of Debt	0.0790	**0.0770**
Debt Fraction	0.4440	**0.4500**
Cost of Equity	0.1125	**0.1190**

CAPITAL COST FACTORS--SPRINT

Expense Input	Current Scenario Value	Default Scenario Value
Cost of Debt	0.088	**0.0770**
Debt Fraction	0.5541	**0.4500**
Cost of Equity	0.1225	**0.1190**

DROP LENGTHS

For both Sprint and GTE the drop length values from Par. 134 of the Eighth Supplemental Order were input into the HAI 5.0a model. Par. 121.

Distribution Input	Current Scenario Value	Default Scenario Value
Drop Distance, feet - 0	175	**150**
Drop Distance, feet - 5	175	**150**
Drop Distance, feet - 100	125	**100**
Drop Distance, feet - 200	125	**100**
Drop Distance, feet - 650	75	**50**
Drop Distance, feet - 850	75	**50**
Drop Distance, feet - 2550	50	**50**
Drop Distance, feet - 5000	50	**50**
Drop Distance, feet - 10000	50	**50**

For US WEST drop lengths the Commission performed three sensitivity runs. Par. 121.

1) The Base Run utilized 80% of the drop length values from Ex. 295:8.

Distribution Input	Current Scenario Value	Default Scenario Value
Drop Distance, feet - 0	394	150
Drop Distance, feet - 5	296	150
Drop Distance, feet - 100	192	100
Drop Distance, feet - 200	137	100
Drop Distance, feet - 650	110	50
Drop Distance, feet - 850	85	50
Drop Distance, feet - 2550	66	50
Drop Distance, feet - 5000	58	50
Drop Distance, feet - 10000	51	50

2) The Mid Run utilized 90% of the drop length values from Ex. 295:8

Distribution Input	Current Scenario Value	Default Scenario Value
Drop Distance, feet - 0	444	150
Drop Distance, feet - 5	333	150
Drop Distance, feet - 100	216	100
Drop Distance, feet - 200	154	100
Drop Distance, feet - 650	124	50
Drop Distance, feet - 850	95	50
Drop Distance, feet - 2550	74	50
Drop Distance, feet - 5000	65	50
Drop Distance, feet - 10000	58	50

3) The High Run used 100% of the drop length values from Ex. 295:8.

Distribution Input	Current Scenario Value	Default Scenario Value
Drop Distance, feet - 0	493	150
Drop Distance, feet - 5	370	150
Drop Distance, feet - 100	240	100
Drop Distance, feet - 200	171	100
Drop Distance, feet - 650	138	50
Drop Distance, feet - 850	106	50
Drop Distance, feet - 2550	82	50
Drop Distance, feet - 5000	72	50
Drop Distance, feet - 10000	64	50

STRUCTURE SHARING

For US WEST, Sprint, and GTE the following structure sharing values, adopted by the Commission in the Eighth Supplemental Order at paragraph 76, were used for distribution and feeder.

STRUCTURE FRACTION SHARING FOR DISTRIBUTION

Expense Input	Current Scenario Value	Default Scenario Value
Distribution Aerial Fraction - 0	0.63	**0.50**
Distribution Aerial Fraction - 5	0.63	**0.33**
Distribution Aerial Fraction - 100	0.63	**0.25**
Distribution Aerial Fraction - 200	0.50	**0.25**
Distribution Aerial Fraction - 650	0.50	**0.25**
Distribution Aerial Fraction - 850	0.50	**0.25**
Distribution Aerial Fraction - 2550	0.35	**0.25**
Distribution Aerial Fraction - 5000	0.35	**0.25**
Distribution Aerial Fraction - 10000	0.35	**0.25**
Distribution Buried Fraction - 0	0.88	**0.88**
Distribution Buried Fraction - 5	0.88	**0.88**
Distribution Buried Fraction - 100	0.88	**0.88**
Distribution Buried Fraction - 200	0.68	**0.68**
Distribution Buried Fraction - 650	0.68	**0.68**
Distribution Buried Fraction - 850	0.68	**0.68**
Distribution Buried Fraction - 2550	0.55	**0.55**
Distribution Buried Fraction - 5000	0.55	**0.55**
Distribution Buried Fraction - 10000	0.55	**0.55**
Distribution Underground Fraction - 0	0.88	**1.00**
Distribution Underground Fraction - 5	0.88	**0.50**
Distribution Underground Fraction - 100	0.88	**0.50**
Distribution Underground Fraction - 200	0.63	**0.50**
Distribution Underground Fraction - 650	0.63	**0.40**
Distribution Underground Fraction - 850	0.63	**0.33**
Distribution Underground Fraction - 2550	0.63	**0.33**
Distribution Underground Fraction - 5000	0.63	**0.33**
Distribution Underground Fraction - 10000	0.63	**0.33**

STRUCTURE FRACTURE SHARING FOR FEEDER

Expense Input	Current Scenario Value	Default Scenario Value
Feeder Aerial Fraction - 0	0.63	**0.50**
Feeder Aerial Fraction - 5	0.63	**0.33**
Feeder Aerial Fraction - 100	0.63	**0.25**
Feeder Aerial Fraction - 200	0.50	**0.25**
Feeder Aerial Fraction - 650	0.50	**0.25**
Feeder Aerial Fraction - 850	0.50	**0.25**
Feeder Aerial Fraction - 2550	0.35	**0.25**
Feeder Aerial Fraction - 5000	0.35	**0.25**
Feeder Aerial Fraction - 10000	0.35	**0.25**
Feeder Underground Fraction - 0	0.88	**0.50**
Feeder Underground Fraction - 5	0.88	**0.50**
Feeder Underground Fraction - 100	0.88	**0.40**
Feeder Underground Fraction - 200	0.63	**0.33**
Feeder Underground Fraction - 650	0.63	**0.33**
Feeder Underground Fraction - 850	0.63	**0.33**
Feeder Underground Fraction - 2550	0.63	**0.33**
Feeder Underground Fraction - 5000	0.63	**0.33**
Feeder Underground Fraction - 10000	0.63	**0.33**
Feeder Buried Fraction - 0	0.88	**0.40**
Feeder Buried Fraction - 5	0.88	**0.40**
Feeder Buried Fraction - 100	0.88	**0.40**
Feeder Buried Fraction - 200	0.68	**0.40**
Feeder Buried Fraction - 650	0.68	**0.40**
Feeder Buried Fraction - 850	0.68	**0.40**
Feeder Buried Fraction - 2550	0.55	**0.40**
Feeder Buried Fraction - 5000	0.55	**0.40**
Feeder Buried Fraction - 10000	0.55	**0.40**

COMMON COSTS

For both US WEST, Sprint, and GTE the Common Cost, or Corporate Overhead Factor, located in the Expense Module, was changed in the various sensitivity runs in the following fashion (Par. 281):

1) For the Base run the Corporate Overhead Factor was left at the HAI 5.0a default value of 10.4%;

2) For the Mid run the Corporate Overhead Factor was set at 12.25%, the average of the HAI 5.0a value of 10.4% and the value proposed by US WEST, Brief at 94, of 14.1%;

3) For the High run the Corporate Overhead Factor was set at the US WEST proposed value of 14.1%.

OPERATIONS EXPENSE FACTOR

Consistent with Par. 239 of the Eighth Supplemental Order, the ***Operations Expense Factor***, also known as the ***Forward-looking Network Operations Factor***, located in the **Expense Module**, was changed from 50% to 70% for US WEST, Sprint and GTE. This change was made so as to model a 30% reduction due to forward looking costs instead of the 50% reduction used as a default value.

COPPER/FIBER CROSSOVER

In conformity with Par. 198 of the Eighth Supplemental Order, the TR-303 DLC **Copper Feeder Max Distance, ft**, located in the **Distribution Module**, was changed from 9,000 ft to 12,000 ft. in the commission runs of US WEST, Sprint and GTE

ADJUSTMENTS FOR SPECIAL ACCESS LINE COUNTS

For GTE the Special Access Lines from the ARMIS report were reduced from 93,075 to 33,075, which represents a reduction of approximately 7% of the total number of lines. For US WEST the Special Access Lines from the ARMIS report were reduced from 522,276 to 327,097 which represents a reduction of approximately 7% of the total number of lines. Pars. 219 and 220.

AERIAL DROP PLACEMENT COSTS.

The Commission substituted the BCPM 3.1 national default value, $0.77, for the US WEST aerial value for use in both the Hai 5.0a and BCPM 3.1. Par. 226.

For US WEST this change was performed in the following manner:

1) For the Commission Base Run the $0.77 per foot charge was multiplied by US WEST's suggested drop lengths, reduced by a factor of 20%, as found on page 8 of Ex. 295. The resultant figures were then put in the HAI 5.0a model as Aerial Placement Cost (Total) and the HAI 5.0a input ***Drop cable investment per foot aerial*** was set to 0.

2) For the Commission Mid Run the $0.77 per foot charge was multiplied by US WEST's suggested drop lengths, reduced by a factor of 10%, as found on page 8 of Ex. 295. The resultant figures were then put in the Hai 5.0a model as Aerial

Placement Cost (Total) and the Hai 5.0a input ***Drop cable investment per foot aerial*** was set to 0.

3) For the Commission High Run the $0.77 per foot charge was multiplied by US WEST's suggested drop lengths, unreduced, as found on page 8 of Ex. 295. The resultant figures were then put in the HAI 5.0a model as Aerial Placement Cost (Total) and the HAI 5.0a input ***Drop cable investment per foot aerial*** was set to 0.

The following tables illustrate what this process.

COMMISSION BASE RUN--US WEST			
Distribution Input	**Us WEST Input**	**Commission Adopted per Foot Charge for Aerial Drop**	**Commission Base Run Aerial Drop Placement (Total) for HAI 5.0a**
Drop Distance, feet - 0	394	0.77	303.69
Drop Distance, feet - 5	296	0.77	227.92
Drop Distance, feet - 100	192	0.77	147.84
Drop Distance, feet - 200	137	0.77	105.34
Drop Distance, feet - 650	110	0.77	85.01
Drop Distance, feet - 850	85	0.77	65.30
Drop Distance, feet - 2550	66	0.77	50.51
Drop Distance, feet - 5000	58	0.77	44.35
Drop Distance, feet - 10000	51	0.77	39.42
COMMISSION MID RUN--US WEST			
Distribution Input	**Us WEST Input**	**Commission Adopted per Foot Charge for Aerial Drop**	**Commission Mid Run Aerial Drop Placement (Total) for HAI 5.0a**
Drop Distance, feet - 0	444	0.77	341.65
Drop Distance, feet - 5	333	0.77	256.41
Drop Distance, feet - 100	216	0.77	166.32
Drop Distance, feet - 200	154	0.77	118.50
Drop Distance, feet - 650	124	0.77	95.63
Drop Distance, feet - 850	95	0.77	73.46
Drop Distance, feet - 2550	74	0.77	56.83
Drop Distance, feet - 5000	65	0.77	49.90
Drop Distance, feet - 10000	58	0.77	44.35
COMMISSION HIGH RUN--US WEST			

Distribution Input	Us WEST Input	Commission Adopted per Foot Charge for Aerial Drop	Commission High Run Aerial Drop Placement (Total) for HAI 5.0a
Drop Distance, feet - 0	493	0.77	379.61
Drop Distance, feet - 5	370	0.77	284.9
Drop Distance, feet - 100	240	0.77	184.8
Drop Distance, feet - 200	171	0.77	131.67
Drop Distance, feet - 650	138	0.77	106.26
Drop Distance, feet - 850	106	0.77	81.62
Drop Distance, feet - 2550	82	0.77	63.14
Drop Distance, feet - 5000	72	0.77	55.44
Drop Distance, feet - 10000	64	0.77	49.28

Sprint and GTE's aerial drop placement total costs were calculated using the companies' respective recommended inputs. This was done in a manner similar to what was done for US WEST with the exception that, since neither GTE nor Sprint filed a drop length study of their own, the drop lengths adopted by the Commission in the Eighth Supplemental Order (Par. 134) were used in making the calculations. For Sprint and GTE no sensitivity runs were conducted on drop lengths.

The following tables illustrate the Aerial Drop Placement (Total Costs) for these companies' which were used in the Commission's runs.

COMMISSION RUN--GTE			
Distribution Input	**Commission Adopted Drop Lengths**	**Commission Adopted per Foot Charge for Aerial Drop**	**Commission Adopted Aerial Drop Placement (Total) for HAI 5.0a**
Drop Distance, feet - 0	175	0.89	155.75
Drop Distance, feet - 5	175	0.89	155.75
Drop Distance, feet - 100	125	0.89	111.25
Drop Distance, feet - 200	125	0.89	111.25
Drop Distance, feet - 650	75	0.89	66.75
Drop Distance, feet - 850	75	0.89	66.75
Drop Distance, feet - 2550	50	0.89	44.50
Drop Distance, feet - 5000	50	0.89	44.50
Drop Distance, feet - 10000	50	0.89	44.50
COMMISSION RUN--Sprint			

Distribution Input	Commission Adopted Drop Lengths	Commission Adopted per Foot Charge for Aerial Drop	Commission Adopted Aerial Drop Placement (Total) for HAI 5.0a
Drop Distance, feet - 0	175	0.61	106.75
Drop Distance, feet - 5	175	0.61	106.75
Drop Distance, feet - 100	125	0.61	76.25
Drop Distance, feet - 200	125	0.61	76.25
Drop Distance, feet - 650	75	0.61	45.75
Drop Distance, feet - 850	75	0.61	45.75
Drop Distance, feet - 2550	50	0.61	30.50
Drop Distance, feet - 5000	50	0.61	30.50
Drop Distance, feet - 10000	50	0.61	30.50

As in the US WEST runs, the HAI 5.0a input ***Drop cable investment per foot aerial*** was set to 0 as this input represents the material cost of the cable. This cost has been included in the placement costs input into the tables above.

BURIED DROP PLACEMENT

For US WEST, Sprint, and GTE the Commission used the per foot costs for buried drops appearing in the tables below. These costs include the labor costs related to cable installation and material costs of the cables themselves. Par. 227.

COMMISSION RUN–US WEST		
Distribution Input	**Commission Adopted Value**	**Default Scenario Value**
Buried Drop Placement (total) - 0	0.85	**0.60**
Buried Drop Placement (total) - 5	0.85	**0.60**
Buried Drop Placement (total) - 100	0.85	**0.60**
Buried Drop Placement (total) - 200	0.85	**0.60**
Buried Drop Placement (total) - 650	0.85	**0.60**
Buried Drop Placement (total) - 850	0.85	**0.60**
Buried Drop Placement (total) - 2550	0.85	**0.75**
Buried Drop Placement (total) - 5000	0.85	**1.50**
Buried Drop Placement (total) - 10000	0.85	**5.00**
COMMISSION RUN–SPRINT		

Distribution Input	Commission Adopted Value	Default Scenario Value
Buried Drop Placement (total) - 0	0.81	**0.60**
Buried Drop Placement (total) - 5	0.81	**0.60**
Buried Drop Placement (total) - 100	0.81	**0.60**
Buried Drop Placement (total) - 200	0.81	**0.60**
Buried Drop Placement (total) - 650	0.81	**0.60**
Buried Drop Placement (total) - 850	0.81	**0.60**
Buried Drop Placement (total) - 2550	0.81	**0.75**
Buried Drop Placement (total) - 5000	0.81	**1.50**
Buried Drop Placement (total) - 10000	0.81	**5.00**
COMMISSION RUN--GTE		
Distribution Input	**Commission Adopted Value**	**Default Scenario Value**
Buried Drop Placement (total) - 0	0.89	**0.60**
Buried Drop Placement (total) - 5	0.89	**0.60**
Buried Drop Placement (total) - 100	0.89	**0.60**
Buried Drop Placement (total) - 200	0.89	**0.60**
Buried Drop Placement (total) - 650	0.89	**0.60**
Buried Drop Placement (total) - 850	0.89	**0.60**
Buried Drop Placement (total) - 2550	0.89	**0.75**
Buried Drop Placement (total) - 5000	0.89	**1.50**
Buried Drop Placement (total) - 10000	0.89	**5.00**

For each company run, the HAI 5.0a input ***Drop cable investment per foot buried*** was set equal to 0 as this input represents the material cost of the cable. This cost has been included in the placement costs input into the tables above.

BURIED DROP SHARING FRACTION

The buried drop sharing fraction was set at the values adopted for distribution facilities in the generic cost docket. These values are (Par. 122):

Drop Sharing Fraction		
Distribution Input	**Commission Utilized Value**	**Default Scenario Value**
Buried Drop Sharing Fraction - 0	0.88	**0.50**

Buried Drop Sharing Fraction - 5	0.88	**0.50**
Buried Drop Sharing Fraction - 100	0.88	**0.50**
Buried Drop Sharing Fraction - 200	0.68	**0.50**
Buried Drop Sharing Fraction - 650	0.68	**0.50**
Buried Drop Sharing Fraction - 850	0.68	**0.50**
Buried Drop Sharing Fraction - 2550	0.55	**0.50**
Buried Drop Sharing Fraction - 5000	0.55	**0.50**
Buried Drop Sharing Fraction - 10000	0.55	**0.50**

POLE SPACING

For pole spacing, the Commission used the US WEST, Sprint, and GTE proposed values. Par. 175.

SPRINT--POLE SPACING			US WEST--POLE SPACING	
Distribution Input	**Current Scenario Value**		**Distribution Input**	**Current Scenario Value**
Pole Spacing, feet - 0	202		Pole Spacing, feet - 0	150
Pole Spacing, feet - 5	172		Pole Spacing, feet - 5	150
Pole Spacing, feet - 100	126		Pole Spacing, feet - 100	150
Pole Spacing, feet - 200	123		Pole Spacing, feet - 200	150
Pole Spacing, feet - 650	123		Pole Spacing, feet - 650	150
Pole Spacing, feet - 850	115		Pole Spacing, feet - 850	150
Pole Spacing, feet - 2550	115		Pole Spacing, feet - 2550	150
Pole Spacing, feet - 5000	115		Pole Spacing, feet - 5000	150
Pole Spacing, feet - 10000	115		Pole Spacing, feet - 10000	150

GTE--POLE SPACING	
Distribution Input	**Current Scenario Value**
Pole Spacing, feet - 0	175
Pole Spacing, feet - 5	175
Pole Spacing, feet - 100	175
Pole Spacing, feet - 200	175
Pole Spacing, feet - 650	175
Pole Spacing, feet - 850	175

Pole Spacing, feet - 2550	175
Pole Spacing, feet - 5000	175
Pole Spacing, feet - 10000	175

PLANT MIX

For plant mix, the ILECs' proposed values were used in the HAI 5.0a runs. For US WEST, these values were derived from page 9 of Ex. 295. For Sprint and GTE, these values were taken from those companies' BCPM 3.1 input tabs. These inputs are illustrated in the tables below (Par. 106):

Plant Mix--US WEST				Plant Mix--GTE		
Distribution Input	**US WEST Value**	**Default Scenario Value**		**Distribution Input**	**GTE Value**	**Default Scenario Value**
Buried Fraction - 0	0.67	**0.75**		Buried Fraction - 0	0.85	**0.75**
Buried Fraction - 5	0.67	**0.75**		Buried Fraction - 5	0.63	**0.75**
Buried Fraction - 100	0.81	**0.75**		Buried Fraction - 100	0.57	**0.75**
Buried Fraction - 200	0.81	**0.70**		Buried Fraction - 200	0.48	**0.70**
Buried Fraction - 650	0.81	**0.70**		Buried Fraction - 650	0.37	**0.70**
Buried Fraction - 850	0.85	**0.70**		Buried Fraction - 850	0.39	**0.70**
Buried Fraction - 2550	0.71	**0.65**		Buried Fraction - 2550	0.25	**0.65**
Buried Fraction - 5000	0.71	**0.35**		Buried Fraction - 5000	0.25	**0.35**
Buried Fraction - 10000	0.29	**0.05**		Buried Fraction - 10000	0.25	**0.05**
Aerial Cable Fraction - 0	0.33	**0.25**		Aerial Cable Fraction - 0	0.15	**0.25**
Aerial Cable Fraction - 5	0.33	**0.25**		Aerial Cable Fraction - 5	0.35	**0.25**
Aerial Cable Fraction - 100	0.19	**0.25**		Aerial Cable Fraction - 100	0.39	**0.25**
Aerial Cable Fraction - 200	0.19	**0.30**		Aerial Cable Fraction - 200	0.47	**0.30**
Aerial Cable Fraction - 650	0.19	**0.30**		Aerial Cable Fraction - 650	0.10	**0.30**
Aerial Cable Fraction - 850	0.15	**0.30**		Aerial Cable Fraction - 850	0.42	**0.30**
Aerial Cable Fraction - 2550	0.11	**0.30**		Aerial Cable Fraction - 2550	0.59	**0.30**
Aerial Cable Fraction - 5000	0.11	**0.60**		Aerial Cable Fraction - 5000	0.59	**0.60**
Aerial Cable Fraction - 10000	-	**0.85**		Aerial Cable Fraction - 10000	0.59	**0.85**
From page 9 of Ex. 291						

Plant Mix--Sprint		
Distribution Input	**US WEST Value**	**Default Scenario Value**
Buried Fraction - 0	0.69	**0.75**
Buried Fraction - 5	0.69	**0.75**
Buried Fraction - 100	0.66	**0.75**
Buried Fraction - 200	0.55	**0.70**
Buried Fraction - 650	0.50	**0.70**
Buried Fraction - 850	0.59	**0.70**
Buried Fraction - 2550	0.56	**0.65**
Buried Fraction - 5000	0.49	**0.35**
Buried Fraction - 10000	0.49	**0.05**
Aerial Cable Fraction - 0	0.30	**0.25**
Aerial Cable Fraction - 5	0.31	**0.25**
Aerial Cable Fraction - 100	0.32	**0.25**
Aerial Cable Fraction - 200	0.41	**0.30**
Aerial Cable Fraction - 650	0.45	**0.30**
Aerial Cable Fraction - 850	0.38	**0.30**
Aerial Cable Fraction - 2550	0.40	**0.30**
Aerial Cable Fraction - 5000	0.46	**0.60**
Aerial Cable Fraction - 10000	0.46	**0.85**

Plant Mix--US WEST				Plant Mix--US WEST		
Feeder Input	**US WEST Value**	**Default Scenario Value**		**Feeder Input**	**US WEST Value**	**Default Scenario Value**
Copper Aerial Fraction - 0	0.06	**0.50**		Fiber Aerial Fraction - 0	0.06	**0.35**
Copper Aerial Fraction - 5	0.06	**0.50**		Fiber Aerial Fraction - 5	0.06	**0.35**
Copper Aerial Fraction - 100	0.02	**0.50**		Fiber Aerial Fraction - 100	0.02	**0.35**
Copper Aerial Fraction - 200	0.02	**0.40**		Fiber Aerial Fraction - 200	0.02	**0.30**
Copper Aerial Fraction - 650	0.02	**0.30**		Fiber Aerial Fraction - 650	0.02	**0.30**
Copper Aerial Fraction - 850	-	**0.20**		Fiber Aerial Fraction - 850	-	**0.20**

Copper Aerial Fraction - 2550	-	**0.15**		Fiber Aerial Fraction - 2550	-	**0.15**
Copper Aerial Fraction - 5000	-	**0.10**		Fiber Aerial Fraction - 5000	-	**0.10**
Copper Aerial Fraction - 10000	-	**0.05**		Fiber Aerial Fraction - 10000	-	**0.05**
Copper Buried Fraction - 0	0.92	**0.45**		Fiber Buried Fraction - 0	0.92	**0.60**
Copper Buried Fraction - 5	0.89	**0.45**		Fiber Buried Fraction - 5	0.89	**0.60**
Copper Buried Fraction - 100	0.83	**0.45**		Fiber Buried Fraction - 100	0.83	**0.60**
Copper Buried Fraction - 200	0.83	**0.40**		Fiber Buried Fraction - 200	0.83	**0.60**
Copper Buried Fraction - 650	0.83	**0.30**		Fiber Buried Fraction - 650	0.83	**0.30**
Copper Buried Fraction - 850	0.20	**0.20**		Fiber Buried Fraction - 850	0.20	**0.20**
Copper Buried Fraction - 2550	0.15	**0.10**		Fiber Buried Fraction - 2550	0.15	**0.10**
Copper Buried Fraction - 5000	0.15	**0.05**		Fiber Buried Fraction - 5000	0.15	**0.05**
Copper Buried Fraction - 10000	-	**0.05**		Fiber Buried Fraction - 10000	-	**0.05**
From page 9 of Ex. 291				From page 9 of Ex. 291		
Plant Mix--Sprint				**Plant Mix--Sprint**		
Feeder Input	**Sprint Value**	**Default Scenario Value**		**Feeder Input**	**Sprint Value**	**Default Scenario Value**
Copper Aerial Fraction - 0	0.30	**0.50**		Fiber Aerial Fraction - 0	0.18	**0.35**
Copper Aerial Fraction - 5	0.31	**0.50**		Fiber Aerial Fraction - 5	0.12	**0.35**
Copper Aerial Fraction - 100	0.32	**0.50**		Fiber Aerial Fraction - 100	0.13	**0.35**
Copper Aerial Fraction - 200	0.41	**0.40**		Fiber Aerial Fraction - 200	0.12	**0.30**
Copper Aerial Fraction - 650	0.45	**0.30**		Fiber Aerial Fraction - 650	0.14	**0.30**
Copper Aerial Fraction - 850	0.38	**0.20**		Fiber Aerial Fraction - 850	0.12	**0.20**
Copper Aerial Fraction - 2550	0.40	**0.15**		Fiber Aerial Fraction - 2550	0.11	**0.15**

Copper Aerial Fraction - 5000	0.46	**0.10**		Fiber Aerial Fraction - 5000	0.14	**0.10**
Copper Aerial Fraction - 10000	0.46	**0.05**		Fiber Aerial Fraction - 10000	0.14	**0.05**
Copper Buried Fraction - 0	0.69	**0.45**		Fiber Buried Fraction - 0	0.76	**0.60**
Copper Buried Fraction - 5	0.69	**0.45**		Fiber Buried Fraction - 5	0.81	**0.60**
Copper Buried Fraction - 100	0.66	**0.45**		Fiber Buried Fraction - 100	0.73	**0.60**
Copper Buried Fraction - 200	0.55	**0.40**		Fiber Buried Fraction - 200	0.62	**0.60**
Copper Buried Fraction - 650	0.50	**0.30**		Fiber Buried Fraction - 650	0.54	**0.30**
Copper Buried Fraction - 850	0.59	**0.20**		Fiber Buried Fraction - 850	0.68	**0.20**
Copper Buried Fraction - 2550	0.56	**0.10**		Fiber Buried Fraction - 2550	0.65	**0.10**
Copper Buried Fraction - 5000	0.49	**0.05**		Fiber Buried Fraction - 5000	0.53	**0.05**
Copper Buried Fraction - 10000	0.49	**0.05**		Fiber Buried Fraction - 10000	0.53	**0.05**
Plant Mix--GTE				**Plant Mix--GTE**		
Feeder Input	**GTE Value**	**Default Scenario Value**		**Feeder Input**	**GTE Value**	**Default Scenario Value**
Copper Aerial Fraction - 0	0.27	**0.50**		Fiber Aerial Fraction - 0	0.27	**0.35**
Copper Aerial Fraction - 5	0.43	**0.50**		Fiber Aerial Fraction - 5	0.43	**0.35**
Copper Aerial Fraction - 100	0.50	**0.50**		Fiber Aerial Fraction - 100	0.50	**0.35**
Copper Aerial Fraction - 200	0.49	**0.40**		Fiber Aerial Fraction - 200	0.49	**0.30**
Copper Aerial Fraction - 650	0.08	**0.30**		Fiber Aerial Fraction - 650	0.08	**0.30**
Copper Aerial Fraction - 850	0.38	**0.20**		Fiber Aerial Fraction - 850	0.38	**0.20**
Copper Aerial Fraction - 2550	0.52	**0.15**		Fiber Aerial Fraction - 2550	0.52	**0.15**
Copper Aerial Fraction - 5000	0.52	**0.10**		Fiber Aerial Fraction - 5000	0.52	**0.10**
Copper Aerial Fraction - 10000	0.52	**0.05**		Fiber Aerial Fraction - 10000	0.52	**0.05**

Copper Buried Fraction - 0	0.73	**0.45**		Fiber Buried Fraction - 0	0.73	**0.60**
Copper Buried Fraction - 5	0.54	**0.45**		Fiber Buried Fraction - 5	0.54	**0.60**
Copper Buried Fraction - 100	0.41	**0.45**		Fiber Buried Fraction - 100	0.41	**0.60**
Copper Buried Fraction - 200	0.36	**0.40**		Fiber Buried Fraction - 200	0.36	**0.60**
Copper Buried Fraction - 650	0.46	**0.30**		Fiber Buried Fraction - 650	0.46	**0.30**
Copper Buried Fraction - 850	0.15	**0.20**		Fiber Buried Fraction - 850	0.15	**0.20**
Copper Buried Fraction - 2550	0.13	**0.10**		Fiber Buried Fraction - 2550	0.13	**0.10**
Copper Buried Fraction - 5000	0.13	**0.05**		Fiber Buried Fraction - 5000	0.13	**0.05**
Copper Buried Fraction - 10000	0.13	**0.05**		Fiber Buried Fraction - 10000	0.13	**0.05**

BURIED PLACEMENT COSTS

For buried placement costs, the Commission used the same values as Staff. We did, however, change the HAI 5.0a hard rock and soft rock placement multipliers. These changes are reflected in the following table. Par. 216.

Hard and Soft Rock Placement Multipliers						
	0-5 Lines Per Square Mile			6-100 Lines Per Square Mile		
	Normal	Soft Rock	Hard Rock	Normal	Soft Rock	Hard Rock
Gabel/Kennedy[3]	1.69	3.17	4.66	2.23	3.72	5.20
Rock Placement Multipliers		1.88	2.76		1.67	2.33
Average Soft Rock Placement Multiplier		1.77				
Average Hard Rock Placement Multiplier			2.55			

The average hard and soft rock placement multipliers were derived in the following manner:

1) For the 0-5 density zone the soft rock multiplier is found by taking the

[3] These values were derived from Ex. 241:41.

Gabel/Kennedy value for soft rock of $3.17 and dividing this by the $1.69 to arrive at the 1.88. For the 6-100 density zone, the multiplier is 1.66 (3.72/2.23). The average of 1.88 and 1.66 is 1.77.

2) The average hard rock placement multiplier was calculated in the same fashion.

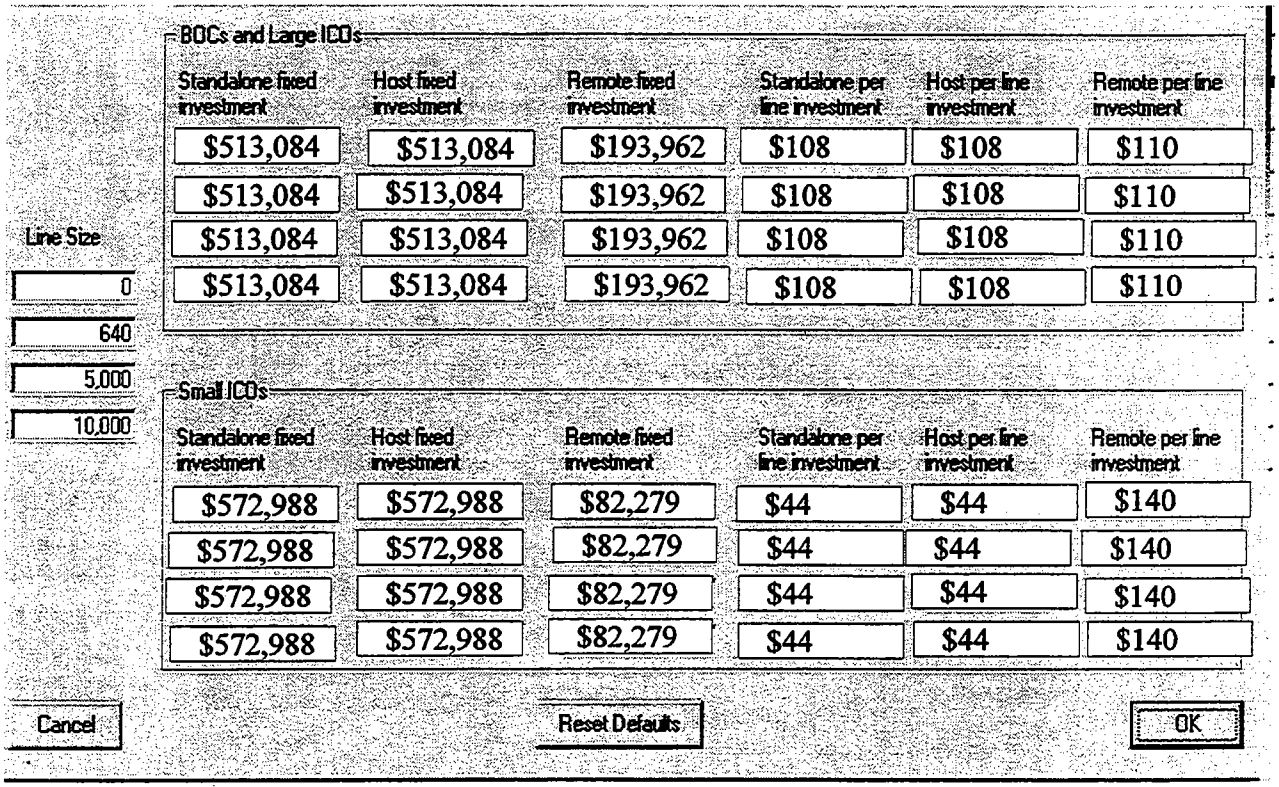
SWITCHING INPUT CHANGES TO HAI 5.0a MODEL

For its switch related costs the Commission used the estimates provided by the NRRI report, *Estimating the Cost of Switching and Cables Based on Publicly Available Data*, Ex. 241:124. Par. 316.

Switching Investment Used in the Commission Runs		
	Small Companies	Medium and Large Companies
Remote Getting Started	82,279	193,962
Line on remote switch	140.34	110.49
Host/Stand-Alone Getting Started	572,988	513,083
Line on host switch	44	108

This data was implemented in the HAI 5.0a model in the manner outlined in the following tables.

SWITCHING INVESTMENT USED IN COMMISSION RUNS



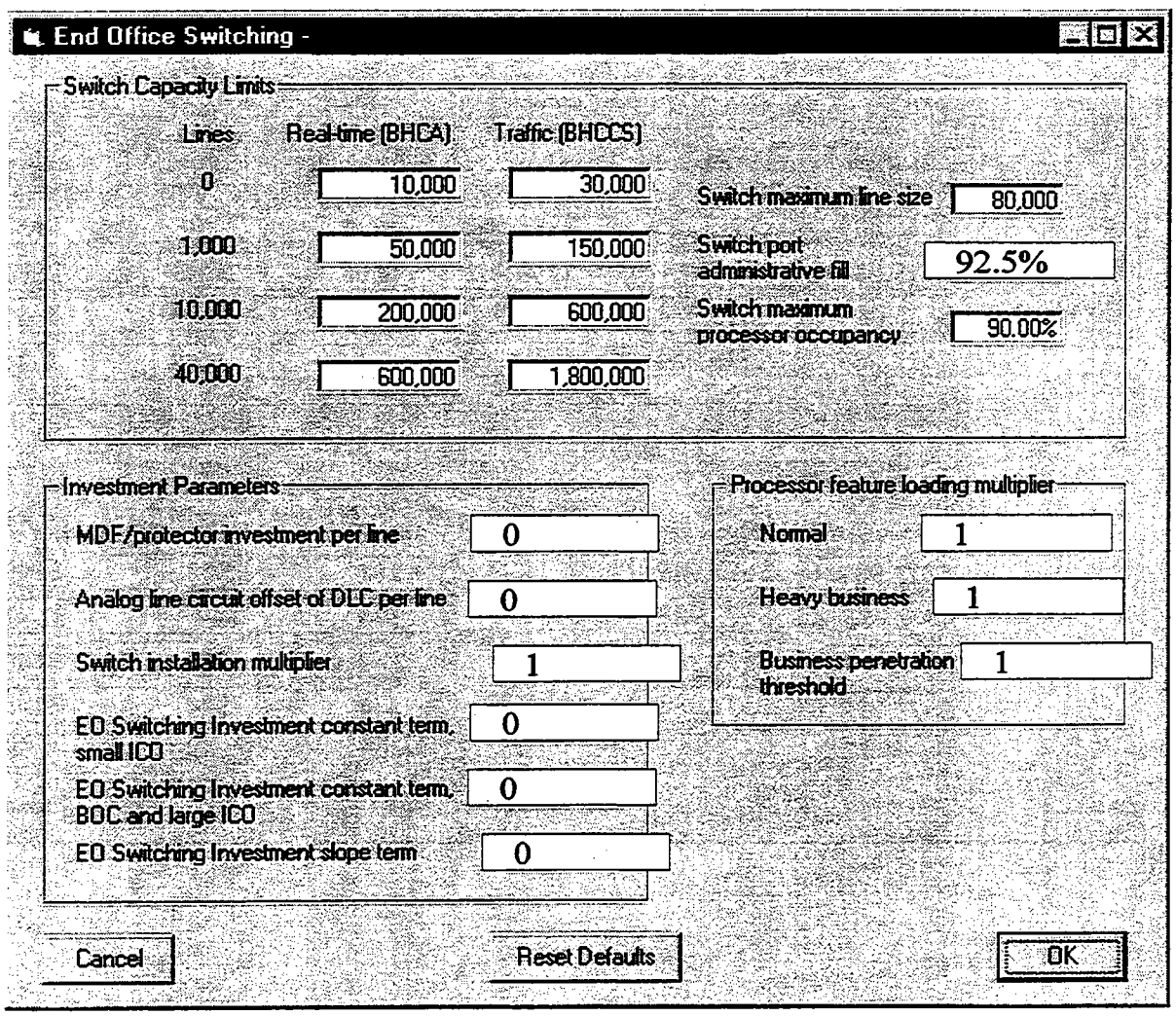
BOCs and Large ICOs

Line Size	Standalone fixed investment	Host fixed investment	Remote fixed investment	Standalone per line investment	Host per line investment	Remote per line investment
0	$513,084	$513,084	$193,962	$108	$108	$110
640	$513,084	$513,084	$193,962	$108	$108	$110
5,000	$513,084	$513,084	$193,962	$108	$108	$110
10,000	$513,084	$513,084	$193,962	$108	$108	$110

Small ICOs

Line Size	Standalone fixed investment	Host fixed investment	Remote fixed investment	Standalone per line investment	Host per line investment	Remote per line investment
0	$572,988	$572,988	$82,279	$44	$44	$140
640	$572,988	$572,988	$82,279	$44	$44	$140
5,000	$572,988	$572,988	$82,279	$44	$44	$140
10,000	$572,988	$572,988	$82,279	$44	$44	$140

Cancel Reset Defaults OK



The Investment Parameters in the above table were set to zero as these values are already included in the switching cost figures reported above as the **Switching Investment Used in the Commission Runs**. The Processor feature loading multipliers were set to 1 as these are multipliers for vertical services, whose costs are already included in the aforementioned Switch Investment figures. Ex. 241, page 122.

Power Investment was also set to zero as this investment is included in the switch cost data reported in the **Switching Investment Used in the Commission Runs** table, above. Ex. 241 page 122.

Switching Input	Current Scenario Value
Power Investment 1	0
Power Investment 2	0
Power Investment 3	0
Power Investment 4	0
Power Investment 5	0

Page 114 of Exhibit 241 notes that line switch use typically ranges from 90 to 95%. Since the Commission decided to adopt the switch investments suggested in Exhibit 241, it was decided to use a switch port administrative fill factor of 92.5%, the average of the 90% and 95% reported in Exhibit 241.

In its runs the Commission used the host-remote assignment option of the HAI 5.0a model. The host, remote, and stand-alone assignments used were the same as those used in the BPCM 3.1 runs by the various parties.

OTHER INPUT CHANGES

The buried fraction available for shift was set equal to 0. This has the effect that no fraction of buried cable would be shifted over to aerial cable. This was done so as to conform with the Commission's decision to use ILEC values for plant mix. Par. 106.

CHANGES MADE TO HAI 5.0a MODULE ALGORITHMS

The following changes were made to the ***investment inputs*** worksheet in the **wire center expense module** per Ex. 221T:30-31:

Cell DB3: "Inputs!H70" was changed to "Inputs!$H$70"

So as to allow the calculation of feeder buried cable expense to work correctly for all wire centers,

Cell DH3: "(O3+Q3+R3)" was changed to "(O3+R3*Inputs!$G$70+Q3*Inputs!$G$70)"

So as to include the effects of structure sharing on feeder underground placement in the total feeder cost calculation,

Cell DI3: "IF(Inputs!$G$70>0.5,1" was changed to "IF(Inputs!$G$70>0.5,P3" (two instances in formula)

So as to include full manhole investment in the calculation of manhole direct cost whenever

the sharing fraction is greater than 0.5 (the calculation works correctly when the sharing fraction is less than or equal to 0.5, including the default values),

Column GD: "GT3/((GE3/B3/12)/(1-'96 Actuals'!F142))" was changed to "GW3/((GH3/B3/12)/(1-'96 Actuals'!$F$142))" Note that the '96 Actuals'!F142' cell reference must be changed to an absolute reference as shown.

APPENDIX D
Changes Made to BCPM 3.1
For
Washington USF Proceedings, Docket UT-980311(a)

Loop Length Adjustment

All BCPM 3.1 runs for all parties were done using the Loop Length adjustments provided by the parties. In the case of Sprint, the Loop Length adjustment ratios had been made an internal component of the BCPM 3.1 model provide to the Commission along with Sprint's post hearing brief. In the case of US WEST and GTE an external ***Loop Length Adjustment*** program, provided by both those parties, was run to perform this adjustment. This was done per Par. 270 of the current order.

Households

Per paragraph 90 of the current order the Commission altered the BCPM 3.1 model so that it built plant to households rather than to housing units for all runs performed. The method the Commission chose to make this alteration was based on Sprint's response to Hearing Request No. 9 and was performed as follows:

1. In the **base_loop3_erts.csv** file the ratio of total house holds to total housing units, at the grid level, was established.

2. This ratio was then used to adjust the housing unit figures appearing in columns O through X.

3. Following the ratio adjustment, the values in the total house hold column were copied over into the total housing unit column.

4. For the quadrant figures, the values found in the quadrant house hold column were copied over into the relevant quadrant housing unit column.

Distribution and Feeder Fill factors

These were set to the BCPM 3.1 National Default values for all runs on all companies, per paragraph 256 of the current order.

Density Cable Sizing Factor Table

Density	Feeder	Distribution
0	75.00%	100.00%
6	80.00%	100.00%
101	80.00%	100.00%
201	85.00%	100.00%
651	85.00%	100.00%
851	85.00%	100.00%
2551	85.00%	100.00%
5001	85.00%	100.00%
10001	85.00%	100.00%

DEPRECIATION AND SALVAGE LIVES

For US WEST and GTE, the values reported in the Eighth Supplemental Order at Par. 217 were used in the Commission runs. For Sprint the HAI 5.0a national default values were used.

Table 1: US WEST Service Lives and Future Net Salvage Values

Acct.	Description	Service life	Future Net Salvage
2112	motor vehicles	9.6	16.00%
2114	Special Purpose	14	0.00%
2115	garage work equip	14	0.00%
2116	other work equip	16	9.00%
2121	buildings	33	4.00%
2122	furniture	20	0.00%
2123.1	office equipment	15	0.00%
2123.2	company comp equip	9.9	0.00%
2124	gen purpose equip	5.8	5.00%
2211	analog equip		0.00%
2212	digital switch equipment	17	0.00%
2220	operator systems	12	0.00%
2231	radio systems	15	-3.00%
2232	Circuit Equipment	12	1.00%
2351	public tel term equip	10	5.00%
2362	other term equip	9	0.00%
2611	pole lines	28	-75.00%
2421	Aerial cable met	24	-24.00%
2421	Aerial cable non-met	28	-24.00%
2422	Ungrd cable met	25	-22.00%
2422	Ungrd cable non-met	30	-22.00%
2423	Buried Cable met	22	-7.00%
2423	Buried Cable non-met	28	-7.00%
2426	intra bldg ca met	20	-20.00%
1426	intra bldg ca non-met	28	-20.00%
2431	Aerial wire	8.7	-124.00%
2441	conduit systems	55	-10.00%

Table 2: GTE's Service Lives and Future Net Salvage Values

Acct.	Description	Service life	Future Net Salvage
2112	motor vehicles	9.3	20.00%
2115	garage work equip	18	5.00%
2116	other work equip	15	10.00%
2121	buildings	43	0.00%
2122	furniture	20	10.00%
2123.1	office equipment	15	10.00%
2123.2	company comp equip	8	2.00%
2124	gen purpose equip	8	5.00%
2212	digital switch equipment	16.5	3.00%
2220	operator systems	12	-2.00%
2231	radio systems	14	0.00%
2232	Circuit Equipment	12	4.00%
2351	public tel term equip	8	10.00%
2362	other term equip	10	5.00%
2611	pole lines	28	-75.00%
2421	Aerial cable met	21	-27.00%
2421	Aerial cable non-met	30	-5.00%
2422	Underground cable met	26	-15.00%
2422	Ungrd cable non-met	30	-5.00%
2423	Buried Cable met	23	-5.00%
2423	Buried Cable non-met	30	-5.00%
2426	intra bldg ca met	20	-30.00%
1426	intra bldg ca non-met	30	-5.00%
2431	Aerial wire	15	-15.00%
2441	conduit systems	50	-5.00%

Table 3: Service Lives and Net Salvage Values for Sprint

Account	Economic Life (years)	Tax Life (years)	Future Net Salvage (percent)
Land	0	0	0%
Motor Vehicle	8.24	3	11%
Special Purpose Vehicles	8.24	3	11%
Garage Work	12.22	5	-11%
Other Work	13.04	5	3%
Building	46.93	31.5	1.9%
Furniture	15.92	5	6.9%
Office Support	10.78	5	7%
General Purpose Computers	6.12	5	3.7%
Switching	16.17	5	3.0%
Circuit/DLC	10.24	5	-2%
Pole	30.25	15	-90.0%
Aerial Copper	20.61	15	-23.030%
Aerial Fiber	26.14	15	-17.53%
Underground Copper	25	15	-18.260%
Underground Fiber	26.45	15	-14.6%
Buried Copper	21.57	15	-8.390%
Buried Fiber	25.91	15	-8.58%
Conduit	56.19	15	-10.3%

COST OF MONEY AND TAX RATES

Again, for US WEST and GTE the authorized values, as decided in the Eighth Supplemental Order at Par. 211, were used. For Sprint, the company numbers were used. Staff testified that Sprint's cost of Money and Tax Data comply with Guideline 4 and had not objected to the numbers filed with Sprint's cost study.[1]

Financial Data for US WEST

Return on Equity	11.80%
Debt Rate	7.27%
Debt Ratio	48.00%

Tax Data for USWest

Federal Tax Rate	35.0%
State Tax Rate	0.0%
Gross Receipts Tax	0.0%
Ad Valorem, Insurance, etc.	0.0%
Other Tax Rate	5.0%

Financial Data for GTE

Return on Equity	11.25%
Debt Rate	7.90%
Debt Ratio	44.40%

Tax Data for GTE

Federal Tax Rate	35.0%
State Tax Rate	0.0%
Gross Receipts Tax	0.0%
Ad Valorem, Insurance, etc.	0.0%
Other Tax Rate	5.0%

Financial Data for Sprint

Return on Equity	12.25%
Debt Rate	8.8%
Debt Ratio	54.41%

[1]For example, Staff witness Roth stated that Sprint complied with guideline 4 with the exception of fill factors. Tr. 898-902

Tax Data for Sprint

Federal Tax Rate	35.0%
State Tax Rate	0.0%
Gross Receipts Tax	0.0%
Ad Valorem, Insurance, etc.	0.0%
Other Tax Rate	5.0%

STRUCTURE FRACTURE SHARING

For US WEST, Sprint, and GTE, we have used the structure sharing fractions used in the Eighth Supplemental Order. UT-960369 at Par. 76. These appear in table below.

BCPM 3.1 Structure Sharing Fractions Used for all Parties For Feeder and Distribution			
DENSITY	Aerial	Buried	Underground
0-5	62.50%	87.50%	87.50%
6-100	62.50%	87.50%	87.50%
101-200	62.50%	87.50%	87.50%
201-650	50.00%	67.50%	62.50%
651-850	50.00%	67.50%	62.50%
851-2550	50.00%	67.50%	63.00%
2551-5000	35.00%	55.00%	63.00%
5000-10000	35.00%	55.00%	63.00%
10000+	35.00%	55.00%	63.00%

BURIED CABLE STRUCTURE COST

For density zones with greater than 100 lines the national default values for activity mix were used in the US WEST and GTE BCPM 3.1 runs. For the Sprint runs the company suggested activity mix was used in these higher density zones. Par. 212.

For the bottom two density zones, the numbers proposed by ILECs were used with the following exceptions: (Par. 213):

a) For Sprint in the normal category in density zones 0-5 and 6-100 we replaced Sprint's values with values derived from Ex. 241:41;

b) For US WEST in both the soft and hard rock categories we will replace US WEST's values with values derived from Ex. 241:41.

These changes were made in the structure inputs tab in the following fashion:

5) For US WEST the $3.17 was put in the **Cost Adjustment** column of the 0-5 density zone in the ***Soft Rock--Buried Distribution Cable*** and the ***Soft Rock--Buried Feeder Cable*** tables. The total of the $3.17 was assigned to the **Plow** activity.

6) 100% of the activity was assigned to the **Plow** activity, where the $3.17 had been assigned.

7) The formula in the **Weighted Amount Column** was then changed so that *weighted amount = cost adjustment * %activity * %assigned telephone.* This formula change was also applied to the **Weighted Amount Column** in the 6-100 line density zone.

The other changes to US WEST's buried cable structure cost suggested above, along with the changes proposed in the tables above to Sprint's buried cable structure cost, were done in the manner outlined above.

Cost of Drops

Drops connect the distribution cable to customers' premises. More specifically, the drop is the cable that extends from the terminal to the network interface device (NID). The buried drop cost input determines the per foot material and placement cost for the buried drop. The aerial drop cost input determines the per foot material and placement cost for the aerial drop. The total investment in the drop is the product of the drop cost input times the drop length.

For the Commission's run of BCPM 3.1, the BCPM 3.1 national default value of $0.77 per foot for the material cost of aerial drop was substituted for US WEST's proposed value. See order at Par. 226.

For US WEST's buried cable drops, the Commission runs utilized a cost of $0.85 per foot. See Order at Par. 227.

For GTE and Sprint, the Commission has used the companies' respective recommended inputs in its BCPM 3.1 runs.

POLES

For pole costs the values from Ex. 241:54-59 were utilized in the following manner (Par. 179): $341.71 for normal soil conditions; $450.67 for soft rock conditions; and $523.36 for hard rock conditions.

The costs for Anchors and Guys used were $36.28, $54.96 and $66.52 for the 0-100, 100-2,550, and 2,550+ density zones, respectively. These values were used in all soil types. These were input in the following fashion:

1) $36.28 was input as the base cost for anchors and guys in all soil types.

2) For the 100-2,550 density zones the value of $54.96 - $36.28 = $18.68 was entered into the ***cost adjustment*** column in the ***anchors and guys*** row for those density zones.

3) For the 2,550+ density zones a value of $66.52 - $36.28 = 30.24 was entered into the ***cost adjustment*** column in the ***anchors and guys*** row for those density zones.

WIRELESS CAP

The Commission has decided not to impose a wireless cap. Par. 77. Therefore, there were no sensitivity runs performed varying the amount of the cap. Values reported are from the ***Uncapped*** column of the **Detail** reports. For the wirecenter detail runs the values reported are from the **WCSUMMARY**, BCPM 3.1 report review option.

The exception to this is the case of GTE. GTE's version of BCPM 3.1, as was explained in Par. 189, above, had a flawed **CBG_ROLLUP** module. Running the GTE version of BCPM 3.1 with this module resulted in ***Capped*** costs being reported as greater than ***Uncapped*** costs. Furthermore, the total cost of the subsidy when applied at the wirecenter level was greater than when the subsidy was applied at the grid level. The very opposite of what ought to occur. While we do not pretend to understand what is going wrong with the GTE **CBG_ROLLUP** module, we do feel that reporting the values from the ***Uncapped*** column of the **Detail** reports and from the **UNCAPPED_WCSUMMARY** report do provide a reasonable approximation of the USF costs faced by GTE in its service territory.

OTHER CHANGES MADE TO BCPM 3.1

The following modifications to BCPM 3.1 were made so that costs could be calculated in a manner that is consistent with the staff recommendation to use a revenue benchmark.

<u>BCPM 3.1 Global Inputs Table</u>

Adjust "heavy business" loading multiplier to 1
Adjust minimum loading multiplier to 1

BCPM 3.1 State default inputs table

Set ARMIS percent local calls to 100%
Set ARMIS percent toll calls to 0%
Set SS7 capacity to basic calls to 100%

BCPM 3.1 Transport Inputs Table

Set percent of Interoffice MOUs that are EAS to 100%

The suggested modifications outlined above are from Sprint's response to Hearing Request No. 009, US WEST's response to Hearing Request No. 003, and from GTE's response to Hearing Request No. 015.

BCPM 3.1 Global Inputs Table

The **Direct Routed Fraction of Local Interoffice Traffic** was adjusted for the number of calls going to a tandem. For this change we utilized the value of 93% suggested by US WEST in their response to Hearing Request No. 003.

BCPM 3.1 State default inputs table

The **Percent of Local Calls that are Interoffice** was adjusted for the number of all calls that are interoffice. For this change we utilized the value of 64% suggested by US WEST in their response to Hearing Request No. 003.

SWITCHING

The Commission determined that the estimates provided by exhibit 241 at 124, shown in the table below, must be used in both the HAI 5.0a and BCPM 3.1. Par. 157.

In part 1 of its response to Hearing Request No. 003, suggested a way by which these values might be utilized within the BCPM 3.1 model. However, when this method was tried it was noticed that BCPM 3.1 still appeared to be drawing upon the large switch regression curve data in developing switching costs. Since we could not immediately ascertain why this would be so, it was decided not to utilize the

estimates provided by exhibit 241 at 124 in ut BCPM 3.1 runs.

Switching Investment Function	
Remote Getting Started	193,962.1
Line on remote switch	110.49
Host Getting Started	513,083.8
Line on host switch	107.86

OVERHEAD EXPENSES

The Commission ran three overhead expense scenarios for Sprint, GTE and US WEST. These were:

1) The Base run used a total value of $7.00 as the **Per Line Monthly Operating Expenses for Small, Medium and Large Companies**. This value was input into both the Business and Residence Expense tables found in the ***Expense Inputs*** tab of the BCPM 3.1 **Inputs** workbook. To arrive at this total expense value the **Network Support Expenses** account was set to zero, all the other accounts, with the exception of the **General Support** account, had a value of $0.01 input into them. The remainder of the $7.00, $6.82, was put into the **General Support** account.

2) The Mid run used a total value of $11.00 as the **Per Line Monthly Operating Expenses for Small, Medium and Large Companies**. This value was input into both the Business and Residence Expense tables found in the ***Expense Inputs*** tab of the BCPM 3.1 **Inputs** workbook. To arrive at this total expense value the **Network Support Expenses** account was set to zero, all the other accounts, with the exception of the **General Support** account, had a value of $0.01 input into them. The remainder of the $11.00, $10.82, was put into the **General Support** account.

3) The High run used a total value of $15.00 as the **Per Line Monthly Operating Expenses for Small, Medium and Large Companies**. This value was input into both the Business and Residence Expense tables found in the ***Expense Inputs*** tab of the BCPM 3.1 **Inputs** workbook. To arrive at this total expense value the **Network Support Expenses** account was set to zero, all the other accounts, with the exception of the **General Support** account, had a value of $0.01 input into them. The remainder of the $15.00, $14.82, was put into the **General Support** account.

The Commission made additional changes to Sprint's **Per Line Monthly Operating**

Expenses for Small, Medium and Large Companies when performing its Sprint BCPM 3.1 runs. In its runs the Commission utilized the adjusted investment related expense loading factors provided by Sprint in its response to Hearing Request No. 10. These changes were as follows:

BCPM 3.1 EXPENSE FACTORS FOR SPRINT

Cost Element	USOAR Account	Filed BCPM 3.1 Expense Factor	Commission Adjusted BCPM 3.1 Expense Factor
Network Support Expense	6110	0.0312	0.0257
COE Switching	6210	0.0343	0.0357
COE Transmission	6230	0.0202	0.0191
Poles	6411	0.0318	0.0127
Aerial Copper Cable	6421.1	0.0608	0.0373
Aerial Fiber Cable	6421.2	0.0033	0.0032
Underground Copper Cable	6422.1	0.0200	0.0123
Underground Fiber Cable	6422.2	0.0360	0.0037
Buried Copper Cable	6423.1	0.0463	0.0373
Buried Fiber Cable	6423.2	0.0031	0.0029
Conduit Investment System	6441	0.0009	0.0006
Other Property Plant	6510	0.0000	0.0000
Network Operations	6530	0.0000	0.0000

FIBER/COPPER CROSSOVER

For its BCPM 3.1 runs the Commission used the following values, from Par. 198 of the Eighth Supplemental Order, in the **Misc Inputs** tab of the ***BCPM 3.1 Inputs*** workbook:

CprMaxDistr, the maximum length of copper cable in the CBG distribution was changed to 15,000 feet. This value is found in cell C9 of the **Misc Inputs** tab.

The **cable break point** was changed to 12,000 feet. This values is found in cell C15 of the **Misc Inputs** tab.