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BEFORE THE ARIZONA CORPORATION COMMISSION

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ARIZONA CORPORATION COMMISSION
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8 IN THE MATTER OF THE REVIEW AND
9 POSSIBLE REVISION OF ARIZONA
10 UNIVERSAL SERVICE FUND RULES,
11 ARTICLE 12 OF THE ARIZONA
12 ADMINISTRATIVE CODE.

Docket No. RT-00000H-97-0137

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

Docket No. T-00000D-00-0672

NOTICE OF FILING

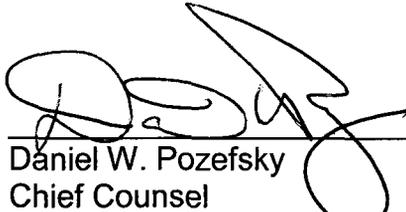
The Residential Utility Consumer Office ("RUCO") hereby provides notice of filing the Direct Testimony of Dr. Ben Johnson in the above-referenced matter.

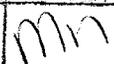
RESPECTFULLY SUBMITTED this 6th day of January, 2010.

Arizona Corporation Commission

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By Ernestine Gamble
Ernestine Gamble

**ARIZONA UNIVERSAL SERVICE
FUND RULES**

DOCKET NO. RT-00000H-97-0137 et al.

DIRECT TESTIMONY

OF

BEN JOHNSON, Ph.D.

ON BEHALF OF

THE

RESIDENTIAL UTILITY CONSUMER OFFICE

JANUARY 6, 2010

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TESTIMONY
OF BEN JOHNSON, PH.D.
On Behalf of
THE STATE OF ARIZONA
RESIDENTIAL UTILITY CONSUMER OFFICE
Before the
ARIZONA CORPORATION COMMISSION

Docket Nos. T-00000D-00-0672 and RT-00000H-97-0137

Introduction

Q. Would you please state your name and address?

A. Ben Johnson, 3854-2 Killearn Court, 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.

1 **Q. What is your purpose in making your appearance at this hearing?**

2 A. Our firm has been retained by the Residential Utility Consumer Office ("RUCO") to assist with
3 RUCO's participation in this generic proceeding to investigate the pricing of intrastate switched
4 access service, including proposals to reduce access rates by increasing local rates, and/or
5 expanding the Arizona Universal Service Fund ("AUSF"). I have been asked to provide
6 testimony responding to issues identified by the Arizona Corporation Commission (the
7 Commission). More specifically, I will be discussing (1) whether interexchange carriers
8 ("IXCs") may be at a competitive disadvantage if access charges are not reformed, (2) whether
9 transferring cost recovery responsibility from IXCs (e.g. through carrier common line ("CCL")
10 charges) to end users results in end user subsidies of incumbent local exchange carrier
11 ("ILEC")-provided toll services, (3) whether transferring cost recovery responsibility from
12 IXCs to end users results in end user benefits, and (4) what considerations make access charge
13 reform in the public interest and, more specifically, why the approach recommended by RUCO
14 is in the public interest.

15
16 **Q. Would you please explain how your testimony is organized, and briefly summarize its
17 major elements?**

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

22 The second section sketches the historical context of key issues involved in this
23 proceeding, including positions taken over the past century by the U.S. Supreme Court, other
24 state public utility commissions, Congress, and the Federal Communications Commission
25 ("FCC") concerning certain issues which are crucial to the outcome of this proceeding. By

1 examining these issues in a long term historical context, the Commission can gain valuable
2 insight into the advocacy efforts of various parties, and gain a deeper understanding of the
3 public policy tradeoffs involved in these issues.

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

8 In the fourth section I discuss the economic characteristics of the networks which are
9 used in providing local exchange, toll, access, and custom calling services, and explain the
10 reason why the cost of providing switched access service has been declining rapidly. I also
11 explain why the appropriate method of recovering these costs tends to be so controversial. The
12 fifth section focuses on the universal service goal and relates this goal to the issues surrounding
13 access rates and costs. I explain that transferring cost recovery responsibility from IXCs to end
14 users (through higher local rates or per-line end user charges) may result in net benefits for high
15 toll users but low toll users may experience higher bills, which may discourage them from
16 having phone service. In the sixth section, I discuss certain technical issues associated with any
17 future efforts to revise the AUSF. In the seventh section I present my conclusions and
18 recommendations.

19

20 **I. Background**

21

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

24 **A. Yes. The Arizona Universal Service Fund was established on September 22, 1989. [Decision**
25 **No. 56639] The AUSF was designed to help offset high basic local telephone rates in rural**

1 areas. One half of universal service funding was derived from local exchange carriers based on
2 the number of access lines, and one half was derived from interLATA and intraLATA intrastate
3 minutes of use. On March 24, 1996, the Commission adopted rules which established a new
4 universal service fund mechanism. The AUSF rules expanded the types of telecommunications
5 providers that contribute to the AUSF and changed the criteria for drawing from the fund. In
6 1997, Docket RT-00000H-97-0137 was opened to again review and revise the AUSF rules.

7 The Commission opened Docket T-00000D-00-0672 in 2000 with the intent of
8 analyzing the relationship between the rates charged and the costs incurred in the provision of
9 access service. "Phase I" of the docket addressed Qwest's access charges, and "Phase II" was
10 intended to address access charges for other carriers. These two dockets were consolidated in
11 2007. On October 7, 2008, numerous parties filed issue statements which left the Commission
12 with no clear consensus on how to proceed. On October 10, 2008, the parties agreed that no
13 further action should be taken in this consolidated docket until the FCC issued an order on
14 intercarrier compensation that was expected to be issued the following month. At a January 29,
15 2009 Procedural Conference, the parties again advocated disparate approaches to the issues
16 involved in this docket. Some parties suggested moving forward, while others recommended
17 waiting for further action by the FCC. [See, September 29, 2009 Procedural Order, p. 2] During
18 the summer of 2009, the parties participated in two workshops. A Procedural Conference was
19 held on September 6, 2009 to again discuss how this docket should proceed. On September 29,
20 2009, the Commission concluded:

21 There does not appear to be a dispute that access charges and AUSF
22 should be reviewed to reflect the current realities in the communications
23 industry, but after years of discussions among the parties, discovery and
24 workshops, no consensus has emerged about how to proceed, much less
25 on the substantive or policy questions. ... The recommendation to conduct
26 an evidentiary hearing appears to be the best means to make progress
27 with the Commission's investigation in these matters. [Id., p. 3]
28

1 The Commission also provided a list of 12 issues to be addressed at the hearing. [Id., pp. 4-5]
2 Finally, the Commission established a testimony filing schedule that included filing direct
3 testimony by all parties except Staff and RUCO on December 1, 2009, and by Staff and RUCO
4 on January 6, 2010.

5
6 **Q. Can you briefly describe the testimony filed on December 1, 2009?**

7 A. Yes. Direct testimony was filed by Qwest, Verizon, AT&T, Sprint, ALECA, Cox and a group of
8 CLECs. For the most part, the filings reiterated positions that had been advocated by the parties
9 numerous times over the course of these consolidated dockets. Qwest focuses on AUSF issues,
10 and advocates a wire-center targeted support mechanism that would be uniformly applied to
11 rural and non-rural carriers. Qwest also recommends allowing carriers to recover a portion of
12 "additional costs" from end-users. Verizon recommends capping all LEC switched access rates
13 at Qwest's current levels. Any lost revenues should be collected from increased retail rates,
14 according to Verizon. Verizon also recommends leaving the existing AUSF system essentially
15 unchanged. ALECA proposes a revenue neutral approach by which lost revenues from reduced
16 access charges would be recouped from a high cost universal service program. ALECA
17 proposes to use Qwest's intrastate access rates to set its members' rates. ALECA also does not
18 believe rate cases should be required for its members.

19 AT&T recommends ILECS be required to lower access charges to interstate levels, and
20 capping CLEC rates at ILEC levels. AT&T also recommends a revenue neutral approach
21 whereby rate-regulated carriers can recoup lost revenues from price-capped lines. Sprint asserts
22 that subsidies from access charges are no longer needed, since LECs have expanded the types of
23 retail services they provide over their networks. Sprint recommends setting LEC access rates at
24 interstate levels.

25 The Joint CLECs argue that CLEC access rates need not, and should not, be addressed at

1 this time. When CLEC access rates are modified, the changes should be based on cost, rather
2 than interstate rates or Qwest's intrastate rates. Otherwise, according to the Joint CLECs,
3 changes should be based on Qwest's rates from 1999. In any event, the CLECs recommend a
4 gradual, multi-year approach to access charge reform. Finally, the CLECs recommend the
5 Commission set rates for terminating wireless carriers' intrastate, intraMTA calls. Cox
6 recommends the Commission wait for the FCC to finalize its efforts to reform intercarrier
7 compensation. If the Commission were to move forward and include CLEC access rates in the
8 proceeding, it should proceed slowly and allow CLECs to set rates that are higher than
9 corresponding ILEC rates.

10
11 **II. History of Access Charges: The Toll vs. Local Battle**

12
13 **Q. Let's turn to the second section of your testimony. Would you please begin by providing a**
14 **brief definition of intrastate access charges?**

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

1 the current controversy over access charges into a broader context.

2

3 **Q. Is the debate over the relationship between access costs and access rates a new one?**

4 A. No. For more than 30 years, AT&T and other interexchange carriers have advanced the
5 argument that they should be allowed to use the local networks without paying anything for this
6 privilege. They have put forth many different arguments in support of this position, including
7 the contention that the costs in question are "non-traffic sensitive" (NTS) and these costs
8 shouldn't be recovered through traffic sensitive toll charges (or access charges), the argument
9 that the costs of the local loop are entirely the responsibility of the end user who is connected to
10 that loop, and the argument that economic efficiency, the competitive process, or some other
11 desideratum will be furthered if cost responsibility is shifted from toll to local markets.

12 Over the years, these carriers continued to recycle these arguments, adapting them to fit
13 changing market conditions and changing attitudes of their audience. Prior to the AT&T
14 divestiture in the mid 1980's, the primary argument was that toll competition was increasing,
15 and that local rates needed to be increased in order to "level the playing field" and protect the
16 financial viability of the local carriers in the face of increased toll competition. Rate revisions
17 were proposed which would allow the LECs to cut prices in toll markets (where they
18 anticipated the strongest downward pressure on rates due to competition) and which would
19 allow them to "finance" these price cuts with increases in markets where competitive entry was
20 expected to be more difficult, and where competitive pressures were expected to be less severe.
21 By the mid-1980's, this theme was amplified and repeated throughout the country, with an
22 emphasis on the potential effect of equal access and divestiture. Some of the Bell Operating
23 Companies even implied that unless local rates were dramatically increased at the time of
24 divestiture, disaster would befall them.

25 Many regulators allowed rate increases around the time of divestiture, but in most cases

1 local rates were not increased as much as requested. Events subsequently proved that the
2 "doom and gloom" arguments were fundamentally false, or at least greatly exaggerated. In the
3 years following the AT&T divestiture and the introduction of switched access tariffs, LEC
4 profits remained strong, "bypass" of the LEC networks never grew as rapidly as predicted, and
5 in most markets the LECs enjoyed strong growth in demand for their switched access service,
6 despite the fact that access rates were established at levels far in excess of the levels advocated
7 by AT&T and the Regional Bell Operating Companies (RBOCs). Not only has history proven
8 many of the arguments in favor of shifting cost responsibility from toll to local markets to be
9 false, but the arguments in favor of drastic cost shifting tend to be inconsistent with both
10 economic theory and common sense.

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

1 **Q. You mentioned the U.S. Supreme Court. Has it issued any ruling concerning this**
2 **controversy?**

3 A. Yes. The U.S. Supreme Court handed down a landmark decision concerning the interpretation
4 and recovery of the joint cost of access lines more than 85 years ago in Smith vs. Illinois Bell
5 Telephone Company ("Smith") which is directly on point to the question of whether switched
6 access rates should be greatly reduced or eliminated. Writing for the Court on the question of
7 whether the entire cost of the access line could be charged to a single service, Chief Justice
8 Charles Evans Hughes noted as follows:

9 In the method used by the Illinois Company in separating its interstate
10 and intrastate business, for the purpose of the computations which were
11 submitted to the court, what is called exchange property, that is, the
12 property used at the subscriber's station and from that station to the toll
13 switchboard, or to the toll trunk lines, was attributed entirely to the
14 intrastate service.... While the difficulty in making an exact
15 apportionment of the property is apparent, and extreme nicety is not
16 required..., it is quite another matter to ignore altogether the actual uses to
17 which the property is put. It is obvious that, unless an apportionment is
18 made, the intrastate service to which the exchange property is allocated
19 will bear an undue burden.... [282 U.S. 150, 151 (August 1923).]
20

21 In the years since, this principle of fairly distributing the joint or fixed costs of the
22 network to all of the users of that network has been upheld again and again. Despite decades of
23 pressure to shift network costs from toll to local services, the policy of spreading these costs
24 across multiple services was affirmed by state public utility commissions in numerous
25 proceedings throughout the country over a period of more than half a century.

26
27 **Q. Has Congress also spoken to the issue of shifting joint and common costs entirely onto**
28 **local service customers?**

29 A. Yes. The appropriate treatment of these costs has been vigorously debated for many years in
30 many different forums. Thus, it isn't surprising that Congress included some specific provisions

1 relating to this issue in the 1996 Telecom Act. The Act adds an entirely new section to federal
2 law dealing with universal service--Section 254. Within this context, a portion of ¶254(k)
3 reads:

4 [T]he States, with respect to intrastate services, shall establish any
5 necessary cost allocation rules, accounting safeguards, and guidelines to
6 ensure that services included in the definition of universal service bear no
7 more than a reasonable share of the joint and common costs of facilities
8 used to provide those services. [47 U.S.C. § 254(k) (1996).]
9

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

22
23 **Q. Has the FCC been active in this area?**

24 **A.** Yes. In response to the concerted advocacy efforts of the interexchange carriers and others, the
25 FCC has been quite active in this area, adopting various policies which have driven down
26 interstate access rates, and increased the flat monthly rates paid by most customers. For
27 instance, in 2000, the FCC issued what is commonly referred to as its CALLS order. This order

1 was based on a proposal developed by Coalition for Affordable Local and Long Distance
2 Service. According to its proponents, this plan was designed to reduce, and in most instances
3 eliminate, implicit subsidies among end-user classes; make implicit universal service funding in
4 access charges explicit and portable; provide significant benefits to consumers who make few
5 or no long-distance calls; and set carrier charges at reasonable levels. [Access Charge Reform,
6 Price Cap Performance Review for Local Exchange Carriers, Low-Volume Long-Distance
7 Users, Federal-State Joint Board on Universal Service, CC Docket Nos. 96-262, 94-1, 99-249,
8 and 96-45, Sixth Report and Order, FCC 00-193 (adopted May 31, 2000) (CALLS Order) at ¶
9 29.] The FCC felt that the CALLS Proposal was procedurally advantageous because it
10 produced end user benefits, was pro-competitive and economically efficient. [Id.]

11 Later, on October 20, 2000, a diverse group of industry participants filed a plan with the
12 FCC for improved regulation of interstate services of non-price cap incumbent local exchange
13 carriers and interexchange carriers. The Multi-Association Group (MAG) members, consisting
14 of the National Rural Telecom Association (NRTA), the National Telephone Cooperative
15 Association (NTCA), the Organization for the Promotion and Advancement of Small
16 Telecommunications Companies (OPASTCO) and the United States Telecom Association
17 (USTA), claimed that its plan, or petition for rulemaking, would improve the Commission's
18 access charge and universal support systems, as well as to enforce the geographic averaging
19 requirements of the Act.

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

23 The MAG Plan was intended to be compatible with the CALLS plan and gained support
24 from the FCC because the reforms were designed to establish a "pro-competitive, deregulatory
25 national policy framework" for the United States telecommunications industry, and fulfill

1 universal service provisions in the 1996 Act. [Multi-Association Group (MAG) Plan for
2 Regulation of Interstate Services of Non-Price Cap Incumbent Local Exchange Carriers and
3 Interexchange Carriers Federal-State Joint Board on Universal Service Access Charge Reform
4 for Incumbent Local Exchange Carriers Subject to Rate-of-Return Regulation Prescribing the
5 Authorized Rate of Return for Interstate Services of Local Exchange Carriers, CC Docket Nos.
6 00-256, 96-45, 98-77, and 98-166, Second Report and Order, FCC 01-304 (adopted October 11,
7 2001) (MAG Order) at ¶ 3.] Specifically, through the MAG Plan the FCC hoped to "align the
8 interstate access rate structure more closely with the manner in which costs are incurred, and
9 create a universal service support mechanism to replace implicit support in the interstate access
10 charges with explicit support that is portable to all eligible telecommunications carriers." [Id.]
11

12 **Q. Did the CALLs and MAG orders solve all the problems with intercarrier compensation?**

13 A. No. As competition emerged in some local telephone markets, existing weaknesses in the
14 compensation regimes were highlighted. As the FCC observed in 2001,

15 Interconnection arrangements between carriers are currently governed by
16 a complex system of intercarrier compensation regulations . . . [that] treat
17 different types of carriers and different types of services disparately, even
18 though there may be no significant differences in the costs among
19 carriers or services. [*Developing a Unified Intercarrier Compensation*
20 *Regime*, CC Docket No. 01-92, Notice of Proposed Rulemaking, 16 FCC
21 Rcd 9610 (2001)]
22

23 The FCC recently noted that numerous examples of "regulatory arbitrage" exist

24 both because of the different rates for similar functions under different
25 intercarrier compensation regimes and because none of these regimes
26 currently set rate levels in an economically efficient manner. [Order on
27 Remand and Report and Order and Further Notice of Proposed
28 Rulemaking, WC Docket No. 05-337, November 5, 2008 (2008
29 FNPRM)]
30

31 One example of this arbitrage opportunity involved ISP-bound traffic. After the FCC's 1996

1 *Local Competition First Report and Order*, state commissions set reciprocal compensation rates
2 for the exchange of local traffic. The magnitude of these rates induced many CLECs to target
3 and serve ISP customers who were large recipients of local traffic through dial up internet
4 access. In response, in 1999 the FCC declared ISP-bound traffic to be interstate in nature.
5 [Declaratory Ruling and Notice of Proposed Rulemaking, 14 FCC Rcd 3689, (1999)] Another
6 regulatory arbitrage opportunity arose from the FCC's 1997 decision not to regulate the
7 interstate access charges of competitive LECs. Following that decision, many CLECs set
8 access charges well above analogous charges by the incumbent LECs. In response, the FCC
9 adopted new rules that capped CLEC interstate access charges.

10 Over much of the past decade, the FCC has also been considering more comprehensive
11 intercarrier compensation reform. These efforts have largely involved numerous rounds of
12 comments regarding new rules proposed by the FCC, and new compensation plans proposed by
13 various industry participants. In 2008, the FCC attempted to stabilize the federal universal
14 service fund by adopting an interim cap on payments to competitive ETCs, "helping pave the
15 way for comprehensive intercarrier compensation and universal service reform, and leading to a
16 number of new reform proposals". [2008 FNPRM, WC Docket No. 05-337, November 5, 2008]
17 In the 2008 FNPRM, the FCC did little to change the compensation regime for ISP-bound
18 traffic, but it sought comment on a proposal that included extensive revisions to other aspects of
19 intercarrier compensation and universal service.

20 We conclude today that, with the universal service fund now stabilized,
21 we can wait no longer to begin the process of comprehensive intercarrier
22 compensation reform. The differences in existing intercarrier
23 compensation regimes impose significant inefficiencies on users and
24 distort carriers' investment incentives, which can result in losses of
25 billions of dollars in consumers and producers surplus. Possibly more
26 important, these legacy regulatory regimes pose an obstacle to the
27 transition to an all-IP broadband world. Because carriers currently can
28 receive significant revenues from charging above-cost rates to terminate
29 telecommunications traffic, they have a reduced incentive to upgrade

1 their networks to the most efficient technology or to negotiate
2 interconnection agreements that are designed to accommodate the
3 efficient exchange of IP traffic, as both actions would likely lead to
4 reduced intercarrier payments. ... we adopt here a gradual ten-year
5 transition plan with separate stages, designed to reduce rates over a
6 sufficient period to minimize market disruptions and to cushion the
7 impact of our reform on both customers and carriers. At the end of the
8 transition period, all telecommunications traffic will be treated as falling
9 within the reciprocal compensation provisions of section 251(b)(5), and
10 states will set default reciprocal compensation rates pursuant to the new
11 methodology we adopt herein. [Id., Appendix A, ¶189-190]
12

13 The FCC is still considering comments on its intercarrier compensation and universal service
14 proposals.
15

16 **Q. Can you briefly explain how this historical context is relevant to the issues in this**
17 **proceeding?**

18 **A.** Most of the parties to this proceeding have been embroiled in this controversy for decades;
19 while the specific arguments being put forth at this time may differ in some of the specifics, the
20 overall thrust of many of the parties' positions continue to be very similar to the positions they
21 have taken for many years. The Commission has been reluctant to adopt sweeping reductions
22 to switched access rates, or toll rates, where those reductions would require increases to the
23 monthly price paid by most customers for basic local service.

24 While the underlying factual circumstances continue to change, particularly because of
25 changes adopted by the FCC, the pressure to lower access and/or toll rates, and corresponding
26 pressure to increase local rates is a common thread that runs throughout the advocacy efforts of
27 many of the parties to this proceeding – efforts that have spanned more 30 years, with very
28 limited success at this Commission, but with much greater success at the FCC. During portions
29 of this 30 year period there was a broad consensus among both federal and state regulators
30 rejecting attempts to shift joint and common costs onto local exchange service. In many of

1 these intensely litigated cases decision makers responded similarly, rejecting as fallacious the
2 varied arguments claiming that the costs of the local network are the sole responsibility of local
3 exchange service, and refusing to adopt extreme shifts in costs away from IXCs to local
4 customers. However, during the more recent time period, the FCC has responded by reducing
5 interstate access charges, and moving away from per-minute recovery of local network costs,
6 culminating in its recent proposal to essentially eliminate these rates by adopting a system of
7 “reciprocal compensation”.

8
9 **III. Public Policy Goals**

10
11 **Q. Please turn to the third section of your testimony. Would you please briefly explain the**
12 **policy goals you feel should guide the Commission's decision-making process in this**
13 **proceeding?**

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

- 20
21 (1) The preservation and promotion of affordable, high-quality,
22 universal, basic telecommunications services.
23 (2) The maintenance of fair, just, and reasonable rates (inter-customer
24 equity).
25 (3) The maintenance of a reasonable level of rate continuity.
26 (4) The promotion of economic efficiency.

1 (5) The promotion of technological innovations.

2 (6) The encouragement of effective competition.

3

4 **Q. Please explain the first of these six goals. What is universal service and why is this**
5 **important as a policy goal in developing rates?**

6 A. Universal service is a situation in which virtually every household and business is connected to
7 a common communications network, so that everyone can conveniently and inexpensively
8 communicate with everyone else—including those who are not inclined to have a phone, because
9 their disposable income is so limited, or they simply don't place much value on having
10 telephone service. This has been a major policy goal for legislators and regulators for the past
11 75 years, and it continues to be a very important goal. Society, ratepayers, and the Company all
12 benefit from maximum subscriber participation on an interconnected telephone network. It has
13 long been clear that the more users a network links together, the more valuable the service is for
14 each and every user.

15

16 **Q. Would you next discuss the second of your recommended policy goals--that of equity**
17 **between rate classes?**

18 A. Yes. While much of the debate in this proceeding is likely to play out in terms of cost theory,
19 economic efficiency, inconsistencies in federal and state policies, and other technical arguments,
20 behind the surface of these debates there are also some fundamental questions of equity. For
21 instance, regulators have often rejected seemingly plausible costing approaches which
22 exclusively allocate loop costs onto basic local exchange service, because this seems
23 fundamentally unfair to local exchange customers. Loops (which connect customers to their
24 central office) are used in the provision of the entire range of telephone services, including
25 access, toll and custom calling. Hence, most observers will agree that it is equitable for

1 subscribers to all these services to share in the cost of the construction and maintenance of these
2 facilities. Giving a completely "free ride" to the IXCs violates fundamental notions of fairness.

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

13
14 **Q. How can the Commission's decision making be guided by the equity goal?**

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

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

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

25 Equitable treatment of carriers doesn't necessarily mean equal treatment, nor does it

1 imply that every carrier should be treated identically, regardless of circumstances. Rather,
2 equity implies a mechanism that avoids unduly favoring or disadvantaging any carrier or class
3 of carriers. For example, while all carriers should participate in the effort to maintain or
4 achieve universal service, one cannot reasonably expect every carrier to carry an equal share of
5 the overall burden. Large carriers obviously can and should contribute more to the support of
6 universal service than small carriers. Similarly, the "carrier of last resort," function would
7 normally be assumed by the incumbent LEC, which alone possesses the ubiquitous network and
8 other infrastructure necessary to carry out that responsibility. Incumbency confers many
9 competitive advantages on its possessor, such as ownership of ubiquitous facilities, a dominant
10 market share, and name recognition. In developing equitable policies, the Commission can and
11 should recognize the advantages of incumbency, while also recognizing offsetting burdens and
12 obligations.

13
14 **Q. Would you please discuss the third of your recommended policy goals--the maintenance of**
15 **reasonable rate continuity?**

16 **A. Yes.** Another longstanding principle of rate making is that customers should not be subjected to
17 sudden and extreme increases in rates, particularly if the increases are unrelated to
18 improvements in service quality or expansions in service offerings, and even more particularly
19 if no reasonable substitute for the service is readily available. In the present context, it is
20 worthwhile to separately state the goal of rate continuity, because it reinforces the importance of
21 the universal service and equity goals. If the traditional rate continuity principles were ignored,
22 the abrupt nature of the potential increases to local rates could cause subscribers to drop off the
23 system, to the detriment of the universal service goal. Similarly, regulatory commissions often
24 have found that "rate shock" should be avoided, or minimized for both equitable and other
25 reasons. Where customers do not have other viable options (e.g., where effective competition

1 does not exist), extreme or abrupt rate increases are particularly inappropriate and undesirable.
2 In this regard, it is important to realize that the goal of rate continuity doesn't preclude changes
3 to the status quo—it merely requires that changes be well justified, and that they be implemented
4 in a gradual manner.

5
6 **Q. Would you next discuss the fourth of your recommended policy goals--the promotion of**
7 **efficiency through pricing?**

8 A. Yes. Efficiency is a well recognized goal in utility rate design. Economics describes it as a state
9 in which an optimal level and mix of goods and services is produced, using optimal production
10 methods. In the context of telecommunications regulation, this objective implies that rates
11 should not induce wasteful and inefficient methods of production (either by the utility or by
12 other producers), nor lead to over- or under-consumption of the telecommunication firm's
13 services.

14 Under the widely accepted approach of Vilfredo Pareto, economic efficiency or
15 inefficiency can be defined in terms of waste. When economic efficiency has been maximized,
16 any change will increase waste. To the extent the Commission seeks to improve or maintain
17 economic efficiency, the logical focus is on marginal cost. This is the type of cost that is most
18 relevant to discussions of economic efficiency, and an understanding of the marginal cost
19 concept is essential to any effort to maximize economic efficiency.

20
21 **Q. Would you please discuss the fifth goal--the promotion of economic growth and**
22 **technological progress?**

23 A. Certainly. If universal service is defined merely as applying to voice grade dial tone at the end
24 of a customer's line, then in the emerging age of the broadband "telecommunications
25 superhighway" local exchange companies like Qwest will surely have no problem supplying it

1 at a marginal cost considerably below current rates, just as they can typically provide another
2 minute of voice service at a marginal cost that is extremely small. I say this because basic voice
3 communications require a small fraction of the total digital bandwidth required for video on
4 demand, high speed internet access, and other advanced services. Thus, for example, in areas
5 where broadband services are widely available at affordable prices, then the marginal cost of
6 carrying ordinary voice traffic on such a network will be very small. In turn, if the price of basic
7 local service were set at its marginal cost level, it would be easy to ensure that nearly everyone
8 has voice grade telephone service at extremely low prices. Needless to say, however, that is not
9 the method of cost recovery envisioned by most of the parties to this proceeding.

10 To the contrary, many of the carriers participating in this proceeding view the basic local
11 exchange customer as the "cash cow" that should be forced to cover most of the fixed costs of
12 the network, while other services – like broadband internet access and video services – are
13 charged at unregulated profit maximizing levels, and still other services – like wireless carrier
14 interconnection service and interstate switched access service – are being priced at very low
15 levels (near zero), due to the success of their advocacy efforts before the FCC. These extreme
16 inconsistencies are rationalized in various ways, including the argument that switched access,
17 video services, high speed internet access and the like are properly classified as "ancillary
18 services" which carry little or none of the burden of the fixed network costs, and the argument
19 that the network facilities located within each locality should be paid for by local exchange
20 customers in that area, allowing the carriers to get a free ride on that network.

21 Fortunately, the past decade has seen a continued downward trend in per-unit
22 telecommunications costs. Technological improvements and increasing scale economies have
23 resulted in sharp reductions in the cost of providing most telecommunications services. As costs
24 have declined, profits have generally increased and many prices have also decreased in various
25 parts of the industry. Proposals in this proceeding to further burden local exchange customers

1 by increasing local rates runs counter to this overall trend. While some shifting of costs from
2 toll to other services may be the inevitable consequence of recent policy shifts in the federal
3 jurisdiction, I would suggest that the Commission should not view these two issues—toll rate
4 reductions and local rate increases—as inextricably linked. To the contrary, the benefits of
5 increasing economies of scale and technological innovation, as well as surging demand for
6 telecommunications services creates a declining cost environment in which access charges and
7 toll rates can be reduced substantially without necessarily requiring an offsetting increase in
8 basic local exchange rates. As well, there are other cost recovery options worth considering, in
9 addition to local rate increases.

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

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

25 Society as a whole benefits from the flow of communication, regardless of whether

1 those communications occur over traditional voice lines, or through emails, social media
2 websites like Facebook, or a wireless phone call. Many systems, and markets in general,
3 become more efficient when the flow of information improves. Economic theory suggests that
4 such positive externalities should be considered in resolving policy issues, such as the rate
5 rebalancing proposals in this proceeding. Although externalities are not reflected in the
6 development of costs, they have historically been acknowledged by regulators, at least
7 implicitly, when decisions have been made to keep the price of interconnecting to the network
8 low enough to encourage nearly everyone to join the network, regardless of how low their
9 income may be, or how little they may value their connection to that network.

10
11 **Q. You mentioned that one of the goals is advancement towards "effective" competition.**
12 **What do you mean by this term?**

13 A. When attempting to decide whether a product is produced and marketed under competitive
14 conditions, one must consider pricing behavior. In a fully competitive marketplace, both buyers
15 and sellers view price as a given. All participants in the market behave as if market prices are
16 unaffected by their own decisions regarding how much they should purchase or produce. If
17 either buyers or sellers recognize that they can control prices, competitive conditions do not
18 fully prevail. The greater the degree of control exercised by a buyer or seller, the less
19 competitive forces will prevail.

20
21 **Q. How would you apply these policy goals and objectives in an evaluation of access rate**
22 **design proposals?**

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

1 For example, it is often argued that economic efficiency will be encouraged if rates are
2 moved toward their marginal cost, and I agree with this premise. But, I would caution against
3 focusing only on the low marginal cost of one service (e.g. switched access) while ignoring the
4 low marginal cost of other services (e.g. connecting one more person or household to the
5 network). Furthermore, if a movement toward lower, more efficient rates in one area will
6 require drastic increases in rates in another area, I would recommend caution and moderation.
7 In my opinion, efforts to promote economic efficiency should not take precedence over
8 considerations of rate continuity and avoidance of disruptive rate changes, which argue for
9 moderation and caution.

10 Likewise, it would not be in the public interest to risk the universal service objective by
11 adopting rate design proposals that would shift a large share of the revenue burden from
12 intrastate toll and switched access to residential basic exchange services. Some may argue that
13 such a shift will encourage efficiency, by bringing the toll and access rates closer to marginal
14 cost. But to determine if such a shift would truly result in a net gain in efficiency, the
15 Commission would also need to consider any offsetting efficiency losses that would result in
16 the local market, where prices would be increased farther above marginal cost, pushing
17 customers off the network, undermining the goal of universal service and potentially
18 endangering the stability of our long-held goal of allowing nearly everyone to easily
19 communicate with everyone else using a common network, regardless of how low their income,
20 how remote their location, or how little they personally value their connection to the common
21 network. Consideration of network externalities are vitally important, and the universal service
22 should be given considerable weight in the Commission's deliberations in this proceeding.

23 The pricing arrangements of the past several decades, which have required toll users to
24 shoulder a sizable share of the joint costs of the network, have been very successful in creating
25 and maintaining a ubiquitous telephone system that is unparalleled anywhere else in the world.

1 In the United States, nearly everyone is connected to a common telecommunications network.
2 While some changes to the traditional pricing arrangements and rate relationships might be
3 needed to reflect changing conditions (e.g., increased competition, changing federal pricing
4 policies), the Commission should not rush to abandon a longstanding pricing approach which
5 has been so successful in benefiting the public.

6 It is also important to carefully evaluate the potential consequences of proposed
7 realignments of telecommunications prices at this stage in the effort to transition toward a more
8 competitive market. While reducing access rates may benefit some carriers, the policy changes
9 being advocated in this case won't necessarily help new entrants gain a foothold in the market,
10 and there may be unintended consequences of such a policy, which may make further progress
11 towards effective competition less likely to be achieved in some markets.

12
13 **IV. Efficiency and Economic Costs**

14
15 **Q. Please turn to the fourth section of your testimony. It is sometimes argued that reductions**
16 **in access rates can enhance economic efficiency, because rates are far in excess of**
17 **economic costs. Please respond?**

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

1 It would not be in the public interest to adopt proposals that would shift a large share of
2 the revenue burden from toll and access to residential basic exchange services, if this would risk
3 the universal service objective. Some may argue that such a shift will encourage efficiency, by
4 bringing the toll and access rates closer to marginal cost. But to determine if such a shift would
5 truly result in a net gain in efficiency, the Commission would also need to consider any
6 offsetting efficiency losses that would result in the local market, where prices would be
7 increased farther above marginal cost. As well, in evaluating questions of efficiency, it is
8 important to take into consideration the phenomena of network externalities, which suggests
9 that society greatly benefits from pricing policies which encourage high network participation
10 rates.

11
12 **Q. The debate over economic efficiency is generally couched in terms of cost recovery. Can**
13 **you briefly explain the types of costs which are recovered through access rates?**

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

22 Most of the NTS costs have another important characteristic: they are joint or common
23 costs which are not only necessary for the provision of intrastate switched access service, but
24 also are necessary for the provision of interstate switched access, local exchange and custom
25 calling services. Common costs are incurred when production processes yield two or more

1 outputs. Joint costs are a specific type of common cost. The classic definition specifies that joint
2 costs are incurred when production processes yield two or more outputs in fixed proportions.
3 More intuitively, joint costs arise in situations where there are production factors that, once
4 acquired for use in producing one good, are available for use without cost in the production of
5 others. Thus, for example, cattle feed that is acquired for use in producing hamburgers is
6 available for use without cost in producing leather shoes.

7 The local loop fits the definition of a joint cost because, except when congestion is
8 present, there is no trade-off between the joint uses of the loop. If an access line is acquired for
9 purposes of placing local calls, it is available for use without cost in placing long distance calls,
10 as well. When an additional access line is installed, it simultaneously increases the intermediate
11 output (access) available to both toll and local markets (as well as the market for other services,
12 such as custom calling). Even if a line is intended strictly for local calls, it can also be used to
13 place and receive toll calls, and vice versa. Accordingly, local loops are analogous to cattle feed
14 in the production of steaks and leather coats. Even if feed is strictly intended to increase the
15 amount of available beef, it concurrently increases the amount of hides which are available.

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

25 To assign the entire amount of these joint costs to local exchange service is not

1 appropriate, and the resulting total cannot meaningfully be arrayed beside the revenues derived
2 from basic local exchange service. The LECs have many revenue sources which help cover
3 these joint costs, including toll, switched access, and custom calling – as well as revenues
4 generated by various unregulated services, like internet broadband access and video services.

5 Carriers have long relied upon all of these different revenue sources in order to pay the
6 cost of the networks they have installed in each local area. Many of the facilities used in
7 providing basic local telephone service are also required for (and used by) other services these
8 carriers provide, including interstate switched access, intrastate switched access, intrastate toll,
9 custom calling, Caller ID service and broadband internet service. The poles, cable, drop wire,
10 line card, and channel connection are equally required for the provision of these other services,
11 and there is no logical reason to impose the entirety of these costs onto just one of the services
12 that benefit from them.

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

22
23 **Q. Observers have often characterized telecommunications as a declining cost industry. Does**
24 **this have relevance to the issues in this proceeding?**

25 **A. Yes. Because this is a declining cost industry, rates which were initially designed to recover a**

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

14
15 **Q. Do you have any evidence that average costs per unit of output decline as a**
16 **telecommunications network expands?**

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

1 **V. Universal Service and Access Reform**

2

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

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

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

17 There is no inherent conflict between the goal of universal service, and the idea of
18 opening the markets to increased competition -- provided that all carriers are required to
19 interconnect with each other on reasonable terms and conditions. In other words, nearly
20 everyone can be connected to a universal public switched network, yet portions of that overall
21 network may be owned and operated by competing firms. Stated differently, a global network of
22 interconnected networks can achieve the goal of universal service just as effectively as a smaller
23 group of monopoly networks. However, individual customers and carriers do not necessarily
24 have the incentive to advance the goal of universal service. For instance, incumbent carriers
25 may seek to discourage entry by competitors by making it difficult, or unduly costly for the

1 newer firms to interconnect with, or utilize portions of, the established firm's network.

2 Accordingly, the Commission should establish appropriate policies to ensure that all of the
3 networks are interconnected and compatible with each other, and to encourage every business
4 and every household to connect to this network of networks.

5
6 **Q. Can you please explain what you mean by the "positive externalities" associated with
7 universal service?**

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

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

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

24 Historically, a wide variety of different policies have been adopted by regulators and
25 carriers to advance the goal of universal service. These policies include lifeline programs, cross-

1 industry cost sharing, averaging of costs across urban and rural areas, and rate structures that
2 are specifically designed to encourage maximum levels of participation in the network.

3

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

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

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

20 Similarly, in the absence of pro-active government policies, carriers might make little
21 effort to sign up low income customers, and those people who don't greatly value telephone
22 service. Efforts to connect these marginal customers to the network will fall short of the
23 universal service goal, if they are perceived by carriers as being not an especially profitable
24 market segment (e.g. due to problems with uncollectible bills, or an inability to purchase high
25 volumes of high-margin discretionary services like custom calling). Just as retail prices are

1 sometimes higher and alternatives fewer in low income neighborhoods, there is reason to be
2 concerned that carriers will not aggressively seek to expand into low income markets, if they
3 believe that profit margins will not be as high in these locations.

4 That is not to say that telephone service would disappear if the universal service goal
5 were eliminated. Absent regulatory policies designed to help advance the goal of universal
6 service, one can easily envision a set of circumstances in which nearly all businesses and
7 perhaps 70% of the residential households would purchase telephone service, at much higher
8 prices. This figure can be compared with the participation rate achieved by the cable television
9 industry in a nearly unregulated monopoly environment. Most cable carriers have achieved
10 about 60% penetration, or buy up, while operating in a regulatory environment that has not
11 stressed ubiquitous or universal service and which has generally allowed carriers to skim the
12 cream of the overall market. Lower income customers and those who do not value cable service
13 highly tend not to join the network.

14 With lower prices, it would undoubtedly feasible to entice nearly everyone to connect
15 with the cable network – including many viewers now contented with the over-the-air signal
16 and some households that rarely watch TV. However, the cable industry hasn't chosen to
17 aggressively pursue these customers, perhaps because it would have to cut the prices charged
18 some of the core customers below the monopoly profit maximizing level. With lower prices and
19 higher participation, these firms would make less money than they achieve charging higher
20 prices to fewer customers. While society may not be harmed by policies which allow cable
21 carriers to pursue profit maximizing pricing strategies, resulting in relatively high monthly
22 charges and relatively low participation rates, applying a similar "hands off" regulatory
23 approach to the telecommunications industry as a whole would have drastic consequences for
24 society. Unlike with cable TV service, the rate of participation on two-way communications
25 networks is of vital importance to society. Any substantial reduction below today's nearly

1 universal participation rate would have serious adverse consequences not only for those former
2 customers who are forced off the network, but also for those who want and need to
3 communicate with them.

4
5 **Q. In light of the universal service goal, are there specific requirements that local rates must**
6 **be "just, reasonable, and affordable"?**

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

13
14 **Q. Please relate your discussion of the goal of universal service to the investigation of**
15 **switched access charges at hand in this proceeding?**

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

22
23 **Q. Can policy decisions regarding access charges have an effect on universal service?**

24 A. Yes, particularly to the extent access rate reductions are offset by increases in the fees paid by
25 local exchange customers. It is difficult, if not impossible, to separate concerns about the level

1 of access charge from concerns about universal service support, despite the fact that these issues
2 are often dealt with in separate proceedings. The FCC recognized this linkage in its Access
3 Charge Reform Order:

4 [T]hrough this First Report and Order in our access reform docket and
5 our Universal Service Order, we set in place rules that will identify and
6 convert existing federal universal service support in the interstate high
7 cost fund, the dial equipment minutes (DEM) weighting program, Long
8 Term Support, Lifeline, Link-up, and interstate access charges to explicit
9 federal universal service support mechanisms. [¶ 5]
10

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

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

24
25 **SUBSIDY OF COMPETITIVE SERVICES PROHIBITED- A**
26 telecommunications carrier may not use services that are not competitive
27 to subsidize services that are subject to competition. The Commission,
28 with respect to interstate services, and the States, with respect to
29 intrastate services, shall establish any necessary cost allocation rules,
30 accounting safeguards, and guidelines to ensure that services included in

1 the definition of universal service bear no more than a reasonable share
2 of the joint and common costs of facilities used to provide those services.
3 [Section 254(k).]
4

5 In determining the scope of this provision, the FCC concluded that this provision of the
6 1996 Telecom Act protects not only basic local exchange service but also the ability to access
7 long distance carriers. However, it does not protect toll services provided by those carriers. As
8 the FCC points out, this provision does not prevent universal service support for access:

9
10 Regarding GCI's argument that interexchange service should not be
11 supported because it is a competitive service, we emphasize that
12 universal service support will be available for access to interexchange
13 service, but not for the interexchange or toll service. [note omitted] We
14 find that the record does not support including toll service among the
15 services designated for support, although, as discussed in section V
16 below, we find that the extent to which rural consumers must place toll
17 calls to reach essential services should be considered when assessing
18 affordability. Nevertheless, universal service should not be limited only
19 to "non-competitive" services. One of the fundamental purposes of
20 universal service is to ensure that rates are affordable regardless of
21 whether rates are set by regulatory action or through the competitive
22 marketplace. GCI's argument implies that, if there were multiple carriers
23 competing to provide, for example, basic dialtone service at \$1000 per
24 month, there could be no universal service support because the price was
25 set through competition. Such a result would be inconsistent with
26 Congress's intentions to preserve and advance universal service in
27 adopting section 254. We note that section 254(k), which forbids
28 telecommunications carriers from using services that are not competitive
29 to subsidize competitive services, is not inconsistent with our conclusion
30 that it is permissible to support competitive services. [note omitted]
31 [Access Charge Reform Order, ¶ 77]
32

33 There are undoubtedly a variety of different ways the Commission can ensure
34 compliance with this provision of the 1996 Telecom Act. Where doubt exists concerning the
35 best policy to adopt, or the most appropriate distribution of the burden of joint and common
36 costs, it is clear that priority must be given to ensuring that universal service is protected—even

1 if that results in intrastate long distance toll and switched access rates which are higher than
2 would otherwise be desired. Stated another way, the Commission will undoubtedly receive
3 conflicting advice in this proceeding concerning the most appropriate way of spreading the
4 burden of joint and common costs between basic local exchange service and long distance toll
5 services. In evaluating this conflicting advice, it would be appropriate to err in the direction of
6 ensuring that the "price of entry" by individual consumers onto the telephone network remains
7 at attractively low levels—thereby helping to maintain very high penetration rates. That is not to
8 say that the Commission should be unwilling to deviate from the status quo, or that it should
9 refuse to consider any reductions to access charges for fear of the consequences. However, the
10 Commission should place a very high burden of proof on parties that are urging extreme
11 changes to cost recovery patterns which have proven so successful for so many years.

12
13 **VI. AUSF Mechanics - Benchmarks and Embedded vs. Economic Costs**

14
15 **Q. Let's turn to the sixth section of your testimony. Various proposals are being made in this**
16 **proceeding to expand and modify the AUSF. Without attempting to respond to each of**
17 **these specific proposals, can you provide some brief general comments concerning the**
18 **structure of the AUSF?**

19 **A.** Yes. Simply stated, the fund should not be tailored for the exclusive benefit or detriment of any
20 one carrier or group of carriers. To best support the goal of universal service, funding should be
21 tightly targeted at carriers serving customers in the highest cost portions of the state, while
22 contributions into the fund should be broadly distributed, encompassing all carriers and all
23 telecom services which benefit from universal service.

24 More specifically, to the extent it is administratively practical and legally permissible,
25 contributions into the AUSF should come from incumbent LECs, CLECs, interexchange

1 carriers, wireless carriers and internet service providers. Conversely, payments out of the fund
2 should be narrowly targeted at the highest cost areas in the state, and to the extent feasible
3 further targeted at customers within those areas who are most in danger of leaving the network.

4 Ideally, payments from the fund should be competitively neutral, providing support to all
5 carriers that are helping to maintain universal service in these high cost areas, based upon
6 appropriate criteria which are not skewed in favor of any particular type of carrier, or
7 technology. For instance, if a cable TV company offers telephone service to residential
8 customers in a high cost area, there is no reason to preclude that carrier from being considered
9 for receiving USF support, along with the incumbent LEC in that area. The universal service
10 goal is so important, it should not be left to the incumbent LECs alone.

11
12 **Q. Can you explain what you mean by a benchmark?**

13 A. A benchmark is typically used for comparison purposes, to better identify high cost areas, and
14 to help determine the amount of support needed in these areas. It provides a numerical basis for
15 evaluating the extent to which costs in a particular area are above the "norm," and thus
16 potentially in need of support. There are several different types of benchmarks; for instance, the
17 benchmark can be based upon revenue per line, or cost per line. In either case, high cost
18 support is provided to geographic areas where costs are found to be inordinately high, in
19 comparison with the benchmark.

20
21 **Q. If a revenue benchmark were chosen for the AUSE, what revenues should the Commission
22 include in the benchmark?**

23 A. If a revenue benchmark is used, it is important to carefully evaluate which revenues should be
24 included in the benchmark, and how to take into account any revenue sources which are
25 excluded from the benchmark. In general, this evaluation should be consistent with the fact that

1 telecommunications networks are used in providing many different services, and that it can be
2 highly misleading to exclusively focus on just a few of these many different services.

3 If support is going to be provided for the high cost of network facilities located in rural
4 areas, including the high cost of installing and maintaining cable and other facilities connecting
5 each customer to the network, in developing a revenue benchmark mechanism, it is imperative
6 to carefully consider the impact of all the different services that use or benefit from those
7 facilities. Basic local exchange service is not the only service that uses this cable and other
8 facilities, and it is not the only revenue source used in recovering the cost of those facilities.
9 The Commission should carefully evaluate the effect of other revenue sources, including the
10 impact of interstate services and the federal universal service support mechanisms, as well as
11 the impact of revenues carriers receive from intrastate switched access, intrastate toll, custom
12 calling, Caller ID and internet access service.

13
14 **Q. Some of the parties to this proceeding have suggested using a revenue benchmark, but the**
15 **FCC and some state jurisdictions have used a cost benchmark instead. Which approach**
16 **do you recommend?**

17 **A.** I recommend using an economic cost benchmark. This makes it easier to identify the highest
18 cost areas in the state, and to maintain consistency between the method used in identifying those
19 high cost areas and the method used in developing the benchmark. It is also consistent with the
20 method the FCC has been using for the federal USF. Moreover, a cost benchmark provides the
21 Commission with greater flexibility in balancing the interests of urban and rural customers – for
22 instance, it makes it easier to target support at the highest cost portions of an exchange –
23 something that cannot as easily be done with a revenue benchmark, since most rates (and thus
24 revenues) tend to be averaged throughout each exchange. The portion of the high cost burden
25 which will be borne by carriers and customers statewide (through the AUSF) and the portion

1 which will be borne by carriers and customers located in or adjacent to the highest cost areas
2 can be more precisely specified if the Commission uses an economic cost benchmark.

3
4 **Q. The purpose of a cost benchmark is to determine the extent to which costs in areas**
5 **believed to have high costs actually have costs that are far greater than in the “average”**
6 **area. For the Federal USF, the FCC accomplished this comparison using the nationwide**
7 **average level of costs generated by the FCC model for non-rural carriers. What degree of**
8 **averaging should be used in this proceeding?**

9 A. The cost benchmark should ideally be based upon a true statewide average, incorporating all
10 high and low cost areas within the state.

11
12 **Q. You indicated that the cost benchmark should “based upon” average costs. Could the**
13 **benchmark differ from the average itself?**

14 A. Yes. There are several ways a cost benchmark could be implemented. Obviously, the
15 Commission could set the benchmark exactly equal to the statewide average cost level, thereby
16 funding all locations where costs exceed the statewide average. However, this would not be the
17 best approach. To help reduce the funding requirements and enhance the long term viability of
18 the support mechanism, it would be preferable for the Commission to establish a benchmark
19 which exceeds the statewide average by some defined percentage, thereby concentrating
20 support on areas with the highest costs. This is similar to the approach adopted at the federal
21 level. In the October 21, 1999 Methodology Order, the FCC limited the size and scope of the
22 federal support mechanism by establishing its cost benchmark at 135% of the national average.

23 The FCC explained:

24 Because affordability is closely tied to local rate levels, established and
25 regulated by the states, we conclude that states are well-positioned to
26 adopt local rate structures and intrastate universal service support

1 mechanisms that maintain affordable and reasonably comparable rates on
2 a statewide basis. Federal mechanisms, in contrast, will assure that these
3 goals are met nationally by providing support to those states where the
4 cost of providing the supported services substantially exceed the national
5 average. [May 27, 1999 Order, ¶ 57. Emphasis added].
6

7 If the Commission could follow a similar approach, establishing a cost benchmark for the
8 AUSF which exceeds the statewide average cost per line by a specified percentage. The
9 difference could be 35%, or it could be a lesser or greater percentage.
10

11 **Q. Is there any reason why the Commission must follow what the FCC has done and set the**
12 **benchmark at 135% of the statewide average?**

13 A. No. The appropriate percentage is a policy decision for the Commission to determine. The
14 effect of varying this percentage figure is straightforward: with a higher benchmark, the AUSF
15 will be smaller; with a lower benchmark the AUSF will be larger, holding everything else
16 constant. While 135% may have been appropriate in the federal jurisdiction, the appropriate
17 figure in Arizona could be different. There is no requirement that the Commission use the same
18 figure as the FCC. For one thing, the percentage figure that is selected by the Commission will
19 be applied to average Arizona costs, rather than national costs. There are differences between
20 the Arizona average costs which will be used in setting the AUSF benchmark and the national
21 average costs that the FCC has historically upon in developing the cost-based Federal USF
22 program.
23

24 **Q. What are the policy implications of applying a higher or lower percentage figure?**

25 A. One consideration is the total amount of support flowing from urban Arizona to rural Arizona;
26 while people in the urban areas clearly benefit from the existence of universal service
27 throughout the state – including the ability to place and receive calls from people located in

1 high cost rural areas, in the interests of fairness, as well as to ensure the long term sustainability
2 of the support mechanism, it is appropriate to take steps to narrowly target support at areas with
3 the most extreme cost conditions. One way this can be accomplished is to use a relatively high
4 percentage figure. By selecting a percentage figure that is above 100%, the Commission can
5 better focus the funding support on areas with the highest costs, thereby limiting the size of the
6 AUSF.

7
8 **Q. Is it appropriate for carriers and customers in high cost areas to bear some of the high**
9 **cost burden?**

10 A. Yes. The Commission can strike an appropriate balance between rural and urban rates, by
11 carefully considering several different aspects of the support mechanism, including the
12 percentage figure I just discussed, and the manner in which geographic areas are defined when
13 developing area-specific cost estimates. Another factor to take into consideration is the calling
14 scope available to various customers. Customers in some high cost areas benefit from toll-free
15 calling throughout large portions of a nearby metropolitan area., Customers in other high cost
16 areas are located in more isolated areas, and they do not have the benefit of a large local calling
17 area. Given these discrepancies, it would may be reasonable to require customers in the former
18 high cost areas to pay higher rates (bear a higher portion of the high cost of serving them),
19 relative to customers in the more isolated areas.

20 In developing an optimal support mechanism, the Commission should not only consider
21 the cost of providing service in various areas, the ability of customers in those areas to bear the
22 high cost of serving them, but also the extent of the benefits received by those customers (and
23 thus, the extent to which there is a danger of pushing customers off the network, endangering
24 the universal service goal). In general, the Commission must decide how much of the high cost
25 burden should be borne by customers located in the high cost areas, and to what extent that

1 burden should be shouldered more broadly, but customers throughout the state. Although the
2 Commission has considerable flexibility in resolving this issue, it does not have unlimited
3 discretion. For instance, rates in rural areas must remain reasonably comparable to rates in
4 urban areas. That is to say, while rates need not be identical, they must remain within a
5 reasonable range. For example, if rates in rural areas were twice the rates in urban areas, and the
6 calling scope of the rural areas were less than half that provided in the urban areas, urban and
7 rural rates would clearly not be “reasonably comparable.”
8

9 **Q. Should carriers receive funding for every one of their wire centers in which costs exceed**
10 **the benchmark?**

11 A. Not necessarily. For administrative convenience, the Commission could set a minimum support
12 level before AUSF funding will be provided. Consider a wire center with 500 lines, with costs
13 that exceed the benchmark by just 10 cents per month. Although the carrier would receive
14 support of 10 cents per line, this would amount to just \$50 per month. Clearly, this minimal
15 level of funding does not justify the administrative burdens associated with calculating and
16 disbursing such a small payment. Even with somewhat higher funding levels, the administrative
17 burden might be out of proportion to the funding being provided—particularly when one
18 considers the need for the carrier to track and report the number of supported lines in each wire
19 center. Accordingly, it would be reasonable for the Commission to limit AUSF payments to wire
20 centers where the payments are anticipated to exceed a reasonable minimum level (e.g. \$500
21 per month per wire center).
22

23 **Q. You have just indicated that the AUSF should be cost-based. Would you please explain the**
24 **term "cost" and briefly distinguish between “embedded” and “economic” costs?**

25 A. Yes. The term "cost" is applied in a variety of different contexts (and by different individuals)

1 with different meanings. It is, therefore, useful to distinguish some of the different versions of
2 this concept.

3 Embedded cost data is recorded in the books and records of a firm. It measures historical
4 costs, based upon a uniform set of rules, which has largely been developed by accountants.
5 Embedded cost data is often used by managers, investors, regulators, and economists in
6 understanding and interpreting a firm's historical financial performance.

7 Economic costs, on the other hand, tend to be more forward looking and more
8 theoretical in nature. Economists have developed a comprehensive set of theories concerning
9 cost, which they use to describe, explain, and predict the behavior of firms and individuals (e.g.,
10 consumers). While embedded cost data has its advantages—it's often quite practical to use, it
11 tends to be readily available, and it's fairly consistent from firm to firm, it also has its
12 limitations. For instance, embedded cost data is not particularly amenable to "what if?" type
13 analyses, and it is backward looking. Economic cost data, on the other hand, is more difficult to
14 develop, but it is often more useful in analyzing complex issues and making critical decisions.

15

16 **Q. What options does the Commission have regarding development of cost studies for**
17 **Universal Service purposes?**

18 A. Costs can be calculated in more than one way, hence, the Commission must decide the type of
19 cost data it will rely upon. While there are many options available, the fundamental dichotomy
20 is between embedded cost studies and forward looking economic cost studies. The former
21 approach has generally been used in rate base, rate of return regulation, while the latter
22 approach has increasingly gained favor with regulators as the industry has trended towards
23 increased competition.

24

25

1 **Q. Are there problems with using embedded cost data?**

2 A. There are at least five reasons why embedded cost data will not be adequate in developing a
3 cost-based USF mechanism for Arizona. First, embedded costs involve the accretion of capital
4 investments and their depreciation over a period of many years. Accounting records over this
5 lengthy period of time are sometimes fragmentary, and they weren't necessarily recorded in the
6 detail necessary to identify the specific costs incurred in specific wire centers, along specific
7 feeder routes, or within specific distribution areas. Due to inadequate record keeping, it
8 becomes difficult, or impossible, to track embedded costs to the level of geographic detail
9 necessary for USF purposes. While wire centers are important structural features of the network
10 from an engineering perspective, they have much less relevance from a financial or
11 administrative perspective, since a carrier's workforce, and many aspects of its operations tend
12 to be centralized. Accordingly, a carrier with numerous wire centers may not maintain detailed
13 records of the specific costs incurred in each part of its network.

14 Second, an embedded cost analysis will reflect the construction and maintenance of
15 networks developed mainly during the period of traditional rate of return regulation. A classic
16 weakness of ROR regulation is that it can be vulnerable to goldplating or inefficiencies that
17 translate into higher than necessary investment levels. Like any cost-plus system of
18 compensation, ROR regulation can create perverse incentives, since the more you spend, the
19 more you make, and inefficiencies are not necessarily penalized.

20 Third, if a carrier's actual, embedded costs are used for universal service funding
21 purposes, there will be strong incentives to shift costs into "high cost" areas in order to
22 maximize a carrier's draw from the AUSF. Universal service support will be maximized by
23 increasing the stated cost of high cost areas; offsetting reductions in the stated cost of low cost
24 areas will not have an offsetting downward impact in the amount of AUSF payments received
25 by a carrier, thus, the higher the estimated cost to serve selected areas, the higher the funded

1 amount. This provides incentives for carriers to manipulate their cost records, mis-allocate
2 costs, or otherwise shift costs from their lower cost areas to their higher cost areas.

3 Fourth, the embedded approach doesn't work very well in a competitive market with
4 multiple carriers, regardless of whether the system is based upon the incumbent's costs alone or
5 the embedded costs of each individual carrier. In a multicarrier environment, it doesn't make
6 much sense for a single carrier's embedded costs to drive the funding system. Why should
7 carrier B be reimbursed for the cost of providing service in rural areas based upon carrier A's
8 costs? If the AUSF is based upon the incumbent carrier's costs, the system will tend to be
9 skewed in favor of the incumbent—the payment levels will be perfectly tailored to its needs, but
10 will not necessarily fit the needs of other carriers. Other carriers will tend to be
11 overcompensated or under compensated, depending upon how their costs compare to the
12 incumbent LEC's costs.

13 Fifth, as competition develops and market shares shift between carriers, a funding
14 system based upon embedded costs could become unstable, requiring constantly rising funding
15 levels. This is true regardless of whether the system is based upon the embedded costs of just
16 the incumbent carrier, or the embedded costs of all carriers.

17 Consider what would happen if carriers receive funding based upon the incumbent's
18 embedded cost per line. As the incumbent LEC's market share declines, its embedded
19 investment and other fixed costs will be spread over fewer lines, raising its per-line costs and
20 increasing its per-line draw from the AUSF. If the competitive carriers draw from the AUSF the
21 same per-line amount as the incumbent, their funding amount will increase even more rapidly,
22 as they receive an ever-increasing amount per line multiplied times an increasing number of
23 lines. This could result in a dramatic increase in the size of the AUSF, if the incumbent's market
24 share were to decline. To visualize the problem, consider an extreme example, in which the
25 incumbent's market share declines to just 10% of its initial number of lines, while its total

1 embedded costs remain largely unchanged. As a result, its embedded cost per line would
2 increase nearly ten-fold while the total dollars the incumbent draws from the fund would remain
3 largely unchanged. Meanwhile, each of its competitors would potentially also receive nearly ten
4 times more per line, assuming they qualify for withdrawals from the fund. Under these
5 extreme circumstances, the total amount drawn from the fund would increase astronomically,
6 because the per-line funding amount increases as the incumbent's market share declines.
7 Analogous, though less extreme, problems would arise if each carrier receives its own
8 embedded costs. The incumbent's funding amount per line could increase rapidly as it loses
9 market share, for the reasons just given.

10 For all of these reasons, I don't believe embedded cost data will be adequate for AUSF
11 purposes over the long term. Accordingly, I recommend the Commission focus its attention on
12 long run economic costs in revamping the AUSF.

13
14 **Q. Up to this point you have emphasized the problems with embedded cost data. Are there
15 also problems with using forward-looking costs?**

16 **A.** Yes. The primary problem is that economic costs must be developed—they are not reported on
17 the books and records of the carriers. Forward looking costs are developed using economic
18 modeling tools, and none of the available cost models effortlessly produces perfectly accurate
19 cost results. While the Commission would not need to start from scratch – for instance, it could
20 initially focus on cost studies developed by the FCC for purposes of developing federal high
21 cost support – it will need to carefully review and analyze those studies, and quite likely it will
22 want to update and refine the cost results, carefully selecting appropriate inputs, and perhaps
23 making modifications or improvements to some aspects of the model, in order to overcome data
24 limitations or other problems.

25

1 **VII. Conclusions and Recommendations**

2

3 **Q. Let's turn to the final section of your testimony. How do you recommended the**
4 **Commission proceed in this docket?**

5 A. The Commission should be cautious, study the issues thoroughly, and make sure that any
6 changes that are introduced are beneficial to the public interest – not merely to the corporate
7 interests of certain carriers. That is not to say, however, that an investigation of these issues is
8 not worthwhile. At some point in the future, the Commission may need to move forward with
9 access charge reform, and at that time it would be beneficial to have a firm understanding of the
10 issues and options.

11 In it's 2008 FNPRM, the FCC gave some indication of where it might be heading with
12 its efforts to further modify interstate intercarrier compensation, and those efforts may include
13 further preemption of states' authority to set intercarrier compensation rates. For example, the
14 "Chairman's Draft Proposal" attached to the 2008 FNPRM would require states to eventually set
15 default reciprocal compensation rates for all telecommunications traffic in accordance with a
16 new methodology to be adopted by the FCC. If the FCC adopts the Chairman's Draft Proposal
17 or takes an approach similar to it, the FCC will either force the Commission to make changes,
18 or remove the Commission's freedom to control intrastate intercarrier compensation.

19 As federally regulated intercarrier compensation has been increasingly reduced toward
20 zero (by lowering interstate access rates, retaining very low rates for wireless interconnection,
21 and expanding the scope of reciprocal compensation), the FCC has been expanding the
22 discrepancy between intrastate and interstate compensation levels, putting pressure on state
23 Commissions to reduce the level of revenue received by local exchange carriers through
24 intrastate switched access charges. For these reasons, the Commission would be well advised to
25 carefully think through the consequences of any future reduction or elimination of intrastate

1 access charges, and develop a plan which will help minimize the adverse consequences of any
2 such changes.

3
4 **Q. If the Commission eventually moves forward with access charge reductions, do you have**
5 **any recommendations for how it should proceed?**

6 A. Given the pattern of declining unit costs which has long been experienced in
7 telecommunications, the Commission should make a presumption that carriers are able to
8 reduce intrastate access rates without a dollar-for-dollar offsetting increase in other revenue
9 sources. Carriers should have the burden of proving they should be provided with replacement
10 revenues, as well as the amount of any such replacement funding. To the extent some carriers
11 are successful in proving that an offsetting revenue source is needed, other options should be
12 explored, besides local rate increases, including the possibility of expanding the AUSF.

13 There are ample reasons to be skeptical about proposals being made in this proceeding
14 that call for "revenue neutrality." In addition to the benefits of declining unit costs due to
15 technological improvements, there is also the benefit of growth in the use of other services that
16 utilize many of the same network facilities that are used in providing local exchange service.
17 For instance, many local exchange carriers are now providing broadband internet access over
18 their networks. While internet access is not subject to intrastate regulation (due to Federal
19 preemption), this service uses many of the same fiber and copper cables and other facilities that
20 are used in providing intrastate switched access and basic local exchange service. The
21 Commission should look closely at growth in this service, and evaluate the impact of this
22 growth on the share of network costs which is appropriately borne by intrastate services,
23 including intrastate switched access, and basic local exchange service.

24 Some parties to this proceeding have suggested that local exchange rate increases can be
25 avoided, or at least minimized, by providing rural carriers with increased support from the

1 Arizona Universal Service Fund. If payments from the AUSF are to be greatly expanded, it will
2 obviously be necessary to expand the overall size of the fund. Any such expansion of the AUSF
3 should not be implemented without careful consideration of appropriate mechanisms for
4 supporting such an expansion. In particular, the Commission should investigate options for
5 expanding the revenue base used in the AUSF funding process, to include additional carriers
6 and additional services – including both wireless services and internet access services.

7 If the revenue base of the AUSF were substantially broadened, it would be easier to
8 protect customers from unreasonable increases in basic local exchange rates. That said, I do not
9 mean to imply that an expansion of the AUSF will be necessary. Before considering an
10 expansion of the AUSF, the Commission should first look at the beneficial effects of declining
11 costs and expanded use of the carriers' network facilities in providing internet access and other
12 non-jurisdictional services. The Commission should reject proposals that any switched access
13 reductions must be "revenue neutral." A policy of "revenue neutrality" is appealing to carriers,
14 since it would protect them from any adverse changes in their revenues, but it is not fair to
15 customers. Revenue neutrality fails to protect customers from bill increases, it fails to ensure
16 that the public interest is protected, and it is not a sufficient basis for waiving the standard
17 requirement for rate changes to be accomplished in the context of a fair return on fair value rate
18 case.

19 Why should carriers be protected from any reduction in their revenues, while customers
20 won't be protected from increases in their bills? A more equitable approach would protect both
21 carriers and customers from extreme changes, while requiring both groups to share some of the
22 burden of any needed reforms. Basic principles of equity requires a careful and deliberate
23 approach to policy changes, but it doesn't mean that individual carriers should be totally
24 protected from any changes while individual customers are given little or no such protection.
25 Stated differently, while it is legitimate to be concerned about maintaining the financial

1 stability of rural carriers, and it is easy to understand why these carriers are asking to be
2 protected from the adverse impact of any access rate reductions, revenue neutrality is not a valid
3 public policy goal, nor should the more legitimate policy goal of maintaining a reasonable
4 degree of financial stability be pursued to the point where individual customers are treated
5 inequitably.

6 Fortunately, increasing competition and technological changes have been creating
7 downward pressures on the underlying costs of telecommunication services, including switched
8 access and basic local exchange service, as well as internet access and many other services.
9 Considering this downward trend in costs, there is no reason to assume that carriers are entitled
10 to continue receiving the level of revenues they are currently receiving from switched access, or
11 that "revenue neutrality" is an appropriate prescription for resolving the issues in this
12 proceeding.

13 Given the declining cost characteristics of this industry, there is reason to be skeptical
14 about the necessity of adopting regulatory policies which would have the effect of substantially
15 increasing some customers' bills, merely because pressures exist to reduce intrastate switched
16 access rates to levels that are closer to those being established in the interstate jurisdiction.
17 Certainly, there is no need to assume that intrastate switched access rate reductions must be
18 financed with increases in local rates, or through expanded payments from the AUSF, on an
19 exact dollar-for-dollar basis. To the extent the Commission ultimately concludes that intrastate
20 switched access rates should be reduced, those reductions can be accomplished without
21 necessarily requiring sharp increases in other rates, or individual customer bills.

22
23 **Q. Can you briefly elaborate on your recommendations concerning the AUSF?**

24 **A.** To the extent the Commission ultimately concludes that access rate reductions are appropriate,
25 and to the extent some carriers are unable to absorb the entire amount of the resulting reduction

1 in access revenues without an increase in other revenue sources, the Commission should look
2 closely at the option of expanding the AUSF. If payments from the AUSF are to be
3 significantly expanded, it would be appropriate to look at options for simultaneously expanding
4 the scope of the fund, to encompass additional carriers and additional services.

5 The focus of an expanded AUSF should be to provide targeted, portable support for the
6 highest cost areas within the state. To achieve this purpose, the Commission should accurately
7 identify high cost areas in Arizona, determine how much support should be provided to each of
8 these areas (e.g. a dollar amount per basic exchange access line per month) and determine the
9 best mechanism to use in providing this support. As a general principal, support should be
10 narrowly targeted at the highest cost areas – primarily low density rural areas located away
11 from towns and cities – where universal service would be most endangered in the absence of the
12 type of support which has historically been received from intrastate switched access service,
13 and which could potentially be provided through an expansion of the AUSF.

14 Funds should be available to carriers serving the highest cost areas, to the extent these
15 carriers are helping to maintain universal service in these areas for the benefit of customers
16 throughout the state, based upon appropriate criteria which are not skewed in favor of any
17 particular carrier. As well, the AUSF should promote, rather than discourage, effective
18 competition throughout the state. An appropriately designed, competitively neutral program
19 would not place a burden on traditional wireline carriers like Qwest, while exempting wireless
20 and other carriers who also benefit from universal service.

21 Similarly, AUSF support should be readily transferable from one carrier to the next, if a
22 customer in a high cost area changes carriers. Portability logically follows from the principles
23 of competitive neutrality and equitable treatment, since AUSF support should not necessarily be
24 limited to the incumbent carrier. In general, the philosophy should be one of providing support
25 to customers in high cost areas, to ensure that they can communicate with the rest of society at a

1 reasonable cost, even though they are located in a low density, high cost area, and even though
2 the AUSF payments are paid to the carrier, rather than the customer. The support payment
3 associated with a particular customer (whether one with low income or one living in a high cost
4 area) should be portable, in the sense that the support moves if the customer changes carriers.

5 In practical terms, this means that cash subsidies should be limited to the amounts
6 needed to achieve the relevant public policy goals, these payments should be tightly targeted to
7 unusually high cost areas, with a particular emphasis on low income consumers and other
8 subscriber groups that would be lost to the network absent the support mechanism. For similar
9 reasons, it would be preferable to calculate AUSF payments based on a carrier-neutral
10 benchmark, rather than basing them on the embedded costs or revenue requirement of the
11 incumbent LECs.

12 In this regard, I would note that if the AUSF is expanded in a way that causes it to
13 provide substantial support to customers or carriers that do not truly need support, the fund will
14 be larger than necessary, undermining its long term viability and limiting the Commission's
15 ability to advance and maintain the universal service goal over the long term. Thus, in
16 considering any expansion of the AUSF, the Commission should simultaneously consider
17 appropriate steps to more narrowly target the fund, in order to minimize the extent to which
18 expanded support would be provided to geographic areas that do not have extraordinarily high
19 cost levels.

20
21 **Q. Does your silence on any of the issues addressed in the testimony of the other witnesses in**
22 **this proceeding mean that you accept their positions on such issues?**

23 **A.** No, it does not.

24
25 **Q. Does this complete your direct testimony, which was prefiled on January 6, 2010?**

Direct Testimony of Ben Johnson, Ph.D.

On Behalf of The Arizona Residential Utility Consumer Office, Docket Nos. T-00000D-00-0672; RT-00000H-97-0137

1 A. Yes, it does.

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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 "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

1 others. We are also employed by various private organizations and firms, both
2 regulated and unregulated. The diversity of our clientele is illustrated below.

3

4 Regulatory Commissions

5

6 Alabama Public Service Commission—Public Staff for Utility Consumer Protection

7 Alaska Public Utilities Commission

8 Arizona Corporation Commission

9 Arkansas Public Service Commission

10 Connecticut Department of Public Utility Control

11 District of Columbia Public Service Commission

12 Idaho Public Utilities Commission

13 Idaho State Tax Commission

14 Iowa Department of Revenue and Finance

15 Kansas State Corporation Commission

16 Maine Public Utilities Commission

17 Minnesota Department of Public Service

18 Missouri Public Service Commission

19 National Association of State Utility Consumer Advocates

20 Nevada Public Service Commission

21 New Hampshire Public Utilities Commission

22 North Carolina Utilities Commission—Public Staff

23 Oklahoma Corporation Commission

24 Ontario Ministry of Culture and Communications

25 Staff of the Delaware Public Service Commission

26 Staff of the Georgia Public Service Commission

27 Texas Public Utilities Commission

28 Virginia State Corporation Commission

29 Washington Utilities and Transportation Commission

30 West Virginia Public Service Commission—Division of Consumer Advocate

31 Wisconsin Public Service Commission

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

- 1 Nevada Attorney General's Office of Advocate for Customers of Public Utilities
- 2 South Carolina Attorney General
- 3 Utah Attorney General
- 4 Virginia Attorney General
- 5 Washington Attorney General

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7 Local Governments

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- 9 City of Austin, TX
- 10 City of Corpus Christi, TX
- 11 City of Dallas, TX
- 12 City of El Paso, TX
- 13 City of Galveston, TX
- 14 City of Norfolk, VA
- 15 City of Phoenix, AZ
- 16 City of Richmond, VA
- 17 City of San Antonio, TX
- 18 City of Tucson, AZ
- 19 County of Augusta, VA
- 20 County of Henrico, VA
- 21 County of York, VA
- 22 Town of Ashland, VA
- 23
- 24 Town of Blacksburg, VA
- 25 Town of Pecos City, TX

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1 Other Government Agencies

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3 Canada—Department of Communications

4 Hillsborough County Property Appraiser

5 Provincial Governments of Canada

6 Sarasota County Property Appraiser

7 State of Florida—Department of General Services

8 United States Department of Justice—Antitrust Division

9 Utah State Tax Commission

10

11 Regulated Firms

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13 Alabama Power Company

14 Americall LDC, Inc.

15 BC Rail

16 CommuniGroup

17 Florida Association of Concerned Telephone Companies, Inc.

18 LDDS Communications, Inc.

19 Louisiana/Mississippi Resellers Association

20 Madison County Telephone Company

21 Montana Power Company

22 Mountain View Telephone Company

23 Nevada Power Company

24 Network I, Inc.

25 North Carolina Long Distance Association

26 Northern Lights Public Utility

27 Otter Tail Power Company

28 Pan-Alberta Gas, Ltd.

29 Resort Village Utility, Inc.

30 South Carolina Long Distance Association

31 Stanton Telephone

- 1 Teleconnect Company
- 2 Tennessee Resellers' Association
- 3 Westel Telecommunications
- 4 Yelcot Telephone Company, Inc.

5

6 Other Private Organizations

7

- 8 Arizona Center for Law in the Public Interest
- 9 Black United Fund of New Jersey
- 10 Casco Bank and Trust
- 11 Coalition of Boise Water Customers
- 12 Colorado Energy Advocacy Office
- 13 East Maine Medical Center
- 14 Georgia Legal Services Program
- 15 Harris Corporation
- 16 Helca Mining Company
- 17 Idaho Small Timber Companies
- 18 Independent Energy Producers of Idaho
- 19 Interstate Securities Corporation
- 20 J.R. Simplot Company
- 21 Merrill Trust Company
- 22 MICRON Semiconductor, Inc.
- 23 Native American Rights Fund
- 24 PenBay Memorial Hospital
- 25 Rosebud Enterprises, Inc.
- 26 Skokomish Indian Tribe
- 27 State Farm Insurance Company
- 28 Twin Falls Canal Company
- 29 World Center for Birds of Prey

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1 ***Prior Experience***

2

3 **Q. Before becoming a consultant, what was your employment experience?**

4 A. From August 1975 to September 1977, I held the position of Senior Utility
5 Analyst with Office of Public Counsel in Florida. From September 1974 until
6 August 1975, I held the position of Economic Analyst with the same office. Prior
7 to that time, I was employed by the law firm of Holland and Knight as a corporate
8 legal assistant.

9

10 **Q. In how many formal utility regulatory proceedings have you been involved?**

11 A. As a result of my experience with the Florida Public Counsel and my work as a
12 consulting economist, I have been actively involved in approximately 400
13 different formal regulatory proceedings concerning electric, telephone, natural
14 gas, railroad, and water and sewer utilities.

15

16 **Q. Have you done any independent research and analysis in the field of
17 regulatory economics?**

18 A. Yes, I have undertaken extensive research and analysis of various aspects of utility
19 regulation. Many of the resulting reports were prepared for the internal use of the
20 Florida Public Counsel. Others were prepared for use by the staff of the Florida
21 Legislature and for submission to the Arizona Corporation Commission, the
22 Florida Public Service Commission, the Canadian Department of
23 Communications, and the Provincial Governments of Canada, among others. In
24 addition, as I already mentioned, my Master's thesis concerned the theory of the
25 regulated firm.

26

1 **Q. Have you testified previously as an expert witness in the area of public utility**
2 **regulation?**

3 A. Yes. I have provided expert testimony on more than 250 occasions in proceedings
4 before state courts, federal courts, and regulatory commissions throughout the
5 United States and in Canada. I have presented or have pending expert testimony
6 before 35 state commissions, the Interstate Commerce Commission, the Federal
7 Communications Commission, the District of Columbia Public Service
8 Commission, the Alberta, Canada Public Utilities Board, and the Ontario Ministry
9 of Culture and Communication.

10

11 **Q. What types of companies have you analyzed?**

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

17

18 ***Teaching and Publications***

19

20 **Q. Have you ever lectured on the subject of regulatory economics?**

21 A. Yes, I have lectured to undergraduate classes in economics at Florida State
22 University on various subjects related to public utility regulation and economic
23 theory. I have also addressed conferences and seminars sponsored by such
24 institutions as the National Association of Regulatory Utility Commissioners
25 (NARUC), the Marquette University College of Business Administration, the
26 Utah Division of Public Utilities and the University of Utah, the Competitive
27 Telecommunications Association (COMPTEL), the International Association of

1 Assessing Officers (IAAO), the Michigan State University Institute of Public
2 Utilities, the National Association of State Utility Consumer Advocates
3 (NASUCA), the Rural Electrification Administration (REA), North Carolina State
4 University, and the National Society of Rate of Return Analysts.

5
6 **Q. Have you published any articles concerning public utility regulation?**

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

8
9 “Attrition: A Problem for Public Utilities—Comment.” *Public Utilities*
10 *Fortnightly*, March 2, 1978, pp. 32-33.

11
12 “The Attrition Problem: Underlying Causes and Regulatory Solutions.” *Public*
13 *Utilities Fortnightly*, March 2, 1978, pp. 17-20.

14
15 “The Dilemma in Mixing Competition with Regulation.” *Public Utilities*
16 *Fortnightly*, February 15, 1979, pp. 15-19.

17
18 “Cost Allocations: Limits, Problems, and Alternatives.” *Public Utilities*
19 *Fortnightly*, December 4, 1980, pp. 33-36.

20
21 “AT&T is Wrong.” *The New York Times*, February 13, 1982, p. 19.

22
23 “Deregulation and Divestiture in a Changing Telecommunications Industry,” with
24 Sharon D. Thomas. *Public Utilities Fortnightly*, October 14, 1982, pp. 17-22.

25
26 “Is the Debt-Equity Spread Always Positive?” *Public Utilities Fortnightly*,
27 November 25, 1982, pp. 7-8.

- 1 “Working Capital: An Evaluation of Alternative Approaches.” *Electric*
2 *Rate-Making*, December 1982/January 1983, pp. 36-39.
- 3
- 4 “The Staggers Rail Act of 1980: Deregulation Gone Awry,” with Sharon D.
5 Thomas. *West Virginia Law Review*, Coal Issue 1983, pp. 725-738.
- 6
- 7 “Bypassing the FCC: An Alternative Approach to Access Charges.” *Public*
8 *Utilities Fortnightly*, March 7, 1985, pp. 18-23.
- 9
- 10 “On the Results of the Telephone Network's Demise—Comment,” with Sharon D.
11 Thomas. *Public Utilities Fortnightly*, May 1, 1986, pp. 6-7.
- 12
- 13 “Universal Local Access Service Tariffs: An Alternative Approach to Access
14 Charges.” In *Public Utility Regulation in an Environment of Change*, edited by
15 Patrick C. Mann and Harry M. Trebing, pp. 63-75. Proceedings of the Institute of
16 Public Utilities Seventeenth Annual Conference. East Lansing, Michigan:
17 Michigan State University Public Utilities Institute, 1987.
- 18
- 19 With E. Ray Canterbury. Review of *The Economics of Telecommunications:*
20 *Theory and Policy* by John T. Wenders. *Southern Economic Journal* 54.2
21 (October 1987).
- 22
- 23 “The Marginal Costs of Subscriber Loops,” A Paper Published in the Proceedings
24 of the Symposia on Marginal Cost Techniques for Telephone Services. The
25 National Regulatory Research Institute, July 15-19, 1990 and August 12-16, 1990.
- 26

1 With E. Ray Canterbery and Don Reading. "Cost Savings from Nuclear
2 Regulatory Reform: An Econometric Model." *Southern Economic Journal*,
3 January 1996.

4

5 ***Professional Memberships***

6

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

8 **A. Yes. I am a member of the American Economic Association.**

9