BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NO. 97-239-C-ORDER NO. 98-322

MAY 6, 1998

IN RE: Proceeding to Establish Guidelines for an Intrastate Universal Service Fund	)))	ORDER ON UNIVERSAL SERVICE COST MODELS

I. PROCEDURAL BACKGROUND

This matter comes before the South Carolina Public Service Commission ("Commission") in connection with the Commission's obligations under S.C. Code Ann. § 58-9-280(E) (Supp. 1997) to establish an intrastate universal service fund ("USF") for distribution to carriers of last resort. Further, as discussed below in more detail, this matter comes before the Commission in connection with its obligations under federal law to select a cost proxy model for use in calculating interstate support for non-rural incumbent local exchange carriers ("ILECs") serving rural, insular and high cost areas in South Carolina. On May 29, 1997, in response to this statutory obligation, the Commission issued a Notice of Proceeding creating a proceeding to establish guidelines as may be necessary for the funding and management of the USF including issues related to the size of the USF. The Commission assigned Docket No. 97-239-C to the matter.

Numerous parties intervened in Docket No. 97-239-C including BellSouth Telecommunications, Inc. ("BellSouth"), the Consumer Advocate for the State of South Carolina ("Consumer Advocate"), the South Carolina Cable Television Association ("SCCTA"), MCI Telecommunications Corporation ("MCI"), South Carolina Public Communications Association ("SCPCA"), John C. Ruoff, Ph.D. ("Ruoff"), American Communications Services, Inc. ("ACSI"), AT&T Communications of the Southern States, Inc. ("AT&T"), South Carolina Budget and Control Board, Office of Information Resources ("OIR"), Worldcom, Inc. ("Worldcom"), Alliance for South Carolina's Children ("Alliance"), Parents Reaching Out to Parents of South Carolina, Inc. ("PRO-Parents"), GTE South Incorporated ("GTE"), South Carolina Fair Share and the Women's Shelter ("SC Fair Share"), LCI International Inc. ("LCI"), South Carolina Telephone Association ("SCTA"), South Carolina Telephone Coalition ("SCTC"), and United Telephone Company ("United").

In Order No. 97-516, dated June 13, 1997, the Commission clarified that an intrastate USF fund would be established in the following manner. First, the Commission would establish guidelines for the fund, including estimating the size of the level of support to be trued up or down after the Commission determines the actual methodology to be used. Second, the Commission stated it would hold a separate hearing to accept and

evaluate evidence regarding specific methodologies to be used in determining the actual size of the intrastate USF. Order No. 97-516.

An initial public hearing in this docket was held on August 4, 1997. In Order No. 97-753, dated September 3, 1997, the Commission addressed the USF guidelines, adopted with certain modifications the guidelines proposed by the SCTA, and deferred ruling on certain sections. Pursuant to the requirements of S.C. Code Ann. § 58-9-280(E)(4), the Commission estimated the size of the USF to be $439.7 million. In Order No. 97-942, dated December 31, 1997, the Commission granted in part and denied in part various petitions for rehearing and/or reconsideration of Order No. 97-753, emphasizing that the actual size of the USF would be determined de novo in future Commission proceedings. In Order No. 98-201, dated March 17, 1998, the Commission granted reconsideration in part of Order No. 97-942, reinstating certain parts of Order No. 97-753 which had been deleted in Order No. 97-942.

In Order No. 97-958, dated November 24, 1997, the Commission designated BellSouth, United, GTE and the member companies of the South Carolina Telephone Coalition as telecommunications carriers eligible to receive universal service support under section 214(e)(2) of the Telecommunications Act of 1996.

A second public hearing in this docket was held on November 19, 1997, for the limited purpose of receiving testimony and permitting cross-examination of SCTA witnesses Alphonso Varner and Keith Oliver, and SCTC witnesses Azita Sparano, and Douglas Meredith, pursuant to Commission Order No. 97-1001, dated November 20, 1997. The hearing was thereafter recessed until a later date, and ultimately reconvened on March 9, 1998. The public hearing concluded on March 11, 1998.

During the USF hearings, BellSouth was represented by Caroline N. Watson, William F. Austin, J. Phillip Carver, William J. Ellenberg, II and Edward L. Rankin, III. BellSouth presented the testimony of Dr. Randall S. Billingsley, G. David Cunningham, Peter F. Martin, D. Daonne Caldwell, Jamshed K. Madan, Michael D. Dirmeier, and David C. Newton.

United was represented by Richard Whitt and James Wright. United presented the testimony of Jerome C. Weinert, Wayne Jones, Dr. Brian Staihr, and Steve Parrott.

BellSouth and United jointly presented the testimony of Dr. Kevin Duffy-Deno, Dr. Robert Bowman, and Dr. Brian Staihr.

SCTA and SCTC were represented by M. John Bowen, Jr. and Margaret Fox. SCTA presented the testimony of Alphonso Varner and Keith Oliver. The SCTC presented the testimony of Azita

Sparano and Douglas Meredith. The SCTA and SCTC witnesses testified on November 19, 1997.

The Consumer Advocate was represented by Elliott F. Elam, Jr. The Consumer Advocate presented the testimony of John B. Legler and Allen G. Buckalew.

MCI was represented by John M. S. Hoefer, and Paige Gossett. MCI presented the testimony of Thomas Hyde.

AT&T was represented by Francis P. Mood, Robin Dunson, Steve A. Matthews and Steven Ruscus. AT&T presented the testimony of James W. Wells, Brian F. Pitkin, Art Lerma, Richard Guepe, David L. Kaserman, Mike Guedel, Don Wood, James W. Currin, and John I Hirshleifer.

GTE was represented by Steven W. Hamm, Joe Foster, Ed Fuhr and Rich Harper. GTE presented the testimony of Gregory Jacobson, Allen E. Sovereign, Michael R. Norris, Dr. Timothy J. Tardiff, Mark S. Calnon, and Francis Murphy.

SCPCA was represented by John F. Beach. SCPCA presented the testimony of Walter Rice.

ACSI was represented by Russell B. Shetterly. ACSI presented no witnesses.

SCCTA was represented by B. Craig Collins. SCCTA presented no witnesses.

The Commission's Staff was represented by F. David Butler. The Commission Staff presented no witnesses during this phase of the proceeding.

II. SUMMARY OF TESTIMONY

ALPHONSO J. VARNER

The SCTA presented the direct testimony of Alphonso J. Varner, Senior Director for State Regulatory for BellSouth Telecommunications, Inc. Mr. Varner addressed the general topic of universal service and what the SCTA should do to ensure it is preserved in South Carolina. Mr. Varner addressed policy issues regarding USF. Mr. Varner outlined costing principles developed by the SCTA which he testified were consistent with the Telecommunications Act of 1996 as well as the Federal Communications Commission's ("FCC") May 8, 1997 Report and Order in Docket No. 96-45. Mr. Varner also testified as to the guidelines approved by the Commission in its Order No. 97-757 as well as the modifications proposed by the SCTA in Sections 9 and 11 which were deferred in the initial universal service proceeding.

H. KEITH OLIVER

The SCTA presented the direct testimony of Keith J. Oliver, Vice-President Finance, Home Telephone Company, Inc. Mr. Oliver

testified about the administrative procedures developed by the SCTA for use in the USF guidelines.

DOUGLAS MEREDITH

The SCTC presented the direct testimony of Douglas Meredith. Mr. Meredith is the Director of Economics and Pricing Division of John Staurulakis, Inc. (JSI) in Alpharetta, Georgia. Mr. Meredith testified regarding the treatment of costs for rural carriers in South Carolina. He testified to the methodology used to determine the size of the intrastate USF for those companies as listed. All these companies are incumbent local exchange carriers ("ILECs") who have carrier of last resort (COLR) status within South Carolina.

AZITA SPARANO

The SCTC presented the direct testimony of Ms. Sparano. Ms. Sparano is Director of Southeast Operations of John Staurulakis Inc. (JSI) of Alpharetta, Georgia. Ms. Sparano testified as to a detailed outline of the embedded cost methodology as described by witness Meredith. She also presented the result of the application of that methodology for the SCTC Company.

RANDALL BILLINGSLEY

Dr. Billingsley, a finance professor at Virginia Polytechnic Institute and State University, filed rebuttal testimony on behalf of BellSouth. Prior to the hearing, the parties agreed to

stipulate to Dr. Billingsley's rebuttal testimony into the record. The Commission approved the stipulation. Dr. Billingsley attempted to rebut the testimony of John I. Hirshleifer and a statement of Matthew I. Kahal which was relied upon by Don Wood in his testimony. Mr. Hirshleifer and Mr. Wood testified on behalf of AT&T.

Specifically, Dr. Billingsley testified that Hirshleifer erroneously estimated BellSouth Corporation's cost of equity to be only 10.99% to 11.05% and BellSouth Telecommunications, Inc.'s ("BST") overall cost of capital to be only 9.43%. Dr. Billingsley's testimony included an explanation of the errors and inconsistencies in Hirshleifer's discounted cash flow ("DCF") and capital asset pricing model ("CAPM") analyses of BellSouth Telecommunications, Inc.'s cost of equity capital. Dr. Billingsley determined an overall cost of capital for BST of 11.25%. Dr. Billingsley also attempted to rebut Kahal's cost of capital analysis for LECs as being unrealistically low.

G. DAVID CUNNINGHAM

BellSouth presented the rebuttal testimony of G. David Cunningham, Director of Finance for BellSouth. Prior to the hearing, the parties agreed to stipulate Cunningham's rebuttal testimony into the record. The Commission approved the stipulation. Mr. Cunningham testified in response to the direct

testimony of James W. Currin on behalf of AT&T regarding the economic lives used in BellSouth's calculation of universal service costs. Mr. Cunningham testified as to the appropriateness of the forward-looking economic lives developed by BellSouth's Depreciation organization and provided for use in BellSouth's first study using the BCPM 3.1 Model.

JAMES W. CURRIN

AT&T presented the direct and rebuttal testimony of Mr. James W. Currin. Mr. Currin is a Senior Consultant of the economic consulting firm of Snavely King Majoros O'Connor & Lee, Inc. in Washington, DC. Prior to the hearing, the parties agreed to stipulate Mr. Currin's direct and rebuttal testimony into the record. The Commission approved the stipulation. Mr. Currin testified that he was responding to the testimony of Daonne Caldwell who presented the depreciation lives proposed by BellSouth, and Michael Norris and Allen E. Sovereign, who presented the lives used by GTE South. Mr. Currin testified that he compared these lives to those appropriate for universal cost calculations pursuant to the Commission Order of September 3, 1997 and to the lives used in the Hatfield Model.

Mr. Currin testified as a rebuttal witness to the testimony of G. David Cunningham (BellSouth) on the subject of the appropriate economic lives and future net salvage percents to be

used in calculating depreciation pursuant to the Universal Services Order of the FCC.

JOHN I. HIRSHLEIFER

AT&T presented the direct and rebuttal testimony of John I. Hirshleifer, Vice President and Director of Research of FinEcon of Los Angeles, California. Prior to the hearing, the parties agreed to stipulate Mr. Hirshleifer's direct and rebuttal testimony into the record. The Commission approved the stipulation.

Mr. Hirshleifer testified as to the estimate of the forward-looking cost of capital that should be used in determining the telephone subsidiaries of GTE and BellSouth and for United Telephone Company of the Carolinas, and the forward looking cost of capital appropriate for the provision of universal service. Mr. Hirshleifer testified that the midpoint of his cost of capital range for the provision of universal services is 9.43% for BellSouth and 9.60% for GTE and 9.53% for United.

AT&T presented Mr. Hirshleifer to attempt to rebut BellSouth's proposal to adopt a 11.25% cost of capital. Mr. Hirshleifer also testified as a rebuttal witness to the testimony of Dr. Billingsley.

THOMAS HYDE

MCI presented the direct testimony of Thomas Hyde. Mr. Hyde is a consultant for MCI. Prior to the hearing, the parties agreed to stipulate Mr. Hyde's direct and revised direct testimony into the record. The Commission approved the stipulation. Mr. Hyde testified as to certain aspects of the testimony of Douglas Meredith filed by the SCTC.

GREGORY D. JACOBSON

GTE presented the rebuttal testimony of Gregory D. Jacobson, Vice President and Treasurer of GTE Telephone Operating Companies. Prior to the hearing, the parties agreed to stipulate Mr. Jacobson's rebuttal testimony into the record. The Commission approved the stipulation. Mr. Jacobson testified in support of the capital structure and overall weighted average cost of capital (WACC) used in the cost studies presented by GTE. Mr. Jacobson testified that the WACC reflects forward-looking costs consistent with prevailing economic theory. Mr. Jacobson also attempted to rebut certain issues raised in the direct testimony of John I. Hirshleifer on behalf of AT&T. Mr. Jacobson testified that Mr. Hirshleifer had made certain arbitrary assumptions and modifications to the application of the DCF, CAPM and capital structure that are inconsistent with prevailing economic theory and which individually and

collectively bias Mr. Jacobson's results and understate the forward-looking cost of capital for GTE South.

DAVID L. KASERMAN

AT&T presented the direct testimony of David L. Kaserman, an economist, employed as Torchmark Professor of Economics at Auburn University. Prior to the hearing, the parties agreed to stipulate Dr. Kaserman's direct testimony into the record. The Commission approved the stipulation. Dr. Kaserman described some fundamental economic principles that apply to issued raised by the Commission's current efforts to reform the system through which the policy objective of universal service is pursued. Dr. Kaserman testified that these principles are useful both in describing the overall characteristics that should be incorporated in the new system and in guiding the selection of an appropriate cost model for use in operating that system.

JOHN LEGLER

The Consumer Advocate presented the surrebuttal testimony of John Legler, Professor of Banking and Finance from the University of Georgia. Prior to the hearing, the parties agreed to stipulate Dr. Legler's surrebuttal testimony into the record. The Commission approved the stipulation. Dr. Legler testified in his surrebuttal testimony that BellSouth Telecommunications had a

rate of return of common equity of 11.00% and GTE had a rate of return on common equity of 11.80%.

WALTER RICE

The South Carolina Public Communications Association (SCPCA) presented the direct testimony of Walter Rice. Mr. Rice is President of R&R Communications and is the President of the South Carolina Public Communications Association (SCPCA). Prior to the hearing, the parties agreed to stipulate Mr. Rice's direct testimony into the record. The Commission approved the stipulation. Mr. Rice testified as to the appropriate way in which Payphone Service Providers ("PSPs") should contribute to Universal Service in South Carolina.

ALLEN SOVEREIGN

GTE presented the rebuttal testimony of Allen E. Sovereign. Mr. Sovereign is employed by GTE Telephone Operations as Manager-Capital Recovery in Texas. Prior to the hearing, the parties agreed to stipulate Mr. Sovereign's rebuttal testimony into the record. The Commission approved the stipulation. Mr. Sovereign attempted to rebut the direct testimony of James W. Currin.

JEROME C. WEINERT

United presented the rebuttal testimony of Jerome C. Weinert, Vice President of Associated Utility Services, Inc. of Wisconsin. Prior to the hearing, the parties agreed to stipulate

Mr. Weinert's rebuttal testimony into the record. The Commission approved the stipulation. Mr. Weinert testified as to the appropriateness of the depreciation lives and net salvage factors to be utilized by United in its model (BCPM 3.1) for determining the cost of telecommunications services that should be supported by the universal service funding mechanism and to attempt to rebut evidence presented by intervenors to this proceeding contrary to United's proposed depreciation parameters.

BRIAN K. STAIHR

BellSouth and United presented the direct, revised direct and rebuttal testimonies of Brian K. Staihr. Mr. Staihr is a regulatory economist with Sprint United Management Company in Kansas. Mr. Staihr testified regarding the proper costing methodology that should be used in determining explicit universal service support for the state of South Carolina. Mr. Staihr testified that the costing methodology should be the Benchmark Cost Proxy Model. Mr. Staihr testified in his rebuttal testimony as to certain issues raised in the direct testimonies of AT&T witnesses Don Wood and Jim Wells. Mr. Staihr testified that these issues deal specifically with the Hatfield Model Version 5.0a and also presented a sensitivity analysis of key inputs to both models filed, Hatfield 5.0a and BCPM 3.1.

KEVIN T. DUFFY-DENO

BellSouth and United presented the direct and rebuttal testimony of Kevin T. Duffy-Deno, Managing Director-Market Research at INDETEC, International in Utah. Dr. Duffy-Deno testified, along with Dr. Robert Bowman, in lieu of Dr. Richard D. Emmerson's testimony, about the BCPM.

Dr. Duffy-Deno testified in response to testimony filed by AT&T in support of a new release of the Hatfield Model, Release 5.0a. Dr. Duffy-Deno testified specifically regarding Don Wood's assertions regarding HM 5.0a.

ROBERT M. BOWMAN

BellSouth and United presented the direct and rebuttal testimony of Robert M. Bowman, an independent telecommunications consultant from Colorado. Dr. Bowman testified in lieu of Dr. Richard B. Emmerson, explaining the BCPM. Dr. Bowman testified that, from an engineering perspective, the BCPM Version 3.1 is the appropriate model to rely upon in estimating the costs of universal service for BellSouth and United's territory in South Carolina. Dr. Bowman testified as to its forward-looking network for efficient universal service. Dr. Bowman also testified as to how the BCPM 3.1 integrates its customer location methodology with its network design to ensure that engineering design and constraints reflect the underlying customer location data.

PANEL BY WAYNE H. JONES AND DR. BRIAN STAIHR

United presented the direct panel testimony of Wayne H. Jones, Manager of Service Costing for Sprint-Mid-Atlantic in North Carolina and Dr. Brian Staihr, Regulatory Economist, Sprint United Management Company in Kansas. The panel testified as to United's use of the BCPM, Version 3.1 for determining the cost of providing Universal Service in South Carolina.

CHARLES S. PARROTT

United presented the direct testimony of Steve Parrott, Sprint's Mid-Atlantic Operations Director - Regulatory Affairs, North Carolina. Mr. Parrott testified as to the results and calculations supporting United's requirement for explicit universal service support in South Carolina and to share certain of the policy views of Sprint on critical universal service issues.

DAONNE CALDWELL

BellSouth presented the revised direct and supplemental direct testimony of Daonne Caldwell, Director of Finance for BellSouth Telecommunications, Inc. On Tuesday, March 10, 1998, due to a sudden family illness, the parties agreed to stipulate as to Ms. Caldwell's testimony with the understanding that the cross-examination of her in the jurisdictions of Alabama and Louisiana also be received into the record. The Commission

approved the stipulation. Ms. Caldwell's filed testimony explained and supported BellSouth's cost methodology for calculating universal service costs. Ms. Caldwell's testimony was that BellSouth had determined that the BCPM Version 3.1 most closely reflects the cost of providing universal service to BellSouth's South Carolina customers. Subsequently BellSouth filed universal service cost studies based on BCPM 3.1, which included refinements to the digital loop carrier and feeder/distribution interface calculations; feeder cable calculation to provide for cable requirements to handle unoccupied housing units; distribution cable costs associated with the limitation of quadrant cable lengths and switching fixed costs.

MICHAEL NORRIS

GTE presented the direct, updated supplemental direct and revised updated supplemental direct testimony of Michael R. Norris, GTE Service Corporation Manager - Cost Models and Methods Development, Texas. Mr. Norris' direct testimony addresses why company-specific costs studies are appropriate for estimating both the costs of unbundled network elements and universal service support requirements. Mr. Norris' also testified as to why cost proxy models are not appropriate. Mr. Norris also testified as to GTE's integrated Cost Model (ICM) which he

testified was the appropriate model to estimate GTE's costs for both the determining of rates for unbundled network elements (UNEs) and universal service support requirements. However, the ICM was not available for consideration in this proceeding.

GTE presented Mr. Norris' updated testimony. Mr. Norris' testimony supported of a new version of the BCPM, Version 2.5. Mr. Norris testified to his revised results of the new release of BCPM 3.1.

GTE presented Mr. Norris' revised supplemental direct testimony. Mr. Norris' testimony provided revised results of BCPM 3.1 based on a corrected understanding of cable sizing function for distribution plant. Mr. Norris testified the change results in a decrease of the Company's cost per line estimate.

MARK S. CALNON

GTE presented the direct, supplemental, updated supplemental direct, revised updated supplemental direct and rebuttal testimonies of Mark S. Calnon, Director of Pricing and Tariffs for GTE Service Corporation in Texas. Mr. Calnon testified in his direct testimony of the implications of removing the implicit subsidies contained in the incumbent local exchange carriers (ILECs) rates consistent with Section 254(f) of the Telecommunications Act of 1996.

Mr. Calnon's supplemental testimony provided an update to the universal service funding for GTE. The change was a direct result of an updated analysis using the BCPM Version 2.5 model.

Mr. Calnon's updated supplemental direct testimony updated the direct result of an updated BPCM Version 3.1 model.

Mr. Calnon provided revised updated supplemental testimony updating a change in the result of an input correction to the BCPM Version 3.1. All changes are explained in Mr. Norris' revised updated supplemental direct testimony.

Mr. Calnon's rebuttal testimony was filed to address the issues raised by AT&T witnesses Kaserman, Guepe and Guedel and Bucklew on behalf of the Consumer Advocate.

DON J. WOOD

AT&T presented the direct and supplemental direct testimonies of Don J. Wood, consultant from Georgia. Mr. Wood testified as to Release 4 of the Hatfield Model sponsored by AT&T. Mr. Wood also testified as to the results of the model run to determine universal service funding requirements for each tier I ILEC in South Carolina. In addition, Mr. Wood testified as to the results of analysis of switching cost assumptions used by Sprint and BellSouth in their costing model.

Mr. Wood's supplemental direct testifies as to the release of the Hatfield Model 5.0a.

JAMES W. WELLS, JR.

AT&T presented the direct and supplemental testimonies of James W. Wells, Jr., District Manager - Outside Plant Cost Engineering for AT&T. Mr. Wells testified to the OSP inputs to the local loop portion of the Hatfield Model; his analysis of modifications to the OSP of the BCPM 2.0; rebuttal testimony to specific portions of direct testimony of BST and GTE's witnesses and address criticisms of the Hatfield Model.

Mr. Wells' supplementally testified as to the enhancements of OSP modeling methodology and input values as to the local loop portions of the Hatfield Model and validation as to the input values.

BRIAN F. PITKIN

AT&T presented the rebuttal testimony of Brian F. Pitkin, consultant with Klick, Kent & Allen, Inc. of Virginia. Mr. Pitkin testified as to the BCPM Release 3.1 submitted by BellSouth and GTE. Mr. Pitkin testified as to the comparison of the BCPM and Hatfield Model presented by Don Wood.

ART LERMA

AT&T presented the rebuttal testimony of Art Lerma, Regional Regulatory Chief Financial Officer for AT&T. Mr. Lerma testified as to the calculations of BellSouth's operating expenses that were populated in the BCPM 3.1 Model. Mr. Lerma also testified

as to GTE's operating expenses as populated by the BCPM 3.1 Model. Mr. Lerma's direct testimony addressed the expenses based on BCPM 2.0.

RICHARD GUEPE

AT&T presented the supplemental direct testimony of Richard Guepe, District Manager, Law & Government Affairs, Georgia. Mr. Guepe testified as to the present universal service subsidy requirements developed from the Hatfield Model for BellSouth, United and GTE territories in South Carolina; the revenue benchmark and cost inputs necessary to calculate the universal service subsidy requirements; respond to GTE witness Calnon's request for "interim" surcharges; address the mechanism for recovery of USF contributions and additional requirements to achieve a competitively neutral USF.

MIKE GUEDEL

AT&T presented the direct testimony of Mike Guedel, Manager Network Services, AT&T, Georgia. Mr. Guedel testified as to the elimination of CCLC charges and the reduction of access charges to a level to the forward looking economic cost incurred by the companies in providing access services.

ALLEN BUCKALEW

The Consumer Advocate presented the direct and supplemental testimony of Allen Buckalew, economist, J. W. Wilson &

Associates, Washington, DC. Mr. Buckalew testified as to whether the fund methods proposed by the LECs are consistent with the federal rules for the USF. Mr. Buckalew also testified as to his analysis of the cost studies presented by the LECs in support of the USF.

MICHAEL D. DIRMEIER, DAVID C. NEWTON AND JAMSHED K. MADAN

Mr. Dirmeier and Mr. Madan are principals in the Georgetown Consulting Group ("Georgetown"). Mr. Newton is an independent consultant currently employed by Georgetown. As a panel, these three witnesses (collectively, "Georgetown") filed rebuttal testimony on behalf of BellSouth. Georgetown testified that the inputs selected by AT&T for use in the Hatfield Model were inappropriate for determining the cost of providing basic local service in South Carolina. Specifically, Georgetown testified that the default values selected by AT&T, particularly for sensitive user adjustable inputs ("SUAIs") do not reflect the conditions of BellSouth in South Carolina and do not reflect cost or other conditions reasonably expected to occur in the future. Georgetown selected alternative values for SUAIs which more accurately reflected the conditions in South Carolina.

TIMOTHY J. TARDIFF

GTE presented the rebuttal testimony of Timothy J. Tardiff, Vice President at National Economic Research Associates of

Massachusetts. Dr. Tardiff testified as to his economic and engineering criticisms of the Hatfield Model. Dr. Tariff also responded to the direct testimony of Mr. Don Wood.

FRANCIS J. MURPHY

GTE presented the rebuttal testimony of Francis J. Murphy. Mr. Murphy is employed by Network Engineering Consulting, Inc. in Massachusetts. Mr. Murphy testified that he had analyzed and evaluated the various versions of the Hatfield Model in order to determine whether the Model is appropriate to use in establishing universal service obligations or in estimating costs or prices for unbundled network elements. Mr. Murphy testified that the Hatfield Model is subject to a myriad of economic and engineering flaws that are so severe so as to render the Model unusable for its intended purpose.

III. OVERVIEW OF UNIVERSAL SERVICE

Prior to discussing its findings and conclusions in this matter, the Commission finds it necessary to provide an overview of the fundamental changes in federal and state law that serve as a backdrop for the Commission's decision. One of the central challenges Congress faced in drafting the Telecommunications Act of 1996 ("Act") was how to open a new era of competition in local telephone service without jeopardizing the continued availability of what is known as "universal service." Universal service

refers to a nationwide telecommunications policy of ensuring access to certain basic telephone service for all Americans at affordable rates.

Prior to the Act, universal service was supported by a complex system of inter-customer and inter-service subsidies administered in part by state public utility commissions and in part by the FCC. Under this old regime, universal service was supported primarily by requiring ILECs to charge some customers (typically urban and business customers) above-cost rates so that they could charge other customers (typically rural and residential customers) rates that were below cost. Additional sources of subsidies have traditionally included services such as toll services and access charges. Access charges are the fees that both long distance carriers and end-user customers pay for using a local telephone company's network of lines and switches for terminating or originating long distance calls. Businesses or individuals that make many long distance calls help subsidize those persons who primarily make local calls.

This extensive system of implicit subsidies (i.e., subsidies embedded in an ILEC's rates) was feasible in the past, because local telephone service was primarily provided through a system of exclusive franchises granted and administered by the states. Before the Act, a single telephone company under rate-of-return

regulation typically provided local service for a specified geographic territory under an exclusive, state-granted franchise. For its part, the telephone company agreed to invest enormous sums required to build and maintain a state-of-the-art telephone network and to assume the obligation to serve all customers within its service territory at rates regulated by the state. In return, state regulators set rates that were designed to ensure that the telephone company would be paid for the cost of providing service and would have the opportunity to earn a reasonable return on the capital invested in the network. Because state regulators could control the rates charged to all customers, and because (for the most part) the incumbent telephone company faced no competition within its service area for basic local exchange service, the state could maintain this extensive system of inter-customer and inter-service subsidies to advance its universal service goals while still allowing the telephone company a reasonable chance to recover its costs and earn a fair rate of return.

In the Act, however, Congress abolished exclusive franchises in favor of competition. In doing so, Congress recognized that the implicit cross subsidies that have traditionally supported universal service could not be sustained in a competitive marketplace. Competitors who have no obligation to serve all

residents in the market will naturally target those customers who are charged above-cost rates or who provide a greater than average amount of revenues, and will easily undercut those rates. As a result, either the ILEC would be forced to lower its above-cost rates to meet competition or it would simply lose the high margin customers that currently support universal service. In either event, the ILEC would lose the source of funding that supports universal service. Accordingly, given the loss of universal service support from implicit subsidies, subsidized local rates would have to rise substantially to reflect the actual costs of providing service in the fully competitive environment created by elimination of exclusive franchises. To introduce competition in all markets while protecting universal service, Congress had to reshape fundamentally the funding of universal service.

To that end, Congress gave specific instructions in the Act concerning the form that the new universal service system should take. First, Congress set forth the key principles that the FCC and a special Federal-State Joint Board should follow in establishing a new fund. Thus, the Act states that "[c]onsumers in all regions of the Nation, including low-income consumers and those in rural, insular, high cost areas, should have access to telecommunications and information services" and that the federal

mechanism "should be specific, predictable and sufficient." Section 254(b)(3), (b)(5) (emphasis added). Congress further directed the FCC, in consultation with the Joint Board, to establish a "definition of the services that are supported by Federal universal service support mechanisms." Section 254(c)(1). The new funding system would be designed to support this defined set of basic services.

In express terms, Congress mandated that the new system "should be explicit and sufficient to achieve the purposes of this section." Section 254(e) (emphasis added). Congress recognized that only a system that makes universal service support explicit--not a system that continues to rely on implicit subsidies built into retail rates--will be sustainable, and thus "sufficient" in a competitive marketplace. In addition, Congress specified that "[e]very telecommunications carrier that provides interstate telecommunications services shall contribute, on an equitable and nondiscriminatory basis, to the specific, predictable, and sufficient mechanisms established by the [FCC] to preserve and advance universal service." Section 254(d). Similarly, in Section 254(f), Congress directed that the states should establish mechanisms for supporting universal service that would be consistent with the new competitive environment and thus required that "[e]very telecommunications carrier shall

contribute, on an equitable and nondiscriminatory basis, in a manner determined by the State to the preservation and advancement of universal service in that State." Through these requirements, Congress sought to ensure that the new universal service funding system--unlike the existing system of implicit subsidies--would not create regulatory distortions that artificially advantage some carriers over others in the competitive marketplace.

Congress also sought to ensure that funding from the new federal mechanism would be available only to carriers that actually undertook the task of providing basic services to residents in the rural, insular and high cost areas that typically require universal support. Thus, Section 254(e) of the Act specified that a common carrier may be designated as "eligible" to receive support only if "throughout the service area for which the designation is received," the carrier "offer[s] the services that are supported by Federal universal service support mechanisms under Section 254(c)" and "advertise[s] the availability of such services and the charges therefor using media of general distribution." The clear objective of these requirements is to ensure that a carrier will receive a subsidy payment from the government only if it furthers the goals of universal service by genuinely making the basic set

of supported services available to everyone in a high cost area. In short, Congress did not intend to have subsidies paid to carriers who, through restricted advertising or other stratagems, attempted to attract only those profitable customers at the high end of the revenue spectrum.

In addition to Congress' vision with respect to the preservation and advancement of universal service, the South Carolina General Assembly (through S.C. Code Ann. § 58-9-280) has required the Commission to "establish a universal service fund (USF) for distribution to a carrier(s) of last resort" so as to continue "South Carolina's commitment to universally available basic local exchange telephone service at affordable rates and to assist with the alignment of prices and/or cost recovery with costs."

In its May 8, 1997 Universal Service Order, the FCC attempted to implement the commands of Section 254 by establishing a new federal system for supporting the costs of universal service. Following the direction of Section 254(c)(1), the FCC first established a definition of the basic services that would be supported by the new federal funding mechanism. The FCC thus specified a list of basic services--including voice grade access to the public switched network, access to operator services, access to long distance or "interexchange" service, and

access to directory assistance--as the set of supported services under the Act. Id. at ¶ 56.

One of the most important issues that the FCC had to address was how it would calculate the cost of providing universal service. In other words, the FCC had to determine the size of the implicit subsidy flow built into current rates that allows ILECs to maintain low charges for basic service. The FCC first ruled that, in determining the size of the subsidy, it would rely on projections of so-called forward-looking economic costs. Id. at ¶ 224. The FCC's particular version of a forward-looking cost measure purports to project how much it would cost today to build and operate a network to provide the services in question using the most efficient technology available.

The FCC gave the states the opportunity to submit a cost model for use in calculating interstate support for non-rural ILECs serving rural, insular and high cost areas in their respective states. However, to obtain federal universal service funding based on a state-selected cost model, that model must meet the following criteria:

1. The technology assumed in the cost study or model must be the least-cost, most efficient, and reasonable technology for providing the supported services that is currently being deployed.

2. Any network function or element, such as a loop, switching, transport or signaling, necessary to produce supported services must have an associated cost.

3. Only long-run forward-looking economic cost may be included.

4. The rate of return must be either the authorized federal rate of return on interstate services, currently 11.25 percent, or the state's prescribed rate of return for intrastate services.

5. Economic lives and future net salvage percentages used in calculating depreciation expense must be within the FCC-authorized range.

6. The cost study or model must estimate the cost of providing service for all businesses and households within a geographic region.

7. A reasonable allocation of joint and common costs must be assigned to the cost of supported services.

8. The cost study or model and all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment.

9. The cost study or model must include the capability to examine and modify the critical assumptions and engineering principles.

10. The cost study or model must deaverage support calculations to the wire center serving area level at least, and, if feasible, to even smaller areas such as a Census Block Group ("CBG"), Census Block ("CB"), or grid cell.

Id. at ¶ 250.

After deciding upon a methodology for determining the overall size of universal service costs that required support from a subsidy source, the FCC decided to construct the federal

universal fund to cover only 25 percent of those costs. The FCC explained that under the current separations process, roughly 25 percent of the costs of the local loop are assigned to the interstate jurisdiction and, therefore, the new federal fund would cover only 25 percent of the total cost of subsidizing universal service. Unless this determination is reversed through a pending appeal of that order, the states must fund the remaining 75 percent of these costs above the FCC's arbitrary revenue benchmark. Id. at ¶ 269.

The States had a deadline of April 24, 1998 to submit to the FCC a cost model for use by the FCC in calculating federal support for non-rural ILECs serving rural, insular and high cost areas. Distributions from the federal fund will begin January 1, 1999. If a state-selected study fails to meet the FCC's criteria, or if a state fails to submit a study, the FCC will itself determine the interstate portion of the universal service subsidy for that state according to the FCC's own forward-looking cost methodology. The FCC is currently evaluating various cost models for this purpose; however, it has not yet selected a model.

The FCC's criteria are binding for federal universal service funding support only. However, although this Commission realizes that it is not bound by these criteria when establishing its

intrastate universal service fund, it finds that the criteria are reasonable and that using the same cost model and cost methodology to calculate both the federal and state fund will simplify the state fund calculation. Furthermore, if the Commission does not select a model consistent with the FCC's criteria for determining the federal cost of universal service, then the amount of federal support for South Carolinians will be determined by a federal model based upon national average default inputs. Such a model could not possibly provide as accurate a view of the universal service requirements in South Carolina as would a model developed with inputs specific to South Carolina. This Commission is best suited to determine which model and inputs best calculate the cost of providing universal service in South Carolina.

In the instant proceeding, therefore, the Commission has selected an appropriate cost model and inputs that can produce reasonable cost estimates of providing universal service in South Carolina and that can meet the FCC criteria for calculation of the appropriate level of support from the federal high cost fund. The selection of this correct cost proxy model and inputs will ensure that the actual cost of providing high quality local exchange service to rural areas is accurately estimated. Further, it will ensure that access to basic local service is

maintained even as local exchange competition erodes the implicit subsidies that historically have been used to maintain affordable rates for rural subscribers. Moreover, the Commission concludes that the selection of the correct cost proxy model and inputs will encourage CLECs to develop business plans that serve rural South Carolinians and will provide incentives to ILECs to continue to make capital investments in their high cost serving areas of this State.

The parties to this proceeding have presented the Commission with two cost proxy models to consider as well as various sets of cost inputs to those models. The ILECs--BellSouth, United, and GTE--contend that the Benchmark Cost Proxy Model Version 3.1 (BCPM 3.1) and the South Carolina company-specific inputs submitted for use in that model produce the best estimation of universal service costs in their territories in South Carolina. Likewise, AT&T and MCI submit that the Commission should adopt the Hatfield Model Version 5.0a (HM 5.0a) as the correct cost proxy model for estimating the cost of providing universal service in South Carolina.

In general, cost proxy models are used to provide reasonable cost estimates when it is not possible to specifically identify the cost of serving individual customers. A determination of costs at the appropriate geographic level is more effectively

accomplished with a proxy model than by attempting to determine the cost of serving each individual customer. Therefore, both BCPM 3.1 and HM 5.0a provide estimates of the cost of providing universal service in South Carolina by approximating the cost of serving actual subscribers rather than attempting to define the cost of serving each individual subscriber.

The Commission finds that it is axiomatic that if new entrants are to enter rural markets, they must have a vehicle that allows them to recover their costs of service and yet still compete successfully against ILEC rates that are below cost. A properly sized universal service fund is that vehicle. If the fund is properly sized, new entrants will have the appropriate incentives to bring the benefits of competition to rural customers. If the fund is undersized, the Commission concludes that rural South Carolinians will undoubtedly suffer. Without a method to recover their costs, CLECs will have no incentive to enter high cost areas. Moreover, infrastructure investment by ILECs will decline, because those firms will no longer have the means by which to recover additional capital improvements in high cost areas. Customers in high cost areas will inevitably see declining service quality relative to lower cost areas and will not have the same access to advanced telecommunications services and information services as do lower cost customers. ILECs will

lose the lower cost, high margin customers to competition and will be left to serve predominantly high cost, low margin customers.

Ultimately, because only the low margin customers will be left to cover the full cost of the network, prices for those predominantly high cost customers will have to increase, thus jeopardizing the availability of universal service in this State. Therefore, the Commission has selected the cost proxy model and inputs it believes will best ensure that South Carolinians in rural and other high cost areas will realize the benefits of competition in the local exchange marketplace and will continue to enjoy high quality service from their provider of choice.

Finally, as was made clear by Mr. Varner and Mr. Oliver during the November 1997 hearings, we wish to reiterate this proceeding is <u>not</u> a rate case. The whole purpose of establishing a universal service fund is to ensure that basic local exchange rates will remain affordable. The Commission's own guidelines referenced above state that for every dollar of funding an eligible carrier receives from the universal service fund, that carrier's rates will be <u>reduced</u> by that amount of money.

IV. FINDINGS AND CONCLUSIONS

A. BCPM 3.1 More Accurately Locates Customers In Rural and Other High Cost Areas In South Carolina Than Does HM 5.0a.

A cost proxy model that estimates the cost to serve rural areas must be able to locate telephone customers with a reasonable degree of accuracy in those areas. The ability to reasonably estimate the cost to serve "high-cost" areas is an essential characteristic of a model that is used to determine the required funding for state and federal universal service programs.

Both BCPM 3.1 and HM 5.0a use the Census Block as the starting point for their customer location methodologies. The Census Block is the finest level of geography for which Census data is provided, such as housing units. Census Blocks are areas bounded on all sides by visible features such as streets, roads, streams, and railroad tracks, and by invisible boundaries such as city, town, township, and county limits, property lines, and short, imaginary extensions of streets and roads. (Tr. Vol. III at 252-253). The U.S. Bureau of the Census provides housing unit counts at the Census Block and Census Block Group level. A Census Block Group is a collection of Census Blocks generally containing between 250 and 550 housing units, with an ideal count

of 400 units. On average, there are 31 Census Blocks in a Census Block Group. (Id.)

In urban areas, Census Blocks are fairly small. For example, in a downtown area, they tend to be 0.005 square miles in size. In a typical suburban area, they tend to be in the 0.5 to 1.0 square mile range. In rural areas, however, Census Blocks tend to be much larger. Census Blocks as large as 60 square miles are not uncommon, with 20 square miles being more typical. (Tr. Vol. III at 253). Thus, a cost proxy model's customer location methodology for placing customers within a Census Block is much more critical in rural, low density areas.

The first step in accurately establishing customer locations is the specification of the appropriate wire center boundaries. BCPM 3.1 relies on publicly available wire center boundary data obtained from Business Location Research ("BLR"). (Tr. Vol. III at 247). Next, a BCPM 3.1 customer location algorithm partitions the area of a wire center into "microgrids," roughly 1,500 feet by 1,700 feet in size (0.09 square miles). Thus, each Census Block within the serving wire center is overlaid with microgrids, unless the entire Census Block falls within a single microgrid. (Tr. Vol. III at 257).

In the rural areas of the wire center, the allocation of customer locations is based upon the road network, the location

of which is known in every Census Block. BCPM 3.1 uses data on the road network obtained from TIGER/Line files ("Topologically Integrated Geographic Encoding and Referencing") from the U.S. Census Bureau. (Tr. Vol. III at 247). In dense urban areas, Census Blocks may be smaller than the microgrid, and the assignment of customer data along the road network is not required. Because the Census Block road network is known with certainty and because people tend to live along roads, BCPM 3.1 apportions Census Block housing units to microgrids based on the share of the Census Block's road mileage that occurs in a given microgrid. (Tr. Vol. III at 257).

These microgrids are then aggregated into telephone engineering Carrier Service Areas ("CSAs") and Distribution Areas ("DAs"), as appropriate. These are referred to as "ultimate grids." The maximum size of an ultimate grid is constrained to approximately 12,000 feet by 14,000 feet (roughly six square miles) to comport with engineering guidelines. (Id.) BCPM 3.1 does not assume that customers are uniformly distributed within each ultimate grid. Rather, each ultimate grid is divided into four distribution quadrants, each of which may contain a distribution area. The latitude and longitude coordinates of the distribution quadrants are determined by first establishing the road centroid of the ultimate grid. The distribution quadrants

are centered on this road centroid. For those distribution quadrants that do not have any customers assigned to them, no distribution area is designed within the distribution quadrants, thus ensuring that plant is not "built" in non-populated areas. (Tr. Vol. III at 258).

For each populated distribution quadrant, the total area that falls within a 500-foot buffer along each side of the roads within that distribution quadrant is calculated. The DA is modeled as a square whose size is equal to the total road buffer area. The center of each distribution quadrant's square DA is placed at the road centroid of the distribution quadrant. The above-described approach provides a reasonable model of the required telecommunications network facilities for two reasons. First, households and businesses typically are located near roads and centering the distribution quadrant of the DA at the center of the roads establishes network facilities closer to where customers are located. Second, rights-of-way for telecommunications structures generally exist near roadways. This approach reduces requisite network facilities, given customers' actual location. (Tr. Vol. III at 258).

In sum, the Commission finds that BCPM 3.1's customer location algorithm yields an accurate picture of where telephone customers are actually located in South Carolina's rural areas.

It is undisputed, moreover, that these high-cost, rural areas will most need support from the federal and state universal service funds.

In contrast to BCPM 3.1, HM 5.0a attempts to use "geocoding" to locate customers within Census Blocks. The geocoding process is performed by PNR and Associates ("PNR"). PNR obtains customer addresses within a Census Block from Metromail, Inc., Dun & Bradstreet, and other commercial providers of mailing addresses and then spatially locates customers on a street map of the Census Block using latitude and longitude coordinates. The PNR database is provided as a finished product to the Hatfield developers, who then run HM 5.0a using the PNR data. (Wood Ex. DJW-2). As shown below, although reasonably accurate for usage in dense, urban areas, the geocoding process is grossly inadequate for the large, rural areas that are at the core of this Commission's universal service inquiry.

In an ex parte filing with the FCC dated February 3, 1998, MCI conceded that HM 5.0a had little success with geocoding rural customers. (Tr. Vol. III at 263; Exh. 29). In the filing, MCI provided the success rate, by density zone within each state, for the geocode data in HM 5.0a. MCI reported that:

> [t]he data indicate that the greatest success in geocoding customer locations was in the middle density zones (between 200 and 2550 customer

> locations per square mile), with lower success rates at the higher and lower density zones. (emphasis added).

For South Carolina, MCI reported an average geocode success rate of only 72 percent, meaning that the geocode process could spatially locate on a street map less than three-quarters of actual customers. It further reported geocode success rates of only 28 percent in the lowest density zone and 53 percent in the next-to-lowest density zone. The Commission finds that the geocoding process experiences poor success rates in less-densely populated areas for the reasons discussed below.

Metromail, which provides the residential addresses for use in geocoding, does not provide 100 percent coverage of housing units in the United States. Metromail compiles addresses from telephone directory white page data. The Metromail database does not contain addresses for households that simply list their name and number in the white pages, nor does it include non-published phone numbers and addresses. As a result, the Metromail database contains only 64.8 percent of the potential addresses necessary to spatially locate all of the existing housing units in the 50 states. (Tr. Vol. III at 254-55).

The Commission concludes that the Metromail database that HM 5.0a relies upon for "accurate" geocoding is incomplete and

cannot be reliably used to locate customers in rural areas in South Carolina.

Not only is the Metromail database incomplete, not all customer locations can be geocoded. For example, as Dr. Duffy-Deno testified, P.O. Box and Rural Route addresses cannot be geocoded. (Tr. Vol. III at 255). Because P.O. Boxes and Rural Route addresses occur more frequently in rural areas, HM 5.0a's inability to geocode these customers is more pronounced in rural areas than it is in urban areas. Further, customers may not be geocoded because of a missing street or road in the road network database. (Id.)

Importantly, even when customers can be located through geocoding, the precise locations of customers are not used in HM 5.0a to build telephone plant to serve them. According to the HM 5.0a documentation, once customers are geocoded, they are grouped into one of two types of clusters. A "main cluster" contains the bulk of the customer locations. "Outlier clusters" contain one to five locations. These outlier clusters are attached to a given main cluster and are connected by network facilities both to each other and to the main cluster on which all the associated outlier clusters "home." It is these clusters that HM 5.0a relies upon to "build" outside plant to actually serve customers.

After the clusters are formed, the geocoded information is discarded. (Tr. Vol. III at 256, 281).

As acknowledged by AT&T witness Mr. Pitkin, customer locations that cannot be geocoded are arbitrarily placed (i.e., assumed to exist) on the perimeter of the Census Block in which they are located. (Tr. IX at 123). These customer locations placed on the Census Block boundary are called "surrogate" locations. HM 5.0a places these "surrogate" customers on the Census Block boundary because it assumes that there may be a road on the perimeter of the Census Block. (Tr. Vol. IX at 123-27). However, the Commission can find no compelling evidence in this record that shows a strong relationship between Census Block boundaries and roads in South Carolina. As stated above, Census Blocks may be bounded by many things--visible and invisible--other than roads. Moreover, Dr. Duffy-Deno testified that in South Carolina, 30 percent of the roads are interior to Census Blocks. (Tr. Vol. III at 280-81).

By placing unknown customer locations on the Census Block boundary, HM 5.0a ignores the common sense understanding that people live along roads. On average, there is no reason to conclude that customers are more likely to live on exterior roads than on any other roads, including interior roads. The Commission concludes that a cost proxy model like HM 5.0a that

assumes that unknown people (surrogate geocoded locations) live on unknown roads (along the Census Block perimeter) simply cannot be the basis for calculating the investment needed to provide universal service in South Carolina.

To demonstrate the inadequacies of geocoding, INDETEC performed an empirical analysis that confirmed that large numbers of customers cannot be located by geocoding in rural areas in South Carolina. (Tr. Vol. III at 261). INDETEC examined the geocode success rate for three rural South Carolina counties--Bamberg, Edgefield and Marion. All three counties are characterized by low housing unit densities, i.e., less than 35 housing units per square mile. The extremely low percentages of Census housing units that could be geocoded were as follows: Bamberg--27.93 percent; Edgefield--23.81 percent; and Marion--32.5 percent. (Id.)

Moreover, HM 5.0a's clusters do not include all populated Census Blocks in South Carolina. Exhibit KDD-5 to Dr. Duffy-Deno's testimony shows that HM 5.0a's clusters fail to serve any households in 6,558 populated Census Blocks in this State. The unserved Census Blocks amount to almost 7.2 percent of the total populated Census Blocks in South Carolina and account for nearly 3.5 percent of the Census households in this State. In practical terms, HM 5.0a's clusters leave at least 46,399 households in

South Carolina without the possibility of receiving telephone service. (Tr. Vol. III at 263-64).

The size and shape of the HM 5.0a's clusters also reflect fundamental flaws in the model's logic that make serving actual customers almost impossible. In the Bamberg, Edgefield and Marion wire centers, 22 of the 47 main clusters are greater than 9 square miles in size. For the entire state of South Carolina, 32 percent of the main clusters are greater than 9 square miles and the largest cluster is 21 square miles. (Tr. Vol. III at 263-64). By comparison, the largest BCPM grid in South Carolina is just under 9 square miles and 97.6 percent of the BCPM 3.1 grids are smaller than 7 square miles. (Id.)

However, no matter the size of a cluster, HM 5.0a always assumes that customers are evenly distributed within each cluster. The Commission concludes that assuming an even distribution of customer locations, for example, over a 21-square mile area cannot realistically predict the investments necessary to actually serve those customers.

Unlike the HM 5.0a assumption, BCPM 3.1 does not assume that customers are evenly distributed within its grids but, instead, further locates these customers using the logical assumption that people tend to live along roads. (Tr. Vol. III at 264). INDETEC studied the relationship between the number of housing units in a

Census Block and the total road miles in a Census Block and found a reasonably high correlation. (Tr. Vol. III at 265). Specifically, INDETEC studied such correlations for four density zones in South Carolina less than 200 housing units per square mile. The correlations were all positive (generally close to 1), thus indicating a strong association between housing unit locations and road miles. (Id.)

In sum, the Commission finds that a large percentage of customer addresses that can be accurately geocoded are in urban areas. However, in urban areas (where Census Blocks tend to be small) there is little to be gained in terms of cost estimation by geocoding those addresses. In contrast, in rural areas (where Census Blocks tend be large), reasonably locating customers within the Census Block is critical to a proper estimation of the cost of serving rural customers.

Because successful geocoding in rural areas tends to be low, the HM 5.0a's customer location algorithm is reduced to allocating most customer locations to the perimeter of Census Blocks, regardless of where those customers are located. Because the Census Block road network is known with certainty and people tend to live along roads, BCPM 3.1's algorithm yields a more accurate picture of where telephone customers actually live in rural areas. For all the above-stated reasons, the Commission

concludes that BCPM 3.1's road-based customer-location methodology is superior to HM 5.0a's and, therefore, more accurately estimates the cost of providing universal service in South Carolina.

B. BCPM 3.1 Designs A Network Superior To That Designed By HM 5.0a.

In addition to the question of how well each model locates customers in rural areas, another critical issue in this proceeding is the reasonableness of the network design incorporated in each model. The Act's universal service goal will not be met by a low-cost telephone network that provides marginal voice grade services, but fails to provide minimal access to data and other advanced services. Section 254 requires that federal and state universal service policies should assure that 1) quality services are available at just, reasonable, and affordable rates; and 2) consumers in all regions, including those in rural and high cost areas, have access to advanced telecommunications and information services comparable to those provided in urban areas. As set forth below, the Commission finds that BCPM 3.1 is best designed to meet the universal service goals of Congress, the FCC and the General Assembly.

Dr. Robert M. Bowman testified on behalf of BellSouth and United on the engineering aspects of BCPM 3.1. Dr. Bowman earned

Bachelor, Masters and Ph.D degrees in electrical engineering and has 28 years of telecommunications experience with Bell Labs and US WEST Communications. Dr. Bowman has personally developed models that calculate the cost of outside plant design. (Tr. Vol. IV at 41).

As Dr. Bowman noted, the great majority of the costs of providing universal service are the costs of constructing and maintaining the loop network. (Tr. Vol. IV at 46). The loop network consists of the facilities from the central office switching center to the customer's premise. The loop includes feeder cable, distribution cable, Feeder Distribution Interfaces ("FDIs"), distribution terminals, drop wire and Network Interface Device ("NID") at the customer's premise. The facilities between the switching center and the terminal at the customer's premise are typically divided into feeder and distribution cable plant. Feeder facilities are the facilities between the switching center and the FDI.

An FDI is generally the demarcation point between feeder and distribution facilities. Distribution facilities begin at the FDI and end at the NID or at a building terminal. A distribution terminal (drop terminal) is used to terminate drop wire and connect the drop wire to the distribution cable. Drop wire connects the distribution cable to the network device located at

the customer's premises. (Tr. Vol. IV at 47). A sound cost proxy model must design a network that includes all the loop cost elements necessarily incurred in providing customers with the capability of placing and receiving telephone calls.

While AT&T witness Wells generally averred that HM 5.0a followed standard engineering design rules, he could not cite to any specific engineering practice or standard to substantiate his claim. (Tr. Vol. IV at 55). As Dr. Bowman testified, HM 5.0a does not comport with the engineering guidelines and practices published by Mr. Wells' own employer--AT&T. (Id.) AT&T's "Outside Plant Engineering Handbook, August 1994" (reprinted under the Lucent label in 1996) generally limits copper loops beyond the Digital Loop Carrier Remote Terminal ("DLC") to 12,000 feet for quality service. BCPM 3.1 followed this engineering practice in its network design by using larger 24-gauge cable beyond 11,100 feet and replacing standard channel unit cards with extended range line cards beyond 13,600 feet. (Tr. Vol. IV at 57).

HM 5.0a, on the other hand, violates this standard by extending copper loops beyond the DLC up to 18,000 feet without additional provisions, such as extended range channel unit cards. HM 5.0a places standard channel unit cards (plug-ins) in its DLC, which are less expensive than the extended range cards. (Tr. Vol.

IV at 55-57; BellSouth Late Filed Exh., 4-3-98). The Commission finds that HM 5.0a models copper distances that are not supported by the technology assumed, thus underestimating the actual cost of providing quality telephone service. As reflected by Bowman Exhibit RMB-2, it is more economical to place additional DLC than it is to use expensive extended range line cards to extend copper loop length. (See also BellSouth Late Filed Exh., 4-3-98) Furthermore, as noted by Dr. Bowman, the use of these standard channel unit cards, combined with the distance of the loop past the DLC, results in an unacceptable decibel loss on the loop. (Tr. Vol. IV at 56-57).

Not only does HM 5.0a's use of standard channel cards on loops that extend to 18,000 feet violate the AT&T OSP handbook, it is also not consistent with the guidelines published by the manufacturer of the DLC assumed by both models to be used in the network, the Litespan 2000. The Litespan guidelines describe limitations on loop lengths and the need for extended range line cards for loops beyond 12,000 feet. (Tr. Vol. IV at 57).

Finally, from a network design perspective, the Commission agrees with Dr. Bowman that not all of the HM 5.0a engineering assumptions are obvious to the user nor can they readily be changed. For example, HM 5.0a does not place telephone poles as a part of the model's aerial structure in the two highest density

zones. (Tr. Vol. IV at 52-54). Not only is this assumption not obvious to the user, there is no user-adjustable input that allows the user to provide for placement of poles as part of the aerial structure in these two density zones. The user must not only search through the Excel formulas to discern exactly how structure is treated, but also must modify the Excel formulas to incorporate a more realistic assumption. (Id.) Moreover, exclusion of poles in the two highest density zones is an important omission from a cost perspective. HM 5.0a assumes that as much as 60 percent to 85 percent of loop plant is aerial in its two highest density zones. However, by assuming no poles, the model only includes the material cost of the cables. This likely results in an understatement of structure costs in the high density zones, especially given HM 5.0's assumption of such a high percentage of aerial plant. (Id.)

A second HM 5.0a engineering assumption that is difficult to identify and then change involves the omission of manholes, handholes and pullboxes in distribution plant. (Tr. Vol. IV at 54-55). The Commission agrees with Dr. Bowman that it is unrealistic to assume that distribution manholes, handholes and pullboxes are not required in a universal service cost proxy model. Larger cable sizes in dense urban areas are often too big to sweep up from beneath the ground and attach to pedestals on

the surface. Manholes, handholes, and pullboxes are frequently required to build distribution plant in urban areas. Omitting them entirely from HM 5.0a fails to recognize requisite costs incurred to serve urban subscribers. The model lacks user-adjustable input tables that permit the user to easily add such items of structure to the distribution plant. Therefore, unless a user is capable of altering the model's computer programming, the model automatically substantially understates underground conduit costs in distribution plant. (Id.)

In conclusion, after careful consideration of the evidence presented on this subject, the Commission concludes that BCPM 3.1's network design is superior to HM 5.0a's because it follows industry-accepted design standards; builds a network that reaches all customers--existing and potential; makes advanced services as available to rural customers as they are to urban customers; and builds a high quality network over which urban and rural South Carolinians can actually talk. We therefore adopt BCPM 3.1 as the State forward-looking cost model for BellSouth, GTE South, Inc. and United Telephone Company of the Carolinas.

C. The Cost Inputs Proposed By BellSouth, GTE South and United For Use In BCPM 3.1 Will Enable The Commission To Accurately Estimate The Cost Of Providing Universal Service In The Companies' South Carolina Service Areas.

Although the selection of the proper cost model is important, the Commission believes that selection of the appropriate model inputs that result in an accurate determination of the "real world" costs of providing universal service in high cost areas is just as critical. In addition to the state-specific model inputs for Census data and terrain information, cost inputs should reflect the costs that an efficient carrier will incur in providing universal service in South Carolina. A cost model's inputs must be capable of not only determining the cost for a specific state, it must also be capable of determining how those costs vary from area to area within that state.

Ms. Daonne Caldwell's testimony explained why the inputs proposed by BellSouth comply with FCC requirements and will enable the Commission to accurately determine the costs of universal service in South Carolina. (Tr. Vol. V at 100-119). In its Universal Service Order (¶ 250), the FCC identified ten criteria that "all methodologies used to calculate the forward-looking economic cost of providing universal service in rural, insular, and high cost areas must meet." The first criterion requires that "[t]he technology assumed in the cost study or

model must be the least-cost, most-efficient, and reasonable technology for providing the supported services that is currently being deployed." Id. Moreover, although costs cannot be embedded costs, the model "must be based upon an examination of the current cost of purchasing facilities and equipment, such as switches and digital loop carriers (rather than list prices)." Id.

As discussed in more detail below, the Commission concludes that BellSouth's inputs to BCPM 3.1 reflect the costs of currently available technologies for BellSouth territory. BellSouth used current material prices, labor costs, and contractor costs that are adjusted by Telephone Plant Indices ("TPIs") to reflect 1997-1999 costs. In certain plant accounts, the TPIs add inflation estimates to the costs. In other accounts, the TPIs actually result in lower costs when costs are forecasted to decline in a particular type of telephone plant. In other words, BellSouth's cost inputs do not reflect embedded costs. While they take into consideration the actual costs incurred today by BellSouth, they are adjusted to reflect cost changes projected over the next three-year period. These adjustments include inflation, deflation, and productivity gains.

Both HM 5.0a and BCPM 3.1 require thousands of input items ranging from the material price of cable to Census data on

households. The input data can be classified into two broad categories: external inputs and user-adjustable inputs. The external inputs include items like soil type, number of households, and topography. These inputs are generally the same for both models. The user adjustable inputs include such things as prices of cable, fill factors, plant mix, structure sharing, financial parameters and expenses. (Tr. Vol. VI at 520).

BCPM 3.1 contains default values for approximately 12,000 user adjustable inputs. These default values represent national averages based upon survey results from many companies. (Tr. Vol. VI at 522). However, the user has the option of replacing the default input values with user-specific values. For the overwhelming majority of user adjustable inputs, BellSouth supplied inputs specific to its service territory in South Carolina. (Id.) When BellSouth data was not available in the format or in the level of detail required by the model, BellSouth drew upon its own experience and company data to verify the reasonableness of the default values. Although approximately 50 default values were not verified, BellSouth did determine that those inputs would not have a significant impact on the cost per loop generated by the model. (Id.)

In addition to Ms. Caldwell's testimony addressing the appropriateness of all of BellSouth's inputs, BellSouth also

submitted the testimony of Dr. Billingsley n the issue of cost of capital and Mr. Cunningham on the issue of depreciation. With respect to cost of capital (FCC criterion No. 4), BellSouth used the FCC's overall recommended cost of capital of 11.25 percent but used its own capital structure components. (Tr. Vol. V at 110). Because the FCC's prescribed capital structure is set at a nationwide level, BellSouth correctly concluded that it would be inappropriate to use that nationwide capital structure in a South Carolina-specific universal service cost model.

Dr. Billingsley tested the reasonableness of BellSouth's overall cost of capital of 11.25 percent by using two different sets of assumptions—one using BellSouth's reported capital structure and embedded cost of debt of only 6.36 percent, and the second using an equity ratio of 60 percent and a current forward-looking cost of debt of 6.90 percent. (Tr. Vol. II at 47-50). Based upon his cost of equity estimates of 14.66 to 15.24 percent for BellSouth and the use of the above tests, Dr. Billingsley correctly concluded that the use of an 11.25 percent overall cost of capital by BellSouth is reasonable and conservative. (Id.)

With respect to the depreciation issue (FCC criterion No. 5), Mr. Cunningham described the asset lives that were developed and provided for use in BCPM 3.1. (Tr. Vol. II at 52-75). These represent BellSouth's expected economic lives for newly placed

plant. Mr. Cunningham asserts that economic lives, as opposed to prescribed lives, are the appropriate lives to be used in depreciation calculations in a forward-looking cost study. Lives were last prescribed by the FCC for South Carolina in 1995 and are much too long, particularly for technology sensitive accounts. (Tr. Vol. II at 55). They were based on the old regulatory paradigm in which plant lives were artificially lengthened beyond their true economic lives so that the investment in that plant would be recovered over long periods of time. Today's competitive marketplace will not allow BellSouth to recover investment based on lives that are inappropriately long.

Economic lives reflect the useful (revenue producing) life of an item of plant and are appropriate for use in economic cost studies to ensure that costs are recovered over a time period equal to the revenue-producing life of the plant. Furthermore, the economic lives used in BellSouth's BCPM 3.1 study and the lives used to determine the depreciation rates currently booked in South Carolina for intrastate and for public reporting purposes are the same for most accounts, i.e., approximately 93 percent of BellSouth's South Carolina investment. (Tr. Vol. II at 62).

After careful consideration, the Commission finds that the BellSouth-specific inputs (as modified by our decision on identical inputs in Docket No. 97-374-C) are the appropriate inputs to use in determining the costs of providing universal service in BellSouth territory in South Carolina. BellSouth has many years of experience building and operating a network that provides quality telecommunications service in this State. BellSouth engineers understand the area and the State-specific requirements. Moreover, BellSouth is a large purchaser of telecommunications equipment and, therefore, often receives volume discounts from vendors. The BellSouth inputs reflect a reasonable view of conditions and experiences that an efficient carrier would experience providing service in BellSouth's territory in South Carolina and, moreover, meet the ten criteria established by the FCC in its Universal Service Order.

Likewise, after due consideration of the evidence, we hold that GTE company-specific inputs are appropriate inputs to use for the BCPM 3.1 for GTE territory, and United company-specific inputs are appropriate inputs to use for the BCPM 3.1 for United territory.

However, all three sets of inputs, i.e., these for BellSouth, GTE, and United will be modified as appropriate to be

consistent with the following points:

1. To the extent that TELRIC cost studies already include a reasonable return on investment, it is not appropriate to include any additional profit in the price of a service. (A "reasonable return on investment" is defined as a company's latest overall rate of return as approved by this Commission.)

2. Utilize the depreciation rates which have been approved by the Public Service Commission of South Carolina.

3. At least, adopt fill factors for the Feeder System of 75%, and the Distribution System of 50%.

4. Common cost estimates should be reduced to avoid the potential for using common costs which are overstated. A common cost factor of 4.79% should be utilized in any study.

5. Residual cost recovery should be denied for unbundled elements.

6. Fall-out factors should be reduced to reflect a more competitive environment. A fall-out factor of 5% should be used in any study.

D. HM 5.0a's Default Inputs Do Not Accurately Reflect The Actual Cost Of Providing Universal Service In South Carolina.

Unlike the South Carolina-specific inputs that BellSouth used in BCPM 3.1, the default inputs contained in HM 5.0a do not contain information specific to this State and, accordingly,

cannot possibly accurately reflect the forward-looking cost of providing high quality telephone service to South Carolinians.

There are essentially two databases used in the HM 5.0a in this proceeding: 1) a voluminous set of cluster data concerning customer counts, locations and geophysical characteristics of the service territory; and 2) a set of data values that make up a user adjustable input database. The values for the cluster data are fixed and are not intended to be user adjustable. The values for the user adjustable inputs are designed to reflect the conditions of the carrier for which prices are being developed. (Tr. Vol. X at 68).

HM 5.0a's default values are generic in nature, national in scope and largely form the basis for AT&T and MCI model filings in numerous states across the nation. Therefore, the HM 5.0a default inputs, unless changed, are the same for South Carolina as they would be for every other state. (Tr. Vol. X at 92). With respect to the default user adjustable inputs in this proceeding, AT&T and MCI changed only three--cost of capital, depreciation, and the regional labor adjustment. (Id.) This approach to input development ignores South Carolina-specific operating conditions experienced by BellSouth and cannot reasonably reflect the universal costs in this State.

No witness other than AT&T's Mr. Wells offered testimony on how the HM 5.0a inputs recommended for use in South Carolina were developed. Even Mr. Wells could not offer supporting testimony for almost half of the user adjustable inputs, because he only had responsibility for those inputs related to outside plant. (Tr. Vol. VII at 86-87). Cross-examination of Mr. Wells, however, revealed an input calculation process that is fundamentally flawed. According to Mr. Wells, the outside plant inputs for HM 5.0a were developed by a team of "independent" experts who used their collective outside plant expertise and experience to develop the values. However, none of the team's opinions concerning engineering inputs were based on South Carolina-specific information. According to Mr. Wells, the team's "assumptions and input values are what we would call national values." (Tr. Vol. VIII at 92). Mr. Wells admitted that not only did his team not use South Carolina-specific information in forming their opinions, they did not contact contractors in South Carolina or check material prices in this State to verify if their assumptions were correct. (Tr. Vol. VIII at 92-94). Finally, Mr. Wells conceded that he could offer no personal knowledge of the origin of many of the outside plant inputs because they were developed prior to his joining the team. (Tr. Vol. VIII at 88-90).).

The Hatfield input team itself consists of two members who are AT&T employees and four consultants who are paid by AT&T and MCI. (Tr. Vol. VIII at 87-88). Any member of the team, according to Mr. Wells, has the power to reject inputs proposed by other team members. Thus, even if five team members strenuously believed than an input should be changed, one member could prevent the change if he desired. (Tr. Vol. VIII at 95-96). Under the circumstances, the Commission has serious doubts about the independence of the HM 5.0a outside plant input team.

Mr. Wells conceded that some of the input assumptions that the HM 5.0a makes have not been achieved by any telephone company today. (Tr. VIII at 110). He attempted to discount this admission by stating that the model assumes a future environment where a hypothetical, most efficient local exchange carrier operates in a competitive environment. (Tr. Vol. VIII at 110-111). However, even with that qualification, Mr. Well's testimony regarding the "future" use of buried structure sharing strains credulity.

HM 5.0a assumes that an ILEC will share buried support structures for distribution cable with other companies one-third of the time (a 33 percent sharing factor). This means that the ILEC would pay for only one-third of the total cost of this support structure and someone else would pay for the other two-

thirds. (Tr. Vol. VIII at 112). This sharing factor was developed by the input team prior to the time Mr. Wells joined it. (Id.) Moreover, Mr. Wells admitted that the team's validation process did not reveal a single telephone company in North America that had achieved a 33 percent sharing factor. (Tr. Vol. VIII at 114).

AT&T also offered the testimony of Art Lerma who recommended that the Commission adopt the operating expense inputs in HM 5.0a. (Tr. Vol. IX at 137-165). Although Mr. Lerma asked that the HM 5.0a operating expense inputs be adopted, he admitted that he was "not a Hatfield expert" and had "not analyzed the Hatfield Model." (Tr. Vol. IX at 172). Mr. Lerma further admitted that he had performed no review of his own of the operating expense inputs of the HM 5.0a to verify whether those inputs were reasonable or not. (Id.)

Nevertheless, Mr. Lerma asked the Commission to accept all the HM 5.0a operating expense inputs, including one that would reduce BellSouth's network operating expenses by 50 percent. Mr. Lerma testified that such a drastic reduction was feasible because of technological improvements, productivity gains and increased competition that could be expected in the future. (Tr. Vol. IX at 176). The Commission finds that the assumptions underlying Mr. Lerma's proposal to reduce network operating

expenses are simply unrealistic at this time, particularly his assumption that competition in BellSouth's local exchange market will logically drive this reduction. Mr. Lerma could not tell the Commission when AT&T will ever be vigorously competing in South Carolina local exchange markets, much less predict when other firms would begin widespread competition here.

In addition to the flaws in the HM 5.0a input process revealed in Mr. Well's and Mr. Lerma's testimony, BellSouth presented the testimony of the Georgetown Consulting Group, which examined whether the default values chosen by MCI and AT&T reflected BellSouth's operations in South Carolina or reflected cost or other considerations reasonably expected to occur in the future. (Tr. Vol. X at 59-106).

For purpose of its analysis, Georgetown accepted the underlying logic of HM 5.0a and focused its attention only on the model's user adjustable inputs. In summary, Georgetown identified groups of inputs that were related by the model's logic and then tested the model's sensitivity to changes in the values for the groups. The results of HM 5.0a were considered sensitive to a group of inputs if a change in one or more of the default values for the related inputs changed the average loop price or switching price by one percent or more. (Tr. Vol. X at 66-67).

For the input groups considered sensitive, Georgetown examined whether the default values chosen by MCI and AT&T reflected BellSouth's operations in South Carolina and reflected cost or other considerations reasonably expected to occur in the future. When the default values for those groups of inputs failed that standard, Georgetown fashioned alternative values to meet it by examining current costs and other data specific to BellSouth in South Carolina, stripping that information of any embedded characteristics and creating the type of forward-looking cost or other data that complied with the FCC's criteria for development of cost proxy models. The default values selected for fourteen groups of user adjustable inputs had a significant effect on the results derived by applying HM 5.0a. (Id.).

The fourteen groups of related user adjustable inputs encompassed about 70 of the 201 specific inputs examined. Georgetown also tested to ensure that the insensitive inputs, taken together, produced no significant change in the HM 5.0a output by changing each default value in a direction that decreased loop and switching prices. When all the changes were run on a combined basis, the total loop and switching price decreased by less than $1. (Tr. Vol. X at 69-71).

By changing the default values for these fourteen groups of inputs to reflect South Carolina-specific data and then running

HM 5.0a with those new values, Georgetown produced an average loop cost of $43.16, which is extremely close to the $41.11 average loop cost produced by BCPM 3.1 with the BellSouth-specific inputs described in Ms. Caldwell's testimony. (Tr. Vol. X at 73). The majority of the cost differential was attributed to six of the categories: NID and drop--$1.92; distribution investment--$9.17; structure sharing--$2.68; expense factors--$1.61; cost of capital--$1.49 and depreciation--$1.16. (Id.). Not all of the fourteen categories increased. In four loop categories--terminal and splice; interoffice investment; copper and fiber fill factors; and switching factors--Georgetown actually decreased values from the levels recommended by HM 5.0a. (Id.)

The Commission concludes that the sensitivity analysis performed by Georgetown on the HM 5.0a default inputs corroborates the appropriateness of using the South Carolina-specific inputs recommended by Ms. Caldwell, and those recommended by the other non-rural LECs, for use with BCPM 3.1.

E. Embedded cost model is adopted for rural LEC's.

First, we must rule on the Consumer Advocate's objection to admission into the record of Hearing Exhibit 14, the embedded cost studies of the rural LEC's. The ground for said objection is incompleteness. The objection is overruled and the Exhibit is

admitted into the evidence of this case. The conclusion is based on the following.

Cost experts at John Staurulakis, Inc. ("JSI") developed cost of service studies for residential and single-line business service for SCTC companies by obtaining information from each of the twelve SCTC cost companies (i.e., companies that file a cost study with the National Exchange Carrier Association for interstate settlement purposes.) Prefiled Direct Testimony of Douglas Meredith at 4. The remaining eleven SCTC companies are average schedule companies, which receive interstate settlements based on average schedule formula, i.e., they do not perform company-specific cost studies. Id.

The financial information obtained from the cost companies included booked investments amounts, including depreciation reserves, for investment under Part 32 Accounting rules. This financial information also included allowable expense amounts for the telecommunications activity of the company. Finally, information relating to the operation of the company that relate to how shared and common investments and expenses are allocated, and the usage of the network for various types of calling activity, was obtained. Id. at 4-5.

The actual cost information was allocated to department and then to functional components within department based upon the

information provided by the company. These functional components were then combined to form a basic residential or business service cost. Id. at 5. This procedure utilizes cost allocation principles that are used in embedded cost methodologies. Id.

The eleven average schedule companies were assigned service cost by calculating a weighted cost of service for all cost companies. The weighting is based upon total residential and business access lines used in the analysis. Id. This procedure is consistent with state law, which provides "In the event that a carrier of last resort does not currently conduct detailed cost studies relating to such services, the Commission shall allow for an appropriate surrogate for such study." S.C. Code Ann.§58-9-280(E)(6).

The cost of basic service for the SCTC cost companies ranged from $35.07 per month to $70.81 per month, and the weighted average was $41.52 per month, as detailed in the testimonies of SCTC witnesses Douglas Meredith and Azita Sparano. See Exhibits to Prefiled Testimony of Douglas Meredith and Azita Sparano.

The embedded cost studies performed by JSI on behalf of the SCTC were submitted for the record under seal, because disclosure of the individual companies' cost information could put those companies at a competitive disadvantage. The studies were made available, upon request, to the Consumer Advocate's consultant

and to representatives of AT&T for review and comment. Hearing Exhibit Number 14 in this proceeding contains the cost studies (under seal), along with AT&T's Comments on the studies and SCTC's Reply Comments, which were filed pursuant to the Commission's ruling at the hearing on this matter.

The SCTC's embedded cost studies present actual costs of the SCTC cost companies. The weighted cost used for the average schedule companies is a reasonable surrogate for actual costs in the absence of cost studies for these companies, which tend to be the smaller companies in the state. Mr. Thomas Hyde, who testified on behalf of MCI Telecommunications, Inc. in this matter, stated that "the cost per line appears to be reasonable for rate of return based embedded costs." Prefiled Direct Testimony of Thomas Hyde at p. 3. The Consumer Advocate's objection is overruled and the Exhibit is admitted.

The Federal Communications Commission ("FCC") has recognized that rural carriers may be disproportionately affected by a change in universal support mechanisms and, for this reason, it is appropriate to allow rural carries to continue to receive support based on embedded cost for at least three years. In re: Federal-State Join Board on Universal Service, CC Docket No. 96-45, FCC 97-157 (May 8, 1997) at para. 294. Once forward-looking methodologies are in place for non-rural carriers, the FCC will

evaluate mechanisms for rural carriers. Id. Any subsequent shift to a different support mechanism will be gradual, to allow rural carriers ample time to adjust to any changes in the support calculation. Id.

South Carolina state law, consistent with federal law, also allows rural carriers to use embedded cost studies. S.C. Code Ann. §58-9-280(J) provides:

> Subject to the requirements of applicable federal law, a small LEC [defined in §58-9-10(14) to mean a rural telephone company as defined in the federal Act] may define the term "cost" as used within this section and where applicable to a small LEC, to include all embedded costs as well as a reasonable contribution to universal local service, where applicable, until such time as these costs are recovered from other sources.

In accordance with the FCC's position for rural carriers and in accordance with state law, the SCTA has proposed that the Commission adopt State USF Guidelines that would allow rural telephone companies to use an embedded cost methodology to determine their universal service costs until such time as the FCC adopts federal guidelines for rural local exchange carriers.

Accordingly, we hereby adopt the embedded cost model proposed by SCTC, including recommended inputs, related to cost recovery by rural local exchange companies in South Carolina.

IT IS THEREFORE ORDERED THAT:

1. The Benchmark Cost Proxy Model (BCPM) 3.1 is hereby adopted as the State forward-looking cost model for BellSouth, GTE South, Inc., and United Telephone Company of the Carolinas.

2. Company-specific inputs as recommended by BellSouth, GTE South, Inc., and United Telephone Company of the Carolinas are adopted for use in the BCPM 3.1 for use in the companies' respective service areas. These inputs will be modified as appropriate to be consistent with the Commission decision in Docket No. 97-374-C, the Proceeding to Review BellSouth Telecommunications, Inc.'s cost studies for unbundled network elements, said points as listed herein.

3. The embedded cost model proposed by South Carolina Telephone Coalition, including recommended inputs, related to cost recovery by rural local exchange companies in South Carolina is hereby adopted for the rural local exchange companies in South Carolina.

4. All other matters related to the intrastate universal service fund and not ruled upon herein are held in abeyance.

5. This Order shall remain in full force and effect until further Order of the Commission.

BY ORDER OF THE COMMISSION:

Chairman

ATTEST:

Deputy Executive Director

(SEAL)