

MobileMedia Communications, Inc.	MobileMedia
Mon-Cre Telephone Cooperative	Mon-Cre
Montana Independent Telecommunications Systems	Montana Indep. Telecom.
Montana Public Service Commission	Montana PSC
Montana Telephone Association	Montana Tel. Ass'n
Mountaineer Doctor TeleVision	Mountaineer Doctor TV
National Association of Development Organizations	
National Association of Regulatory Utility Commissioners	NARUC
National Association of State Utility Consumer Advocates	NASUCA
National Black Caucus of State Legislators	Nat'l Black Caucus
National Cable Television Association	NCTA
National Emergency Number Association	NENA
National Exchange Carrier Association	NECA
National Retail Federation	Nat'l Retail Fed.
National Rural Electric Cooperative Association	Rural Electric Coop.
National School Boards Association American Library Association	
(Comments)	NSBA I
(Flexibility Analysis)	NSBA II
National Urban League-Boston College	National Urban League-BC
Navajo Nation	Navajo Nation
Nebraska Association of Hospitals & Health Systems	Nebraska Hospitals
Nebraska Rural Development Commission	Nebraska RDC
Netscape Communications Corporation	Netscape
New Hope Telephone Cooperative	New Hope Tel.
New Jersey Board of Public Utilities	New Jersey BPU
New Jersey Division of Ratepayer Advocate	New Jersey Advocate
New Mexico Attorney General	New Mexico AG
New York Board of Regents	New York Regents
New York State Consumer Protection Board	New York CPB
New York State Department of Public Service	New York DPS
North Dakota Department of Health	
North Dakota Public Service Commission	North Dakota PSC
North Dakota State Health Officer	North Dakota Health
North of Boston Library Exchange, Inc.	
Nynex	NYNEX
OMB Watch	
Oakland Unified School District	Oakland School District
Office of Communication of the United Church of Christ	United Church of Christ
Office of Insular Affairs	OIA
Office of People's Counsel of the District of Columbia	OPC-DC
Office of Rural Health Policy of HRSA/HHS	ORHP/HHS
Office of the Ohio Consumers' Counsel	Ohio Consumers' Counsel

Oklahoma Corporation Commission	Oklahoma CC
Oklahoma Dept. of Libraries	Oklahoma Libraries
OpTel, Inc.	Optel
Oregon Independent Telephone Association & Washington Independent Telephone Association	OTIA-WITA
Oregon Public Utility Commission	Oregon PUC
Pacific Telecom, Inc.	
Pacific Telesis Group	PacTel
Park Region Mutual Telephone Co.	Park Region Tel.
Pennsylvania Public Utility Commission	Pennsylvania PUC
Pennsylvania Rural Development Council	Pennsylvania RDC
People For the American Way, Alliance for Community Media, Alliance for Communications Democracy, Benton Foundation, Center for Media Education, League of United Latin American Citizens, Minority Media and Telecommunications Council National Council of La Raza, National Rainbow Coalition	People For
People of the State of California, California PUC	California PUC
Personal Communications Industry Association	PCIA
Public Advocates Inc.	Public Advocates
Public Utility Commission of Texas	Texas PUC
Public Utility Law Project of New York, Inc.	PULP
Puerto Rico Telephone Company	Puerto Rico Tel. Co.
Ragland Telephone Company	Ragland Tel. Co.
Reed, Smith, Shaw & McClay	Reed Smith
Rhode Island Public Utilities Commission	Rhode Island PUC
Richard Riley, Secretary of Education	Secretary of Education
Robert A. Hart IV	Hart
Rock Port Telephone Co.	Rock Port Tel.
Rural Iowa Independent Telephone Association	
Rural Health Network	
Rural Telephone Coalition	RTC
Rural Telephone Finance Coop.	
Rural Utilities Serv.	RUS
STAR Program	STAR
Sailor (MD Library Proj.)	Sailor
South Carolina Public Service Commission	South Carolina PSC
South Dakota Public Utilities Commission	South Dakota PUC
South New England Telephone Co.	SNET
Southwest Montana Telepsychiatry Network	Montana Telepsychiatry
Southwestern Bell Telephone Company	SWBT

Sprint Corporation	Sprint
St. Alexius Medical Center	St. Alexius
Staff of Public Utilities Commission of Ohio	Ohio PUC
State of Alaska	Alaska
State of South Dakota	South Dakota
Syracuse University School of Informational Studies	Syracuse University
Taconic TCA, Inc.	Taconic Tel. Corp.)
Tele-Communications, Inc.	TCI
Telec Consulting Resources, Inc.	
Telecomm Access Association	Telecomm Access
Telecommunications Industry Association	TIA
Telecommunications Resellers Association	TRA
Telecommunications Subcommittee Commission on the Future of Southwest Virginia	Southwest Virginia Future
Telefonica Larga Distancia de Puerto Rico (TLD)	TLD
Teleport Communications Group, Inc.	Teleport
Texas Advisory Commission on State Emergency Communications	Texas Emergency
Texas Department of Information Resources	Texas DIR
Texas Office of Public Utility Counsel	Texas OPUC
Time Warner Communications Hlds, Inc.	Time Warner
United States Catholic Conference, National Coalition for the Homeless, Washington Legal Clinic for the Homeless, American Women's Roundtable, Community Technology Institute, Consumer Action, Farmworker Justice Fund, Fifth Street Connection, Heartland Alliance for Human Needs and Rights, Interstate Migrant Education Council, National Association of Migrant Educators, Marcia Zashin, Education Consultant to Cleveland Public Schools and Project Act, Migrant Legal Action Program, Vermont Migrant Education Program	Catholic Conference
US Distance Learning Association	
US National Commission on Libraries & Information Science	U.S. Libraries
U S West, Inc.	U S West
UTC, the Telecommunications Association	UTC
United States Telephone Association	USTA
United Utilities, Inc.	United Utilities

Vanguard Cellular Systems, Inc.	Vanguard
Virginia State Corporation Commission	Virginia CC
Virginia's Rural Telephone Co's	Virginia's Rural
Warren Library Association	Warren Library
Washington State Library	Washington Library
Washington State Superintendant of Public Instruction	Washington SPI
Washington Utilities and Transportation Commission	Washington UTC
WavePhore, Inc.	WavePhore
West Virginia Consumer Advocate	
Western Alliance	Western Alliance
Western Wireless Corporation	Western
WinStar Communications, Inc.	WinStar
Winnebago Cooperative Telephone Association	Winnebago Tel.
Wyoming Public Service Commission	Wyoming PSC

**APPENDIX B
PARTIES FILING REPLY COMMENTS**

<u>Commenter</u>	<u>Abbreviation</u>
360 Degree Communications Co.	360
AARP,	AARP
CFA,	
Consumer Union	
Access to Communication for Education Coalition	ACE
AD HOC Rural Consortium	ARC
AD HOC Telecommunications Users Committee	Ad Hoc Telecom. Users
Airtouch Communications, Inc.	Airtouch
Alaska Public Utilities Commission	Alaska PUC
Alaska Telephone Association	Alaska Tel.
Alliance for Community Media	
Alliance for Public Technology	Alliance for PublicTechnology
American Association of Community Colleges, Association of Community College Trustees	Community Colleges
American Library Association	ALA
American Public Power Association	APPA
Ameritech	
Association for Local Telecommunications Services	ALTS
AT&T Corp.	AT&T
Bell Atlantic	
BellSouth/National Economic Research Associates	BellSouth
Benton Foundation	Benton
Black Community Crusade for Children	
California Department of Education	CDE
Cathey, Hutton and Associates	Cathey, Hutton
Century Telephone & TDS Telecommunications	Century
Cincinnati Bell	Cincinnati Bell
Citizens for a Sound Economy Foundation	CSE Foundation
Colorado State Libraries	
Commnet Cellular, Inc.	Commnet Cellular
Commnet Cellular Inc. (Erratum)	
Communications Workers of America	CWA
Community Technology Centers' Network	
Competition Policy Institute	CPI
Competitive Telecommunications Association	CompTel
CompuServe Inc.	CompuServe
Council for Education Development and Research	CEDR

Council of Organizational Representatives	
Curtis Telephone	Curtis Tel.
Dell Telephone Cooperative	Dell Tel.
Edgemont Neighborhood Coalition	Edgemont
ETEX Telephone Cooperative	ETEX Tel. Coop.
Evans Telephone Co.	Evans Tel.
Humboldt Telephone Co.,	
Kerman Telephone Co.,	
Oregon-Idaho Utilities, Inc.,	
Pinnacles Telephone Co.,	
The Ponderosa Telephone Co.,	
Siskiyou Telephone Co.,	
The Volcano Telephone Co.	
Florida Public Service Commission	Florida PSC
General Communications, Inc.	GCI
General Service Administration	GSA
Governor of Guam	
GTE	
Guam Telephone Authority	Guam Tel. Authority
GVNW, Inc/Management	GVNW
Hauben, Ronda	
Idaho Public Utilities Commission (States' Joint Reply)	Idaho PUC
Indiana Utility Regulatory Commission	Indiana URC
Information Renaissance	Information Renaissance
InformationTechnology Association of America,	ITA/EMA
Electric Messaging Association,	
Information Technology Industry Council,	
Information Industry Association,	
National Retail Federation	
Iowa Telephone Association	Iowa Tel. Ass'n
ISTE	
LDDS Worldcom	LDDS
Libraries for the Future	
Lincoln Telephone and Telegraph	Lincoln
MCI	
Metricom, Inc.	Metricom
MFS Communications Company, Inc.	MFS
Milbury, Peter	
Minnesota Independent Coalition	Minn. Indep. Coalition
MobileMedia Communications, Inc.	MobileMedia
Motorola and Iridium North America	
National Association of Broadcasters	

National Association of the Deaf	NAD
National Association of Regulatory Utility Commissioners	NARUC
National Cable Television Association	NCTA
National Council of La Raza (aka Public Advocates, Inc.)	National Council of La Raza
National Emergency Number Association	NENA
National Exchange Carrier Association	NECA
National Public Telecomputing Network	
National School Boards Association American Library Association, American Library Association, including the American Association of School Librarians, A Division of ALA, National Education Association, Consortium for School Networking, Council of Chief State School Officers, Education Legislative Service, Inc., National Association of Independent Schools, National Association of Secondary School Principals, American Federation of Teachers, AFL-CIO, Association for the Advancement of Computing in Education, National Association of Elementary School Principals, American Association of School Administrators, American Psychological Association, Association for Supervision and Curriculum Development, Council for American Private Education, Council for Educational Development and Research, Global Village Schools Institute, National Association of State Boards of Education, National Parents and Teachers Association, United States Distance Learning Association, Center for Media Education (Comments) (Flexibility Analysis)	
New York State Department of Public Service	NSBA I
Northern Telecommunications	NSBA II
Nynex	New York DPS
Oakland Unified School District	NorTel
Office of the Ohio Consumers' Counsel	NYNEX
Office of People's Counsel of the District of Columbia	Oakland School District
Pacific Telesis Group	Ohio Consumers' Counsel
Pennsylvania Library Association	OPC-DC
Pennsylvania Public Utility Commission	PacTel
People of the State of California, California PUC,	Pennsylvania Library Ass'n
	Pennsylvania PUC
	California PUC

The Public Utilities Commission of the State of California	
Personal Communications Industry Ass'n	PCIA
Plummer, Paul	
Public Broadcasting System	PBS
Public Service Commission of the District of Columbia	DC PSC
Puerto Rico Telephone Company	Puerto Rico Tel. Co.
Reed Smith Shaw & McClay	Reed, Smith
Rural Telephone Coalition	RTC
Rural Utilities Serv.	RUS
Siskiyou Telephone Company	Siskiyou
South Dakota Independent Telephone Coalition	SDITC
Southern New England Telephone Co.	SNET
Southwestern Bell Telephone Company	SWBT
Sprint Corporation	Sprint
Taconic Telephone Corporation	Taconic Tel. Corp.
TCA, Inc.	TCA
Teledesic	
Telefonica Larga Distancia de Puerto Rico	TLD
Telephone Association of Michigan	Tel. Assoc. of Michigan
Teleport Communications Group, Inc.	Teleport
Texas Advisory Comm'n on State Emergency Comm.	Texas Emergency
Texas Office of Public Utility Counsel	Texas OPUC
Union City Board of Education	
United Cerebral Palsy Associations	United Cerebral Palsy Ass'n
United States Telephone Association	USTA
United Utilities Inc.	United Utilities
US Catholic Conf.,	Catholic Conference
National Coalition for the Homeless,	
Washington Legal Clinic for the Homeless,	
American Women's Roundtable,	
Community Technology Institute,	
Consumer Action,	
Fifth Street Connection,	
Heartland Alliance for Human Needs and Rights,	
Interstate Migrant Education Council,	
National Association for Migrant Educators,	
Marcia Zashin, Education Consultant to Cleveland Public Schools and Project Act,	
Migrant Legal Action Program,	
Vermont Migrant Education Program	
US Distance Learning Association	
US National Comm'n on Libraries & Information Science	U.S. Libraries
U S West, Inc.	U S West

Vanguard Cellular Systems, Inc.	Vanguard
Virgin Island Telephone Co.	Vitelco
Virginia State Corporate Commission	Virginia CC
Washington Independent Telephone Association	WITA
Washington State Department of Information Services	Washington DIS
Washington Utilities and Transportation Commission	Washington UTC
West Virginia Consumer Advocate	
Western Alliance	Western Alliance
WinStar Communications, Inc.	Winstar
Wyoming Public Service Commission	Wyoming PSC

**APPENDIX C
PARTIES FILING FURTHER COMMENTS**

<u>Commenter</u>	<u>Abbreviation</u>
AirTouch Communications, Inc.	AirTouch
Alaska Telephone Association	Alaska Tel.
Alaska Public Utilities Commission	Alaska PUC
Alliance for Public Technology	Alliance for Public Technology
American Library Association	ALA
American Public Television Stations and Public Broadcasting Service Association	APTS/PBS
Ameritech	
Apple Computer, Inc.	Apple
Association for Local Telecommunications Services	ALTS
AT&T Corp.	AT&T
Bell Atlantic	
BellSouth/National Economic Research Associates	BellSouth
Benton Foundation	Benton
California Library Association	
Cathey, Hutton, & Assoc.	Cathey, Hutton
Century Telephone & TDS Telecommunications	Century
Citizens Utilities Companies	Citizens Utilities
Colorado State Library	
Commonwealth of the Northern Mariana Islands	CNMI
Competitive Telecommunications Association	CompTel
Consumer Federation of America	
Council of the Great City Schools	Great City Schools
Council of Pennsylvania Library Networks	
Education and Library Network Coalition	EDLINC
Florida Public Service Commission	Florida PSC
General Communications, Inc.	GCI
General Service Administration	GSA
GTE	
GVNW, Inc./Management	GVNW
Illinois State Library	
Information Renaissance	Information Renaissance
International Business Machines Corporation	IBM
ITCs, Inc.	ITC
Maine PUC,	Maine PUC
The State of Maine Public Utilities Commission,	

The State of Montana Public Service Commission,	
The State of Nebraska Public Service Commission,	
The State of New Hampshire Public Utilities Commission,	
The State of New Mexico State Corporation Commission,	
The State of Utah Public Service Commission,	
The State of Vermont Department of Public Service and Public Service Board,	
Public Service Commission of West Virginia	
Maryland State Department of Education	Maryland DOE
MCI	
Media Access Project and People for the American Way	MAP
Metricom, Inc.	Metricom
MFS Communications Company, Inc.	MFS
Minnesota Independent Coalition	Minnesota Indep. Coalition
National Association of Manufacturers	
National Association of Regulatory Utilities Commissioners	NARUC
National Cable Television Association	NCTA
National Coalition for the Homeless,	
American Women's Roundtable,	
Community Technology Institute,	
Consumer Action,	
Fifth Street Connection,	
Heartland Alliance for Human Rights and Needs,	
Interstate Migrant Education Council,	
Migrant Legal Action Program,	
National Association of Migrant Educators,	
United Church of Christ, Office of Communications,	
Marcia Zashin, Education Consultant to Cleveland Public Schools and Project Act,	
Washington Legal Clinic for the Homeless,	
Vermont Migrant Education Program	
National Emergency Number Association	NENA
National Exchange Carrier Association	NECA
National Public Telecomputing Network	
Netscape Communications Corporation	Netscape
New York State Department of Education	New York DOE
Nynex	NYNEX
Oakland Unified School District	Oakland School District
Pacific Telecom, Inc.	
Pacific Telesis Group	PacTel
Personal Communications Industry Association	PCIA
Puerto Rico Telephone Company	Puerto Rico Tel. Co.
Rural Telephone Coalition	RTC
Rural Utilities Serv.	RUS

Senate Education Technology Working Group	
Southern New England Telephone Company	SNET
Southwestern Bell Telephone Company	SWBT
Sprint Corporation	Sprint
Superintendent of Public Schools	
Tele-Communications, Inc.	TCI
Teleport Communications Group, Inc.	Teleport
Time Warner Communications Hlds, Inc.	Time Warner
Union City Board of Education	
United Utilities, Inc.	United Utilities
University of California	
US Distance Learning Association	
US National Commission on Libraries & Information Science	U.S. Libraries
US Telephone Association	USTA
US West, Inc.	U S West
Vanguard Cellular Systems, Inc.	Vanguard
Virgin Island Telephone Corp.	Vitelco
Washington Superintendent of Public Instruction	Washington SPI
Wireless Field Tests	
Worthy, Patricia M.	

**APPENDIX D
PARTIES FILING COMMENTS ON PROXY MODELS**

<u>Commenter</u>	<u>Abbreviation</u>
Alaska Public Utilities Commission	Alaska PUC
Ameritech	
AT&T Corp.	AT&T
BellSouth/National Economic Research Associates	BellSouth
California Public Utility Commission	California PUC
GTE	
Maine PUC	Maine PUC
MCI	
MFS Communications Company, Inc.	MFS
National Cable Television Association	NCTA
National Exchange Carrier Association	NECA
Nynex	NYNEX
Pacific Telesis Group	PacTel
Rural Telephone Coalition	RTC
Rural Utilities Serv.	RUS
Sprint Corporation	Sprint
Southwestern Bell Telephone Company	SWBT
United States Telephone Association	USTA
U S West, Inc.	U S West

**APPENDIX E
PARTIES FILING INITIAL AND REPLY COMMENTS
CC DOCKET 80-286**

<u>Commenter</u>	<u>Abbreviation</u>
Ad Hoc Telecommunications Users Committee	Ad Hoc Telecom. Users
Alabama Public Service Commission	Alabama PSC
Alaska Public Utilities Commission	Alaska PUC
Alaska Telephone Association	Alaska Tel.
Albion Telephone Company	Albion Tel.
Alenco Communications, Inc.	Alenco
Allnet Communications Services	Allnet
ALLTEL Telephone Services Corporation	ALLTEL
Alma Telephone Company	Alma
Ameritech	
AMSC Subsidiary Corporation	AMSC
Arctic Slope Telephone Association	Arctic
Arkansas Public Service Commission	APSC
Ascension Telephone Company	Ascension
Associated Communications & Research Services, Inc.	Associated Communications
Association for Local Telecommunications Services	ALTS
AT&T Corporation	AT&T
Baltic Telecom Cooperative	Baltic
Bell Atlantic	Bell Atlantic
BellSouth Telecommunications, Inc.	BellSouth
Blanca Telephone Company	BTC
Buffalo Commons Group	BCG
California Telephone Association	CTA
Cambridge Telephone Co.	Cambridge
Canby Telephone Association	Canby
Cascade Utilities	Cascade
Cathey, Hutton and Assoc., Inc.	Cathey, Hutton
Central Utah Telephone, Inc.	CUT
Century Telephone Enterprises, Inc.	Century
Cheyenne River Sioux Tribe Telephone Authority	Cheyenne River Sioux Tel.
Chillicothe Telephone Company	Chillicothe
Churchill County Telephone and Telegraph System	Churchill County
Cincinnati Bell Telephone	Cincinnati Bell
Citizens Utilities Company	Citizens Utilities
City of Ketchikan, Alaska d/b/a Ketchikan Public Utilities	KPU
Coastal Utilities, Inc.	Coastal

Colorado Independent Telephone Association, Inc.	Colorado Indep. Tel.
Colton Telephone Company	Colton
Competition Telecommunications Association	CompTel
Consumers of Ohio, South Carolina and Florida	Consumers
Copper Valley Telephone Cooperative	Copper Valley
Cowiche Telephone	Cowiche
Crossville Communications	Crossville
Dell Telephone Cooperative	Dell Tel.
Deposit Telephone Company	Deposit
Ellensburg Telephone Company	Ellensburg
Emery Telephone	Emery
Farmers Telephone Company	Farmers
Florida Public Service Commission	Florida PSC
Fred Williamson and Associates	Fred Williamson
General Communications, Inc.	GCI
Golden West Communications, Inc.,	Golden West
Great Plains Communications, Inc.	Great Plains
GTE	GTE
Gulf Telephone Company	Gulf
GVNW, Inc./Management	GVNW
Home Telephone Company	Home
ICORE, Inc.	ICORE
InterBel Telephone Cooperation	InterBel
International Communications Association	International Communications Ass'n
ITELCO	
John Staurulakis, Inc.	John Staurulakis
Kalona Cooperative Telephone Company	Kalona
Kerrville Telephone Company	Kerrville
Kingdom Telephone Company	Kingdom
La Jicarita Rural Telephone Cooperative	La Jicarita
LDDS Wolrdcom	LDDS
Leaco Rural Telephone Cooperative	Leaco
Lincoln County Telephone System, Inc.	Lincoln County
Mantanuska Telephone Assn., Inc.	Matanuska Tel. Ass'n
MCI Telecommunications Corporation	MCI
MFS Communications Company, Inc.	MFS
Mid-Rivers Telephone Cooperative, Inc.	MRTC
Minnesota Telephone Association	Minnesota Tel. Ass'n
Missouri Public Service Commission	Missouri PSC
Molalla Telephone Company	Molalla
Montana Telephone Assn.	

Montana Telephone Company	Montana Tel. Co.
Montrose Mutual Telephone Company	Montrose
National Exchange Carrier Association	NECA
National Rural Telecom Association	NRTA
National Telephone Cooperative Association	NCTA
Nehalem Telephone & Telegraph Company	
New York State Department of Public Service	New York DPS
North Carolina Utilities Commission	North Carolina UC
North Dakota Telephone Company	North Dakota Tel. Co.
North State Telephone Company	North State Tel.
Northeast Florida Telephone Company	Northeast Florida
Nynex	NYNEX
Oregon Telephone Cooperative	OTC
Oregon Utilities, Inc.	Oregon Utilities
Organization for the Protection and Advancement of Small Telephone Companies	OPASTCO
Otz Telephone Cooperative	Otz
Pacific Bell	
Pacific Telecom, Inc.	
Peetz Telephone Company	Peetz
Pennsylvania Public Utility Commission	Pennsylvania PUC
People of the State of California and the Public Utilities	California PUC
Pigeon Telephone Company	Pigeon
Pioneer Telephone	
Pioneer Telephone Company	Pioneer Tel.
Pond Branch Telephone Company	Pond Branch Tel.
Puerto Rico Telephone Company	Puerto Rico Tel. Co.
Range Telephone Cooperative	Range
Rio Virgin Telephone Company	Rio Virgin Tel.
Rochester Telephone Corporation	Rochester Tel.
Rock Hill Telephone Company	
Roggen Telephone Cooperative	Roggen
Roosevelt County Rural Telephone Coop.	Roosevelt Tel.
Roseville Telephone Company	Roseville Tel.
Rural Telephone Company - Idaho	RTC-I
Rural Telephone Company - Nevada	RTC-N
SBA	
Scott County Telephone Company	Scott County Tel.
Silver Star Telephone Company	Silver Star
Smithville Telephone Company	Smithville Tel.
South Central Utah Telephone Assn.	South Central Utah Tel.
Southern Montana Telephone Company	Southern Montana Tel.

Southwestern Bell Telephone Company	SWBT
Sprint Corporation	Sprint
Taconic Telephone Corp.	Taconic Tel. Corp.
Tallon, Cheeseman & Associates, Inc.	Tallon, Cheeseman
TDS Telecom	
Telec Consulting Resources, Inc.	
Telephone Electronics Corporation	TEC
Teleport Communications Group, Inc.	Teleport
Texas Public Utilities Commission	Texas PUC
Time Warner Telecommunications	Time Warner
Trans-Cascade Telephone Co.	Trans-Cascade
United States Telephone Association	USTA
United Telephone Mutual Aid Corporation	UTMAC
United Utilities, Inc.	United
U S WEST, Inc.	U S WestUTC
UTC	
Vermont Department of Public Service	Vermont DPS
Virgin Islands Public Service Commission	VIPSC
Virgin Islands Telephone Corporation	Vitelco
Washington Independent Telephone Assn. Small Company Committee	WIT
West River Telecommunications Cooperative	West River
Western Alliance	Western Alliance
Western Wahkiakum County Telephone Company	Western Wahkiakum Tel.
Wyoming Public Service Commission	Wyoming PSC
Yelm Telephone Company	Yelm Tel.

APPENDIX F -- ANALYSIS OF PROXY MODELS

1. In the text of the Recommended Decision, we briefly discussed the criteria that the Commission should consider in evaluating the reasonableness of using a proxy model to determine the level of universal service support a carrier should receive for a particular geographic area. In this Appendix, we highlight some of the issues raised by commenters, differences between the models, and the results each model produces. At the workshops that we have recommended that the Commission conduct, we expect that model proponents would be prepared to discuss the relative merits of each model, the criticisms raised by commenters, and the major causes of the substantial differences between the size of the high cost assistance support derived by the models.

2. As we discussed in the text of the Recommended Decision, the proxy model must rely on the forward-looking economic cost of developing and operating the network facility and functions used to provide services supported under Section 254(c)(1). Costs for providing universal service should be based on the most efficient technology that can be deployed using the incumbent local exchange carrier's (LEC) current wire-center locations. For the most part, we believe that the useful aspects of "forward-looking" approach are captured by the least cost concept. To the extent that reliable new technologies represent the least cost method for providing the supported services, they should be incorporated in the model. Firms in a competitive market may well choose to place facilities with the capability of providing a number of competitive services beyond the supported services. To the extent that this is true, the network we are modelling may depart from that which a firm may choose to install. However, to the extent that new technologies are necessary to provide a platform for a number of other competitive services, they should not be included in the model. The model should be sufficiently flexible to incorporate new technologies as the cost of these facilities falls such that they become the most efficient way to provide the supported services. In addition, the model must be sufficiently flexible to include the functionalities necessary to provide an evolving set of supported services.

3. Model Assumptions and Results - Demand. We agree that the models should reflect the impact on costs of the number and distribution of residential and business lines. The models start with an assignment of one residential line to each household in every census block group (CBG) reported in the 1990 Census. The Hatfield model uses recent Census estimates to update the 1990 Census values.¹ Because not all households have telephone service and some households have more than one line, the models are calibrated to match state and study area residential demand totals. Currently, the models use data on employees per CBG to assign the relative number of business lines per CBG. Because the ratio of business telephones to employees is not constant across all industries, a model used for calculating universal service support would need to include a better indicator of business lines

¹ Letter from Richard N. Clarke, AT&T, to William F. Caton, FCC (dated Sept. 10, 1996).

per CBG. Numerous commenters have reported unexplained variations between model line demand and expected line demand. The models should attempt to simulate the actual location of households and the placement of facilities to reach those households through a technically feasible route.

4. Loop Investments. Loop investments, i.e., outside plant, include the investments in cable and wire from an end user's home or business to the telephone company central office. They also include the investment in structures that support the cable and wire, such as poles and conduits, and the cost of placing the cable and wire. The models provide different estimates of loop investment because of different assumptions regarding fill factors, terrain impacts, structure sharing and the fiber/copper cross-over point. For the reasons set forth below, we believe that these inconsistencies must be resolved in order for the models to provide reasonable estimates of loop investments. Furthermore, the models should more accurately reflect the network topography necessary to serve an area. For example, many rural areas are extremely high cost regions which the models currently may not adequately represent. If the model does not accurately account for extreme geographic or climatic conditions, it may underestimate support necessary to serve these areas and may put continued service at risk.

5. A fill factor represents the percentage of the loop facility that is being used. Fill factors must be below 100 percent because it is necessary to have reserve capacity to replace damaged facilities and serve new demand. Because it is cheaper to build plant in discrete increments rather than adding one loop at a time, fill factors are generally lower if there is an anticipation of growth. In residential markets, telephone companies traditionally place additional or spare distribution plant so customers could purchase more than one line. In business markets, many telephone companies may increase loop investment as part of a strategy to provide Centrex service. These practices lower the fill factors. The original BCM uses fill factors lower than those in the Hatfield model.² BCM2, however, uses fill factors that are very similar to the Hatfield estimates.³ In response to the Common Carrier Bureau's information request, the models' proponents indicate that the fill factors that are calculated as ratio of demand divided by the number of loops constructed by the models are less than the

² MCI Communications, Inc, NYNEX Corporation, Sprint/United Management Co., and U S West, Inc, Benchmark Costing Model: A Joint Submission, Copyright 1995, CC Docket No. 80-826, filed December 1, 1995. Letter from Richard N. Clarke, AT&T, to William F. Caton, FCC (dated Aug. 27, 1996).

³ Letter from Jay C. Keithley, Sprint, and Glenn Brown, US West, to William F. Caton, FCC, in regard to CC Docket No. 96-45 (dated July 3, 1996).

input fill factors.⁴ This occurs because cable can be purchased only in increments, such as 100 pair cable, and therefore, will always exceed the required demand.

6. Terrain impacts refer to the effect of soil composition, the level of the water table and slope characteristics. BCM2 develops unique factors for 54 different combinations of terrain impacts.⁵ It appears that changes in terrain impacts are responsible, in part, for the increase in BCM2 investment relative to the BCM investment. The Hatfield model incorporates adverse terrain conditions by increasing the loop length by 20 percent rather than estimating the impacts of each terrain characteristic.⁶ Detailed documentation to support the terrain-impact-input analysis is essential to an evaluation of the reasonableness of these assumptions.

7. Structure sharing refers to the practice of sharing investments with other utilities in poles, trenches and conduits. The Hatfield model assumes that structures are shared equally by telephone, electric and cable companies; this assumption reduces the assumed investment in structures to one third of their estimated cost.⁷ In contrast, BCM2 assumes that the telephone company is responsible for 100 percent of the structure costs. The difference in the sharing assumption accounts for approximately 13 to 15 percent of the difference in the model's forward-looking cost estimate for high cost areas.⁸ We are unconvinced that sharing exists to the extent the Hatfield model presumes, but we do not conclude, as do the proponents of the BCM2, that the cost of structures is never shared among the utilities. The model proponents should be prepared to supplement their current filings with documentation that supports their position regarding this issue as well as the related issue of whether the percentage of sharing is a function of the type of structure, e.g., is there more sharing of poles than conduit?

8. The fiber-copper cross-over point refers to choice of using copper or fiber in the feeder plant. Each model specifies a default loop length. It then assumes that, if the loop is greater than the default length, the feeder plant will be fiber and if the loop is less than the default length, the feeder plant will be copper. The cross-over point should be based on engineering practice. Neither model proponent submits studies to support the engineering

⁴ Letter from Mike Pelcovits, MCI and Joel Lubin, AT&T, to John Morabito, FCC (dated Aug. 19, 1996). Letter from Warren D. Hannah, Sprint and Glenn Brown, U S West, to William F. Caton, FCC (dated Aug. 22, 1996).

⁵ Letter from Glenn Brown, U S West, to William F. Caton, FCC (dated Sept. 4, 1996).

⁶ Letter from Richard N. Clarke, AT&T, to William F. Caton, FCC (dated Sept. 10, 1996).

⁷ Letter from Richard N. Clarke, AT&T, to William F. Caton, FCC (dated Sept. 10, 1996).

⁸ Letter from Brian W. Matterson, AT&T, to William F. Caton, FCC (dated Sept. 18, 1996).

practice it assumed. Commenters show that assumptions about this practice can lead to different costs.⁹ We note that an examination of both model results shows that over 50 percent of the lines will be served by digital loop carrier connected to central offices by fiber, while currently less than five percent of lines use that type of facility.¹⁰ We believe that our forward looking cost principles would require a determination of whether either of the engineering practices posited in the models is the least-cost method of placing loop facilities.

9. Switching Investment. Switching investments include the cost of the switch, distribution frame, power expenses and the wire center building. The models use only digital switches. The BCM2 proponents allege that they have placed host, stand alone, and remote switches in wire centers according to the current placement of such switches.¹¹ The Hatfield model uses only host switches. Commenters claim that these assignments do not reflect the forward-looking cost of switching.¹² We share the commenters' concern regarding which type of switch, host, stand-alone or remote is assigned to each wire center and suggest that further work by interested parties would clarify this issue. We also have concerns regarding whether switches are included in the models that accurately reflect switching needs, particularly in sparsely populated areas. These concerns should be addressed.

10. Obtaining non-proprietary estimates of the cost of switches is difficult. The proponents of the Hatfield model and the BCM2 obtained switch cost estimates from several sources.¹³ The BCM2 switch input costs are lower than those in BCM and now approach the switch cost used by the Hatfield model.¹⁴ Moreover, the switching costs reported in the

⁹ NCTA cost model comments at 71-75, Attachment A ("Converging on a Cost Proxy Model for Primary Line Basic Residential Service: A Blueprint for Designing a Competitively Neutral Universal Service Fund," Susan M. Baldwin, Lee L. Selwyn (Aug. 1996)).

¹⁰ Letter from Mike Pelcovits, MCI, and Joel Lubin, AT&T, to John Morabito, FCC (dated August 19, 1996). Letter from Warren D. Hannah, Sprint, and Glenn Brown, U S West, to William F. Caton, FCC (dated August 22, 1996). See ARMIS Report 43-07, Table II - Transmission Facilities.

¹¹ Letter from Glenn Brown, U S West, to William F. Caton, FCC (dated Sept. 4, 1996).

¹² NCTA cost model comments at 41-54, Attachment A ("Converging on a Cost Proxy Model for Primary Line Basic Residential Service: A Blueprint for Designing a Competitively Neutral Universal Service Fund," Susan M. Baldwin, Lee L. Selwyn (Aug. 1996))

¹³ Letter from Glenn Brown, U S West, to William F. Caton, FCC (dated Sept. 4, 1996). Letter from Richard N. Clarke, AT&T, to William F. Caton, FCC (dated Sept. 10, 1996).

¹⁴ NCTA cost model comments at 41-54, Attachment A ("Converging on a Cost Proxy Model for Primary Line Basic Residential Service: A Blueprint for Designing a Competitively Neutral Universal Service Fund," Susan M. Baldwin, Lee L. Selwyn (Aug. 1996)).

information requests for each of the three study areas, PacTel of California, GTE of Arkansas, and Southwestern Bell of Texas, are very similar.¹⁵

11. The Hatfield model assigns over 80 percent of the switch cost to supported universal services and BCM2 assigns over 90 percent of the switch to services that are supported. These percentages are greater than the ratio of local usage to total usage. These assignments are higher than the usage ratio because certain switch components, such as the processor, are allocated solely to the provision of supported universal services.¹⁶ We suggest that assignment of switch costs be reviewed to determine whether a more accurate assessment of costs be allocated to universal support mechanisms.

12. Depreciation. Depreciation rates determine the level of expenses associated with the use of investments. Commenters disagree on whether depreciation rates used in the proxy models are too high or too low.¹⁷ Their positions reflect opinions regarding the impact of competition on depreciation rates and the extent to which the cost of supported services should be affected by competitive pressures. We believe that proxy models should use depreciation rates that reflect economic costs and should be flexible enough to permit depreciation rates set by regulators.

13. Annual Charge Factors. Annual charge factors or expense factors determine the level of expenses. In the BCM2 and Hatfield proxy models, plant-specific annual charge factors are determined as the ratio of ARMIS expenses to investment.¹⁸ Several commenters express concern that use of the ARMIS data conflicts with the desire to develop forward-looking costs because the ARMIS data are embedded cost statistics. The proxy models do not rely on the ARMIS expenses, but rather on the ratios of expenses to investment. The ARMIS expense to investment ratio is a ratio of current year expenses to investments purchased over many years. We recommend that the level of expenses be based on an analysis that calculates forward-looking expenses. If the Commission concludes that the ARMIS expense ratios are a reasonable starting position for determining forward-looking expenses, then we recommend

¹⁵ Letter from Mike Pelcovits, MCI and Joel Lubin, AT&T, to John Morabito, FCC (dated Aug. 19, 1996). Letter from Warren D. Hannah, Sprint and Glenn Brown, U S West, to William F. Caton, FCC (dated Aug. 22, 1996).

¹⁶ Letter from Jay C. Keithley, Sprint, and Glenn Brown, U S West, to William F. Caton, FCC, in regard to CC Docket 96-45 (dated July 3, 1996). Letter from Richard N. Clarke, AT&T, to William F. Caton, FCC (dated Sept. 10, 1996).

¹⁷ NYNEX cost model comments at 11; PacTel cost model comments at 11; SWBT cost model comments at 12; MCI cost model comments at 4.

¹⁸ Letter from Glenn Brown, U S West, to William F. Caton, FCC (dated Sept. 4, 1996). Letter from Richard N. Clarke, AT&T, to William F. Caton, FCC (dated Sept. 10, 1996)

that these ratios be modified to reflect changes in the expenses required to support and maintain forward-looking investments. For example, because the models only use digital switches, switch maintenance expenses should not include maintenance expenses associated with analog stored program or electromechanical switches. Expenses used in the models should be accurately reflected.

14. Joint and Common Costs. In its *Local Competition Order*, the Commission defined common costs as "costs that are incurred in connection with the production of multiple products or services, and remain unchanged as the relative proportion of those products or services varies (e.g., the salaries of corporate managers)."¹⁹ With regard to the proxy models used for the purpose of establishing universal service support the Commission must determine how to allocate common costs among the services supported by the universal service mechanism and all other services.

15. The Hatfield model estimates the common cost of corporate operations by multiplying all other expenses by 10 percent. This procedure generates corporate operations expenses that are between 25 and 50 percent of the corporate operations expenses reported in ARMIS.²⁰ The BCM2 divides ARMIS total corporate operations expenses for all reporting companies by the total number of lines served by these companies. It assigns 75 percent of this per-line value to the cost of providing the supported services.²¹ These differences explain approximately 11 percent of the difference between the average monthly forward-looking costs estimated by the Hatfield and BCM2 models.²² Further investigation is required before it would be possible to conclude that either of the proposed approaches or some other approach to the estimation is a reasonable level of corporate operations expenses to be included in calculation of the cost of providing the supported services.

16. Retail Costs. Retail costs are the costs associated with billing and collection, product management, sales, and advertising and other customer service expenses. The Hatfield model excludes product management, sales, and advertising expenses. It includes billing and collection costs and other customer services expenses. Because of these assumptions, the Hatfield model includes only 21 to 25 percent of ARMIS customer

¹⁹ *Local Competition Order* at para. 676.

²⁰ Letter from Mike Pelcovits, MCI and Joel Lubin, AT&T, to John Morabito, FCC (dated Aug. 19, 1996).

²¹ Letter from Glenn Brown, U S West, to William F. Caton, FCC (dated Sept. 4, 1996).

²² Letter from Mike Pelcovits, MCI and Joel Lubin, AT&T, to John Morabito, FCC (dated Aug. 19, 1996). Letter from Warren D. Hannah, Sprint and Glenn Brown, U S West, to William F. Caton, FCC (dated Aug. 22, 1996).

operations expenses in its cost estimates.²³ The BCM2 model incorporates 75 percent of the ARMIS customer operations expenses in its cost estimates. The differences in the treatment of customer operations accounts for 19 percent of the difference between the average monthly forward-looking costs estimated by the Hatfield and BCM2 models.²⁴

17. NCTA's ETI report asserts that regulators should rigorously evaluate the ARMIS data before accepting them as a basis for forward-looking costs. Its investigation of a Massachusetts cost study reveals that a significant proportion of product management expenses are related to market management and planning for business customers. NCTA argues that close examination of sales and advertising expenses reveals that these expenses are not related to the provision of basic residential service. It concludes that only four percent of marketing expenses should be assigned to the cost of providing the supported services.²⁵ We agree that rigorous evaluation of the ARMIS data, to the extent ARMIS data are used, is necessary. We are not willing, however, to conclude that ARMIS data are the only data that should be used to determine retail costs. Therefore, we are not prepared to recommend what would be the reasonable amount of retail costs.

18. Model results. The model results produce significantly different estimates of the nationwide total amount of support required to maintain the provision of the supported services in high costs areas. For example, at a \$20.00 benchmark, using the model's default settings, the Hatfield model indicates that the universal service support would be \$5.3 billion, which is the sum of \$3.4 billion for large LECs and \$1.9 billion for non-Tier1 LECs. The BCM2, at a \$20.00 benchmark, indicates that support would be \$14.6 billion.²⁶ The remaining difference, \$9.5 billion, is a function of the model input costs and engineering design principles.

19. Another means of evaluating the models is to compare their results to the results generated by embedded-cost studies. Because forward-looking and embedded costs rely on different input costs and technologies, the results from these studies are likely to

²³ Letter from Mike Pelcovits, MCI and Joel Lubin, AT&T, to John Morabito, FCC (dated Aug. 19, 1996).

²⁴ Letter from Mike Pelcovits, MCI and Joel Lubin, AT&T, to John Morabito, FCC (dated Aug. 19, 1996). Letter from Warren D. Hannah, Sprint and Glenn Brown, U S West, to William F. Caton, FCC (dated Aug. 22, 1996).

²⁵ NCTA cost model comments at 29-34, Attachment A ("Converging on a Cost Proxy Model for Primary Line Basic Residential Service: A Blueprint for Designing a Competitively Neutral Universal Service Fund," Susan M. Baldwin, Lee L. Selwyn (Aug. 1996)).

²⁶ Letter from Jay C. Keithley, Sprint, and Glenn Brown, U S West, to William F. Caton, FCC, in regard to CC Docket No. 96-45 (dated July 3, 1996). Letter from Chris Frentrup, MCI, and Bruce Cox, AT&T, to William F. Caton, FCC (dated Oct. 31, 1996).

differ. We are concerned, however, about large changes in the relative position of the states when comparing our embedded cost results to the results generated by the proxy models. The state characteristics, such as population density and terrain factors, that cause telephone companies in a state to exhibit high forward-looking costs in the models, do not cause those telephone companies to exhibit relatively high embedded costs. Alternatively, the change in position could be caused by specific management or accounting practices that affect embedded costs but that would not be reflected in forward-looking costs. A state's relative position can be measured by its rank, where the state with the lowest cost has a rank of one and the state with the highest cost would have a rank of 51. A change in the rank order is the difference between the rank order estimated by a model and the rank order according to the current high cost assistance mechanism, which ranks states by embedded loop costs. For example, the change in rank order for California is three because it is the third lowest cost state according to the BCM2 and it is the sixth lowest cost state according to the High Cost Fund.²⁷ There are fifteen states for which the change in rank order is greater than ten.²⁸ We believe it is necessary to determine why these large changes occur, and to ensure that the change in rank order does not threaten the provision of the supported services in these states.

20. Measure of support. The two models on the record calculate support required for the provision of the supported services as the product of the number of lines in a geographic area and the difference between a cost estimate and a uniform benchmark amount. BCM2 uses the CBG as the geographic area to measure the line count and cost estimate. BCM2 sums the support across all CBGs in a state to determine the state-wide support level. Calculation of support at either the wire center, study area, or density zone level is not a standard output of the model. Further manipulation of the BCM2 input sheets is required to obtain these results.²⁹ The Hatfield model estimates the cost per CBG. The model average CBG cost estimates across six density zones. It uses the difference between the density zone average and the benchmark to determine the per-line support per density zone. It multiplies the per-line support by the number of lines per density zone to estimate the density zone support and then sums across all density zones to determine the support for the study area. Calculation of support at either the CBG or wire center level is not a standard output of the

²⁷ Letter from Jay C. Keithley, Sprint, and Glenn Brown, U S West, to William F. Caton, FCC, in regard to CC Docket No. 96-45 (dated July 3, 1996). Monitoring Report, CC Docket No.87-339, Prepared by Federal and State Staff for the Federal-State Joint Board in CC Docket No. 80-286, May 1996, Table 3.3.

²⁸ For those fifteen states, the change in cost per line per month ranged from \$3.06 to \$24.41, with an average change of \$10.47.

²⁹ Letter from Jay C. Keithley, Sprint, and Glenn Brown, U S West, to William F. Caton, FCC, in regard to CC Docket No. 96-45 (dated July 3, 1996).