BEFORE THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE INVESTIGATION
OF THE COST OF TELECOMMUNICATIONS
ACCESS.

DOCKET NO. T-0000D-00-0672

The Residential Utility Consumer Office ("RUCO") hereby provides notice of filing the
Direct Testimony of Dr. Ben Johnson, in the above-referenced matter.

RESPECTFULLY SUBMITTED this 28th day of June, 2002.

Lindy Funkhouser
Director

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Arizona Corporation Commission
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COPIES of the foregoing hand delivered/mailed this 28th day of June, 2002 to:

Lyn Farmer
Chief Administrative Law Judge
Hearing Division
Arizona Corporation Commission
1200 West Washington
Phoenix, AZ 85007

Christopher Kempley, Chief Counsel
Legal Division
Arizona Corporation Commission
1200 West Washington
Phoenix, AZ 85007

Ernest Johnson, Director
Utilities Division
Arizona Corporation Commission
1200 West Washington
Phoenix, AZ 85007

Richard S. Wolters
AT&T Communications of the Mountain States, Inc.
TCG Phoenix
1875 Lawrence Street, Suite 1503
Denver, CO 80202

Eric S. Heath
Sprint Communications Company L.P.
100 Spear Street, Suite 930
San Francisco, CA 94105

Steven J. Duffy
Ridge & Isaacson, P.C.
3101 North Central Ave., Suite 1090
Phoenix, AZ 85012-2638

Timothy Berg
Theresa Dwyer
Darcy Renfro
Fennemore Craig, P.C.
3003 North Central Ave., Suite 2600
Phoenix, AZ 85012

Michael M. Grant
Todd C. Wiley
Gallagher & Kennedy, P.A.
2575 East Camelback Road
Phoenix, AZ 85016-9225

Thomas L. Mumaw
Snell & Wilmer, LLP
One Arizona Center
Phoenix, AZ 85004-2202

Joan S. Burke
Osborn Maledon, P.A.
2929 North Central Ave., Suite 2100
Phoenix, AZ 85012-2794

Curt Huttsell, Ph.D.
State Government Affairs
Citizens Communications Company
4 Triad Center, Suite 200
Salt Lake City, UT 84180

Valley Telephone Cooperative, Inc.
752 East Malley Street, PO Box 970
Willcox, AZ 85544

Michael W. Patten
Roshka Heyman & DeWulf, PLC
One Arizona Center
400 East Van Buren Street, Suite 800
Phoenix, AZ 85004

Thomas H. Campbell
Lewis and Roca, LLP
40 North Central Ave.
Phoenix, AZ 85004-4429

Teresa Tan
Worldcom, Inc.
201 Spear Street, 9th Floor
Department 9976
San Francisco, CA 94105

Dennis D. Ahlers
Eschelon Telecom, Inc.
730 2nd Ave. South, Suite 1200
Minneapolis, MN 55402-2456

By Linda Reeves

Linda Reeves

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IN THE MATTER OF THE INVESTIGATION OF THE COST OF TELECOMMUNICATIONS ACCESS

DOCKET NO. T-0000D-00-0672

DIRECT TESTIMONY

OF

BEN JOHNSON, PH.D.

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

JUNE 28, 2002
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INTRODUCTION

Q. Would you please state your name and address?
A. Ben Johnson, 2252 Killearn Center Boulevard, Tallahassee, Florida 32309.

Q. What is your present occupation?
A. I am a consulting economist and president of Ben Johnson Associates, Inc., an economic research firm specializing in public utility regulation.

Q. Have you prepared an appendix that describes your qualifications in regulatory and utility economics?
A. Yes. Appendix A, attached to my testimony, will serve this purpose.

Q. What is your purpose in making your appearance at this hearing?
A. Our firm has been retained by the Residential Utility Consumer Office ("RUCO") to assist with RUCO's participation in this generic proceeding to investigate the pricing of intrastate switched access service. I have been asked to provide testimony responding to the issues identified by the Arizona Corporation Commission (the Commission). More
Direct Testimony of Ben Johnson, Ph.D.
On Behalf of the RUCO, Docket No. T-00000D-00-0672

specifically, I will be discussing (1) whether interexchange carriers ("IXCs") may be at a competitive disadvantage if access charges are not reformed, (2) whether transferring cost recovery responsibility from IXCs (e.g. through carrier common line ("CCL") charges) to end users results in end user subsidies of incumbent local exchange carrier ("ILEC")-provided toll services, (3) whether transferring cost recovery responsibility from IXCs to end users results in end user benefits, and (4) what considerations make access charge reform in the public interest and, more specifically, why the reform plan recommended by RUCO is in the public interest.

Q. Would you please explain how your testimony is organized, and briefly summarize its major elements?

A. Yes. Following this introduction, my testimony has seven sections. The first section contains a brief discussion of the background of this proceeding and the positions of the other parties, to the extent these positions can be anticipated based upon comments previously filed in this proceeding.

The second section sketches the historical context of key issues involved in this proceeding, including positions taken over the past century by the U.S. Supreme Court, other state public utility commissions, Congress, and the Federal Communications Commission ("FCC") concerning certain issues which are crucial to the outcome of this proceeding. By examining these issues in a long term historical context, the Commission can gain valuable insight into the advocacy efforts of various parties, and gain a deeper understanding of the public policy tradeoffs involved in these issues.

The third section examines the public policy goals that I believe should guide the Commission's decisions in this proceeding. These policy goals include universal service, inter-customer equity, rate continuity, economic efficiency, technological innovation, and effective competition.

The fourth section focuses on the universal service goal and relates this goal to the
issues surrounding access rates and costs. I explain that transferring cost recovery
responsibility from IXCs to end users (through higher local rates or per-line end user
charges) may result in net benefits for high toll users but low toll users may experience
higher bills, which may discourage them from having phone service.

In the fifth section I discuss the economic characteristics of the networks which
are used in providing local exchange, toll, access, and custom calling services, and
explain in some depth the reason why the cost of providing switched access service has
been declining rapidly. I also explain why the appropriate method of recovering these
costs tends to be so controversial.

In the sixth section I comment on existing switched access rates and I compare
Qwest's rates in Arizona with the corresponding rates charged in various other states. The
final section of my testimony is devoted to a few concluding remarks.

Background

Q. Let's turn to the first section of your testimony. Would you please start by outlining
the history of this proceeding?

A. Yes. The Commission opened this docket in September 2000 with the intent of analyzing
the relationship between the rates charged and the costs incurred in the provision of
access service. [Procedural Order, December 3, 2001, p. 1] Due to "significant changes"
that it cites as having occurring in access markets, the Commission Staff ("Staff") filed a
request for a procedural order in this docket on November 21, 2001. [Id.] In that request,
Staff developed a list of 25 questions which it felt the Commission should seek comment
on from the intervening parties. [Id., pp. 2-4] The Commission subsequently issued a
Procedural Order on December 3, 2001. [Id., p. 5] In that Order, the Commission asked
parties to comment on each of Staff's 25 questions and asked Staff to file a proposed
procedural schedule. [Id., p. 2] The list of questions covered such topics as methods for
reforming intrastate access charges, implicit subsidies, monopoly power in access markets, universal service, and a host of procedural matters.

After having the time table to file comments extended by the Commission, the Arizona Local Exchange Carrier Association ("ALECA"), AT&T, Citizens Communications, Cox Telecom, Eschelon Telecom, Qwest, RUCO, Sprint, Table Top Telephone Company, Verizon, and Worldcom all filed responses to the Commission's questions by March 8, 2001. [Staff Recommended Procedural Order, March 28, 2002, pp. 1-2] After reviewing the filed comments Staff recommended that the Commission open a generic proceeding in which the parties could file multiple rounds of testimony. [Procedural Order, May 21, 2002, p. 1] Staff felt that parties should be required to draft direct testimony that answered four general questions, similar to those asked in the first Procedural Order.

1. Whether IXCs may be at a competitive disadvantage if access charges are not reformed.
2. Whether transferring cost recovery responsibility from IXCs through CCL charges to end users (through flat rate end user charges) results in end users subsidies of ILEC-provided toll services.
3. Whether transferring cost recovery responsibility from IXCs (through CCL charges) to end users (though end flat rate end user charges) results in end user benefits.
4. What considerations make access charge reform in the public interest and in addition what considerations make the interested party's proposed access charge reform plan in the public interest. [Id., pp. 1-2]

Following a Qwest response which sought to exclude the consideration of special access issues from this proceeding, the Commission issued its latest Procedural Order on May 21, 2002. The Commission declined to exclude discussion of special access, while recognizing that the primary focus of the investigation is switched access, and it adopted these four general questions for purposes of guiding the parties' testimony. [Id., p. 3] The
Order also set a procedural timetable for the filing of testimony.

Q. To provide some context for the detailed testimony which follows, would you please briefly summarize the similarities and differences in the comments of the parties filed on March 8, 2001?

A. Yes. First, Verizon and RUCO did not provide detailed comments on the substantive questions, instead focusing their responses on the procedural matters of interest to the Commission. Realizing the complexities involved in these issues, RUCO was not in a position to file detailed comments on these substantive issues without performing detailed research, with the assistance of outside experts. (RUCO subsequently hired our firm to assist it in this regard). Each of the other interveners did file responses concerning the substantive issues, and provided some indication of where they thought the Commission should go with this investigation.

Eschelon Telecom alone took the position that the Commission should not use this proceeding to move towards restructuring access charges in Arizona. Citing "a time of great uncertainty in the telecommunications industry" and the pending nature of Qwest's 271 application and "other fundamental issues about access and universal service" on the federal level, Eschelon felt that the Commission could best handle its investigation on a case-by-case approach rather than a statewide proceeding. [Responses of Eschelon Telecom, March 8, 2002, p. 1]

Cox took a similar stance in that it asked the Commission to "consider maintaining existing access charges or deferring any decision until the FCC conducts a significant restructuring of access charges." [Cox Arizona Telecom Comments, March 8, 2002, p. 1] When asked whether switched access charges contain implicit subsidies, Cox answered in the affirmative, stating that the CCL charge creates a subsidy that flows from high volume toll users to low volume toll users because the CCL recovers NTS costs with TS rates. [Id., p. 2] Cox favors using total element long run incremental costs (TELRIC)
to determine the presence of a subsidy and studies of costs and rates in both the access
and local exchange markets to determine the most appropriate method for recovering the
joint cost of the local loop. [Id., p. 3]

Citizens' approach to the subsidy issue is somewhat similar in that it advocates
using total service long run incremental costs (TSLRIC) to determine whether one service
is subsidizing another. Citizens states, for example, that "recent TSLRIC estimates of
basic local exchange services for Citizens' three Arizona ILECs show these services are
priced well below TSLRIC, strongly indicating they receive a cross subsidy." [Citizens
Communications Company Comments, March 7, 2002, p. 3] In pricing switched access,
the Company supports using TSLRIC as a measuring stick. [Id., p. 1] While Citizens
didn't explain how it treated joint and common costs in the referenced TSLRIC studies, it
proposed using revenues from an array of different ILEC services to recover its fixed and
common costs. [Id.]

Sprint uses the "cost-causation" terminology and line of argument to justify its
view of the issues in this proceeding. Cost-causation, according to Sprint "means that all
access charges should have an access cost associated with them and that the method of
charging for access should reflect the manner in which these costs are incurred by the
provider." [Sprint Communications Company Responses, March 7, 2002, p. 1] In other
words, "costs should be borne by the service that creates the cost." [Id., p. 2] This is one
of the classic arguments used to justify shifting costs away from toll services onto local
service. Although this argument has been advocated much more often than it has been
accepted by regulators, it continues to have a persuasive ring to it, if for no other reason
than because of the equity implications. It seems equitable to require those who "cause"
the costs of the local network to pay those costs. Similarly, it doesn't seem as inequitable
to allow IXCs like Sprint to gain free use of the local telecommunications networks, if it
can successfully be argued that these carriers don't "cause" the network to exist, and they
don't "cause" the various joint and common costs of that network to be incurred. Using
this line of reasoning, Sprint argues that the CCL should be eliminated and the costs
which have historically been recovered by this charge should instead be recovered from
consumers of local exchange service. [Id.]

In its comments, ALECA cautions the Commission against this approach to cost
allocation and recovery. Like Citizens Telecom, ALECA argues that all users of
telecommunications facilities should pay for joint and common costs like loops, citing
Section 254(k) of the Telecom Act. [ALECA Responses, March 6, 2002, p. 1] It argues
further that "shifting access costs from per-minute rates to flat monthly rates such as a
Subscriber Line Charge (SLC) will have the same effect as a local rate increase in the
opinion of the consumer." [Id., p. 2] While ALECA shows some willingness to consider
reductions to the CCL and other rates paid by carriers like Sprint, it cautions against
changes which have the effect of greatly increasing local rates in the rural areas served by
its members:

ALECA believes that, should the Commission decide to reduce
ALECA members' access rates, ALECA members must remain
revenue-neutral. In other words, ALECA is amenable to a
redesigned access rate structure where per-minute access rates are
reduced only if new revenue sources are made available and only if
the Commission maintains affordable local pricing for consumers.
[Id., p. 23]

Worldcom also advocates a massive shift in cost recovery away from switched
access charges, suggesting the Commission use the current level of interstate access rates
as a guide in establishing a redesigned intrastate access structure. [WorldCom Comments,
March 8, 2002, p. 5] It attempts to gain support for its position by citing the interstate
rates and noting that those rates which have been agreed to by the major parties involved
in this proceeding, including the large ILECs like Qwest. [Id., pp. 5-6] In the FCC's
CALLS proceeding, large ILECs and large IXCs agreed that interstate access rates should
be set at a target of $0.0055. [Id., p. 5] Worldcom argues that the costs for interstate and
intrastate access are identical and, therefore, the rates can be set at similar, if not identical
levels. [Id., p. 6] Worldcom also cites the presence of competition in certain portions of
the access market as a reason why the Commission should undertake a rate redesign. It
mentions Qwest's forthcoming 271 application and the growth in wireless and internet
messaging as additional reasons why it is concerned about the current high level of
intrastate switched access rates, and expressed concern that without substantial reductions
it might encounter a price squeeze. [Id., pp. 2-3]

AT&T takes a similar position to that of Sprint and Worldcom, urging the
Commission to undertake "swift prescriptive action" to reform switched access rates.
[Answers of AT&T, March 8, 2002, p. 36] While it also cites Qwest's 271 application as
a reason for concern, AT&T also worries about the potential for "re-monopolization of
the industry," focusing its concern more on Qwest than new technology competitors. [Id.]
AT&T offers four policy options that, in its view, the Commission should consider in
approaching the question of access reform. The second of these options is similar to
Worldcom's recommendation.

- Elimination of the non-cost based carrier common line
  ("CCL") as the initial action
- Mirroring of interstate switched access rates – rural and
  non-rural
- Use of a cost proxy model for the determination of
  switching and transport rates for all incumbent carriers
- CLEC access capped at non-rural carrier rates (once
  reformed) [Id., p. 8]

On the question of subsidy, AT&T apparently intends to assert that loop costs
shouldn't be recovered from switched access services, and should instead be borne
entirely by local exchange customers. It states that "whether residential customers are
subsidized today depends solely on whether the revenue received from vertical and other
services covers the cost to serve and connect them." [Id., p. 11] Implicit in this wording is
the notion that revenues from IXCs aren't a relevant part of the analysis, and that none of
the costs associated with connecting residential customers to the IXCs should be borne by
the IXCs. Like Sprint with its "cost causer" argument, AT&T apparently wants this
Commission to believe that the costs of connecting residential customers to IXCs is
entirely the responsibility of the residential customers, and that the IXCs should be given
free use of the facilities which connect these residents to the public switched network.

Qwest advocates the first of AT&T's proposed approaches and, to the extent the
second option is pursued by the Commission, asserts that it would require "a
revenue-neutral restructuring within Basket 2" of Qwest's Price Cap Plan. [Qwest
Response, March 8, 2002, p. 5, 7] Qwest apparently intends to use the familiar argument
that non-traffic sensitive costs shouldn't be recovered through traffic sensitive rates,
contending that the CCL is inefficient because it recovers fixed costs through per-minute
charges. [Id., p. 5] It feels that these per-minute charges would be more efficiently
recovered through a "flat-rate per-line charge to end users." [Id.] Qwest argues that
eliminating the CCL and imposing higher monthly charges on end users will encourage
competition, and it dusts off the "bypass" argument which was widely advocated (but
rarely accepted) during the mid to late 1980s. Qwest claims that in the absence of rate
restructuring, high access rates may cause some customers to "bypass" access providers
and instead connect directly to toll carriers. [Id., p. 3] In its comments, Qwest stresses the
importance of adopting an approach that is efficient and competitively neutral. [Id., p. 3]
Perhaps due to the success of the CALLS program in convincing the FCC to shift costs
away from IXCs, Qwest suggests an attempt at consensus building, in which parties to
this proceeding would "be permitted to get together and recommend a combination of
rates that satisfies criteria for efficiency and benefits all parties including consumers."
[Id., p. 6]
History of the Toll vs. Local Battle

Q. Let's turn to the second section of your testimony. Would you please begin by providing a brief definition of intrastate access charges?

A. Yes. These are rates charged by LECs and paid by IXCs for the origination and termination of long distance calls. When an end user places or receives a toll call, they typically use a phone line provided by their local exchange carrier. Although the IXC typically bills an end user for the phone call, the IXC normally pays one or more LECs for the use of network facilities which are used in processing the call. These inter-carrier billings are referred to as "switched access charges." The current system of access charges has evolved since the mid 1980's, but it represents a continuation of cost recovery process which has existed for a much longer period. Although this cost recovery process has undergone extensive review and modification, it continues to be an important source of revenues for the LECs, and is one of the reasons why local exchange rates remain as low as they are—particularly in rural areas. A brief discussion of the history of this cost recovery process is useful, if for no other reason than because it places the current controversy over access charges into a broader context.

Q. Can you briefly explain the difference between switched and special access charges?

A. Yes. Intrastate access charges include multiple "rate elements" that are designed to recover different types of costs. These rate elements fall into two main categories, switched access and special access. Switched access rates are designed to recover the costs of originating and terminating toll calls using ordinary phone lines connected to the LEC's end office switch. The most controversial rate element is the "carrier common line" charge, or "CCL" which recovers a portion of the cost of the line connecting an end user to the LEC, as well as the "port" which connects the line to the LEC's end office switch. Other rate elements recover a portion of the end office switch which is used in
processing the call, and help. In contrast, special access service typically provides a
dedicated circuit that connects the customer's premise directly to the IXC. The equipment
used in providing special access service is similar to, and may be identical to, that used in
providing switched access service. However, special access circuits are dedicated to a
narrow purpose, rather than being used jointly for many different purposes. These circuits
are often used in private networks, but they are also used to create a direct connections
between a particular end user and their serving IXC, without going through an LEC's
switch. Large users can sometimes choose between special and switched access service to
accomplish essentially the same functions, but special access service typically isn't a
cost-effective option for residential and small business customers.

Q. Is the debate over the relationship between access costs and access rates a new one?
A. No. For more than 20 years, interexchange carriers have advanced the argument that they
should be allowed to use the local networks without paying anything for this privilege.
They have advanced many different arguments in support of this position, including the
contention that the costs in question are "non-traffic sensitive" (NTS) and these costs
shouldn't be recovered through traffic sensitive toll charges (or access charges), the
argument that the costs of the local loop are entirely the responsibility of the end user who
is connected to that loop, and the argument that economic efficiency, the competitive
process, or some other desideratum will be furthered if cost responsibility is shifted from
toll to local markets.

Over the years, carriers have continued to recycle these arguments, adapting them
to fit changing market conditions and changing attitudes of their audience. Prior to
divestiture, the argument was that toll competition was increasing, and that local rates
needed to be increased in order to "level the playing field" and protect the financial
viability of the local carriers in the face of increased toll competition. Rate revisions were
proposed which would allow the LECs to cut prices in toll markets (where they
anticipated the strongest downward pressure on rates due to competition) and which
would allow them to "finance" these price cuts with increases in markets where
competitive entry was expected to be more difficult, and where competitive pressures
were expected to be less severe. By the mid-1980's, this theme was amplified and
repeated throughout the country, with an emphasis on the potential effect of equal access
and divestiture. Some of the Bell Operating Companies even implied that unless local
rates were dramatically increased at the time of divestiture, disaster would befall them.
Many regulators allowed rate increases around the time of divestiture, in most cases,
however, local rates were not increased as much as requested. Events subsequently
proved that the "doom and gloom" arguments were fundamentally false, or at least greatly
exaggerated. In the years since divestiture, LEC profits remained strong, "bypass" of the
LEC networks never grew as rapidly as predicted, and in most markets the LECs enjoyed
strong growth in demand for their switched access service, despite the fact that access
rates were established at levels far in excess of the levels advocated by AT&T and the
Regional Bell Operating Companies (RBOCs). Not only has history proven many of the
arguments in favor of shifting cost responsibility from toll to local markets to be false, but
the arguments in favor of drastic cost shifting tend to be inconsistent with both economic
theory and common sense.

According to this line of thinking, the local exchange networks are the
responsibility of the LECs and their local customers, and the interexchange carriers
should not be required to pay for using these networks, or at most they should make only
token payments for their use of the local networks. By this reasoning, because the IXCs
don't "cause" the costs of the local networks to be incurred, and/or because their usage is
"incidental" to the primary purpose of those networks, and/or because the costs in
questions are classified as "non-traffic sensitive" while access charges and retail toll rates
are both "traffic sensitive" rates, access rates should be reduced towards zero. According
to this argument, the cost of the loop, drop wire, line card, and channel connection are
exclusively part of the incremental cost of providing local exchange service, and none of
these costs can properly be considered part of the cost of providing switched access. If
one believes this line of reasoning, it would seem that the LECs are wrong to charge the
IXCs anything more than the direct, out of pocket cost of providing switched access
service.

Q. You mentioned the U.S. Supreme Court. Has it issued any ruling concerning this
controversy?
A. Yes. The U.S. Supreme Court handed down a landmark decision concerning the
interpretation and recovery of the joint cost of access lines more than 75 years ago in
Smith vs. Illinois Bell Telephone Company ("Smith"). Writing for the Court on the
question of whether the entire cost of the access line could be charged to a single service,
Chief Justice Charles Evans Hughes noted as follows:

In the method used by the Illinois Company in separating its
interstate and intrastate business, for the purpose of the
computations which were submitted to the court, what is called
exchange property, that is, the property used at the subscriber's
station and from that station to the toll switchboard, or to the toll
trunk lines, was attributed entirely to the intrastate service.... While
the difficulty in making an exact apportionment of the property is
apparent, and extreme nicety is not required..., it is quite another
matter to ignore altogether the actual uses to which the property is
put. It is obvious that, unless an apportionment is made, the
intrastate service to which the exchange property is allocated will
bear an undue burden.... [282 U.S. 150, 151 (August 1923).]

In the years since, this principle of fairly distributing the joint or fixed costs of the
network to all of the users of that network has been upheld again and again. Despite
decades of pressure to shift network costs from toll to local services, the policy of
spreading these costs across multiple services has been affirmed by state public utility
commissions in numerous proceedings throughout the country.

Q. Can you provide some recent examples where state commissions have supported the cost sharing principles set forth in the High Court's ruling in Smith vs. Illinois Bell?

A. Yes. In many cases, the issue has been resolved without much explicit discussion (e.g. by failing to adopt proposed rate changes). However, in some cases Commissions have discussed the issue in considerable detail. One prominent recent example is a April 11, 1996 order by the Washington Utilities and Transportation Commission, which rejected tariff changes proposed by Qwest (then known as U.S. West Communications or USWC).

[Commission Decision and Order Rejecting Tariff Revisions, Docket No. UT-950200.]

In analyzing various cost studies submitted in that proceeding, the Washington Commission found as follows:

[T]he cost of the local loop is not appropriately included in the incremental cost of local exchange service. The local loop facilities are required for nearly every service provided by the Company to a customer. Neither local service nor in-state long distance service nor interstate long distance nor vertical features can reach a customer without the local loop. Should USWC cease to provide any one of these services, its need for a local loop to provide the remaining services would remain. The cost of the local loop, therefore, is not incremental to any one service. It is a shared cost that should be recovered in the rates, but no one service is responsible for that recovery. USWC's presentation that the local loop is appropriately and necessarily an element of the cost of local exchange service, made through the testimony of witness Farrow, is not credible in light of the purposes of a long run incremental cost study and is inconsistent with accepted economic theory regarding such studies. [Order, p. 78]

The Washington commission's ruling is particularly significant because it was decided in a state in which local exchange competition had emerged early. The commission found that the advent of local competition had not altered the economic
character of the loop. Under conditions of competition, the loop was still a joint and
common cost that should not be recovered solely from end users, but rather in the prices
of all the services that use the loop.

The Pennsylvania Commission noted as follows:

We agree with the PTA and the OCA that local loop costs are joint
or shared costs since the local loop is jointly utilized to provide a
wide array of telecommunications services...[Pennsylvania Public
Utility Commission Order in Docket Nos. I-00940035,
L-000950105, August 31, 1995, p. 12.]

Likewise, in an order dated December 27, 1995, the New Mexico State
Corporation Commission concluded that "it is inappropriate to include the full cost of the
local loop in the determination of the cost of local exchange services." [Order in Docket
No. 94-291-TC: In the Matter of the Application of GTE Southwest, Inc. and CONTEL
of the West, Inc. to Restructure their Respective Rates, Ill58 (p. 15).]

Similarly, in its Costing and Pricing Rules, the Colorado Commission has stated
as follows:

The access loop is not a separate service but rather is an input
necessary for the provision of many telecommunications services.
As such, costs associated with the access loop will not appear in
the total service long run incremental cost of any single service
requiring the access loop but will appear as part of the total service
long run incremental cost of the entire group of services requiring
the loop.... [Rule 4(2)(iii)].

The Colorado Commission subsequently reaffirmed this position in its Order in
Docket No. 96S-257T (issued January 27, 1997), in which it stated:

Loop costs are shared and common and should be covered by all
the services using the loop.... The inclusion of loop costs in the
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TSLRIC for basic exchange service violates the definition of TSLRIC in the Commission's Costing and Pricing Rules. Loop costs would not be avoided if basic exchange services were eliminated and the provision of all other services continued. The network would still be a part of USWC's costs even if basic local exchange service were discontinued. [pp. 42-3.]

In a general rate case of USWC in Utah, that commission expressed its dissatisfaction with the repeated failure of USWC to treat the loop as a shared cost:

We are troubled by the Company's failure to take into account Commission Past orders which deal with some of the pivotal issues and assumptions which go into the calculation of TSLRIC. One failure, in particular, is the Company's decision to assign all costs of access lines to basic residential service... The Commission has already rejected the Company's premise that the only purpose of access lines, the local loop, is for the customer to obtain a dial tone or local service. Without the local loop, the end user would not have access to switched access products or use of toll services. [US West Communications, Inc., Utah Public Service Commission, Docket No. 95-049-05, Report and Order, at 95 (Issued November 6, 1995).]

In the Commonwealth of Virginia, based upon the record which included a cost study prepared and presented by GTE South Incorporated (the Company), a senior hearing examiner found:

While cost of service studies are not a precise science, I am unwilling to accept the results of the Company's LRIC studies in this case because I believe the studies significantly overstate the LRIC of basic local service. The loop is a utility asset which is used by a myriad of other services in additional to local service. Loop costs are, in every sense of the word, joint and common costs which should be allocated to all of the services utilizing the loop.

Indeed, under the Company's proposal to allocate all loop costs to
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local service, the traffic of interexchange carriers would essentially
receive a "free ride" over the loop. That is not fair to local service
customers. Local service customers should not be saddled with all
the costs of an asset which is used by numerous services provided
by the Company, interexchange carriers and others. [Glenn P.
Richardson, Report of Glenn P. Richardson, Senior Hearing
Examiner, Case No. PUC950019, March 14, 1997.]

In its final order, the Virginia Corporation Commission adopted this portion of the
examiner's 121-page report. [Application of GTE South Incorporated For revisions to its
local exchange, access and intraLATA long distance rates, Commonwealth of Virginia
State Corporation Commission, Case No. PUC950019, at 5,19-20 (August 7, 1997).]

In Iowa, the Utilities Board specifically found:

Designating the access line as a separate service and allocating all
of its costs to the local service customer continues to be a major
problem with U.S. West's LRIC methodology. [U.S. West
Communications, Inc., Iowa Utilities Board, Docket No.
RPU-94-1, Final Decision and Order, at 13 (IUB November 21,
1994).]

Similar conclusions have been reached at one time or another by regulatory
commissions in many other states, including Florida, Iowa, Louisiana, Minnesota, New
Hampshire, Texas, and Vermont. Furthermore, both the National Association of
Regulatory Utility Commissions (NARUC) and the National Association of State Utility
Consumer Advocates (NASUCA) have expressed support for the position that loop costs
are properly treated as joint or common costs of the various services using the loop, and
that these costs should not be shifted entirely onto local customers. [Comments of
NARUC, FCC Docket CC 96-45, at 20 (Filed April 12, 1996); Comments of NASUCA,
FCC Docket CC 96-45, at 23-24 (Filed April 12, 1996).]

In summary, numerous state regulators have joined NARUC, and NASUCA in
acknowledging that loop costs are properly treated as joint costs of the full family of
services that make use of the loop, including access, and they should not be loaded
entirely onto just one of those services (e.g. basic local service). While many of the
Arizona carriers believe it is in their economic interests to place 100% of the loop and
port costs onto local exchange customers, this approach is neither economically sound nor
fair. I provide an extended discussion of the joint and common cost concept in Appendix
B to my testimony.

Q. Has Congress also spoken to the issue of shifting joint and common costs entirely
onto local service customers?
A. Yes. The appropriate treatment of these shared costs has been vigorously debated for
many years in many different forums. Thus, it isn't surprising that Congress included
some specific provisions relating to this issue in the 1996 Telecom Act. The Act adds an
entirely new section to federal law dealing with universal service--Section 254. Within
this context, a portion of §254(k) reads:

[T]he States, with respect to intrastate services, shall establish any
necessary cost allocation rules, accounting safeguards, and
guidelines to ensure that services included in the definition of
universal service bear no more than a reasonable share of the joint
and common costs of facilities used to provide those services. [47

Congress was aware of the long standing debate over the proper treatment of these
costs, and the desire of many carriers to shift these costs from toll to local services, as
well as the propensity of monopolists to attempt to shift costs onto their most captive
customers when faced with an increased threat of competition. The remaining parts of
254(k) make it clear that the purpose behind these provisions is to prevent placing an
excess cost burden on basic local service and other services included within the universal
service category. While Congress hasn't mandated the specific allocation procedures to be
used, or specified exactly how much of the joint costs can be placed onto the basic
exchange category, it is obvious that 100% allocation of these costs onto local exchange
service would be contrary to the intent of this passage. Such an extreme shift of cost
responsibility would force local exchange service to bear more than a reasonable share of
the joint and common costs of facilities used in providing local, access, and other
services.

Q. Historically, much of this debate has swirled around the Federal Communications
Commission ("FCC"). What stance has the FCC taken with regard to the recovery
of joint and common cost?

A. The FCC's positions in this area have varied somewhat, depending upon the time frame
and the context. The FCC has recognized that telecommunications carriers provide
multiple services using a common network, and it realizes that this situation greatly
complicates issues of cost recovery. As the FCC has explained:

676. Certain types of costs arise from the production of multiple
products or services. We use the term "joint costs" to refer to costs
incurred when two or more outputs are produced in fixed
proportion by the same production process (i.e., when one product
is produced, a second product is generated by the same production
process at no additional cost). [Implementation of the Local
Competition Provisions in the Telecommunications Act of 1996,
Interconnection Between Local Exchange Carriers and Commercial
Mobile Radio Service Providers, CC Docket Nos. 96-98, 95-185,
First Report and Order, FCC 96-325 (adopted August 1, 1996)
(Local Competition Order) at ¶ 676.]

The FCC has also recognized the fact that the loop is shared by multiple services.
According to the FCC, the loop is "needed" and "used" by several telecommunication
services--services which reside within both the interstate and intrastate jurisdictions. As
previously acknowledged, dealing with costs associated with a shared facility can be
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challenging. The FCC states:

Determining the costs that an incumbent LEC incurs to provide
interstate access services and that, consequently, should be
recovered from those services, is relatively straightforward in some
cases and problematic in others. ... Most facilities, however, are
used for both intrastate and interstate services. ... By contrast, the
cost of other facilities used for both interstate and intrastate traffic
do not vary with the amount of traffic carried over the facilities,
i.e., the costs are non-traffic sensitive. These costs pose
particularly difficult problems for the separations process: The
costs of such facilities cannot be allocated on the basis of
cost-causation principles because all of the facilities would be
required even if they were used only to provide local service or
only to provide interstate access service. A significant illustration
of this problem is allocating the cost of the local loop, which is
needed both to provide local telephone service as well as to
originate and terminate long-distance calls. [Access Charge
Reform, Price Cap Performance Review for Local Exchange
Carriers, Transport Rate Structure and Pricing and End User
Common Line Charges, CC Docket Nos. 96-262, 94-1, 91-213,
and 95-72, First Report and Order, FCC 97-158 (adopted May 7,
1997) (Access Charge Reform Order) at ¶ 23. emphasis added.]

Consistent with this view of common costs, in a recent trilogy of orders the FCC
clearly recognized that the costs associated with the loop are shared costs of multiple
services. In its initial First Report and Order concerning the implementation of local
competition, the FCC recognized that the loop is a shared facility used to provide
telecommunication services which gives rise to common costs. The FCC stated:

As discussed in greater detail below, separate telecommunication
services are typically provided over shared network facilities, the
cost of which may be joint or common with respect to some
services. The costs of local loops and their associated line cards in
local switches, for example, are common with respect to interstate
access service and local exchange service, because once these
facilities are installed to provide one service they are able to provide the other at no additional cost. [Local Competition Order at ¶678.]

The FCC followed this first order with proposed rulemaking on access charge reform. In the context of this rulemaking process the FCC reaffirmed the concept that costs associated with the loop are common costs with respect to certain telecommunication services. [Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Transport Rate Structure and Pricing and Usage of the Public Switched Network by Information service and Internet Access Providers, CC Docket Nos. 96-262, 94-1, 91-213, and 96-263, Notice of Proposed Rulemaking, Third Report and Order, and Notice of Inquiry, FCC 96-488 (adopted December 23, 1996) (NPRM, Third Report and Order).] The FCC states:

For example, interstate access is typically provided using the same loops and line cards that are used to provide local service. The costs of these elements are, therefore, common to the provision of both local and long-distance service.[¶237.]

In an effort to respond to concerns about traffic sensitive recovery of NTS costs while maintaining consistency with the reasoning behind the Smith vs. Illinois Bell case, the FCC developed and announced the phase-in of an alternative to the CCL rate, called a "primary interexchange carrier charge" (PICC). The PICC was assessed on and paid by the end user's presubscribed interexchange carrier. The FCC believed that the PICC, along with the Subscriber Line Charge (SLC), would allow LECs to recover most of the interstate jurisdiction's portion of the loop cost through rates that weren't traffic sensitive. [Access Charge Reform Order at ¶54 and 55.]

In its decision to replace the Common Carrier Line Charge (CCL) with the PICC, the FCC stated:
We reject claims that a flat-rated, per line recovery mechanism assessed on IXC's would be inconsistent with section 254(b) which requires "equitable and nondiscriminatory contributions to universal service" by all telecommunication providers. The PICC is not a universal service mechanism, but rather a flat-rated charge that recovers local loop costs in a cost causative manner. [Id., ¶104.]

The FCC has also rejected the argument that loop costs aren't attributable to long distance calling: "Much of the telephone plant that is used to provide local telephone service (such as the local loop, the line that connects a subscriber's telephone to the telephone company's switch) is also needed to originate and terminate interstate long-distance calls." [Id.] The FCC has varied its response over the years to the many parties who have advocated shifting costs away from interstate switched access rates. In the mid-1980's its response was to adopt the SLC rate, which shifted some of these costs away from per-minute access rates, onto per-line rates paid by local exchange customers. It's initial experience with the SLC was apparently not entirely positive, however, and for many years it refused to move entirely from the CCL rate to a higher SLC. It has only been recently that the FCC has agreed to reduce the interstate CCL rate to zero. And this movement has been somewhat circuitous, in which the FCC at first adopted the PICC, thereby rejecting proposals by carriers like AT&T, who have consistently urged a massive shift of cost responsibility from IXC's to end users.

Q. Has the FCC taken any more recent action in the area of access charge reform?
A. Yes. Approximately three years and many rounds of debate later, the FCC issued what is commonly referred to as its CALLS order. This order was based on a proposal developed by Coalition for Affordable Local and Long Distance Service. According to its proponents, this plan was designed to reduce, and in most instances eliminate, implicit subsidies among end-user classes; make implicit universal service funding in access charges explicit and portable; provide significant benefits to consumers who make few or
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no long-distance calls; and set carrier charges at reasonable levels. [Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Low-Volume Long-Distance Users, Federal-State Joint Board on Universal Service, CC Docket Nos. 96-262, 94-1, 99-249, and 96-45, Sixth Report and Order, FCC 00-193 (adopted May 31, 2000) (CALLS Order) at ¶ 29.] The FCC felt that the CALLS Proposal was procedurally advantageous because it produced end user benefits, was pro-competitive and economically efficient. [Id.]

The primary features of the CALLS program are summarized below:

- Increased the primary residential and single line business subscriber line charge (SLC) caps to $4.35 on July 1, 2000, and gradually increased the SLC caps thereafter to $6.50 on July 1, 2003;
- Removed $650 million in implicit universal service support from carrier access charges;
- Created an explicit portable interstate access universal service support mechanism;
- Eliminated the residential Primary Interexchange Carrier Charge (PICC);
- Required Interexchange Carriers (IXCs) to flow through reductions in access rates to residential and business customers;
- Temporarily eliminated minimum usage rates for low-usage customers by long distance carriers; and
- Provided additional lifeline assistance to low income customers to protect them from increases in the residential SLC.
Later, on October 20, 2000, a diverse group of industry participants filed a plan with the FCC for improved regulation of interstate services of non-price cap incumbent local exchange carriers and interexchange carriers. The Multi-Association Group (MAG) members, consisting of the National Rural Telecom Association (NRTA), the National Telephone Cooperative Association (NTCA), the Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO) and the United States Telecom Association (USTA), claimed that its plan, or petition for rulemaking, would improve the Commission's access charge and universal support systems, as well as to enforce the geographic averaging requirements of the Act.

The MAG plan attempted a holistic approach in addressing the regulation of those ILECs that are not subject to price cap regulation. These rate of return carriers included most of the small and mid-sized LECs that serve U.S. rural and insular areas.

The basic recommendations of the MAG Plan were:

- to provide a more efficient cost recovery mechanism under the FCC's access charge system
- to make universal service support explicit
- to enforce the geographic averaging requirements of the Act
- to ensure availability of broadband and advanced services to all Americans
- to move in the same policy direction as the RTF plan, although subtle differences exist
- to remove current caps on high cost loop support
- to provision two paths of implementation thereby recognizing the diversity of non-price cap carriers
- to adopt the Federal-State Joint Board on Jurisdictional
Separations' recommendation for freezing jurisdictional factors

The MAG Plan was intended to be compatible with the CALLS plan and gained support from the FCC because the reforms were designed to establish a "pro-competitive, deregulatory national policy framework" for the United States telecommunications industry, and fulfill universal service provisions in the 1996 Act. [Multi-Association Group (MAG) Plan for Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and Interexchange Carriers Federal-State Joint Board on Universal Service Access Charge Reform for Incumbent Local Exchange Carriers Subject to Rate-of-Return Regulation Prescribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers, CC Docket Nos. 00-256, 96-45, 98-77, and 98-166, Second Report and Order, FCC 01-304 (adopted October 11, 2001) (MAG Order) at ¶ 3.]

Specifically, through the MAG Plan the FCC hoped to "align the interstate access rate structure more closely with the manner in which costs are incurred, and create a universal service support mechanism to replace implicit support in the interstate access charges with explicit support that is portable to all eligible telecommunications carriers." [Id.]

Q. Why is it beneficial for the Commission to examine the manner in which the issues involved in this proceeding have evolved over time?

A. The Commissioners can learn a great deal from both past arguments that parties have put forward concerning access cost-related issues and the ways in which other regulatory bodies have investigated and ruled in similar proceedings. For many years there has been a wide consensus among federal and state regulators rejecting attempts to shift joint and common costs entirely onto local exchange service. While responses to this debate have changed and evolved over time (e.g. the FCC's establishment and later repeal of PICC charges), in most cases decision makers have responded similarly, rejecting as fallacious
the varied arguments claiming that the costs of the local network are the sole responsibility of local exchange service, and generally refusing to adopt extreme shifts in costs away from IXCs to local customers.

Public Policy Goals

Q. Please turn to the third section of your testimony. Would you please briefly explain the policy goals you feel should guide the Commission's decision-making process in this proceeding?

A. Certainly. Briefly stated, the Commission should strive to ensure that the public receives high-quality telephone service at the lowest practicable cost and that the telecommunications infrastructure not only keeps pace with, but also actively stimulates economic growth and technological progress in Arizona. More specifically, I believe the following specific public policy goals are particularly important, and should guide the Commission's deliberations in this proceeding:

(1) The preservation and promotion of affordable, high-quality, universal, basic telecommunications services.

(2) The maintenance of fair, just, and reasonable rates (inter-customer equity).

(3) The maintenance of a reasonable level of rate continuity.

(4) The promotion of economic efficiency.

(5) The promotion of technological innovations.

(6) The encouragement of effective competition.
Q. Please explain the first of these six goals. What is universal service and why is this important as a policy goal in developing rates?

A. Universal service is a situation in which virtually every household and business is connected to a common communications network, so that everyone can conveniently and inexpensively communicate with everyone else—including those who are not inclined to have a phone, because their disposable income is so limited, or they simply don't place much value on having telephone service. This has been a major policy goal for legislators and regulators for the past 70 years, and it continues to be a very important goal. Society, ratepayers, and the Company all benefit from maximum subscriber participation on an interconnected telephone network. It has long been clear that the more users a network links together, the more valuable the service is for each and every user.

Q. Would you next discuss the second of your recommended policy goals—that of equity between rate classes?

A. Yes. While much of the debate in this proceeding is likely to play out in terms of cost theory, economic efficiency, and other technical arguments, behind the surface of these debates are fundamental questions of equity. For instance, regulators have often rejected seemingly plausible costing approaches which exclusively allocate loop costs onto basic local exchange service, because this seems fundamentally unfair to local exchange customers. Loops (which connect customers to their central office) are used in the provision of the entire range of telephone services, including access, toll and custom calling. Hence, most observers will agree that it is equitable for subscribers to all these services to share in the cost of the construction and maintenance of these facilities. Giving a completely "free ride" to the IXCs violates fundamental notions of fairness.

Interestingly, in a competitive industry, the burden of joint costs primarily depends upon the relative strength of demand for each service—the price of more valuable services will incorporate a larger share of the joint and common costs than the price of
services considered to be less valuable. In a regulated industry, there are many factors that should influence the share of joint and common costs recovered from each service, and one can reasonably debate the appropriate resolution of this issue. However, it clearly would be inequitable for all of these costs to be paid by basic local exchange customers, or for none of these costs to be borne by custom calling, toll and switched access customers. Yet, if history is any guide, we can anticipate that some of the parties in this proceeding will attempt to justify shifting all of the cost burden away from the IXCs and toll markets generally. I discuss the concept of joint costs and the manner in which these costs are recovered in competitive industries in more depth later in my testimony.

Q. **How can the Commission's decision making be guided by the equity goal?**

A. Yes. There are many aspects of equity, and I won't attempt to catalog them here, but I would note that equity requires consideration of more than simply whether some customers are paying less than the cost of serving them, or less than they would be willing to pay, if forced to do so. Drastic rate increases should not be imposed on ratepayers who do not have adequate alternatives—in other words, the principle of rate continuity is consistent with basic principles of fairness. Just as our country's founding fathers felt that taxation without representation was inequitable, customers who have been protected from monopoly power will feel that extreme rate increases are inequitable, unless they have adequate opportunities to select lower cost alternatives. To the extent access reform involves substantial rate increases for some customers, the Commission should consider phasing in the rate changes, thereby reducing the adverse impact and providing time for customers to seek out competitive alternatives.

Equity also suggests that while the concept of "revenue neutrality" (protecting individual carriers from adverse changes in their revenues) has some appeal, it isn't necessarily an appropriate basis for constructing an optimal policy. Why should carriers be protected from any reduction in their revenues, if customers aren't going to be
protected from any increase in their rates? A more equitable approach would protect both carriers and customers from extreme changes, while requiring both groups to share the burden of needed reforms. Thus, for example, if carriers are currently recovering an excessive share of the joint and common costs from switched access rates, it may be appropriate to reduce those charges—without necessarily increasing other rates on a dollar-for-dollar basis. Basic principles of equity require a careful and deliberate approach to policy changes, but it doesn't mean that carriers should be totally protected from any changes while customers are given little or no protection. Stated differently, equitable treatment of individual carriers should not be pursued to the point where individual customers are treated inequitably.

Of course, in urging the Commission to maintain rate continuity, I'm not suggesting that it should protect every customer from any adverse changes in their bills. If every carrier or every customer were to be "held harmless" the Commission's hands would be tied, making it impossible to fully advance the goal of universal service. It is certainly possible that IXC's are paying too much for switched access service, and for that matter some customers may be paying too little for local exchange service. Hence, some reduction in access rates may be appropriate, and some increase in local rates may be merited. However, an optimal resolution of the issues in this proceeding may require gradual changes, with some of the burden of access rate reductions being absorbed by customers (e.g. through changes to the Arizona Universal Service Fund) and some of the burden being absorbed by carriers (e.g. by reductions in profit margins).

Equitable treatment of carriers doesn't necessarily mean equal treatment, nor does it imply that every carrier should be treated identically, regardless of circumstances. Rather, equity implies a mechanism that avoids unduly favoring or disadvantaging any carrier or class of carriers. For example, while all carriers should participate in the effort to maintain or achieve universal service, one cannot reasonably expect every carrier to carry an equal share of the overall burden. Large carriers obviously can and should
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contribute more to the support of universal service than small carriers. Similarly, the "carrier of last resort," function would normally be assumed by the incumbent LEC, which alone possesses the ubiquitous network and other infrastructure necessary to carry out that responsibility. Incumbency confers many competitive advantages on its possessor, such as ownership of ubiquitous facilities, a dominant market share, and name recognition. In developing equitable policies, the Commission can and should recognize the advantages of incumbency, while also recognizing offsetting burdens and obligations.

In this proceeding, the Commission has sought comment on "whether transferring cost recovery responsibility from IXCs (through CCL charges) to end users (through end flat rate end user charges) results in end user benefits." [Procedural Order, May 21, 2002, p. 2] If the CCL is reduced or eliminated, the most direct beneficiaries will be the IXCs, who will experience an immediate reduction in their cost of doing business. Even if they pass this cost reduction through to their customers in the form of lower rates, the IXCs will benefit because rate reductions will stimulate additional demand for their services, from which they will benefit. Since this is a declining cost industry, traffic growth tends to translate into lower unit costs and higher profits. For this same reason, local exchange carriers like Qwest may benefit from access rate reductions—particularly if they are allowed to impose offsetting increases in other rates. As access and toll rates decline, long distance traffic volumes will be further stimulated, resulting in higher revenues and profits for Qwest and other carriers.

From a customer perspective, the benefits from lower access rates will vary in importance, depending upon several factors—most importantly the extent to which customers make long distance calls. When access rates are reduced, toll carriers are likely to reduce at least some of their rates. However, they may find it profitable to leave some rate plans relatively unchanged, while reducing other rates more substantially. Furthermore, even if reductions in access rates were passed through to customers on an equal per-minute basis (which is unlikely), the benefits won't be spread uniformly to all
customers. To the contrary, customers who are heavy toll users are likely to benefit much more than low volume toll users. In actual practice, those high volume toll customers who show the least loyalty to their existing carrier and are the most sensitive to price differences are likely to gain the lion's share of the benefit from any toll rate reductions which follow from access reform.

In general, a flat monthly rate paid by end users will tend to shift costs away from large toll users, particularly large business customers, onto those end users who place relatively few toll calls, particularly residence customers and those small businesses that do not need, or cannot afford, to place large numbers of toll calls. Hence, the Commission must recognize that a program of rate "rebalancing" which is revenue neutral will unquestionably not have neutral impact on individual customers. To the contrary, any such "reform" will result in both "winners" and "losers." While the carriers may all be winners, many customers will be losers, because any toll rate reductions they experience will not be sufficient to offset the increases they experience in other portions of their monthly bill. The Commission should, therefore, proceed with caution and carefully weight the consequences of any plan which might be proposed to lower access and toll rates while increasing other rates.

Q. Would you please discuss the third of your recommended policy goals--the maintenance of reasonable rate continuity?

A. Yes. Another longstanding principle of rate making is that customers should not be subjected to sudden and extreme increases in rates, particularly if the increases are unrelated to improvements in service quality or expansions in service offerings, and even more particularly if no reasonable substitute for the service is readily available. In the present context, it is worthwhile to separately state the goal of rate continuity, because it reinforces the importance of the universal service and equity goals. If the traditional rate continuity principles were ignored, the abrupt nature of the potential increases to local
rates could cause subscribers to drop off the system, to the detriment of the universal
service goal. Similarly, regulatory commissions often have found that "rate shock" should
be avoided, or minimized for both equitable and other reasons. Where customers do not
have other viable options (e.g., where effective competition does not exist), extreme or
abrupt rate increases are particularly inappropriate and undesirable. In this regard, it is
important to realize that the goal of rate continuity doesn't preclude changes to the status
quo—it merely requires that changes be well justified, and that they be implemented in a
gradual manner.

Q. Would you next discuss the fourth of your recommended policy goals—the
promotion of efficiency through pricing?
A. Yes. Efficiency is a well recognized goal in utility rate design. Economics describes it as
a state in which an optimal level and mix of goods and services is produced, using
optimal production methods. In the context of telecommunications regulation, this
objective implies that rates should not induce wasteful and inefficient methods of
production (either by the utility or by other producers), nor lead to over- or
under-consumption of the telecommunication firm's services.

    Under the widely accepted approach of Vilfredo Pareto, economic efficiency or
inefficiency can be defined in terms of waste. When economic efficiency has been
maximized, any change will increase waste. To the extent the Commission seeks to
improve or maintain economic efficiency, the logical focus is on marginal cost. This is
the type of cost that is most relevant to discussions of economic efficiency, and an
understanding of the marginal cost concept is essential to any effort to maximize
economic efficiency.
Q. Would you please discuss the fifth goal—the promotion of economic growth and technological progress?

A. Certainly. If universal service is defined merely as applying to voice grade dial tone at the end of a customer's line, then in the coming age of the broadband "telecommunications superhighway" local exchange companies like Qwest will surely have no problem supplying it at a marginal cost considerably below current rates. I say this because basic voice communications require a small fraction of the total bandwidth required for video on demand, high speed internet access, and other advanced services. Thus, for example, if broadband services are widely available at affordable prices, then the marginal cost of carrying ordinary voice traffic on such a network will be very small. In turn, if the price of basic local service were set at its marginal cost level, it would be easy to ensure that nearly everyone has voice grade telephone service at extremely low prices. Needless to say, however, that is not the method of cost recovery envisioned by most of the parties to this proceeding. To the contrary, they view the basic local exchange customer as the "cash cow" that can be most effectively forced to cover the fixed costs of the network. All other services, including toll and switched access, video services, high speed internet access and the like, are given the benefit of being classified as "ancillary services" which carry little or none of the fixed cost burden.

The past decade has seen a continued downward trend in telecommunications costs. Technological improvements and increasing scale economies have resulted in sharp reductions in the cost of providing most telecommunications services. As costs have declined, profits have generally increased and many prices have also decreased in various parts of the industry. A proposal to increase local rates runs counter to this overall trend. While some shifting of costs from toll to local services may be the inevitable consequence of recent policy shifts in the federal jurisdiction, I would suggest that the Commission should not view these two issues—toll rate reductions and local rate increases—as inextricably linked. To the contrary, the benefits of increasing economies of
scale and technological innovation, as well as surging demand for telecommunications
services creates a declining cost environment in which access charges and toll rates can
be reduced substantially without necessarily requiring an offsetting increase in basic local
exchange rates.

RUCO's resistance to proposals for extreme reductions in access charges does not
stem from a preference for basic over enhanced services. To the contrary, both types of
services are important, and an optimal policy will result in low prices for both
conventional and enhanced services. Telecommunications, as an industry, is undergoing a
competitive technological revolution, which is gradually extending the definition of what
services are considered to be "basic" or "vital" to consumers. While there is considerable
uncertainty concerning the timing and extent of this trend, I consider it likely that what
POTS (plain old telephone service) has been for the 20th century, some form of
broadband service will be for the 21st.

The economic benefits to be derived from universal service are inherent to the
very nature of two-way communications networks. In resolving public policy issues, it is
important to remember that the concept of universal service is not simply a question of
equity, or the desire to ensure that everyone in society enjoys a minimum standard of
living. The strength and efficiency of our economy depends in part on how successful we
are in developing and maintaining key elements of our nation's infrastructure—including
two-way communications networks in which nearly everyone participates.

Society as a whole benefits from the flow of communication. Many systems,
including markets, become more efficient when the flow of information improves.
Economic theory suggests that such positive externalities should be considered in
resolving policy issues, such as the rate rebalancing proposals in this proceeding.
Although externalities are not reflected in the development of costs, they have historically
been acknowledged by regulators, at least implicitly, when decisions have been made to
keep the price of certain services low enough to encourage nearly everyone to join the
network, regardless of how low their income may be, or how little they may value a telephone.

Q. You mentioned that one of the goals is advancement towards "effective" competition. What do you mean by this term?
A. When attempting to decide whether a product is produced and marketed under competitive conditions, one must consider pricing behavior. In a fully competitive marketplace, both buyers and sellers view price as a given. All participants in the market behave as if market prices are unaffected by their own decisions regarding how much they should purchase or produce. If either buyers or sellers recognize that they can control prices, competitive conditions do not fully prevail. The greater the degree of control exercised by a buyer or seller, the less competitive forces will prevail.

Usually, four conditions are considered sufficient to assure that sellers will behave as "price takers," or effectively compete with each other. If any one of these conditions is absent, the prospects for effective competition are diminished or eliminated.

First, no one firm can have a dominant share of the market. If a firm engages in price leadership, dominant firm pricing, or price discrimination, its behavior is inconsistent with competitive behavior. Needless to say, this condition is violated in the provision of any service where a firm's market share is greater than that of all its competitors combined.

Second, the products of the supplying firms must be generally uniform (from the perspective of the buyers in the market). If consumers view the product or service as unique, the firm will not need to behave as a "price taker."

Third, the number of supplying firms must be large enough so that the total amount supplied to the market cannot be restricted. It always is in the interest of suppliers to limit the total amount supplied to the market, because by limiting supply, they can charge a higher rate and earn greater returns (economic profits) than under the conditions...
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of competition.

Fourth, as noted in the criteria cited above, firms must be free to enter and exit the market. If any firm decides to produce the service, no substantial legal, financial, or other barrier must stand in its way. Patents or trademarks (such as brand names) and other legal barriers can preclude effective entry.

Q. How do you think the Commission should respond in this docket to the trend towards competition?

A. This is not the appropriate forum for resolving the many complex issues that arise from this trend, but I believe that the Commission needs to make sure that its decisions in this docket are consistent with the public interest in moving this trend forward towards effective competition (rather than allowing the trend to evolve towards a cartel-like oligopoly, or an unregulated monopoly). Furthermore, while the trend towards increased competition is important, the Commission should not feel pressured to adopt rate changes merely because of this trend. During the transition towards a more competitive market, the Commission continues to have great flexibility in adopting appropriate public policies, and it should continue to establish rates which advance the broad public interest, rather than the narrow corporate interests of the carriers participating in this proceeding. The trend toward increased competition can appropriately be accommodated and encouraged through a variety of different policy approaches—there is no requirement that the Commission mirror the recent actions of the FCC, or to reduce the CCL to zero merely because some carriers believe that such a change would make it easier for them to compete against Qwest once it gains 271 approval.

Q. How would you apply these policy goals and objectives in an evaluation of access rate design proposals?

A. In analyzing proposals, I would support an approach which attempts to strike a reasonable
balance among the six public policy goals rather than seek to achieve one goal to the
exclusion of all others.

For example, it is often argued that economic efficiency will be encouraged if
rates are moved toward their marginal cost, and I agree with this premise. However, if
such movement would require drastic rate increases for particular groups of customers, I
would recommend moderation of the suggested rate change. In my opinion, efforts to
promote economic efficiency should not take precedence over considerations of rate
continuity and avoidance of disruptive rate changes.

Likewise, it would not be in the public interest to risk the universal service
objective by adopting rate design proposals that would shift a large share of the revenue
burden from toll and access to residential basic exchange services. Some may argue that
such a shift will encourage efficiency, by bringing the toll and access rates closer to
marginal cost. But to determine if such a shift would truly result in a net gain in
efficiency, the Commission would also need to consider any offsetting efficiency losses
that would result in the local market, where prices would be increased farther above
marginal cost, consideration of network externalities would diminish, and universal
service would suffer.

The pricing arrangements of the past several decades, which have required toll
users to shoulder a sizable share of the joint costs of the network, have been very
successful in creating and maintaining a ubiquitous telephone system that is unparalleled
anywhere else in the world. In the United States, nearly everyone is connected to a
common telecommunications network. While some changes to the traditional pricing
arrangements and rate relationships might be needed to reflect changing conditions (e.g.,
increased competition), the Commission should not rush to abandon a longstanding
pricing approach which has been so successful in benefitting the public.

It is also important to carefully evaluate the potential consequences of proposed
realignments of telecommunications prices at this early stage in the transition toward a
more competitive market. While reducing access rates may benefit some carriers, increases in local rates won't necessarily help new entrants gain a foothold in the market, and there may be unintended consequences of such a policy, which may make progress towards effective competition less likely to be achieved.

Universal Service and Access Reform

Q. Let's turn to the fourth section of your testimony, concerning universal service. Why is this an appropriate policy goal?

A. As I indicated earlier, universal service is realized when nearly everyone is connected to the public switched telephone network, regardless of how low their income, or how little they value telephone service. Universal service is a desirable goal because it facilitates the free flow of communications within society. This benefits everyone—including the people who would otherwise not have a telephone, as well as everyone who needs to communicate with them.

While this goal is widely accepted, it sometimes gets less attention than it deserves. Because of the rapid changes taking place in the telecommunications industry—including increased competition, deregulation, and changing federal policies—many state regulators are hard pressed to balance the goal of universal service with other policy objectives. Even so, it should never be forgotten that all of society—including business and residential end users as well as both local and long distance carriers—benefits when nearly everyone participates on a universal, fully interconnected telephone network.

There is no inherent conflict between the goal of universal service, and the idea of opening the local telephone markets to competition—provided that all carriers are required to interconnect with each other on reasonable terms and conditions. In other words, nearly everyone can be connected to a universal public switched network, yet portions of that
overall network may be owned and operated by competing firms. Stated differently, a
global network of interconnected networks can achieve the goal of universal service just
as effectively as a smaller group of monopoly networks. However, individual customers
and carriers do not necessarily have the incentive to advance the goal of universal service.
For instance, incumbent carriers may seek to discourage entry by competitors by making
it difficult, or unduly costly for the newer firms to interconnect with, or utilize portions
of, the established firm's network. Accordingly, the Commission should establish
appropriate policies to ensure that all of the networks are interconnected and compatible
with each other, and to encourage every business and every household to connect to this
network of networks.

Q. Can you please explain what you mean by the "positive externalities" associated
with universal service?

A. Yes. The provision of telephone service (particularly the connection of individual
subscribers to the telephone network) involves significant benefits that are not recognized
by the individual consumers who sign up for the service. In other words, they involve
what economists refer to as "positive externalities."

    For instance, numerous individuals benefit when a new customer joins the system,
because the value of having a telephone increases as the number of subscribers rises. (If
none of your friends, relatives, and/or business associates were connected to the telephone
system, you would place little value on having telephone service for yourself.) Moreover,
society as a whole benefits from the flow of communication facilitated by universally
available telephone service.

    Since a ubiquitous telephone infrastructure is important to economic growth and
development, economic theory suggests that the price of connecting to the system should
be maintained at a relatively low level, to ensure that nearly everyone will
connect--including those with very low incomes, those who rarely use the phone, and
those who don't value phone service very highly. Positive externalities are an important consideration in shaping regulatory policy, and they should not be ignored in favor of a narrow calculation of incremental costs and revenues.

Historically, a wide variety of different policies have been adopted by regulators and carriers to advance the goal of universal service. These policies include lifeline programs, cross-industry cost sharing, averaging of costs across urban and rural areas, and rate structures that are specifically designed to encourage maximum levels of participation in the network.

Q. In what ways do these programs advance the goal of universal service?

A. In the absence of special regulatory policies, like lifeline programs, designed to achieve the universal service goal, the carriers do not have sufficient incentive to achieve that goal. They may opt for profit-maximization, rather than maximization of the rate of network participation.

For instance, in the relative absence of competitive pressures in rural areas, an incumbent carrier might be tempted to raise basic rates in rural areas. Such a pricing policy might advance that carrier's profit interests, but it would run counter to the universal service goal. Because of their smaller local calling scopes, many rural customers may be unwilling to pay high rates—particularly if they were raised to the lofty levels which would be required to recover the full cost of rural networks. Historically, rural rates have not reflected the full impact of the high costs per line which are incurred in low density rural areas. If the goal is to have nearly everyone in the state connected to the public switched network, a laissez faire approach will not suffice. Carriers have financial incentives to charge relatively high rates to customers in low density, high cost locations, and the inevitable consequence of a a laissez faire approach would be a loss of participation, with relatively few customers purchasing telephone service in these areas.

Similarly, in the absence of pro-active government policies, carriers might make
little effort to sign up low income customers, and those people who don't greatly value telephone service. Efforts to connect these marginal customers to the network will fall short of the universal service goal, if they are perceived by carriers as being not an especially profitable market segment (e.g. due to problems with uncollectible bills, or an inability to purchase high volumes of high-margin discretionary services like custom calling). Just as retail prices are sometimes higher and alternatives fewer in low income neighborhoods, there is reason to be concerned that carriers will not aggressively seek to expand into low income markets, if they believe that profit margins will not be as high in these locations.

That is not to say that telephone service would disappear if the universal service goal were eliminated. Absent regulatory policies designed to help advance the goal of universal service, one can easily envision a set of circumstances in which nearly all businesses and perhaps 70% of the residential households would purchase telephone service, at much higher prices. This figure can be compared with the participation rate achieved by the cable television industry in a nearly unregulated monopoly environment. Most cable carriers have achieved about 60% penetration, or buy up, while operating in a regulatory environment that has not stressed ubiquitous or universal service and which has generally allowed carriers to skim the cream of the overall market. Lower income customers and those who do not value cable service highly tend not to join the network. However, with a different price structure, or a government mandate, it would undoubtedly feasible to entice nearly everyone to connect with the cable network—including many viewers now contented with the over-the-air signal and some households that rarely watch TV. However, the cable industry hasn't chosen to aggressively pursue these customers, perhaps because it would have to cut the prices charged some of the core customers below the monopoly profit maximizing level. While society may not be harmed by policies which allow cable carriers to pursue profit maximizing pricing strategies, which result in relatively high monthly charges and relatively low participation rates, applying a
similar "hands off" regulatory approach to the telecommunications industry would have drastic consequences for society. Unlike with cable TV service, the rate of participation on the telephone network is of vital importance to society. Any substantial reduction below today's nearly universal participation rate would have serious adverse consequences not only for those former customers who are forced off the network, but also for those who want and need to communicate with them.

Q. In light of the universal service goal, are there specific requirements that local rates must be "just, reasonable, and affordable"?

A. Yes. The Consumer Protection clause of the 1996 Federal Act provides that both the FCC and the states "should ensure that universal service is available at rates that are just, reasonable, and affordable." [§ 254(i)]. This is the first time that Congress has used the term "affordable" in the context of universal service. The extent to which people can afford telephone service is typically measured through telephone penetration rates, and percentages of income spent on telephones.

Q. What is the penetration rate for household telephone service in Arizona?

A. According to the latest FCC Telephone Penetration Report [Telephone Penetration by Income by State, FCC, Released April 2002, Table 4, p. 2], 94.3% of the households in Arizona have a telephone. This percentage, which represents a state-wide average, nearly matches (within 0.2%) the national average penetration rate for the same time period. [Id., p. 24] However, telephone penetration rates can vary significantly for smaller geographic areas. In general, telephone penetration rates are higher in more affluent urban areas and lower in poorer rural areas. Telephone penetration rates also have been found to vary with a wide variety of social and demographic measures such as income, education, and household size.

For example, as shown Schedule 1, telephone penetration rates in Arizona differ
markedly depending on the household's income level. In 2001 over 98% of Arizona households with income over $40,000 had a telephone; just 88.2% of households with income under $10,000 had a telephone. Id., p. 2] Over the past 17 years – since the FCC has been tracking penetration rates – Arizona households with incomes under $20,000 have consistently had penetration rates lower than the statewide average. The reverse has been true for households with incomes over $20,000, with the highest income levels having the highest telephone penetration rates. There has been some variation in penetration rates in Arizona within income groups over time. For incomes under $10,000 the highest penetration listed was 88.6% in 2000 compared to a lowest value of 69.4% is found for 1985. [Id., p. 1, 2] This data indicates that over the past 17 years substantial progress has been made in bringing lower income households onto the network. While small year to year variations in penetration values are not necessarily statistically significant, there has unquestionably been a positive trend in telephone participation, particularly amongst those with low levels of income—those who would be most affected if local service prices were to increase substantially.

Q. Schedule 1 indicates that over the past 15 years telephone penetration rates have been essentially flat in Arizona for households with incomes over $20,000 but have risen for lower income households. Why is this?

A. The demand for telephone service is a function of many factors, including price, income, household size, and the like. The telephone penetration rates for the upper income levels have been consistently high since 1984. [Id.] For these upper income level households, changes in the factors that impact telephone demand over the past 17 years have had only a small effect. Where telephone service is nearly ubiquitous, most changes in factors like price or income will have little effect on demand. Household income and education levels have increased since 1984. Meanwhile—in real terms—the end use price of telephone service has tended to be flat or decreasing. All of these factors have tended to maintain or
increase telephone penetration rates. Increases have been concentrated amongst lower
income level households because this group has been more responsive to the decline in
real prices, among other factors.

As I mentioned earlier, the 94% plus buy-up rate that currently exists in Arizona is
partly driven by the effects of regulatory policies which have emphasized universal
service, and partly by the historical absence of good substitutes for telephone service. To
understand the importance of these policies, consider a simple comparison with the TV
industry. The vast majority of households have at least one color television. Yet, usage of
cable TV service is relatively low—with an average participation rate of perhaps 60%.
Cable providers have chosen to maximize profits by charging prices which are not
considered affordable or reasonable by many people. Considering this example, I think it
is reasonable to assume that telephone usage could decline to nearly that low a level
(perhaps 70%) in the absence of pricing philosophies and regulatory policies designed to
promote universal service. The much higher level of participation which currently exists
is due to the presence of rate regulation which has limited the price of basic local
exchange service and encouraged nearly universal participation on the network.

Even with the regulated prices, penetration rates never reach 100% in any wire
center in the nation. This is attributable not to any single cause but to at least three—each
associated with a particular group or category. The primary groups who tend not to
maintain telephone service are (1) impoverished residents (e.g., with annual incomes
under $5,000) found in all geographic areas but concentrated in minority neighborhoods
in the inner cities; (2) residents and small businesses in areas where costs and rates are
high relative to the value of the service provided; (3) a structural residue of customers that
are not inclined to have a telephone, either because they are transients, or because they
don't place much value on having a telephone in their home or place of business.

To maximize network participation, each of these distinct groups must be
targeted. In particular, regulatory policies can and should target high cost areas and low
income customers, to encourage continued and/or expanded participation on the public
network, even though such policies provide benefits to the targeted groups that aren't
available to others.

Q. Please relate your discussion of the goal of universal service to the investigation of
switched access charges at hand in this proceeding?
A. Yes. These two issues are intimately connected. Switched access service is an important
source of revenues that has historically been used to help pay for the costs of providing
Universal Service. If these rates are greatly reduced, as some parties are advocating, there
will be increased pressure to replace this revenue stream with an alternative source of
funding, such as higher local exchange rates. This type of "rate rebalancing," as it has
been called, may endanger the universal service goal, particularly if it is implemented in
an extreme manner.

Q. Can policy decisions regarding access charges have an effect on universal service?
A. Yes, particularly to the extent access rate reductions are offset by increases in the fees
paid by local exchange customers. It is difficult, if not impossible, to separate concerns
about the level of access charge from concerns about universal service support, despite
the fact that these issues are often dealt with in separate proceedings. The FCC
recognized this linkage in its Access Charge Reform Order:

[T]hrough this First Report and Order in our access reform docket
and our Universal Service Order, we set in place rules that will
identify and convert existing federal universal service support in
the interstate high cost fund, the dial equipment minutes (DEM)
weighting program, Long Term Support, Lifeline, Link-up, and
interstate access charges to explicit federal universal service
support mechanisms. [¶ 5]

Care must be exercised to ensure that the intrastate mechanisms used to maintain
support for affordable local rates are sustainable in the long run, achieve their intended purpose, and do not unduly distort the market. In this regard, the support mechanisms which help maintain affordable rates in high cost rural areas are of particular importance. One way to reduce market distortions and ensure long term sustainability is to use support mechanisms which are explicit and carefully focused. Thus, for example, implicit support embodied in the existing access charges might be replaced with a more explicit form of support provided through an expanded version of the Arizona Universal Service Fund.

The Commission is responsible for ensuring that the intrastate support mechanisms are not only sustainable and consistent with evolving market conditions, but that they comply with the requirements of the 1996 Telecom Act, including the requirement that the services which are vital to the universal service goal are not burdened with an excessive share of the joint and common costs of the network:

**SUBSIDY OF COMPETITIVE SERVICES**

PROHIBITED - A telecommunications carrier may not use services that are not competitive to subsidize services that are subject to competition. The Commission, with respect to interstate services, and the States, with respect to intrastate services, shall establish any necessary cost allocation rules, accounting safeguards, and guidelines to ensure that services included in the definition of universal service bear no more than a reasonable share of the joint and common costs of facilities used to provide those services.

[Section 254(k).]

In determining the scope of this provision, the FCC concluded that this provision of the 1996 Telecom Act protects not only basic local exchange service but also the ability to access long distance carriers. However, it does not protect toll services provided by those carriers. As the FCC points out, this provision does not prevent universal service support for access:

Regarding GCI's argument that interexchange service should not be
supported because it is a competitive service, we emphasize that
universal service support will be available for access to
interexchange service, but not for the interexchange or toll service.

[Note omitted] We find that the record does not support including
toll service among the services designated for support, although, as
discussed in section V below, we find that the extent to which rural
consumers must place toll calls to reach essential services should
be considered when assessing affordability. Nevertheless,
universal service should not be limited only to "non-competitive"
services. One of the fundamental purposes of universal service is
to ensure that rates are affordable regardless of whether rates are
set by regulatory action or through the competitive marketplace.

GCI's argument implies that, if there were multiple carriers
competing to provide, for example, basic dialtone service at $1000
per month, there could be no universal service support because the
price was set through competition. Such a result would be
inconsistent with Congress's intentions to preserve and advance
universal service in adopting section 254. We note that section
254(k), which forbids telecommunications carriers from using
services that are not competitive to subsidize competitive services,
is not inconsistent with our conclusion that it is permissible to
support competitive services. [Note omitted] [Access Charge
Reform Order, ¶ 77]

There are undoubtedly a variety of different ways the Commission can ensure
compliance with this provision of the 1996 Telecom Act. Where doubt exists concerning
the best policy to adopt, or the most appropriate distribution of the burden of joint and
common costs, it is clear that priority must be given to ensuring that universal service is
protected—even if that results in long distance toll rates which are higher than would
otherwise be desired. Stated another way, the Commission will undoubtedly receive
conflicting advice in this proceeding concerning the most appropriate way of spreading
the burden of joint and common costs between basic local exchange service and long
distance toll services. In evaluating this conflicting advice, it would be appropriate to err
in the direction of ensuring that the "price of entry" onto the telephone network remains at
attractively low levels—thereby helping to maintain very high penetration rates. That is not
to say that the Commission should be unwilling to deviate from the status quo, or that it should refuse to consider any reductions to access charges for fear of the consequences. However, the Commission should place a very high burden of proof on parties that are urging extreme changes to cost recovery patterns which have proven so successful for so many years.

Efficiency and Economic Costs

Q. It is sometimes argued that reductions in access rates can enhance economic efficiency, because rates are far in excess of economic costs. Please respond?

A. Yes. Economic theory suggests that allocative efficiency is most readily achieved when prices are set equal to marginal cost, assuming this can be achieved while still allowing the firm an opportunity to recover its total costs. In an industry where economies of scale and scope are pervasive, pricing at marginal cost may not allow the firm to recover its total costs, and thus some mark up above marginal cost will generally be necessary to ensure the long run viability of the firm. While there is certainly some merit to this line of reasoning, there are also problems with using this logic as a basis for lowering access rates—particularly if this is done at the expense of higher local rates.

It would not be in the public interest to adopt proposals that would shift a large share of the revenue burden from toll and access to residential basic exchange services, if this would risk the universal service objective. Some may argue that such a shift will encourage efficiency, by bringing the toll and access rates closer to marginal cost. But to determine if such a shift would truly result in a net gain in efficiency, the Commission would also need to consider any offsetting efficiency losses that would result in the local market, where prices would be increased farther above marginal cost. As well, in evaluating questions of efficiency, it is important to take into consideration the phenomena of network externalities, which suggests that society greatly benefits from
Direct Testimony of Ben Johnson, Ph.D.
On Behalf of the RUCO, Docket No. T-00000D-00-0672

pricing policies which encourage high network participation rates.

Q. The debate over economic efficiency is generally couched in terms of cost recovery. Briefly explain the types of costs which are currently recovered through access rates?

A. Switched access rates have been designed to recover the costs of both the traffic-sensitive (TS) and non-traffic-sensitive (NTS) functions performed by the LEC in processing IXC calls. The TS costs are those that vary depending upon the usage placed over the network (e.g., the portion of the switching equipment which varies in size and cost, depending upon call volumes). In comparison, NTS costs are those costs that do not tend to increase as the number of calls placed over the network increases (e.g. the cost of ordinary copper loops is largely fixed, regardless of the volume of traffic carried by the loop).

Most of the NTS costs have another important characteristic: they are joint or common costs which are not only necessary for the provision of intrastate switched access service, but also are necessary for the provision of interstate switched access, local exchange and custom calling services. Common costs are incurred when production processes yield two or more outputs. Joint costs are a specific type of common cost. The classic definition specifies that joint costs are incurred when production processes yield two or more outputs in fixed proportions. More intuitively, joint costs arise in situations where there are production factors that, once acquired for use in producing one good, are costlessly available for use in the production of others. Thus, for example, cattle feed that is acquired for use in producing hamburgers is costlessly available for use in producing leather shoes.

Despite any contrary claims that might be made by other parties to this proceeding, the local loop fits the definition of a joint cost because, except when congestion is present, there is no trade-off between the joint uses of the loop. If an access line is acquired for purposes of placing local calls, it is costlessly available for use in
placing long distance calls, as well. When an additional access line is installed, it
simultaneously increases the intermediate output (access) available to both toll and local
markets (as well as the market for other services, such as custom calling). Even if a line is
intended strictly for local calls, it can also be used to place and receive toll calls, and vice
versa. Accordingly, local loops are analogous to cattle feed in the production of steaks
and leather coats. Even if feed is strictly intended to increase the amount of available
beef, it concurrently increases the amount of hides which are available.

To be more precise, one can say that the access line connecting a residence or
business to the LEC's central office yields at least two joint products: access to customers
within the same locality (local access) and access to customers within other cities (toll
access). Since the latter form of access is provided via toll carriers, one can think of the
access line as providing access to the local and toll networks. Of course, since
communication is generally two-way, we can also say that at least two other joint
products are also provided: access to the customer installing the line is provided to other
customers within the same locality, and access is provided to toll carriers and to their
customers who have a potential interest in talking with the business or household that
installed the line.

To assign the entire amount of these joint costs to local exchange service is not
appropriate, and the resulting total cannot meaningfully be arrayed beside the revenues
derived from basic local exchange service. The LECs have many revenue sources which
help cover these joint costs, including toll, switched access, and custom calling. Carriers
have long relied upon all of these different revenue sources in order to pay their loop
costs. The loop facilities used in providing local exchange service are also required for
(and used by) other services that local carriers provide, including interstate switched
access, intrastate switched access, intrastate toll, custom calling, and Caller ID service.
The poles, cable, drop wire, line card, and channel connection are equally required for the
provision of these other services, and there is no logical reason to impose the entirety of
these costs onto just one of the services benefitting from them.

Generally, when a customer is connected to the public switched network, that customer is provided with access to the other lines situated within the same city, but access is simultaneously provided to the toll carriers with points of presence in that city; and via their facilities, access is provided to millions of lines located in hundreds of other cities around the state and country. It makes no economic sense to impose the entire cost of the access line, as part of the price of local service, on the particular end user who requests installation of the line. Rather, it is appropriate to recover the cost from all of the beneficiaries of that line—including the other local customers in that city and the toll carriers that also benefit from the new line, whether directly or indirectly.

Q. You have distinguished between NTS and TS costs, and explained the important concept of joint and common costs. Briefly discuss the concept of "economic costs" and distinguish this from "embedded cost"?

A. Many of the parties in this proceeding will agree that prices ought to be based on economic costs. The September 1996 NRRI study distinguishes economic costs from embedded or historical costs:

First, in cases before both the Federal Communications Commission (FCC) and state public utilities commissions, parties have argued over the merits of basing rates on incremental (economic) costs versus embedded (historical), fully distributed costs. [Competition-Enhancing Costing and Pricing Standards for Telecommunications Interconnection, NRRI, p. 1.] And it states that The notion of the embedded cost of service has less and less meaning in today's evolving telecommunication markets. [Id., p. 15]

While I would argue that embedded cost data can still be useful, the view expressed in this NRRI report is certainly consistent with the trend in most jurisdictions.
Most state commissions are continuing to move away from embedded cost allocation
approaches, and placing increased reliance upon economic or incremental costing
methods instead.

Accountants are concerned primarily with the proper recording and measuring of
historical costs based upon a uniform set of rules. The data, recorded in the books and
records of a firm, are referred to as "accounting" or "embedded" costs. Economists, on the
other hand, have developed a comprehensive set of theories concerning cost, which they
use to describe, explain, and predict the behavior of firms and individuals (e.g.,
consumers). While embedded costs—the accountant's measure of cost—are quite practical,
readily available, and fairly consistent from firm to firm, the economist's idea of cost is
more useful in analyzing the critical decisions made by management and government.

In some jurisdictions, the linkage between embedded cost and telephone rates has
at times been very direct and near-absolute: the embedded costs were allocated to various
service categories, and this largely determined the rates charged. At least in recent years,
however, most jurisdictions have followed procedures in which the linkage is less direct
and more flexible. Embedded costs remain important, but they largely influence or
control the overall revenue level, without necessarily controlling the rates charged for
specific items. A variety of information is used in determining specific rates, including
"economic" cost estimates.

For instance, the target revenue stream is often determined by embedded rate of
return data and then divided between the various service categories on the basis of
historic rate relationships, value of service patterns, relative levels of economic cost, and
other considerations. Many jurisdictions rely increasingly upon some form of estimated
economic cost (e.g., long run incremental cost), but regulators have typically allowed a
substantial mark-up, or contribution, above cost, to give the carrier an opportunity to earn
a fair rate of return on its embedded investment.
Q. Are there different types of economic cost?
A. Yes. The form of economic cost that is, at present, perhaps the most widely advocated is TSLRIC, which stands for total service long run incremental cost. TSLRIC is defined as a firm's long-run total cost of producing all its goods and services except the service in question, subtracted from the firm's long-run total cost of producing all its goods and services including the service in question. In effect, it measures the difference between producing a service and not producing it.

However, TSLRIC is by no means the only relevant type of economic cost. Marginal cost, for example, is of great importance in the economic literature, among other reasons because it is of vital importance in understanding pricing behavior by unregulated firms and in evaluating the extent to which economic efficiency is being achieved in a particular situation. I provide an extended discussion of the TSLRIC concept, as well as other important costing concepts in Appendix C to my testimony.

Q. Briefly elaborate on the TSLRIC concept, and explain how it relates to the concept of joint and common costs?
A. Yes. An appropriately prepared TSLRIC study will almost invariably show a very low level of costs—typically the cost results are a small fraction of existing rate levels. For instance, a TSLRIC study for call waiting service will typically show costs that are at most a few pennies a month, primarily related to the cost of billing and collection. In contrast, the service is typically priced at a far higher level—typically $5 or more per month. There are many factors contributing to the gap between current rates and TSLRIC, including the benefits of changing technology and increased economies of scale, which have improved since rates were initially established. However, the most important factor explaining the gap between TSLRIC and current rates is the manner in which joint and common costs are treated in properly developed TSLRIC calculations. Where network elements are required for multiple telecom services, the cost of these elements will
generally not be reflected in the TSLRIC calculations for any single service.

When properly developed, TSLRIC studies will exclude joint costs. This follows directly from the TSLRIC definition, which focuses attention entirely on costs which increase or decrease with the presence or absence of the specific service being studied. Recall that in a multi-product firm, additional services can be added to the mix without incurring any additional joint cost. (These are costs which, if they are incurred in providing any one service can costlessly be used in providing other services as well).

Since TSLRIC only focuses on the additional cost of each product, the joint cost does not appear in a properly computed TSLRIC amount. Stated differently, if the cost of a particular network element remains the same regardless of whether or not any particular telecom service is produced using that element, the cost of that element will not be reflected in the TSLRIC of the individual services which benefit from the presence of that element. In mathematical terms, the cost of the element drops away from the TSLRIC calculations, and thus the TSLRIC of each individual service will exclude the cost of that element.

A large gap between TSLRIC and price is typical for most telecom services. For instance, when the TSLRIC concept is applied to a service like Call Waiting, the estimated cost is likely to be just a few pennies per month. Similarly, when the TSLRIC concept is applied to switched access, the same pattern exists: the TSLRIC amount is a small fraction of the established price.

Although TSLRIC calculations for individual services do not include the full amount of joint and common (shared) costs that are incurred by the firm, this does not mean these costs are not recovered from customers. To the contrary, both regulated and unregulated firms recover their joint and common costs through the rates they charge for their products and services. In unregulated markets this is accomplished by setting rates which reflect demand conditions—services with strong demand are priced far above TSLRIC in order to ensure recovery of the firm’s total costs.
Under competitive conditions, an efficient firm has an opportunity in the long run to recover its total costs, including its joint and common costs. The extent to which the joint and common costs are recovered through the prices charged for particular services, or recovered from particular groups of consumers will not be uniform. In unregulated markets, the pattern of cost recovery will be heavily influenced by demand conditions, including relative levels of perceived value, the extent to which close substitutes exist for particular products or services, and the price of those alternatives.

In regulated markets total cost recovery is also achieved, but the specific pricing pattern may differ. Whether by allowing a substantial mark-up above TSLRUC, by setting prices on the basis of cost allocation procedures, or by using some other procedure to reconcile rates with the firm's overall revenue needs, regulators have historically given carriers an opportunity to recover their joint and common costs. While the pattern of recovery may differ, the overall result is similar to that achieved under competition: joint and common costs are typically recovered from the array of services that require or benefit from these costs.

Q. Observers have often characterized telecommunications as a declining cost industry. Does this have relevance to the issues in this proceeding?

A. Yes. Because this is a declining cost industry, rates which were initially designed to recover a reasonable level of unit costs currently recover much more than the actual level of costs—assuming the per-minute rates haven't declined as rapidly as the per-minute costs. In recent years, we have seen an explosion of technological improvements as the industry has evolved away from analog technology into digital technology. There have been tremendous improvements in the areas of fiber optic cables, digital multiplexing and transmission systems, operations support computers, digital cross connect systems, digital central office switches, and more. Not only do these technologies permit substantial reductions in labor and maintenance costs, but the prices of these items been declining.
As these new technologies are increasingly utilized by carriers, their impact becomes increasingly significant. All of these technologies allow carriers to generate more output, (e.g., minutes of use and numbers of access lines in use), per unit of input (e.g., hours of employee time expended). The benefits of new technology combine with the benefits of economies of scale and scope to create an environment in which unit costs have been rapidly declining.

Q. Do you have any evidence that average costs per unit of output decline as a telecommunications network expands?
A. Yes. In the course of my work in other jurisdictions, I have developed economic cost estimates that demonstrate this phenomenon, and the pattern is very strong. As a carrier expands its output, it will tend to experience a downward trend in its average cost per loop or per minute. This pattern of declining costs confirms the fact that both the IXCs and the LECs participating in this proceeding are operating in a declining cost industry. Even if some of a carrier's input prices are increasing (e.g. salaries) its unit costs are likely to be decreasing, because the uptrend in input costs tends to be more than offset by the benefits of new technology and economies of density and scale, all of which tend to increase over time, as telecommunications markets expand.

Switched Access Rates

Q. Let's turn to the sixth section of your testimony. Up to this point you have emphasized the fact that costs are declining in the telephone industry. Have access rates also been reduced, consistent with this decline in costs?
A. Rates have declined, but not necessarily to the same degree as costs. In the interstate jurisdiction, the FCC has generally required frequent access rate reductions, which have had the effect of periodically passing through some of the benefits of unit cost decreases.
This was initially accomplished through periodic cost-based rate reductions, then through the "X" factor in the FCC's price cap mechanism, as well as provisions which required LECs to share their excess profits with their interstate customers. More recently, rate reductions have resulted from the CALLS program. In Arizona, as in most state jurisdictions, the policy with regard to cost reductions has been more sporadic. In some cases LECs have lowered their switched access rates, thereby passing through some of the benefits of economies of scale and technological change, and in other cases they have retained the benefits of these cost reductions in the form of higher profits.

In Schedule 2, I have estimated the average level of Qwest's interstate and intrastate access rates, by dividing Qwest's Arizona access revenues by its corresponding switched access minutes. For convenience in comparing trends in several data series, I have graphed this data on an indexed basis, where the 1991 value of each data series equals 100. A review of this graph shows that the Company's interstate access rates have declined by over two-thirds over the past decade. The intrastate rates have also declined, but not as sharply. From 1991 to 1997, the average level of the intrastate access rates declined by roughly 20%. In subsequent years, rates were more nearly flat. As a result, Qwest's intrastate access rates in 2001 were about 25% below the 1991 level.

The more rapid decline in Qwest's interstate rates reflects multiple factors, including policies in the federal jurisdiction which have passed cost reductions through to access customers on a more frequent and consistent basis, as well as recent policy changes which have had the effect of shifting cost responsibility away from the per-minute access rates. For instance, the FCC increased the SLC ceiling from $6.00 to $9.00 for multi-line business customers beginning July 1, 1997 and from $3.50 to $5.00 for non-primary lines beginning January 1, 1998. [Access Reform Order, ¶78] More recently, the FCC decided to eliminate the PICC and CCL charges, shifting the cost burden entirely onto end users through the SLC. In the FCC's 2000 CALLS order, it raised the cap on the SLC for primary residential and single-line business lines from
$3.50 to $4.35 beginning July 1, 2000, to $5.00 as of July 1, 2001, to $6.00 as of July 1, 2002, and then finally to $6.50 as of July 1, 2003. [CALLS Order, ¶70] The effect of this shifting of revenue flows is reflected in the end user access revenues per line, which remained nearly flat during the period 1991 through 1996, then increased rapidly from 1997 through 2001. This shift in revenue responsibility accelerated the decline in interstate per minute rates during those same years. The net result of these divergent regulatory policies—with intrastate rates showing little or no decline in recent years, while interstate rates have declined sharply—is a widening of the disparity between Arizona intrastate and interstate access rate levels.

Q. Have you conducted any research into intrastate switched access rates in other jurisdictions?

A. Yes. Schedule 3 of my exhibit summarizes the current intrastate switched access rates in various other states. This schedule contains switched access rates from 83 sets of tariffs, including rates for Alltel, Bell South, Sprint, Qwest, Verizon, SWBT and several SBC companies. In judging whether access rates might be reduced in Arizona, and if so, how substantial a reduction might be appropriate, the Commission might find value in looking at rates charged in other jurisdictions.

As shown on page 2, Qwest-Arizona's total intrastate switched access rate is $0.0345. This compares to a high of $0.1166 for Century Tel-Missouri and a low of $0.0032 for Pacific Bell-California. Qwest's total Arizona rate is moderately higher than the average rate, which is $0.0296. In terms of the component access rates, Qwest-Arizona has the 55th highest CCL rate, the 66th highest end office switching rate, and the 22nd highest transport rates within this nationwide group. Only Qwest's intrastate transport rate falls towards the low end of the range.
Concluding Comments

Q. Do you have any response to the proposals of other parties, to the extent those have been described in the comments which were submitted earlier in this proceeding?
A. No. I will reserve judgment on the details of the other parties' proposals until after I have an opportunity to review a more detailed explanation of their proposals, as set forth in their direct testimony and exhibits. At this point I would simply note that given the reasoning included in some of the comments, the proposals of some parties are likely to be too extreme to be in the public interest.

Q. Are you opposed to reductions in intrastate switched access rates?
A. No. Given the pattern of sharply declining unit costs in recent years, it should be feasible to reduce intrastate access rates without any offsetting increase in the monthly fees paid by local customers, while still maintaining the financial integrity of the LECs. Furthermore, competition, as it increases, will eventually drive down the overall level of telecommunications rates. There is every reason to anticipate that competitive forces will create downward pressures on the underlying costs of all local services, including both switched access and basic local exchange service. And, as costs trend downward, carriers will be forced to share the benefits of that downward trend—to the extent competitive pressures intensify.

While the competitive pressures may not be as immediate, or as strong, in residential markets, there is no reason to assume residential local rates ought to be increased substantially, given the overall downward trend in costs incurred by the LECs. To the contrary, if competition starts being more effective, it will undoubtedly erode profit margins, creating downward pressure on nearly all rates, including those paid by residence customers.

Simply stated, if regulation is effective in restricting monopoly profits over the
longer term, or if competition intensifies enough to serve this same function, there is 
every reason to anticipate that both toll and local prices will decline over time, as a result 
of continued technological improvements, increasing efficiency, greater economies of 
scale and scope, and the elimination of supra-normal profit levels.

Given the declining cost characteristics of the industry, and the fact that many 
incumbent LECs throughout the country have recently been enjoying extraordinarily high 
profit levels (far exceeding their cost of equity), there is reason to be skeptical about the 
necessity of adopting regulatory policies which have the effect of substantially increasing 
local rates. Certainly, there is no need to increase local rates to offset intrastate switched 
access rate reductions on a dollar-for-dollar basis.

Q. **Do you have any other concluding comments?**

A. Yes. Some parties may argue that because the interstate per-minute rates are declining 
towards near-zero levels, the intrastate access rates should follow a similar trajectory. 
There is certainly merit to the notion that the Arizona intrastate rates can't be viewed in a 
complete vacuum. In a market environment in which interstate rates are rapidly declining, 
intrastate rates should also be declining—at least to pass through some of the benefits of 
declining costs which are being enjoyed by the LECs.

However, proposals for extreme reductions in access rates are not in the public 
interest, if they involve substantial increases in basic local rates, or the introduction of 
other rate elements which significantly increase the cost of joining, or staying on, the 
network. The minimum cost of having a telephone in Arizona is already increasing 
substantially, as the FCC phases in higher SLCs as part of the CALLS program. The 
Commission should be careful about exacerbating the impact of the CALLS program by 
adopting rate changes which contribute to an even steeper increase in the cost of having a 
phone.

Competition in the toll market has largely been a "win-win" scenario for most
consumers. As the toll market share commanded by the dominant carriers has fallen, rates have likewise fallen. While the dominant carriers' market share has declined, these "losses" have been offset by increased revenues from industry-wide traffic stimulation.

Intensifying competition and declining costs have led to declining prices, which have led to increased traffic, which has allowed the carriers to benefit from increased economies of scale, which has led to still further reductions in prices. The competitive process has also contributed to traffic growth, by encouraging volume discounts and by increasing customer awareness through intensive advertising. While the lion's share of the benefits from toll competition have been enjoyed by large toll users, and those who are the most sensitive to price differences, the benefits of declining costs have been spread quite widely. Few, if any, customers have been forced to pay more for toll service.

The LECs have also shared in the bounty, since they receive large amounts of revenue from the long distance carriers in the form of access payments. These payments have been growing, allowing the LECs to generate strong profits in recent years. Toll competition has driven down costs and prices, and it clearly has benefitted most consumers, providing them with increased choices, resulting in increased diversity of supply, and encouraging a variety of different technical and marketing innovations.

In evaluating proposals in this proceeding, the Commission should keep this example in mind. Rates which are currently at relatively high levels can and should be reduced—but those reductions can be accomplished without necessarily requiring sharp increases in other rates. In a declining cost environment, rate reform can be accomplished largely through substantial reductions in some rates, while other rates remain unchanged, or decline less sharply.

Q. Does this complete your direct testimony, which was prefiled on June 28, 2002?
A. Yes, it does.
## Arizona Telephone Penetration Rates

*Percentage of Households with Telephone Service*

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Index of Access Rates (1991=100)

- - Index of Intrastate Access Rates  
- - - Index of Interstate Access Rates  
- - - - Index of Interstate End User Fees
## Total Switched Access Rates - Other States

*Per switched access minute Local Transport @ 25 Miles*

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*Per switched access minute Local Transport @ 25 Miles*

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Transport Rates - Other States

*Per Minute @ 25 miles*

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*Per Minute @ 25 miles*

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Appendix A

Qualifications

Present Occupation

Q. What is your present occupation?
A. I am a consulting economist and President of Ben Johnson Associates, Inc., a firm of economic and analytic consultants specializing in the area of public utility regulation.

Educational Background

Q. What is your educational background?
A. I graduated with honors from the University of South Florida with a Bachelor of Arts degree in Economics in March 1974. I earned a Master of Science degree in Economics at Florida State University in September 1977. The title of my Master's Thesis is "A Critique of Economic Theory as Applied to the Regulated Firm." Finally, I graduated from Florida State University in April 1982 with the Ph.D. degree in Economics. The title of my doctoral dissertation is "Executive Compensation, Size, Profit, and Cost in the Electric Utility Industry."

Clients

Q. What types of clients employ your firm?
A. Much of our work is performed on behalf of public agencies at every level of government involved in utility regulation. These agencies include state regulatory commissions, public counsels, attorneys general, and local governments, among
others. We are also employed by various private organizations and firms, both regulated and unregulated. The diversity of our clientele is illustrated below.

**Regulatory Commissions**

- Alabama Public Service Commission—Public Staff for Utility Consumer Protection
- Alaska Public Utilities Commission
- Arizona Corporation Commission
- Arkansas Public Service Commission
- Connecticut Department of Public Utility Control
- District of Columbia Public Service Commission
- Idaho Public Utilities Commission
- Idaho State Tax Commission
- Iowa Department of Revenue and Finance
- Kansas State Corporation Commission
- Maine Public Utilities Commission
- Minnesota Department of Public Service
- Missouri Public Service Commission
- National Association of State Utility Consumer Advocates
- Nevada Public Service Commission
- New Hampshire Public Utilities Commission
- North Carolina Utilities Commission—Public Staff
- Oklahoma Corporation Commission
- Ontario Ministry of Culture and Communications
- Staff of the Delaware Public Service Commission
- Staff of the Georgia Public Service Commission
- Texas Public Utilities Commission
- Virginia State Corporation Commission
- Washington Utilities and Transportation Commission
- West Virginia Public Service Commission—Division of Consumer Advocate
- Wisconsin Public Service Commission
Appendix A, Direct Testimony of Ben Johnson, Ph.D.
On Behalf of the RUCO, Docket No. T-00000D-00-0672

1      Wyoming Public Service Commission
2
3      Public Counsels
4
5      Arizona Residential Utility Consumers Office
6      Colorado Office of Consumer Counsel
7      Colorado Office of Consumer Services
8      Connecticut Consumer Counsel
9      District of Columbia Office of People's Counsel
10     Florida Public Counsel
11     Georgia Consumers' Utility Counsel
12     Hawaii Division of Consumer Advocacy
13     Illinois Small Business Utility Advocate Office
14     Indiana Office of the Utility Consumer Counselor
15     Iowa Consumer Advocate
16     Maryland Office of People's Counsel
17     Minnesota Office of Consumer Services
18     Missouri Public Counsel
19     New Hampshire Consumer Counsel
20     Ohio Consumer Counsel
21     Pennsylvania Office of Consumer Advocate
22     Utah Department of Business Regulation—Committee of Consumer Services
23
24      Attorneys General
25
26      Arkansas Attorney General
27      Florida Attorney General—Antitrust Division
28      Idaho Attorney General
29      Kentucky Attorney General
30      Michigan Attorney General
31      Minnesota Attorney General
32      Nevada Attorney General's Office of Advocate for Customers of Public Utilities
South Carolina Attorney General
Utah Attorney General
Virginia Attorney General
Washington Attorney General

Local Governments
City of Austin, TX
City of Corpus Christi, TX
City of Dallas, TX
City of El Paso, TX
City of Galveston, TX
City of Norfolk, VA
City of Phoenix, AZ
City of Richmond, VA
City of San Antonio, TX
City of Tucson, AZ
County of Augusta, VA
County of Henrico, VA
County of York, VA
Town of Ashland, VA
Town of Blacksburg, VA
Town of Pecos City, TX

Other Government Agencies
Canada—Department of Communications
Hillsborough County Property Appraiser
Provincial Governments of Canada
Sarasota County Property Appraiser
Appendix A, Direct Testimony of Ben Johnson, Ph.D.
On Behalf of the RUCO, Docket No. T-00000D-00-0672

1  State of Florida—Department of General Services
2  United States Department of Justice—Antitrust Division
3  Utah State Tax Commission
4
5  **Regulated Firms**
6
7  Alabama Power Company
8  Americall LDC, Inc.
9  BC Rail
10  CommuniGroup
11  Florida Association of Concerned Telephone Companies, Inc.
12  LDDS Communications, Inc.
13  Louisiana/Mississippi Resellers Association
14  Madison County Telephone Company
15  Montana Power Company
16  Mountain View Telephone Company
17  Nevada Power Company
18  Network I, Inc.
19  North Carolina Long Distance Association
20  Northern Lights Public Utility
21  Otter Tail Power Company
22  Pan-Alberta Gas, Ltd.
23  Resort Village Utility, Inc.
24  South Carolina Long Distance Association
25  Stanton Telephone
26  Teleconnect Company
27  Tennessee Resellers' Association
28  Westel Telecommunications
29  Yelcot Telephone Company, Inc.
30
Other Private Organizations

Arizona Center for Law in the Public Interest
Black United Fund of New Jersey
Casco Bank and Trust
Coalition of Boise Water Customers
Colorado Energy Advocacy Office
East Maine Medical Center
Georgia Legal Services Program
Harris Corporation
Helca Mining Company
Idaho Small Timber Companies
Independent Energy Producers of Idaho
Interstate Securities Corporation
J.R. Simplot Company
Merrill Trust Company
MICRON Semiconductor, Inc.
Native American Rights Fund
PenBay Memorial Hospital
Rosebud Enterprises, Inc.
Skokomish Indian Tribe
State Farm Insurance Company
Twin Falls Canal Company
World Center for Birds of Prey
Appendix A, Direct Testimony of Ben Johnson, Ph.D.
On Behalf of the RUCO, Docket No. T-00000D-00-0672

Prior Experience

Q. Before becoming a consultant, what was your employment experience?
A. From August 1975 to September 1977, I held the position of Senior Utility Analyst with Office of Public Counsel in Florida. From September 1974 until August 1975, I held the position of Economic Analyst with the same office. Prior to that time, I was employed by the law firm of Holland and Knight as a corporate legal assistant.

Q. In how many formal utility regulatory proceedings have you been involved?
A. As a result of my experience with the Florida Public Counsel and my work as a consulting economist, I have been actively involved in approximately 400 different formal regulatory proceedings concerning electric, telephone, natural gas, railroad, and water and sewer utilities.

Q. Have you done any independent research and analysis in the field of regulatory economics?
A. Yes, I have undertaken extensive research and analysis of various aspects of utility regulation. Many of the resulting reports were prepared for the internal use of the Florida Public Counsel. Others were prepared for use by the staff of the Florida Legislature and for submission to the Arizona Corporation Commission, the Florida Public Service Commission, the Canadian Department of Communications, and the Provincial Governments of Canada, among others. In addition, as I already mentioned, my Master's thesis concerned the theory of the regulated firm.
Q. Have you testified previously as an expert witness in the area of public utility regulation?
A. Yes. I have provided expert testimony on more than 250 occasions in proceedings before state courts, federal courts, and regulatory commissions throughout the United States and in Canada. I have presented or have pending expert testimony before 35 state commissions, the Interstate Commerce Commission, the Federal Communications Commission, the District of Columbia Public Service Commission, the Alberta, Canada Public Utilities Board, and the Ontario Ministry of Culture and Communication.

Q. What types of companies have you analyzed?
A. My work has involved more than 425 different telephone companies, covering the entire spectrum from AT&T Communications to Stanton Telephone, and more than 55 different electric utilities ranging in size from Texas Utilities Company to Savannah Electric and Power Company. I have also analyzed more than 30 other regulated firms, including water, sewer, natural gas, and railroad companies.

Teaching and Publications

Q. Have you ever lectured on the subject of regulatory economics?
A. Yes, I have lectured to undergraduate classes in economics at Florida State University on various subjects related to public utility regulation and economic theory. I have also addressed conferences and seminars sponsored by such institutions as the National Association of Regulatory Utility Commissioners (NARUC), the Marquette University College of Business Administration, the Utah Division of Public Utilities and the University of Utah, the Competitive Telecommunications Association (COMPTEL), the International Association of...
Assessing Officers (IAAO), the Michigan State University Institute of Public
Utilities, the National Association of State Utility Consumer Advocates
(NASUCA), the Rural Electrification Administration (REA), North Carolina State
University, and the National Society of Rate of Return Analysts.

Q. **Have you published any articles concerning public utility regulation?**

A. Yes, I have authored or co-authored the following articles and comments:

- “Attrition: A Problem for Public Utilities—Comment.” *Public Utilities

- “The Attrition Problem: Underlying Causes and Regulatory Solutions.” *Public

- “The Dilemma in Mixing Competition with Regulation.” *Public Utilities

- “Cost Allocations: Limits, Problems, and Alternatives.” *Public Utilities


- “Deregulation and Divestiture in a Changing Telecommunications Industry,” with

- “Is the Debt-Equity Spread Always Positive?” *Public Utilities Fortnightly*,


**Professional Memberships**

Q. **Do you belong to any professional societies?**

A. Yes. I am a member of the American Economic Association and the Southern Economic Association.
Appendix B

Joint and Common Costs

Q. Would you please explain joint and common costs in greater detail?
A. Certainly. A firm that produces a single product sold in a single market incurs only direct costs. These include capital costs (cost of money, depreciation, income taxes) and all expenses exclusively attributable to a specific product or service. However, when the firm is engaged in producing multiple products or serving multiple markets, it normally also incurs joint and/or common costs.

The term “common costs” is used by economists to describe costs that are incurred in production of multiple products or services, and which are not directly attributable to a single service. Typical examples of common costs include salaries and other costs of the firm’s upper level executives, regulatory and legal expenses, and audit expenses. The term “shared” costs is sometimes used to describe joint and common costs without distinguishing between these two terms. Joint costs are a particular type of common costs—those incurred when production facilities simultaneously serve two or more markets (or produce two or more products) in fixed proportions. Because proportions are fixed, it is impossible for the firm to increase or decrease the amount of output for one market without changing in the same proportion and in the same direction the output or capacity available for another market. Consequently, joint costs vary in proportion to the total available output of the joint production process, not the output of the individual joint products.

Joint production functions (and joint costs) have traditionally been defined by economists based upon “fixed proportions.” However, this can lead to confusion, since it is difficult to find perfect examples of joint costs. There are few production processes which exhibit absolute fixity of proportion, except, perhaps, at intermediate stages of production. In the Handbook of Industrial Organization, a standard reference work edited
by Schmalensee and Willig, in an article entitled “Technological Determinants of Firm and Industry Structure,” Dr. John C. Panzar explains joint costs in a cogent, and more intuitive, manner. He explains that joint costs arise when there are production factors that “once acquired for use in producing one good... are costlessly available for use in the production of others.” Handbook at 17. This alternative definition clearly fits the familiar example of the joint production of beef and hides. Once the decision is made to produce more beef, the cattle feed used in fulfilling this process will costlessly also produce hides. Similarly, once the decision is made to install one more loop in order to produce any one output, such as local service, it is “costlessly available for the production of others,” such as call waiting service.

Q. How are joint and common costs recovered in competitive markets?

A. To the extent common costs vary with output of individual services, they are recovered in the same manner as direct costs—they directly affect the marginal cost of producing each service, and thus directly influence prices. (In competitive markets, prices tend to be most closely related to marginal cost). To the extent common costs do not vary with output of individual services (as is the case with joint costs), they have no impact on marginal cost, and thus do not directly determine prices in competitive markets. Nevertheless, purchasers of each of the joint products bear some share of the joint and common costs. The relative shares are not determined by arbitrary allocations of the costs, but rather by the relative strength of demand in the various markets. Stated another way, in competitive markets, each product is priced to maximize the contribution to the joint and common costs, within the constraints imposed by the product's demand.

For instance, in the example of beef and hides (which are joint products) leather coat buyers will obviously not be required to shoulder 100 percent of the feed costs, and consumers of beef none of these costs. Nor will the opposite occur. Since there is a considerable demand for both products, both will pay a share of the joint costs. The
portion of the joint costs of cattle production which is recovered from consumers of
leather goods will depend on the amount they are willing to pay for leather; this is limited
by the availability and price of substitutes (e.g. vinyl), income constraints, and other
demand-related factors. Similarly, the amount of cattle production costs which is
recovered from meat consumers depends upon how much they are willing to pay for
hamburgers and steak; this is constrained by the relative popularity and price of
substitutes, such as chicken and pork, as well as other factors (e.g. income).

To reiterate, in competitive markets joint costs are never recovered entirely from
consumers of one of the joint products, to the exclusion of the others; rather, the costs are
shared by both groups of consumers, with the respective proportions depending upon the
relative strength of demand. The stronger the demand for a particular joint product, the
greater the share of joint costs which will be borne by that product.

Q. You mentioned earlier that it isn't appropriate to expect revenues from just one
service to recover all of the shared costs. Would you please elaborate on this point,
particularly as it relates to loop and port costs?

A. As the FCC and many state commissions have affirmed, loop and port costs are joint or
shared costs necessary for the provision of toll, access, and custom calling service, as well
as local exchange service. Even if a line is intended strictly for local calls, it can also be
used to place and receive toll calls, and vice versa. Local loops are thus analogous to
cattle feed in the production of beef and hides. Even if the feed is strictly intended to
increase the amount of beef, it concurrently increases the amount of hides which are
available. The economic literature clearly establishes that the cost of cattle feed won't be
borne entirely by purchasers of steak and hamburger; some of the feed costs will
inevitably be recovered from purchasers of leather coats and gloves.

In general, the more different products involved in the common production
process, the more widely one would expect the costs to be spread. Thus, for example,
revenues from the sale of steak, ribs, hamburger, beef fat, and leather will all be involved in recovering cattle feeding costs.

The provision of a loop and port yields at least two joint products: access to customers within the same locality (local access) and access to customers within other cities (toll access). Since the latter form of access is provided via toll carriers, one can think of the loop and port as providing access to local and toll networks. Of course, since communication is generally two-way, we can also say that at least two other joint products are provided, as well: access to the customer installing the line by other customers within the same locality, and access to that customer by toll carriers and their customers. However, this does not end the list of services involving the loop and port. A LEC has many revenue sources which directly benefit from, and have generally helped recover, these shared costs, including custom calling and Caller ID and voice mail.

Generally, when a customer is connected to the public switched network, that customer is provided with access to the other lines situated within the same city, but access to that customer is simultaneously provided to the toll carriers with points of presence in that city; and via their facilities, access to that customer is provided to millions of lines located in hundreds of other cities around the state and country.

Notwithstanding strong advocacy efforts by both local exchange and interexchange carriers, most state regulatory commission have been reluctant to recover the entire cost of loops and ports as part of the price of local service. A share of these costs has historically been recovered from numerous other services, including switched access services provided to toll carriers, as well as the custom calling and other ancillary services related to the line.

This broad approach to cost sharing has long been used in Arizona, as well as in many other states. Not only is it consistent with the historic pattern in many telecommunications markets, it is also consistent with the normal practice in unregulated markets. Just as cattle feed costs are recovered through the price of steak and coats, loop
Q. Placing of 100% of loop costs on local service has sometimes been defended on a “cost-causative basis.” Would you discuss this argument?

A. Yes. It is sometimes argued that the cost of the access line is effectively “caused” by the act of subscribing to local exchange service, and that all other services that may be provided over the line are made available costlessly and are thus economically irrelevant. That is, because the line is provided by the phone company on a bundled basis, in conjunction with local exchange service, it is argued that the full cost of that line should be attributed to the local exchange category.

This is an overly simplistic view of causation, one that can lead to misleading conclusions. In fact, if we want to really examine causation, the cost of a local loop as physical plant is incurred when someone—perhaps an aspiring subscriber in years past, perhaps a real estate developer or home builder, perhaps a phone company executive—makes a decision to install loop plant along a particular route. Some of this plant is dedicated to a particular neighborhood, or house, and other plant serves a broader geographic area. The decisions that lead to the act of installing these facilities can be seen as the proximate cause of the cost. Subsequently, if consumers don’t decide to purchase telephone service, the plant will often sit idle; if they do decide to purchase service, it will be utilized. The actual loop cost incurred by the phone company may not vary much either way. The investment in loop plant accumulates carrying charges until a further decision is made to activate the circuit and supply the dial tone that enables the line to become an active part of the public switched network. At that time a billing cycle is initiated, and the cost of the loop begins to be recovered.

In general, however, “cause and effect” reasoning does not have any impact on the manner in which joint costs are recovered in competitive markets. To the contrary, all of
the joint products contribute to the joint costs, regardless of which one “caused” the joint
costs to be incurred. Consider, for example, cotton and cotton seed. Cotton seed is a
mere byproduct of the production of cotton, and people buying cottonseed oil arguably
don’t “cause” cotton to be grown. Instead, one can plausibly argue that consumers of
cotton cloth “cause” the various costs of growing raw cotton to be incurred. Yet, this
causal relationship is irrelevant to recovery of the joint costs incurred by cotton farmers.
Consumers of both cottonseed oil and cotton clothing contribute to the cost of growing
and harvesting cotton. The mere fact that the planting of cotton is “caused” by demand
for cotton cloth does not result in all of the joint costs being recovered from the clothing
market, and none from the ancillary products like cottonseed oil. Customers in both
markets share the joint costs, in proportions that are determined by the relative strength of
demand for cotton cloth and cottonseed oil.

Attempting to assign costs on the basis of “causal relationships” is even less
logical in the context of telecommunications services. Undoubtedly, many consumers
want to obtain and use an entire array of telecom services, including local, toll and
custom calling. Any attempt to trace “cost causation” and to assign the loop and port
costs to individual services on the basis of consumer motivation is bound to be
meaningless, since these costs are often “caused” by the desire to use the full array of
services, and the chain of causality cannot be uniquely traced to any single service within
this array. If the access line were bundled with toll service, and local service were priced
as an optional add-on, many consumers would still acquire an access line, to ensure that
they can place and receive toll calls. Under these circumstances, it might appear that the
access line is a direct cost of toll, and thus one could plausibly argue that the entire cost
should be attributed to the toll category. However, this type of reasoning is not
economically valid, regardless of which service is bundled with the access line, and
regardless of which service provides the dominant or primary motivation for acquiring the
line. So long as numerous different services require the use of the line, economic theory
suggests that all of these different services will contribute towards the cost of the line.

Q. **Given the problems with shared costs, is it even possible to compare costs with revenues in a meaningful manner?**

A. Yes it is. While shared costs can be confusing, they do not pose an intractable problem. There are at least three ways in which revenues and costs can appropriately be matched in a context where shared costs loom large:

First, a pure incremental cost approach can be used: the direct cost of a particular service (or group of services) is compared to the revenues from that service or group. Costs that are shared with other services are excluded from the analysis. A calculation is then performed to determine the magnitude of the contribution generated by that service (or family of services). This contribution is available to help cover the joint costs, as well as any common costs which were excluded from the analysis. The resulting contribution can be evaluated, to see how large it is on an absolute basis, or relative to the analogous contribution provided by other services. In other words, the magnitude of the contribution from each service (in absolute or percentage terms) can be evaluated, to judge its profitability, but one would not expect any single service, or limited group of services, to recover the entire amount of shared costs.

Second, an allocated share of the shared costs can be added to the direct costs of the service (or group of services) in question, to arrive at a reasonable cost amount for comparison with the revenues from the service (or family of services) in question. This method differs from the first approach because it includes an allocated share of shared costs in the analysis.

Third, all of the shared costs can be included in the analysis. This is the approach followed in a Stand Alone cost study. Needless to say, one would not normally expect the revenues from a single service to be sufficient to recover all of the shared costs. However, it can be useful to see the degree of cost recovery—what portion of the cost needs to be
recovered from other services at current rate levels. Another approach is to focus on a
greater group of services, thereby minimizing or avoiding the joint and common cost
problem. For instance, the analyst could look at the entire family of services that benefit
from the loop and port. By expanding the analysis to include revenues associated with
this entire family of services, it becomes legitimate to include all of the loop and port
costs, since these are matched with all of the associated revenue streams.

Q. Would you please elaborate on the second method, particularly with regard to the
allocation of loop and port costs?

A. Certainly. There is no universally accepted method for allocating these costs, and the
differences in method can result in very significant differences in the cost study results.
One of the difficulties with the second method is that the results are highly dependent
upon the particular allocation approach that is selected, and there is no consensus
concerning the "right" way to allocate loop and port costs. A category which is shown to
have a very low return in one study can show a very high return in another study,
depending upon the allocation approach that is used.

Perhaps the simplest and most stable approach is for the Commission to select one
or more uniform percentage allocation factors. This is the approach currently used by the
FCC in allocating loop costs between the federal and state jurisdiction—the interstate share
is a uniform 25%, regardless of the specific circumstances applying to a particular carrier.
Other options include revenue-based methods and usage-based methods. Revenue-based
allocations assign shares of joint costs based upon the services' percentages of total
revenues. For example, if basic local service accounts for 35 percent of total revenues, it
might be allocated 35% percent of loop costs. Usage-based allocations assign shares of
joint costs by relative minutes of use, perhaps weighted in some way to distinguish toll
from local and/or peak from off-peak, etc.
Q. Have other jurisdictions addressed this allocation issue?
A. Yes. For instance, the Indiana Utility Regulatory Commission addressed this issue in a
generic universal service proceeding. [Cause No. 40785]. As part of that proceeding, the
Indiana Commission was concerned with the proper interpretation of paragraph 254(k) of
the 1996 Federal Act, which provides in part:

The Commission, with respect to interstate services, and the States, with
respect to intrastate services, shall establish any necessary cost allocation
rules, accounting safeguards, and guidelines to ensure that services
included in the definition of universal service bear no more than a
reasonable share of the joint and common costs of facilities used to
provide those services.

In its discussion of joint and common costs, the Indiana Commission rejected the
principle of “cost causation”, stating that

It seems reasonable that if two or more services require the presence of a
particular facility in order to for each of the services to function, then this
particular facility would be common or joint to each of the services. Even
if it were true that one of the services may have initially caused the cost, it
does not alter the fact that each of the services requires the availability and
use of that facility and therefore each service benefits from the existence of
the facility. [Id., October 28, 1998 Order, p. 36].

The Indiana Commission further held that loop costs are properly included in the
definition of joint and common costs. [Id., p. 39].

Q. Did the Indiana Commission consider a uniform percentage allocation approach?
A. Yes, it did. The Indiana Commission noted that under the federal Part 36 separations
procedures, 25 percent of loop costs are allocated to the interstate jurisdiction. [Id., p. 38].
With regard to allocation of the remaining 75 percent, the Indiana Commission began by
identifying three groups of intrastate services: those included in the definition of universal
service, those not included in the definition of universal service, and those not subject to
its jurisdiction. [Id., p. 42]. The Indiana Commission discussed using fixed allocators and
moving allocators, and concluded that if a fixed allocator were used, an appropriate
approach would be to allocate one third of the intrastate joint and common costs to each
group of services. [Id., p. 44]. This approach would result in the allocation of 25% of
total joint and common costs to the services included in the definition of universal
service, 25% to switched access, toll and other services subject to intrastate regulation,
25% to services within the FCC jurisdiction, and 25% to unregulated services. Another
approach it considered would have allocated 37.5% of total joint and common costs to the
services included in the definition of universal service, 18.75% to other services subject
to intrastate regulation, 25% to services within the FCC jurisdiction, and 18.75% to
unregulated services.

Thus, the Indiana Commission considered use of a uniform percentage allocation
factor for basic universal service ranging from 25% to 37.5%. However, it was reluctant
to settle upon a uniform fixed percentage, since it recognized that “if the services in a
particular category were to be dramatically reduced at some future time, such a fixed
allocator might not continue to be a fair and reasonable method of allocating common and
joint costs” [Id.]. Accordingly, the Indiana Commission indicated a preference for a
moving allocator, which could vary over time, as circumstances changed. It discussed the
possibility of using several different moving allocators, including revenues, minutes of
use, number of users, and investment, but it found flaws with each of these approaches,
and thus decided to let the parties present evidence on an appropriate moving allocator in
a later phase of the Indiana proceeding. [Id., p. 47].

Q. What are the pros and cons related to revenue-based allocation methods?
A. One advantage is that revenues are a common denominator which applies to every
service. In contrast, a usage-based approach cannot readily be applied to custom calling,
Caller ID and similar services which generate revenues, but do not have associated minutes of use. Also, revenues tend to reflect the status quo regarding the manner in which shared costs are currently being recovered (services generating large revenues tend to contribute more to the shared costs than services generating low revenues).

One disadvantage is that revenues are essentially a function of pricing, and pricing may change, depending upon the outcome of the cost analysis, and the resulting pricing decisions. The allocations reflect existing prices. To the extent prices change, the allocations will also change, and thus a problem of circular reasoning may arise. (Prices are increased, which increases the revenue-based allocation of costs, which creates the appearance that prices must increase even further.) Given this potential problem with circularity, I prefer to use a uniform flat percentage approach, although some consideration of revenue relationships may be useful in establishing the uniform percentage factors.

Q. **What are the major usage-based allocation methods?**

A. The two most familiar are use of a Subscriber Line Usage (SLU) factor and use of a Subscriber Plant Factor (SPF). Both SLU and SPF reflect differences in usage; however, there is a very significant difference in the two allocation approaches, which will substantially influence the resulting costs for the toll and local categories.

Q. **What is the difference between SLU and SPF?**

A. SPF has long been used to allocate non-traffic sensitive costs (including the costs of the loop and port) for jurisdictional and cost recovery purposes. SPF is mathematically derived from SLU, which are simply traffic factors that reflect the relative minutes of use for the various services. For instance, an intrastate toll SLU factor would be calculated by dividing the intrastate toll minutes of use (originating and terminating) by total minutes of use (interstate toll, intrastate toll and local exchange) for the service area in
question. The SPF is more complex because it introduces weighting into the
computations, the effect of which is to put greater emphasis on toll usage than on local
usage.

The weighting is designed to reflect certain demand factors, such as distance, and
the deterrent effect of attaching a price tag to toll minutes. Specifically, the SPF formula
is: SPF = (.85 SLU) + (2 SLU \times CSR). For the interstate SPF, the Composite Station
Ratio (CSR) is calculated as the nationwide average interstate 3-minute toll charge
applicable to the average length of haul for interstate calls in the study area, divided by
the nationwide average 3-minute toll charge applicable to the average length of haul for
all toll traffic for the total industry. This component of the formula gives more weight to
the toll usage ratio in areas where the price of toll calls is higher than the average. In the
interstate environment where SPF and SLU were originally developed, the effect of this
formula is to reflect differences in the average length of haul, and the associated
differences in toll prices. The philosophy is straightforward: the higher value and price
tag associated with the call, the greater the appropriate allocation of cost.

If one assumes that the CSR is equal to 1 (toll calls in the study area have a price
that is equal to the overall average), the SPF for toll will be 2.85 times SLU. Similarly, if
one assumes that the calls in question have a zero price, and thus the CSR is equal to
zero, then SPF will be equal to .85 SLU.

While the formula is somewhat complex, the intention is clear: a greater portion
of the costs should be allocated to a category in which the usage has a higher value per
minute of use, and a greater portion of costs should be allocated to a category in which
usage volumes have been suppressed due to high prices. When comparing toll and local,
it is readily apparent that the average toll minute has a higher value than the average local
minute (due to the differences in distance). It is also apparent that toll traffic volumes are
reduced due to the fact that most toll service is not flat rated. SPF partially neutralizes the
deterrent effect of a toll rate structure which imposes a charge for individual calls, unlike
local service, which is typically flat rated.

In contrast, SLU ignores these fundamental differences in the characteristics of toll and local usage. Bear in mind that the costs which are being allocated are not traffic sensitive. Thus, there is no particular reason why the costs should be allocated in strict proportion to usage. While usage is obviously relevant, there are other factors which are also relevant, such as the relative value of a minute of toll usage in comparison with a minute of local usage. In fact, the SPF approach is superior in this context, because it reflects differences in value, differences in benefit, and differences in the strength of demand for local and toll service. These differences are not adequately reflected by raw usage statistics, but they should be considered in an appropriate allocation process. When allocating joint and common costs it is appropriate to simulate to some degree the pattern in competitive markets, where the recovery of shared costs reflects differences in demand characteristics. This is accomplished much more effectively by SPF than by SLU.

Q. What are the pros and cons related to usage-based allocation methods?

A. Usage-based methods potentially avoid the circular reasoning problem, and they are based upon readily available statistics. However, there is no single measure of “usage” which appropriately encompasses all of the many services supporting the access line. The use of custom calling service, for instance, cannot easily be measured in minutes of use. If someone has their phone programmed to forward calls to another number all day, should use of this service be measured for the entire time it is engaged? Or, just during the few seconds while a call is received and forwarded to the other number? Surely, the first alternative overstates the usage and benefits associated with Call Forwarding, while the latter measure understates the benefits. Thus, usage based allocation factors cannot readily deal with the myriad of different services that recover shared costs.
Appendix C

Cost Definitions and Comparisons

Cost Definitions

Q. There are many different types of “cost” and thus many types of “cost” studies. Would you please identify and explain some of the major types of “cost” which can be studied?

A. Certainly. In this context, the most fundamental and important types of cost are fixed cost, variable cost, total cost, average cost, marginal cost, incremental cost, and stand-alone cost—all of which are integral parts of economic theory—as well as certain more specialized cost concepts, derivative from these, which have recently come into use in discussions of telecommunications cost theory. The latter concepts include long run incremental cost, total service long run incremental cost, average service long run incremental cost, and incremental service incremental cost. For orientation purposes, I have provided brief definitions of these terms below. I will also make use of certain other familiar cost terms—sunk cost, direct cost, joint cost, common cost, embedded cost, fully allocated costs, etc., that are prevalent in the literature.

Fixed costs do not change with the level of production, during the planning period or “run” under consideration. Variable costs change directly (but not necessarily proportionately) with the level of production. Together, these constitute total cost, which is the sum of all costs incurred by the firm to produce any given level of output. Dividing the total cost of producing a given quantity of output by the total number of units produced, one can calculate average total cost.

Incremental cost is the change in total cost resulting from a specified increase or decrease in output. In mathematical terms, incremental cost equals total cost assuming the increment of output is produced, minus total cost assuming the increment is not produced.
Incremental cost is typically stated on a per-unit basis, with the change in cost divided by the change in output. Incremental cost can vary widely, depending upon the increment of output which is being considered. If the entire increment from zero units to the total volume of output is considered, incremental cost is identical to total cost. Similarly, where the increment ranges from zero to total output, incremental cost per unit is identical to average cost per unit. Because a wide variety of different increments can be specified, a wide variety of different incremental costs can be calculated. Thus, in considering any estimate of incremental cost it is crucially important to determine whether or not the specified increment is relevant to the issues at hand.

**Marginal cost** is the same as incremental cost where the increment is extremely small (e.g. one unit) and the cost function is smooth and continuous. In mathematical terms, marginal cost is the first derivative of the total cost function with respect to output—that is, it is the rate of change in total cost as output changes. Conceptually, marginal and incremental cost are very similar; however, there are a wide array of incremental cost concepts, corresponding to the wide array of possible increments that can potentially be analyzed. In contrast, marginal cost corresponds to one small portion of this array—where the increment is narrowly defined and extremely small.

**Stand-alone costs** are those costs which would be incurred to produce only the item or service in question “standing alone”. For example, the stand-alone cost of intrastate switched access service could be estimated as the cost associated with providing intrastate switched access in a stand alone context, without consideration of the additional costs which must be incurred in order to provide local or interstate switched access service. Stand-alone cost are those typically used in developing ceiling prices. Economies of scope (defined below) cause per-unit costs to be reduced when more customer groups are served, or when additional services are provided, over the same network. A comparison of long run stand alone costs (LRSAC) and total service long run incremental costs (TSLRIC) will generally display this phenomenon, and can be useful in
establishing the potential range of appropriate prices—with LRSAC representing the absolute ceiling and TSLRIC representing the absolute floor.

**Long run costs** are those calculated under the assumption that most, if not all, costs are variable, and few, if any, are fixed or sunk. In contrast, **short run costs** are those which arise in situations where most costs are fixed. The classic long run concept is sometimes known as a "scorched earth" approach—that is, no preexisting plant is considered in the analysis. Instead, the firm is free to build precisely the size and type of plant which best fits its assumed output level.

All of these cost concepts have well-established definitions in the economics literature, with characteristics and implications that are widely understood and accepted amongst economists. More recently, some related costing concepts have been developed that are of particular interest in the context of multi-product firms like telecommunications carriers. While a variety of different names have been used to describe these concepts, for convenience I will use those adopted on June 1, 1993 by the Colorado Public Utilities Commission, as set forth in their rules governing the costing and pricing of telecommunications services. [Statement of Adoption of Rules, Docket No. 92R-596T]. I’ve provided a copy of these rules as Appendix B to my testimony.

The **total service long run incremental cost** (TSLRIC) of a service (or group of services) is equal to the firm’s total cost of producing all its services including the service (or group of services) in question, minus the firm’s total cost of producing all its services except the service (or group of services) in question. Thus, it is a particular form of long run incremental cost (LRIC), in which the specified increment is the entire volume of output of a particular service, while all other services remain unchanged.

The **average service long run incremental cost** (ASLRIC) of a service (or services) is the total service long run incremental cost divided by the total number of units of the service(s) in question. The **incremental service incremental cost** (ISIC) of a service is the change in total cost resulting from increasing (or decreasing) the quantity of
output of the service by a small number of units, divided by that small number. If the cost function is smooth and the increment is sufficiently small, ISIC will approximate marginal cost.

TSLRIC studies can be useful in determining the existence and extent of subsidies and in developing public policies for the preservation of universal service under circumstances where new entrants may engage in “cream skimming,” or where barriers to entry may exist (e.g., in rural, high-cost areas). Other state commissions have endorsed the use of TSLRIC studies for this purpose. For example, the Pennsylvania Public Service Commission endorsed TSLRIC and rejected the use of embedded cost studies, which it concluded have been "increasingly discredited by most sectors of the industry and most outside observers" because their methodology is limited to embedded costs and fails to "provide for an adequate depiction of future economic costs of telecommunications networks." [Order, Docket No. 1-00940035, at 11.]

In effect, TSLRIC measures the difference between producing a service and not producing it. This difference may not include certain of the firm’s joint or common costs; hence, a firm that recovers in its prices only the TSLRIC of its services may find that its total revenues fall short of its total costs. In the case of many telecommunications services, the magnitude of this shortfall can be substantial, because these services use many of the same network facilities. Where facilities are required if any one of several services is produced, the portion of the firm’s total cost attributable to the facility in question (or, at least certain portions of that cost) may not vary with the presence or absence of any single service. Where this phenomena exists, the cost in question drops away from the TSLRIC calculations, and thus the TSLRIC of each individual service will be quite low.

By definition, all costs can be classified as variable in a long run cost study. However, that doesn’t necessarily mean that all costs vary in along every dimension of the cost function, or that they necessarily vary on a proportional basis. Thus, there can be
significant discrepancies between costs per unit developed on an average basis, and costs per unit developed on an incremental basis. For instance, while the investment in electronic equipment associated with fiber optic transport systems can be considered “variable” in the long run, that doesn’t mean that these costs necessarily vary in proportion to changes in the volume of traffic, or that all of the components of these costs will necessarily increase or decrease as one specific service is added or deleted from the array of services which use this equipment. Due to economies of scale and scope, the incremental fiber electronic investment which is attributable to an incremental service may be substantially lower than the average investment required for all services.

An allocated cost is a joint or common cost that has been divided among the firm's different customers, products, or services, in accordance with a particular formula or the judgments of a cost analyst. Fully allocated costs are the summation of direct and allocated costs for a customer, customer class, product, or product group, developed in a cost study in which none of the firm's joint and common costs are left unallocated. Fully allocated costs are often referred to as fully distributed costs.

Common costs are incurred when production processes yield two or more outputs. They are often common to the entire output of the firm but can be common to just some of the outputs produced by the firm. An increase in production of any one good will tend to increase the level of common costs; however, the increase will not necessarily be proportional, since economies of scope and/or scale may apply. A joint cost is a specific type of common cost--one incurred when production processes yield two or more outputs in fixed proportions. A classic example arises in the joint production of leather and beef. Although cattle feed is a necessary input for the production of both gloves and hamburgers, there is no economically meaningful way to separate out the feed costs that are required to produce each. If the quantity of leather and beef is reduced, there will be a savings in the amount of cattle feeding costs, but it is impossible to say how much of this change in cost results from the change in the quantity of leather and how much from the
change in the quantity of beef. Because the appropriate interpretation and handling of joint and common costs tends to be very controversial in regulatory proceedings, I have provided a more extensive discussion of this topic as Appendix C to my testimony.

**Economies of scale.** Economies of scale are achieved when a firm is able to lower the per-unit cost by producing additional units of the product or service—i.e., when marginal or incremental cost is lower than average cost. The ultimate example of economies of scale is a natural monopoly, where a single firm can supply the entire market for the product or service at a lower per-unit cost than any combination of two or more firms. Economies of scale appear in telecommunications in such plant elements as poles and trenches used to hold cables, where the increase in carrying capacity (e.g., number of circuits) is disproportionately greater than any corresponding increase in the cost of the pole or trench. That is, it costs little more to install poles for 1,000 circuits along a particular route than to install poles for 100 circuits along the identical route.

**Economies of scope** result when the resources a firm uses in the combined production of two or more products are less costly than the resources it would use to produce the products separately, as measured by their combined total of their respective stand-alone costs. For example, if a telecom firm produces both toll and local phone service, it may gain some economies of scope. When the same pole route carries both intercity trunk lines and local loops, the firm can achieve economies of scope by using one set of poles instead of two.

**Cost Comparisons**

**Q.** Can you elaborate on the differences between marginal and incremental cost?

**A.** Yes. By definition, incremental costs can fall anywhere along the conceptual continuum from marginal to average cost, depending upon the specific methodology used and the specific increment which has been selected. As two academic experts in this field explain:
Incremental cost is a generic concept... marginal cost can be approximated by incremental cost when the increment in question is small. But if the increment is large, marginal cost and incremental cost can differ substantially, because the ranges of outputs examined in the two calculations are not the same. [William J. Baumol and J. Gregory Sidak, Toward Competition in Local Telephony. Cambridge (MA): MIT Press, 1994, p. 34. 57]

As Baumol and Sidak also note, TSLRIC includes any fixed cost that must be incurred on behalf of that product alone.” Furthermore,

incremental cost and stand-alone cost are intimately related, and either number can be deduced directly from the other. Specifically, when the firm earns no more and no less than the competitive rate of return, if each of the firm’s prices is above [TSLRIC], then each of those prices must be below its stand-alone cost, and vice versa. [58-9.]

Q. Would you provide an example to illustrate the distinction between analyzing average cost and analyzing incremental or marginal cost?

A. Yes. The clearest distinction exists between marginal and average costs as these relate to the manner in which fixed costs are treated. Average total costs include the total of all fixed and variable costs, divided by the number of units of output. In contrast, marginal cost includes only the rate of change in variable costs as output increases.

Consider, for example, the treatment of the getting started cost of a switch. This is the minimum level of cost associated with a switch, even if it were not equipped with any lines, and even if it didn’t have enough capacity to handle any traffic. An average cost estimate would typically include the total getting started cost of the switch divided by some measure of output (e.g. the number of loops terminated on the switch). In sharp contrast, a marginal cost estimate would most likely exclude any of the getting started costs, because these costs would be considered largely, or entirely, fixed and they would...
not vary with output.

The same principle holds true for other costs which are largely or entirely fixed, such as the cost of installing a cable on the pole. The cost of attaching a small cable, such as one containing 25 loops, will not differ greatly from attaching a much larger cable, such as one containing 900 loops. With the notable exception of splicing costs, most cable installation costs vary less than proportionally with variations in the size of the cable, and thus they should have little or no impact on marginal cost estimates.

Admittedly, some costs which are largely fixed may vary under some limited circumstances. For instance, the getting started costs of a small switch might be lower than the analogous costs of a much larger switch. The point is not whether a particular type of cost is absolutely fixed under any and all circumstances. Rather, the point is that if the increase in costs would normally be far less than proportional to the rate of increase in output, the marginal cost will tend to be less than the average total cost. Because of economies of scale and scope, it is often the case in the telecommunications industry that when properly estimated, TSLRIC will be substantially lower, and stand alone costs will be substantially higher, than average total cost.