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December 4, 2003

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Ms. Blanca Bayó, Director
Commission Clerk and Administrative Services
Room 110, Easley Building
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850

Re: Docket No. 030851-TP

Dear Ms. Bayó:

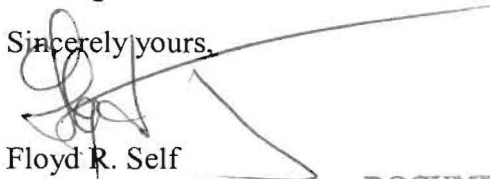
Enclosed for filing on behalf of MCImetro Access Transmission Services, LLC and MCI WorldCom Communications, Inc. are an original and fifteen copies of the following documents:

- 1. The Direct Testimony of Mark T. Bryant; 12442-03
- 2. The Direct Testimony of James D. Webber; and 12443-03
- 3. The Direct Testimony of Sherry Lichtenberg. 12444-03

Please acknowledge receipt of these documents by stamping the extra copy of this letter "filed" and returning the same to me.

Thank you for your assistance with this filing.

Sincerely yours,



Floyd R. Self

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been served on the following parties by Hand Delivery (*), electronic mail, and/or U. S. Mail this 4th day of December, 2003.

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Floyd R. Self

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Implementation of requirements
arising from Federal Communications
Commission's triennial UNE review: Local
Circuit Switching for Mass Market
Customers. | DOCKET NO. 030851-TP

DIRECT TESTIMONY OF DR. MARK T. BRYANT

On Behalf Of

MCI WORLDCOM COMMUNICATIONS, INC.
AND

MCIMETRO ACCESS TRANSMISSION SERVICES LLC

December 4, 2003

PUBLIC VERSION

DOCUMENT NUMBER 030851-TP
12442 DEC-4-03
FPSC-COMMISSION CLEARING

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1 **I. IDENTIFICATION OF THE WITNESS AND SUMMARY OF**
2 **CONCLUSIONS**

3
4 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

5 A. My name is Mark T. Bryant, and my business address is 4209 Park Hollow
6 Court, Austin, Texas.

7 **Q. PLEASE DESCRIBE YOUR QUALIFICATIONS AND EXPERIENCE AS**
8 **THEY PERTAIN TO THIS PROCEEDING.**

9 A. I am self-employed as an economist providing consulting services in
10 telecommunications regulatory and policy matters. I hold the Ph.D. degree from
11 the University of Texas at Austin, and have over twenty years of experience in the
12 telecommunications industry. Exhibit MTB-1 is a detailed description of my
13 educational and professional qualifications.

14 **Q. ON WHO BEHALF WAS THIS TESTIMONY PREPARED?**

15 A. This testimony was prepared on behalf of MCImetro Access Transmission
16 Services LLC, and MCI WorldCom Communications, Inc. (hereafter "MCI").

17 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

18 A. The purpose of my testimony is to provide an economic analysis of the
19 impairment issue with respect to mass market switching in the state of Florida. I
20 will discuss the economic framework and tools that should be applied to the
21 analyses of triggers and the potential deployment of switch-based local exchange
22 service by competitive local exchange carriers ("CLECs"). I will also present
23 estimates of the potential revenues and costs for a hypothetical switch-based
24 CLEC considering entering local markets in Florida. These estimates, which are
25 based on various modeling techniques, attempt to capture how a CLEC would

1 make a decision whether to enter particular markets in Florida, if the unbundled
2 network element platform (“UNE-P”) were no longer available. UNE-P, or
3 unbundled network element platform, is a combination of all unbundled network
4 elements required, in conjunction with other functions supplied by the CLEC, to
5 offer a complete local exchange service. At issue in this proceeding is whether
6 unbundled switching will continue to be available for use by CLECs in individual
7 markets. Without access to unbundled switching, the CLEC would no longer
8 have access to UNE-P, and would be required to self-supply the local switching
9 function in order to offer a complete local exchange service.

10 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND**
11 **RECOMMENDATIONS.**

12 A. I recommend that the Commission adopt the incumbent local exchange carrier
13 (“ILEC”) wire center as the relevant market for analysis both of existing
14 competitive switching supply (the “triggers” analysis) and of the potential for
15 deployment of CLEC switching in Florida. Economic theory and practice, as
16 well as the FCC’s guidance in its *Triennial Review Order*, all suggest that the
17 wire center is the most appropriate starting point for an analysis of whether
18 CLECs are impaired without access to unbundled switching for mass-market
19 customers. Use of the wire center as the basic building block for analysis
20 accomplishes the FCC’s goals of a granular analysis that maximizes accuracy of
21 results, subject to the constraints of practicality. *Report and Order and Order on*
22 *Remand and Further Notice of Proposed Rulemaking, In the Matter of Review of*
23 *the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*

1 (CC Docket No. 01-338); Implementation of the Local Competition Provisions
2 of the Telecommunications Act of 1996 (CC Docket No. 96-989); Deployment
3 of Wireline Services Offering Advanced Telecommunications Capability (CC
4 Docket No. 98-147), FCC No. 03-36, (rel. Aug. 21, 2003) (hereinafter,
5 “*Triennial Review Order*”), ¶ 130.

6 I also present the results of an analysis of the economic factors that affect
7 the potential deployment of switching capability by CLECs in the absence of the
8 availability of UNE-P. This analysis illustrates that the profitability of CLECs
9 offering local exchange services in the absence of unbundled switching is highly
10 uncertain. A wide range of outcomes is possible, depending on the assumed
11 value of a number of critical inputs to the analysis, including the market share
12 achieved by the CLEC, the average expected time that a customer will remain a
13 customer of the CLEC, the cost to the CLEC of handling “hot cut” migrations
14 from the ILEC to the CLEC, and the average revenue per customer achieved by
15 the CLEC, among others. Under the most optimistic assumptions, the analysis
16 can illustrate that a CLEC may achieve profitability in some, but by no means all,
17 wire centers in Florida. Under less optimistic assumptions, the analysis can
18 illustrate that no wire center in Florida would be profitable for CLEC entry in the
19 absence of UNE-P.

20 Because of this uncertainty, I urge the Commission to proceed cautiously
21 both in the analysis of the actual deployment “triggers” and in the analysis of
22 potential deployment of CLEC switching capacity. As I discuss in more detail in
23 the body of this testimony, an erroneous finding of no impairment with regard to

1 access to unbundled switching in the mass market could have dire and irreversible
2 consequences for Florida consumers, while an erroneous finding of impairment
3 would entail far less serious consequences, and would likely be a self-correcting
4 error.

5 **II. INTRODUCTION**

6 *A. Impairment Must Be Decided Within The Specific Context Of The*
7 *Industry And The Established Goals Of The Telecommunications Act Of*
8 *1996*

9 **Q. WHAT IS YOUR UNDERSTANDING OF THE FOCUS OF THIS**
10 **PROCEEDING?**

11 A. This Commission must determine whether unbundled switching and, therefore,
12 the so-called “UNE Platform” or “UNE-P” should continue to be available as a
13 vehicle for competitors to offer local telephone service to residential and very
14 small business customers (“mass-market customers”) in Florida. The
15 Telecommunications Act of 1996 (“Act”) provides certain guidelines for that
16 determination, but it is up to this Commission to interpret those guidelines and
17 determine whether the continued availability of unbundled switching in Florida is
18 consistent with the established goals of the Act and the specific context of the
19 telecommunications industry in this state.

20 **Q. PLEASE BRIEFLY DESCRIBE THE RELEVANT INDUSTRY**
21 **CONTEXT.**

22 A. This Commission must consider how best to achieve the Act’s pro-competitive
23 goals in the context of today’s telecommunications industry. More and more,

1 competing telecommunications providers are offering consumers *bundles* that
2 combine local, long distance, and Internet services, rather than marketing these
3 services individually. In Florida, for example, MCI offers “The Neighborhood,”
4 a bundle of local and long distance calling, with optional calling features and
5 Internet access, BellSouth offers “BellSouth Answers,” a bundle of local and long
6 distance calling, with optional calling features, Internet access, and wireless
7 service, and Z-Tel offers “Z-Line Home,” a bundle of local and long distance
8 calling with advanced calling features. And more and more, consumers are
9 opting for “one-stop shopping,” buying bundled services from a single provider.
10 This is especially true in states where the ILEC is now able to offer interLATA
11 long-distance services along with the local and intraLATA services for which it
12 was previously the monopoly supplier. The increasing popularity of bundling—
13 and the ILEC’s ability to provide a complete bundle of services—makes viable
14 local competition an essential precondition for preserving competition in the long
15 distance and Internet services markets.

16 The strong consumer demand for bundled products puts a monopoly
17 provider of local service in a good position to leverage its monopoly into other
18 services. ILECs such as BellSouth and Verizon stand poised to re-monopolize
19 the competitive long-distance markets made possible by the divestiture of the
20 former Bell System and to extend the former Bell monopoly into newly emerging,
21 and initially competitive, Internet services markets as well.

22 Supply-related considerations also encourage the creation of service
23 bundles and provide the ILECs with potential monopoly power. For example,

1 ILECs are adding broadband capability to the steadily increasing percentage of
2 lines served via fiber feeder and Digital Loop Carrier (“DLC”). *****BEGIN
3 PROPRIETARY *****[REDACTED]*****END PROPRIETARY***** of all loops in
4 Florida currently are served via fiber feeder and DLC. At the ILECs’ urging, the
5 FCC in its *Triennial Review Order* eliminated any requirement under Section 251
6 of the Act for incumbents to provide competitors with unbundled access to the
7 newly added capabilities of their fiber-fed loops. *Triennial Review Order* ¶213.
8 This strategic management of technology allows ILECs to bundle narrowband and
9 broadband services for the millions of customers served over fiber-fed loops in a
10 manner that competitors cannot readily replicate.

11 This is no accident. ILECs are well aware that customers who obtain
12 their broadband Internet access and their local service from a single provider are
13 more “sticky”—*i.e.*, they are less likely to switch carriers. For example, SBC
14 announced recently that:

- 15 • “Adding long distance to an access line reduces the company’s
16 churn rate by 9 percent.
- 17 • “Churn drops by 61 percent when a DSL line is added to an SBC
18 bundle.
- 19 • “Together, long distance and DSL reduce churn by 73 percent.”

20 SBC press release, “SBC Communications Provides Progress Report On Major
21 Growth Strategies, Outlines Broad Service and Cost Initiatives,” November 13,
22 2003. Thus, the inability to match an ILEC’s bundle of broadband and
23 narrowband services puts CLECs at a severe disadvantage not only as potential

1 providers of broadband service, but also as competitors for basic voice-grade local
2 service.

3 Moreover, the ILEC strategy targets less densely populated suburban and
4 rural areas in which it is particularly difficult for CLECs to find or build
5 alternatives to the ILEC network. SBC touted Project Pronto as extending its
6 broadband services to customers beyond the reach of traditional DSL-over-copper
7 solutions, typically, customers located more than 18,000 feet from the central
8 office. (SBC Investor Briefing No. 211, October 18, 1999). There is no simple,
9 inexpensive alternative for competitors to deliver high-quality, ubiquitous
10 broadband service to such customers without using the ILECs' fiber-fed loops.
11 Hence, the ILECs' broadband-over-fiber strategy jeopardizes rural customers'
12 right to a meaningful choice of service providers.

13 ***B. State Impairment Decisions Must Also Be Meaningful within the***
14 ***Context of the Triennial Review Order's National Findings concerning***
15 ***Mass-Market Switching***

16 **Q. WHAT NATIONAL FINDING OR FINDINGS DID THE FCC MAKE**
17 **WITH RESPECT TO UNBUNDLED SWITCHING IN ITS *TRIENNIAL***
18 ***REVIEW ORDER?***

19 A. The FCC found on a national level that requesting carriers are impaired without
20 access to unbundled local switching when serving mass market customers
21 (*Triennial Review Order* ¶419).

1 **Q. WHICH END-USER CUSTOMERS DID THE FCC INCLUDE UNDER**
2 **THE HEADING OF MASS-MARKET CUSTOMERS?**

3 A. The FCC has defined mass-market customers to include all residential customers
4 as well as very small business customers. *Triennial Review Order*, ¶ 127. The
5 FCC did not identify a specific cutoff for the size of businesses considered to be
6 part of the mass market; however, it did provide some guidance on this point. I
7 will discuss this matter further below, in the section of my testimony that
8 addresses market definition issues

9 **Q. WHAT WAS THE BASIS FOR THE FCC'S NATIONAL FINDING OF**
10 **IMPAIRMENT FOR MASS-MARKET SWITCHING?**

11 A. The FCC identified a number of factors that contribute to CLEC impairment
12 without access to unbundled local switching. These factors include the difficulty
13 faced by CLECs in transitioning customers from UNE-P based service to UNE-L
14 based service:

15 Inherent difficulties arise from the incumbent LEC hot cut process for
16 transferring DS0 loops, typically used to serve mass market customers, to
17 competing carriers' switches. These hurdles include increased costs due
18 to non-recurring charges and high customer churn rates, service
19 disruptions, and incumbent LECs' inability to handle a sufficient volume
20 of hot cuts. Accordingly, based on those barriers, we make a national
21 finding that competitive carriers providing service to mass market
22 customers are impaired without unbundled access to local circuit
23 switching. (*Triennial Review Order*, ¶422.

24 The FCC also noted that other operational issues, such as delays in ILEC
25 provisioning of loops and collocation facilities or difficulties in obtaining cross-
26 connect, as well as economic issues such as the relationship between revenues and
27 the cost of obtaining unbundled network elements and the cost of overcoming
28 operational difficulties, may affect the potential deployment of CLEC switches to

1 serve mass market customers. (Triennial Review Order, ¶¶ 456-458.

2 **C. The Commission's Tasks**

3 **Q. WHAT DECISIONS MUST THE COMMISSION MAKE IN THIS**
4 **PROCEEDING?**

5 A. The Commission must conduct a market-by-market investigation into whether
6 barriers to entry “are likely to make entry into a market uneconomic.” *Triennial*
7 *Review Order*, ¶ 84. As I noted above, the FCC made a national finding that
8 CLECs are impaired without unbundled access to ILEC local switching to serve
9 mass-market customers. The Commission must consider detailed evidence at a
10 more granular level to determine if this finding is overcome in some markets in
11 Florida.

12 **Q. PLEASE DESCRIBE THE PROCESS THE COMMISSION SHOULD**
13 **FOLLOW IN REACHING THESE DECISIONS.**

14 A. The first step in the analytical process, logically (although it need not be
15 procedurally), is to define the markets in which the Commission will consider
16 evidence of impairment on a “granular basis to each identifiable market.” *Id.* ¶
17 495.

18 I recommend that the Commission adopt a market definition that permits
19 the most unambiguous and accurate answer to the question of whether CLECs are
20 impaired without access to unbundled switching in a given market. Implicitly,
21 therefore, the market definition and every step of the subsequent analysis should
22 allow this Commission to assess whether there is evidence that clearly

1 demonstrates that the basis for the national finding of impairment does not apply
2 in a specific defined market.

3 Once the Commission has defined the relevant markets, it must then
4 “identify where competing carriers are not impaired without unbundled switching,
5 pursuant to the triggers and analysis of competitors’ potential to deploy.”

6 *Triennial Review Order* ¶ 473. Both the “trigger” analysis and the analysis of
7 potential deployment apply on a market-by-market basis, and the FCC has
8 specified that states must use the same market definition in conducting both
9 analyses. *Id.* ¶ 495. Hence, the task before the Commission in this phase is to
10 determine what market definition is most appropriate, given that the same
11 definition will be used to conduct both “trigger” and potential deployment
12 analyses.

13 **1. Analysis of Triggers**

14 **Q. PLEASE DESCRIBE THE FCC’S REQUIREMENT FOR ANALYSIS OF**
15 **“TRIGGERS.”**

16 A. The FCC found actual marketplace entry to be the most compelling evidence of
17 the lack of impairment. *Triennial Review Order*, ¶ 498. This was so for two
18 reasons: (1) where significant competition already existed in a particular market,
19 customers already have a real choice among competitors, and (2) the existence of
20 multiple competitors actually providing service in a market demonstrates that
21 other competitors also are likely able to enter the market. Therefore, the FCC
22 established two actual marketplace entry “triggers” that could constitute evidence
23 of lack of impairment in a particular market: one relating to the number of carriers

1 that self-deploy switches to serve the mass market, and the other relating to the
2 number of carriers that provide wholesale switching to other carriers for use to
3 serve the mass market. The trigger is reached in a particular market if there are at
4 least three carriers self-deploying switching or two carriers providing wholesale
5 switching. *Id.*, ¶¶ 501, 504. In each case, a carrier only counts toward the
6 trigger in a particular market if that carrier is unaffiliated with the incumbent;
7 carriers affiliated with one another, but not the incumbent, only count as a single
8 carrier toward satisfying the pertinent trigger. *Id.*, ¶ 499. CMRS (wireless)
9 carriers do not count toward either trigger. *Id.*, n. 1549.

10 **Q. WHAT IS THE PURPOSE OF THE TRIGGER ANALYSIS?**

11 A. The FCC prescribed an analysis of triggers to provide “bright-line rules” that “can
12 avoid the delays caused by protracted proceedings and can minimize
13 administrative burdens.” *Triennial Review Order*, ¶ 498. The most reasonable
14 interpretation of this objective is that triggers are intended to deal with the “no
15 brainer” cases in which it is virtually certain that the national finding of
16 impairment does not apply to a particular local market because the customers in
17 the market already have significant alternatives and other competitors can readily
18 enter.

19 But, the trigger analysis only makes sense in a rationally defined market.
20 If a market is defined too large, the Commission will find no impairment even
21 where many customers have no current choice of alternative providers and where
22 it is not certain new competitors can enter. If, for example, a market is defined to
23 include both Jacksonville and Lake City, the presence of CLEC collocations in

1 Jacksonville could lead to a finding of non-impairment in Lake City even though
2 customers in Lake City currently have no choice among different providers. The
3 ILECs may say that customers in Lake City will in the future have a choice of
4 different providers. But that is a question of potential deployment that cannot be
5 answered by a bright line inquiry based on the triggers. As will be discussed
6 further below, it certainly is not clear that in the future customers in Lake City
7 will have a choice just because customers in Jacksonville have such a choice. In
8 general, these sorts of questions are the subject matter of the economics of market
9 definition, and the FCC delegated the task of market definition for the state of
10 Florida to this Commission. *Id.*, ¶ 495.

11 **Q. HOW DOES YOUR TESTIMONY ADDRESS THE PROPER MARKET**
12 **DEFINITION FOR A TRIGGER ANALYSIS?**

13 A. Because the FCC requires that the same delineation of the state into markets must
14 be used for both the trigger analysis and the analysis of potential deployment
15 (*Triennial Review Order*, ¶ 495), I have considered both purposes in the market
16 definition section below. Market definition is crucial to the outcome of the
17 Commission's trigger analysis; if the market is not defined correctly, the trigger
18 analysis is likely to produce an incorrect result.

19 For instance, if the FCC had determined that each state constitutes an
20 appropriate market, it is likely that many states would have three retail CLECs
21 using their own switches somewhere in the state, and the retail trigger would
22 arguably be satisfied throughout the state even though this would say nothing
23 about whether most customers had alternatives or were likely to do so. For the

1 reasons discussed at some length in my Market Definition section, defining the
2 entire state as a market is an approach that clearly would not make sense, and the
3 FCC correctly required that state commissions conduct a market-by-market
4 analysis at a more granular level. *Id.*

5 **Q. WHAT ARE THE CONSEQUENCES OF THE TWO POSSIBLE**
6 **OUTCOMES OF THE COMMISSION'S DECISION REGARDING**
7 **SATISFACTION OF THE TRIGGERS IN A GIVEN MARKET?**

8 A. When considering evidence as to whether the triggers are satisfied in a particular
9 market, the Commission should bear in mind the consequences of the two
10 alternative outcomes. If the Commission finds three qualifying self-provisioning
11 CLECs in a market, suitably defined, and finds that the CLECs serve a sufficient
12 number of customers in the market, a finding of no impairment is required, and
13 UNE-P competition is terminated. In areas within the market in which self-
14 provisioning CLECs are competing, existing UNE-P customers will then have the
15 choice of migrating to one of these CLECs (or another CLEC that enters) or
16 migrating back to the ILEC.

17 Customers in other areas within the market may end up with no
18 alternative. If existing self-provisioning CLECs do not already serve the entire
19 market, as defined, they may be unable, for whatever reason, to expand, and other
20 CLECs may not share the Commission's conclusion that they can self-provision
21 facilities to compete with the ILEC without access to the ILEC's local switching
22 UNE. In this case, UNE-P competition will have made a false start, and
23 customers will have to return to the ILEC.

1 In contrast, if the Commission’s trigger investigation fails to reach a
2 finding of no impairment, the consequence is simply that the investigation must
3 proceed to the more detailed analysis of potential deployment, as called for in the
4 *Triennial Review Order*. This more detailed analysis affords the Commission a
5 better chance of being certain that a finding of no impairment will truly be in the
6 interest of Florida consumers, while at the same time providing ample opportunity
7 to find no impairment if none truly exists. Hence, there is little downside—and a
8 substantial upside—to a decision that the triggers do not justify a finding of no
9 impairment.

10 For all of these reasons, I urge the Commission to conduct any trigger
11 analyses in a manner that errs on the side of caution in protecting the interests of
12 Florida consumers. Any decision to overturn the national finding of impairment
13 for mass market switching based on triggers should rest on incontrovertible
14 evidence that competitive carriers are today able to offer Florida’s residential and
15 small business customers competitive choices, even without access to UNE
16 switching.

17 **2. Analysis of Potential Deployment**

18 **Q. PLEASE DESCRIBE THE ANALYSIS REQUIRED TO EVALUATE THE**
19 **PROSPECT OF POTENTIAL DEPLOYMENT.**

20 A. In the absence of clear evidence of no impairment in the form of actual self-
21 provisioning by CLECs that satisfies the “bright-line rule” of the FCC’s
22 prescribed trigger analysis, the Commission must proceed to the question of the
23 market’s “suitability for multiple, competitive supply.” *Triennial Review Order*,

1 ¶ 506. This analysis is addressed to the definition of impairment in ¶ 84: “We
2 find a requesting carrier to be impaired when lack of access to an incumbent LEC
3 network element poses a barrier or barriers to entry, including operational and
4 economic barriers, that are likely to make entry into a market uneconomic.” This
5 is essentially a test based on the Commission’s prediction about a CLEC’s
6 investment decisions. Namely, will a CLEC decide to deploy facilities to
7 substitute for UNE switching, after evaluation the potential for profit and the need
8 to overcome the barriers to entry? Of course, these barriers are not just economic
9 barriers. Operational barriers pose a threshold test of whether UNE-L
10 competition is feasible, and that test is addressed in the accompanying testimony
11 of James Webber. These operational barriers also affect the economic analysis.
12 Even if a CLEC determines that operational barriers are not insurmountable in
13 and of themselves, the CLEC must take account of the expected cost and extra
14 risk associated with overcoming these barriers in making a decision of whether to
15 enter. The economic analysis below very conservatively assumes no risk and
16 cost in overcoming these barriers.

17 **Q. PLEASE DESCRIBE THE CONSEQUENCE OF THE TWO POSSIBLE**
18 **OUTCOMES OF THE ANALYSIS OF POTENTIAL DEPLOYMENT.**

19 A. In any given market, the Commission could make a finding of no impairment, or
20 could find that the evidence presented is insufficient to overcome the FCC’s
21 national finding of impairment. In the event of a finding of no impairment,
22 UNE-P competition will be terminated, and all consumers currently served by
23 UNE-P CLECs will be forced to make a change in their telephone service: either

1 switching back to the ILEC, switching to a UNE-L CLEC, or switching to their
2 existing CLEC's new UNE-L facilities. If the Commission's finding of no
3 impairment is incorrect, the customer's only option will be to switch back to the
4 ILEC. On the other hand, if the FCC's national finding of impairment is not
5 overcome by the evidence of potential deployment in a particular market, the
6 ILECs will still have additional opportunities to demonstrate no impairment.
7 They can show the Commission that the existing impairment could be overcome
8 by some form of "rolling access" to unbundled local switching for a limited
9 period. And if new evidence shows either potential or actual deployment, they
10 can come back to the Commission and make their case again. Ultimately, a
11 finding of continued impairment maintains the status quo until new, more
12 compelling evidence is presented.

13 I expect that with the passage of time, existing barriers to entry will
14 diminish in importance to the point that the evidence will confirm either that the
15 triggers have been met or that potential deployment is likely. Nonetheless, there
16 may be some markets for which unbundled switching will be essential to
17 competitive entry for many years to come.

18 ***D. Decision Criteria***

19 **Q. WHAT CRITERIA SHOULD THE COMMISSION APPLY WHEN**
20 **REACHING DECISIONS IN THIS PROCEEDING?**

21 A. Although the decisions the Commission must reach in this proceeding are clear –
22 whether CLECs impaired without access to unbundled switching to serve mass-
23 market customers – the Commission must exercise its judgment as to the weight

1 given to conflicting evidence and analytical methods. As I will show in my
2 analysis below, the evidence on which the Commission must ultimately rely will
3 demonstrate that there is significant uncertainty as whether the CLECs will be
4 able to survive in most markets as switched-based providers of service in the mass
5 market.

6 In this circumstance, the Commission should consider the consequences of
7 alternatives when assigning weight to the evidence supporting the alternative
8 decisions. As discussed above, the consequences of a finding of no impairment
9 are very different from the consequences of the alternative, both at the stage of
10 trigger analysis and in the analysis of potential deployment. A finding of no
11 impairment, at whatever stage of the analysis, is essentially irreversible and
12 initiates a process of wrenching change in the local exchange market. A decision
13 that the available evidence does not overcome the national finding of continued
14 impairment is a provisional finding at whatever stage of analysis it is made.

15 **Q. IN WHAT SENSE IS A FINDING OF CONTINUED IMPAIRMENT**
16 **“PROVISIONAL?”**

17 A. Whenever the Commission determines that the available evidence does not
18 overcome the national finding of continued impairment, that determination is
19 always subject to reconsideration. If the Commission finds that the triggers are
20 not satisfied in a particular market, the Commission must reconsider the implied
21 *provisional* finding of continued impairment when it examines evidence of
22 potential deployment in that market. *Triennial Review Order*, ¶ 506. If the
23 Commission determines that evidence regarding potential deployment does not

1 overcome the national finding of continued impairment, that *provisional* decision
2 will be reconsidered in the context of any proposals to overcome existing
3 impairment by rolling access to unbundled local switching for a limited time
4 period. *Id.*, ¶ 521. If the Commission determines that no proposal for limited
5 “rolling access” suffices to overcome existing impairment in a particular market,
6 that *provisional* decision is always subject to reconsideration on the basis of new
7 evidence. *Id.*, ¶ 526.

8 Indeed, insofar as existing barriers to entry diminish in importance, I
9 expect that the increasing provision of service via UNE-L will naturally create a
10 body of evidence supporting a finding of no impairment in a growing number of
11 markets. A determination that the evidence for a particular market does not yet
12 overcome the national finding of continued impairment is always provisional in
13 the sense that the Commission can always revisit the state of evidence in that
14 market and make a finding of no impairment as soon the level of actual or
15 potential facilities-based competition in that market justifies such a finding.

16 **Q. IN WHAT SENSE IS A FINDING OF NO IMPAIRMENT**
17 **IRREVERSIBLE?**

18 A. A finding of no impairment will initiate a period of substantial changes in the
19 market, both for consumers and for providers. CLECs that cannot justify using
20 their own scarce capital resources or cannot secure outside capital sources to
21 invest in self-provisioned switching will have to go out of business, or change
22 their business plans and focus on other parts of the markets, *e.g.*, serving
23 enterprise customers. Consumers will be left with few or no alternatives to the

1 ILECs, until and unless CLECs invest in switching. Although it is conceivable
2 that the CLECs could reenter the market if technology changes to improve the
3 prospect of earning profits, this may not happen for some time. Furthermore,
4 once a CLEC exits the market, it will face a significant new barrier to entry – the
5 cost of establishing a brand name and acquainting a new generation of customers
6 with a competitive local telecommunications market.

7 **Q. IS IT APPROPRIATE FOR THE COMMISSION TO CONSIDER THE**
8 **IRREVERSIBLE CHARACTER OF A FINDING OF NO IMPAIRMENT**
9 **AND THE PROVISIONAL CHARACTER OF A FINDING THAT THE**
10 **EVIDENCE DOES NOT YET OVERCOME THE NATIONAL FINDING**
11 **OF CONTINUED IMPAIRMENT?**

12 A. Yes, I believe it would be a grave error for the Commission not to consider these
13 implications of its decisions. In particular, the Commission should recognize,
14 and attempt to minimize, the consequences of the two kinds of decision-making
15 errors that are possible in this proceeding.

16 First, the Commission could determine that CLECs are not impaired
17 without access to unbundled switching when, in fact, they are impaired. (This
18 would constitute what statisticians call a “Type I” error.) As I noted above, such a
19 decision would do irreversible harm to the prospects for local exchange
20 competition in Florida and would therefore deprive mass-market consumers in
21 Florida of the benefits of such competition. Moreover, with the increasing
22 prevalence of bundling, any decision that impedes local exchange competition
23 will have spillover effects in the long-distance market. Long distance carriers

1 that are unable to offer a bundled local/long-distance product will find it difficult
2 to survive in the marketplace. This could lead to an outcome where there are few
3 or no alternative to the ILEC for long distance and local service. Florida
4 consumers would lose the benefits of the long-distance competition that they have
5 enjoyed for many years.

6 Second, the Commission could judge that CLECs are impaired when, in
7 fact, they are not. (This would constitute what statisticians call a “Type II”
8 error.) As I explained above, there is a good chance that such an error would be
9 self-correcting. If CLECs are not impaired without access to UNE switching, I
10 would expect more CLECs to self-provision switching in the relatively near
11 future. Thus, for any particular market definition, the number of self-
12 provisioning carriers will increase until the three-carrier trigger is met. The
13 incumbent would certainly bring this fact to the Commission’s attention at the
14 first available opportunity in one of the follow-on trigger reviews.

15 Decision theorists use a “loss function” to capture the perceived cost of
16 each type of error. The loss function quantifies the cost, in terms of lost societal
17 (both consumer and producer) welfare, incurred for a given regulatory action and
18 a given set of facts about CLECs’ true ability to enter without access to unbundled
19 switching. Because a false finding of no impairment would cause irrevocable
20 harm, whereas a false finding of impairment has only temporary consequences,
21 the cost to society of the former (Type I) error is far greater than the cost of the
22 latter error.

1 There are some cases where the modeling proves unambiguously that self-
2 provisioning of switching by the CLECs is unprofitable and will remain so for the
3 foreseeable future. In this case, there is no need to introduce a complicated
4 decision rule; the CLECs are certainly impaired. Where the ability of CLECs to
5 serve mass market consumers without access to unbundled switching is
6 ambiguous, however, the Commission should makes its decision in a way that
7 minimizes the expected consequences to Florida consumers and the Florida
8 economy by erring on the side of caution, and applying the strictest possible
9 standard before making a finding of no impairment in any Florida market.

10 **Q. YOU STATED ABOVE THAT GROWTH IN UNE-L BASED SERVICE**
11 **WOULD NATURALLY PROVIDE GROWING EVIDENCE OF NO**
12 **IMPAIRMENT AS EXISTING BARRIERS DIMINISH IN IMPORTANCE.**
13 **IS IT POSSIBLE THAT UNDERPRICED ACCESS TO UNE-P LEAVES**
14 **NO INCENTIVE FOR CLECS TO PROVIDE SERVICE VIA UNE-L?**

15 A. No, there are several reasons to believe this is not the case. The CLECs are new
16 entrants into a market that has been monopolized for a century or more. They
17 have much to gain by limiting their dependence upon the incumbent. Eliminating
18 dependence on ILEC facilities will allow the CLECs to better differentiate their
19 services and improve their appeal to customers, without having to cut prices to the
20 bone. Moreover, if the systems are in place to handle hot cuts and other
21 interfaces between the CLEC and ILEC, the CLECs will have more control over
22 the quality of service that they can offer their customers, and be able to offer
23 redundancy to the ILECs' facilities. This factor has been a major factor in

1 stimulating demand for the CLECs' transport services, and led to significant
2 investment in facilities, even though leasing was still available as an option.

3 **Q. HOW IS YOUR ANALYSIS OF THE TYPES OF POTENTIAL ERRORS**
4 **IN FINDING NO IMPAIRMENT WITH REGARD TO MASS-MARKET**
5 **SWITCHING AFFECTED BY THE DESIRABILITY OF FACILITIES-**
6 **BASED COMPETITION?**

7 A. The ILECs' response to these, and other concerns, will no doubt be a repeat of the
8 mantra of encouraging "real" (*i.e.*, facilities-based) competition. As an
9 economist, I recognize the benefits of facilities-based competition, but question
10 the merits of any attempt to force a "one-size-fits-all" approach to competition.

11 The Act sets a framework for local competition and provides for three
12 entry vehicles: (1) total service resale priced at the incumbent's retail prices less
13 an avoided cost discount; (2) unbundled network elements (including UNE-P)
14 priced at cost, which the FCC has defined as forward-looking economic cost; and
15 (3) facilities-based entry. 47 U.S.C. § 251(c). The Act does not give preference
16 to any of these forms of entry, and neither should the Commission.

17 Certainly, there is no economic basis for such a preference. In non-
18 regulated competitive markets, there are many different viable firm structures,
19 ranging from firms that specialize in retailing (pure resellers) to firms that own
20 and control every step of the process from the extraction of raw materials to the
21 sale of finished goods and services. There is no single optimal level of what
22 economists call vertical integration.

1 The ILECs themselves have changed their levels of vertical integration
2 over time. For example, pre-divestiture, the Bell System was a vertically
3 integrated amalgam of a research and development arm (Bell Labs), an equipment
4 manufacturer (Western Electric), facilities-based local service providers (the
5 various local operating companies, which were spun off as the Regional Bell
6 Operating Companies, or RBOCs) and a facilities-based long distance provider
7 (AT&T Long Lines). Post-divestiture, the RBOCs have become resellers of
8 other manufacturers' equipment, have spun off their own jointly owned and
9 operated research and development arm (the former BellCore, now Telcordia) and
10 have chosen to re-enter the long-distance business by leasing facilities from other
11 carriers.

12 The last example is particularly instructive. The RBOCs are *not* building
13 their own nationwide long distance networks; instead, they are relying on renting
14 others' networks out of region on competitive terms. Yet, in complete contrast to
15 their advocacy concerning local entry via UNE-P, the RBOCs have vigorously
16 argued before state and federal regulators that their entry into the long-distance
17 business will deliver significant consumer benefits, even though they rely
18 extensively on others' facilities.

19 The RBOCs are able to compete fully in the long-distance retail market
20 without building their own nationwide networks because, prior to their entry, the
21 long-distance *wholesale* market was already well-established. The Operations
22 Support Systems ("OSS") were already designed to accommodate multiple

1 carriers using the same networks, and price competition had driven wholesale
2 prices well below historic/embedded costs.

3 CLECs should have the same opportunity to procure network inputs at
4 competitive prices, as well. But, in stark contrast to the long-distance wholesale
5 market, where there are multiple carriers from which the RBOCs can obtain
6 capacity, CLECs generally have no choice but to lease facilities from the former
7 local monopolist in each area. The ILECs have little incentive to offer potential
8 competitors favorable wholesale prices. As I demonstrate further in the
9 following sections, absent a continued requirement to make UNE-P available at
10 prices based on forward-looking economic cost, the ILECs can and undoubtedly
11 will exploit their monopoly leverage over local networks to forestall competitive
12 entry.

13 *E. Steps in Analysis and Organization of Testimony*

14 **Q. PLEASE DESCRIBE THE STEPS FOLLOWED IN YOUR ANALYSIS.**

15 A. My analysis follows four steps. First, I define markets on the basis of principles
16 that apply to both trigger analysis and the analysis of potential deployment. This
17 market definition provides the necessary foundation for the Commission's review
18 of evidence purporting to show that triggers are met in certain markets.

19 The remaining three steps of my analysis relate to the potential
20 deployment question that the Commission must address for markets in which
21 triggers are not met. In the second step, I quantify the various costs that a CLEC
22 would consider in evaluating the feasibility of deploying facilities to provide
23 UNE-L based services. Then, I quantify revenues that a CLEC could expect to

1 receive after deploying facilities to provide UNE-L based service. Finally, I
2 consider the results of my calculations in a way that recognizes the uncertainty
3 associated with many of the inputs necessary for the calculations.

4 Each of these steps is discussed below, and an electronic copy of the
5 analysis tool on which I rely is provided as Exhibit MTB-2. In the final section, I
6 describe the conclusions I draw from the reported results.

7 **III. MARKET DEFINITION (ORDER NO. PSC-03-1265-PCO-TP, ISSUES 1**
8 **AND 2)**

9
10 **Q. YOU INDICATED ABOVE THAT THE MARKET DEFINITION SHOULD**
11 **PERMIT THE MOST UNAMBIGUOUS AND ACCURATE ANSWER TO**
12 **THE QUESTION “ARE CLECS IMPAIRED WITHOUT ACCESS TO**
13 **UNBUNDLED SWITCHING IN THIS MARKET?” PLEASE EXPLAIN IN**
14 **MORE DETAIL WHAT YOU MEANT BY THAT STATEMENT.**

15 A. The FCC has observed that “[i]t is fundamental to our general impairment
16 analysis to consider whether alternative facilities deployment shows a lack of
17 impairment in serving a particular market.” *Triennial Review Order*, n. 1536.
18 This means that the markets as defined should be sufficiently uniform that
19 evidence of (actual or potential) facilities-based competition in any part of a given
20 market implies the ability to provide service to all (or nearly all) customers in that
21 market without access to unbundled switching.

1 **Q. HOW DOES THE FCC REQUIRE MARKETS TO BE DEFINED FOR**
2 **THE PURPOSE OF DETERMINING IMPAIRMENT?**

3 A. At the outset, it is essential to recognize that, “because we measure alternative
4 ‘switching’ in a given market, not switches located in that market, the physical
5 location of the switch is not necessarily relevant to defining the geographic
6 market. For example, a switch located in Rhode Island could satisfy the
7 switching trigger in Massachusetts if it is serving customers in the relevant market
8 in Massachusetts.” *Triennial Review Order*, n. 1536.

9 The FCC clearly intends for state commissions to conduct a more granular
10 impairment analysis than was possible at the national level, and market definition
11 is crucial to that analysis. *Triennial Review Order*, ¶ 495.

12 Specifically, the *Order* calls for this Commission to conduct its
13 investigation “on the most accurate level possible, while still preserving
14 administrative practicality.” *Id.*, ¶ 130. Accuracy is essential to carrying out the
15 pro-competitive purposes of the Telecommunications Act of 1996 (“Act”). If
16 markets are not defined correctly, the Commission could mistakenly find no
17 impairment where, in fact, customers are left without competitive alternatives; or,
18 a faulty market definition could lead the Commission to find impairment where
19 none exists.

1 **Q. HAS THE FCC ESTABLISHED ANY GUIDELINES OR PARAMETERS**
2 **FOR CHOOSING AN ACCURATE AND ADMINISTRABLE MARKET**
3 **DEFINITION TO BE USED IN TRIGGER AND POTENTIAL**
4 **DEPLOYMENT ANALYSES?**

5 A. Yes. The rules that the FCC adopted in its *Triennial Review Order* specify that:

6 A state commission shall define the markets in which it will
7 evaluate impairment by determining the relevant geographic area
8 to include in each market. In defining markets, a state
9 commission shall take into consideration the locations of mass
10 market customers actually being served (if any) by competitors, the
11 variation in factors affecting competitors' ability to serve each
12 group of customers, and competitors' ability to target and serve
13 specific markets profitably and efficiently using currently available
14 technologies. A state commission shall not define the relevant
15 geographic area as the entire state. 47 C.F.R. § 51.319(d)(2)(i).

16 The *Order* also presents examples of the factors that may vary geographically,
17 such as “how the cost of serving customers varies according to the size of the wire
18 center and the location of the wire center, and the variations in the capabilities of
19 wire centers to provide adequate collocation space and handle large number of hot
20 cuts.” *Triennial Review Order* ¶ 496. Significantly, these criteria for market
21 definition are not limited to variations in potential profitability that might be
22 captured, at least in part, by grouping together wire centers that fall into the same
23 UNE and/or retail rate bands. Instead, consistent with the operational basis for
24 the FCC’s national finding of impairment for mass-market switching, the FCC
25 points to many factors that vary among wire centers: (1) locations of customers
26 actually being served; (2) variations in cost between wire centers; (3) variations in
27 capability to provide collocation space; and (4) variations in the ability of wire
28 centers to handle large numbers of hot cuts. Because each of these factors varies

1 among wire centers, a market definition bigger than the wire center will be
2 inaccurate. The ongoing ability of the ILECs to perform hot cuts as mass-market
3 customers change carriers (only one or a handful of lines per location, but
4 potentially and collectively hundreds of lines each day in a given wire center), for
5 example, is critical to the success of switch-based competition and must be
6 considered at all phases of the impairment analysis, beginning with market
7 definition. Moreover, the FCC states that, “where switch providers . . . are
8 identified as currently serving, or capable of serving, only part of the market, the
9 state commission may choose to consider defining that portion of the market as a
10 separate market for purposes of its analysis,” *TRO* ¶ 499 n. 1552, again
11 emphasizing the importance the FCC placed on granularity.

12 **Q. DOES ECONOMIC THEORY PROVIDE ANY GUIDANCE WITH**
13 **RESPECT TO MARKET DEFINITION?**

14 A. Yes. There is a body of economic analysis that applies to the question of defining
15 markets. Much of the economic literature on market definition has focused on
16 facilitating the assessment of market power in merger and antitrust proceedings.
17 The FCC noted in its *Triennial Review Order* that the market power question is
18 somewhat different from the impairment question before the Commission in this
19 proceeding. *Id.* ¶¶ 74 and 109. Nonetheless, the FCC also acknowledged that the
20 market definition literature developed in the context of merger and antitrust
21 analyses provides helpful guidance for market definition in the impairment
22 context. *Id.* n. 439. Hence, as I describe in more detail in a following section, I

1 have taken this economic literature into account in developing my recommended
2 market definition.

3 The essential economic criterion for whether a product belongs in a
4 relevant market is whether the product can serve as an alternative to consumers in
5 that market. Thus, for example, an apartment in Miami is not in the same
6 geographic market as an apartment in Orlando, because the Miami apartment does
7 not serve as a meaningful alternative for Orlando consumers.

8 **Q. HOW HAVE YOU APPLIED THE GUIDANCE IN THE *TRIENNIAL***
9 ***REVIEW ORDER* AND ECONOMIC THEORY CONCERNING MARKET**
10 **DEFINITION?**

11 A. This section sets out in more detail the economic principles that should be
12 followed in defining markets for the purposes of the impairment analysis, which
13 are consistent with those prescribed by the *Order*, and concludes that criteria of
14 “accuracy” as well as “practicality” argue for the Commission to begin its
15 analysis with the presumption that wire centers establish the appropriate level of
16 granularity. ILEC wire center boundaries are the most natural geographic
17 boundaries for purposes of defining markets for several reasons. First, the costs
18 of providing service vary widely from one wire center to another and it is not
19 possible draw conclusions about one wire center from an analysis of another wire
20 center. Second, once a CLEC is serving some customers in a wire center, it will
21 face relatively lower cost of serving other customers in the same wire center,
22 compared to the cost of entering a new wire center market. Third, it is
23 administratively feasible to administer the requirements of the *Order* on a wire

1 center basis, because data on CLEC activity, including collocation, and other cost
2 information is available on this basis. I have demonstrated this point with the
3 impairment analysis tool included in Exhibit MTB-2.

4 ***A. Market Definition Must Be Applied in Two Different Contexts***

5 **Q. FOR WHAT PURPOSES MUST THIS COMMISSION DEFINE SPECIFIC**
6 **MARKETS?**

7 A. For the local switching UNE, the FCC asks this Commission “to assess
8 impairment in the mass market on a market-by-market basis.” *Triennial Review*
9 *Order*, ¶ 493. Thus, this Commission’s market definition task is to divide the
10 mass market customers of the state into separate “markets.”

11 This set of “markets” that the Commission will define provides the
12 starting point for two types of investigation: (1) the identification of qualifying
13 market participants for the wholesale and self-provisioning “triggers” and (2) the
14 analysis of “potential deployment.” As I mentioned above, the Commission must
15 use the same set of “markets” for both of these investigations (*id.*, ¶ 495), so the
16 markets being defined must be appropriate for the purely structural trigger
17 analysis as well as for the analysis of entry decisions and business plans required
18 to reach conclusions on potential deployment.

19 **Q. PLEASE ELABORATE ON THE FIRST USE OF THE MARKET**
20 **DEFINITION IN THIS PROCEEDING.**

21 A. The separate markets defined by the Commission will first be used to identify
22 market participants that may count toward satisfaction of self-provisioning and
23 wholesale triggers. The *Order*’s trigger analysis is intended to provide “bright-

1 line rules” that “can avoid the delays caused by protracted proceedings and can
2 minimize administrative burdens.” *Triennial Review Order*, ¶ 498. The correct
3 functioning of these “bright-line rules” depends crucially on the markets the
4 Commission defines for use in “market-by-market” analysis.

5 In particular, for the trigger analysis to correctly serve its function,
6 markets must be defined so that “[i]f the triggers are satisfied, the states need not
7 undertake any further inquiry, because no impairment should exist in that
8 market.” *Id.*, ¶ 494. That is, markets must be defined so that if the triggers are
9 satisfied and the Commission reaches a finding of no impairment for a market,
10 customers in the market have real choice, and competitive carriers are not
11 impaired in their ability to reach the customers in the defined market. Otherwise,
12 as explained above, the triggers could be satisfied when customers have no
13 alternative choice of providers and indeed where competitors are impaired. The
14 FCC made clear the importance of firms serving as actual alternatives when it
15 explained that existing firms can only be counted toward satisfaction of a trigger
16 if they are “currently offering and able to provide service, and likely to continue
17 to do so.” *Id.*, ¶ 500.

18 The triggers merely identify whether CLECs in a market are clearly not
19 impaired without access to the local switching UNE. Failure to meet the triggers
20 results in further analysis of potential deployment.

21 As a result, the role of market definition in the trigger analysis should be
22 to identify the scope of telecommunications services and locations for which a
23 market participant’s switching capacity clearly shows the absence of impairment

1 because customers already have real alternatives. Market definition should ensure
2 that a qualifying market participant provides an acceptable alternative to
3 qualifying service provided at a geographic location that actually serves the
4 customers in the market. The new entrant's service must be an acceptable
5 substitute, and the location at which service is offered must encompass the areas
6 in which the customers require service. Successful entry into a different market,
7 where the entrant's offering is not a close substitute for service provided with the
8 incumbent's local switching or where the entrant is unable to provide service to
9 the customers, offers no such evidence of non-impairment. Only if the qualifying
10 participant has succeeded in overcoming operational and economic barriers to
11 entry into a properly defined market, which recognizes buyers' product and
12 location substitution possibilities, can the Commission be confident that the new
13 entrant offers evidence of no impairment in provision of the specified service at
14 the specified location.

15 **Q. PLEASE ELABORATE ON THE SECOND USE OF THE MARKET**
16 **DEFINITIONS.**

17 A. If the triggers are not satisfied in a market, analysis proceeds to the possibility of
18 potential deployment to test whether barriers to entry without unbundled access to
19 a network element are "likely to make entry into a market uneconomic, " or
20 whether the market in question is "suitable for 'multiple, competitive supply.'" *Triennial Review Order*, ¶¶ 84, 506. This analysis, which is the central topic of
21 my testimony, must also be conducted on a "market-by-market" basis, analyzing
22 the same markets that are used in the trigger analysis. At this stage of the
23

1 analysis, the Commission must consider any local switching capacity of market
2 participants identified in the trigger analysis in concert with analysis of
3 operational and economic barriers to entry. As with the triggers, it is critical that
4 markets not be defined too broadly or the Commission will end up finding non-
5 impairment in many areas in which competitors are in fact impaired, leaving
6 customers with no choice among providers.

7 **Q. IS YOUR RECOMMENDED APPROACH TO MARKET DEFINITION**
8 **EQUALLY APPLICABLE TO BOTH THE WHOLESALE AND SELF-**
9 **PROVISIONING TRIGGERS?**

10 A. Yes. The same approach to market definition applies to evidence of no
11 impairment presented with respect to wholesale and self-provided switching.

12
13 ***B. Market Definition Analysis Starts with a Specific Service or Product***
14 ***Offering in a Narrow Geographic Market and then Expands the***
15 ***Relevant Market to Incorporate Substitutes***

16 **Q. HOW DO ECONOMISTS TYPICALLY DEVELOP MARKET**
17 **DEFINITIONS?**

18 A. The process of defining a market invariably requires answering questions as to
19 whether a particular product or location belongs in the market, or falls outside its
20 boundaries. These questions are properly answered by considering the extent to
21 which customers regard the various products and locations as substitutes or
22 alternatives.

1 The normal way to begin the analysis is with a single firm’s product,
2 offered at a specified location and then to expand beyond this point to see if
3 products from the expanded product set or geographic area serve as alternatives.
4 Normally, the initial market definition of a specific location and product will turn
5 out to be too small because buyers have acceptable alternatives, or substitutes,
6 outside of the product and location. If buyers regard another firm’s product,
7 possibly offered at a different location, as an acceptable substitute, then the
8 market definition should be expanded to include the other firm’s product and the
9 other location.

10 **Q. IS THIS APPROACH TO MARKET DEFINITION APPLICABLE IN THE**
11 **CONTEXT OF THE TRIGGER ANALYSIS REQUIRED BY THE FCC?**

12 A. Absolutely. Although most economic analyses have developed market definitions
13 in the context of calculating market shares or other measures of market
14 concentration, the conventional approach is also correct for the identification of
15 competitive facilities qualifying for the trigger analysis prescribed in the *Order*.
16 Market definition is a preliminary step in *any* structural analysis of markets, and
17 the same analysis is implied for the identification of market participants to
18 calculate indicia of concentration in a market, or to “count heads” for a trigger
19 analysis.

20 Moreover, this approach is consistent with the specific criteria the FCC
21 provides for defining markets. The *Order* specifically requires state commissions
22 “to define each geographic market on a granular level and direct[s] them to take
23 into consideration the locations of customers actually being served by

1 competitors, the variation in factors affecting competitors' ability to serve each
2 group of customers and competitors' ability to target and serve specific markets
3 economically and efficiently using currently available technologies." *Triennial*
4 *Review Order*, n. 1536

5 **Q. IS THE APPROACH YOU PROPOSE USED IN ANY OTHER**
6 **REGULATORY CONTEXT?**

7 Yes, the market definition approach I have presented is the same as the one used
8 in the Horizontal Merger Guidelines ("HMG") of the U.S. Department of Justice
9 and the Federal Trade Commission. The HMG states that "a market is defined as
10 a product or group of products and a geographic area in which it is produced or
11 sold such that a hypothetical profit-maximizing firm, not subject to price
12 regulation, that was the only present and future producer or seller of those
13 products in that area likely would impose at least a 'small but significant and no
14 transitory' increase in price, assuming the terms of sale of all other products are
15 held constant."

16 Although the FCC rejected certain applications of the HMG for purposes
17 of an impairment analysis, the *Triennial Review Order* explicitly endorses the
18 relevance of the HMG to the market definition that must underlie any impairment
19 analysis: "We take this lesson of geographic granularity from the HMG without
20 adopting the HMG wholesale." *Triennial Review Order*, n. 439. This makes
21 sense because the HMG have authoritative status in industrial organization
22 economics.

1 **Q. HOW DO THE MERGER GUIDELINES APPROACH THE PRACTICAL**
2 **ASPECTS OF DEFINING A MARKET?**

3 A. The HMG describe an approach similar to the one I just described where they
4 “begin with each product (narrowly defined) produced or sold by each merging
5 firm” for the product dimension and “the location of each merging firm (or each
6 plant of a multiplant firm)” for the geographic dimension. HMG 1.11 Product
7 Market Definition General Standards and 1.21 Geographic Market Definition
8 General Standards.

9 This initial tentative market definition is expanded by asking whether
10 consumers regard other products or locations as close enough substitutes that a
11 price increase in the narrowly and tentatively defined market would be met by
12 consumers switching to other products or locations. The notion of “close enough”
13 substitutes is given precision by asking whether a “small but significant and
14 nontransitory” price increase in the narrowly and tentatively defined market
15 would be met by a strong enough substitution response by consumers to make the
16 price increase unprofitable, if it were implemented by a hypothetical monopoly
17 provider controlling all of the products and locations in the tentatively defined
18 market. The tentative market definition is too narrow if it fails to incorporate
19 substitutes that consumers regard as “close enough,” as measured by consumers
20 switching in response to a price increase. If a tentative market definition is found
21 to be too narrow, the definition is expanded to incorporate the next best products
22 or locations that consumers regard as “close enough” substitutes.

1 In short, the analysis of market definition under the HMG is essentially the
2 same as the one that I have proposed. A CLEC serving a group of customers in a
3 specific geographic area would not be counted as a participant in another
4 geographic market if it was not now offering service in that market and it would
5 not extend service to that market in response to a “small but significant
6 nontransitory” price increase.

7 **1. Product Markets and Geographic Markets for Local**
8 **Telecommunications Services**

9
10 **Q. HOW DOES THE ECONOMISTS’ VIEW OF MARKET DEFINITION**
11 **APPLY TO LOCAL TELECOMMUNICATIONS SERVICES?**

12 A. Applying the conventional market definition procedure described above to local
13 telecommunications services begins with identifying the product and geographic
14 starting point for a tentative market definition. In the present case, the starting
15 point is the product and customer location that a requesting CLEC now serves
16 with unbundled access to the incumbent’s local switching network element, and
17 for which we will seek evidence of no impairment in the form of actual or
18 potential deployment of competitive switching capacity in the same market. “In
19 the same market” means that consumers must find the identified competitive
20 offering to be an acceptable substitute for the offering possible with access to the
21 local switching UNE.

22 The analysis then proceeds to expand these tentative product and
23 geographic markets to include other products or locations that consumers will
24 regard as “close enough” substitutes. The *Triennial Review Order* contains
25 specific discussions of many possible substitutes and provides guidance for the

1 Commission about the appropriateness of including each of these substitutes
2 within the market definition.

3 **Q. HOW SHOULD THE COMMISSION IDENTIFY THE PRODUCT OR**
4 **PRODUCTS INCLUDED IN THE RELEVANT MARKET?**

5 A. The Commission should identify the product or products included in the initial
6 tentative market based on the *Order*'s discussion of qualifying services: in short,
7 "those services that have been traditionally the exclusive or primary domain of the
8 incumbent LECs." *Triennial Review Order*, ¶ 135. As I will discuss below, it is
9 necessary to subdivide the ILECs' customers into two different markets,
10 residential and business, even though most of the same products are sold to these
11 two classes of customers. The reason is that price discrimination is enforced
12 between the two market segments.

13 **Q. BASED ON THE ABOVE DISCUSSION, WHAT PRODUCT MARKET**
14 **DEFINITION DO YOU RECOMMEND FOR COMMISSION ADOPTION?**

15 A. In the product market dimension, the Commission should include any alternative
16 to the ILEC's local switching UNE that affords access to the incumbent's loops to
17 provide local voice service, including vertical features and access service. This
18 product definition excludes CMRS, fixed wireless and cable telephony, but
19 includes packet switched local service when it meets the requirements of the
20 Triennial Review Order's impairment analysis.

21 **Q. DOES THE TRIENNIAL REVIEW ORDER DISCUSS WHETHER**
22 **INTERMODAL PROVIDERS ARE IN THE SAME PRODUCT MARKET?**

23 A. Yes, the *Order* states:

1 As in the impairment triggers for high-capacity loops and
2 dedicated transport, states also shall consider carriers that provide
3 intermodal voice service using their own switch facilities
4 (including packet and soft switches) that meet the requirements of
5 these triggers and Part V above. ... In deciding whether to include
6 intermodal alternatives for the purposes of these triggers, states
7 should consider to what extent the services provided over these
8 intermodal alternatives are comparable in cost, quality, and
9 maturity to incumbent LEC services. *Triennial Review Order*, n.
10 1549.
11

12 The *Order* further suggests that CMRS is not a close enough substitute to
13 be included in the market, but packet switches providing voice services should be
14 included, if they “meet the requirements” of the triggers and the *Order*’s Part V,
15 Principles of Unbundling. *Id.* Fixed wireless has “not proven to be viable or
16 deployable on a mass market scale,” suggesting that it may not be a “close
17 enough” substitute to require expansion of the tentative market definition. *Id.*,
18 ¶ 310.

19 Cable telephony fails to serve the “crucial function” of affording access to
20 the incumbent’s loops (*id.*, ¶ 439), and therefore “provides no evidence that
21 competitors have successfully self-deployed switches as a means to access the
22 incumbents’ local loops, and have overcome the difficulties inherent in the hot cut
23 process.” *Id.*, ¶ 440. Further, cable telephony’s strategy is to “bypass the
24 incumbent LECs’ networks entirely.” *Id.*, ¶ 439. This strategy is only available to
25 a single firm in any market because cable TV companies, due to “unique
26 economic circumstances of first-mover advantages and scope economies, have
27 access to customers that other competitive carriers lack.” *Id.*, ¶ 310. As a result,
28 neither cable telephony nor CMRS “can be used as a means of accessing the

1 incumbents' wireline voice-grade local loops. Accordingly, neither
2 technology provides probative evidence of an entrant's ability to access the
3 incumbent LEC's wireline voice-grade local loop and thereby self-deploy local
4 circuit switches." *Triennial Review Order*, ¶ 446. Any competitive facilities that
5 allow access to some local loops but not others clearly cannot be regarded as
6 probative evidence of no impairment concerning those loops that cannot be
7 reached by the competitive facilities.

8 **Q. HOW DO YOU RECOMMEND THE COMMISSION DETERMINE THE**
9 **RELEVANT GEOGRAPHIC MARKETS?**

10 A. In the geographic dimension, it takes only a moment's reflection to recognize that
11 consumers of qualifying telecommunications services will not accept any
12 substitutes that do not deliver service to the customer's premises. Because
13 qualifying services provided to a location other than to a customer's own premises
14 will not generally be a satisfactory substitute, expansion of the tentative market
15 definition to include other locations is not appropriate; the "most accurate" level
16 of granularity must address switching capability for particular customer premises.
17 The relevant points at which qualifying services are provided, analogous to the
18 HMG's "location of each plant" (HMG 1.21), are the Network Interface Devices
19 ("NIDs") that comprise the physical point of interconnection between the
20 incumbent and a customer. Thus, each NID or customer premises is a "location,"
21 or "plant," for purposes of defining initial tentative markets.

22 Fortunately, certain aggregations of consumers can be accomplished to
23 achieve "administrative practicability," as I discuss below. Further, the

1 Commission can respond to the FCC’s concern that markets not be defined so
2 narrowly as to preclude the realization of economies of scale and scope (*Triennial*
3 *Review Order*, ¶ 495) by requiring that each aggregation of customer locations
4 must be economically and operationally “includable” in a serving area large
5 enough to afford economies necessary to compete.

6 **Q. WHAT IS THE SIGNIFICANCE OF THE LOCATION-SPECIFICITY OF**
7 **THE DELIVERY OF TELECOMMUNICATIONS SERVICES?**

8 A. This location-specificity of the delivery of services is one of the unique
9 characteristics of markets for telecommunications services, and it is crucial to the
10 task of defining markets in which the prescribed trigger analysis reflects evidence
11 of actual economic entry into relevant markets without access to the incumbent’s
12 local switching UNE.

13 The *Triennial Review Order* recognizes this location-specificity in several
14 ways. For example, in defining the geographic markets for application of trigger
15 analysis to enterprise loops, the *Order* requires a “customer-by-customer location
16 basis.” [*Id.* N. 1536] Although mass market customers are tied to their locations
17 just as tightly as enterprise customers, the FCC observes that considerations of
18 practicality will not permit a customer-by-customer analysis, for at least some
19 mass market investigations. *Id.*, ¶ 309.

20 I demonstrate below that it is possible to aggregate mass market customer
21 locations in such a way (by wire center) as to preserve much of the accuracy of
22 customer-by-customer analysis, while achieving a high degree of practicality.
23 Identifying large groups of customers that are capable of being served using

1 uniform technologies and techniques, but recognizing that those techniques must
2 be applied to deliver service at the customer location, results in market definitions
3 that remain “accurate” but achieve “administrative practicality.”

4 **Q. ARE THERE ANY SPECIFIC CONCLUSIONS THAT FOLLOW FROM**
5 **THE RECOGNITION OF LOCATION-SPECIFICITY?**

6 A. Yes. Recognizing that each customer comprises a unique geographic market
7 would lead to a “market-by-market” analysis that recognizes that “an important
8 function of the local circuit switch is as a means of accessing the local loop.”
9 *Triennial Review Order*, ¶ 429. Or, “a crucial function of the incumbent’s local
10 circuit switch is to provide a means of accessing the local loop.” *Id.*, ¶ 439. The
11 crucial characteristic of loops is that they terminate in the customer’s premises,
12 which is the geographic location at which qualifying services are provided and the
13 only geographic point at which customers will accept delivery of services.

14 A market definition that ignored location specificity would fly in the face
15 of the entire foundation of antitrust and regulatory economics. It is nonsensical to
16 ignore the costs and entry barriers faced by CLEC wishing to expand service to
17 unique locations and define away these important cost differences by simply
18 declaring a large group of customers to be in the same geographic market. The
19 location is the market, and multiple locations cannot be aggregated without an
20 analysis of the specific facts that govern supply conditions in the market.

1 2. **Accuracy and Practicality**

2 **Q. FROM THIS “MOST ACCURATE” LEVEL OF GRANULARITY, WHAT**
3 **IS REQUIRED TO ACHIEVE “ADMINISTRATIVE PRACTICALITY”**
4 ***(TRIENNIAL REVIEW ORDER, ¶ 130)*?**

5 A. Market definition at the most accurate level of granularity, whether for application
6 of the prescribed triggers or for analysis of potential deployment, would be
7 conducted on a customer-by-customer basis, recognizing that customers will not
8 generally accept a substitute for the incumbent’s wireline service if that service is
9 not delivered to the customer’s premises. That is, the relevant geographic market
10 for local telecommunications services is customer location specific. Nevertheless,
11 subject to certain important limitations discussed below, it is possible to analyze
12 customer-specific locations in large numbers, achieving practicality with little or
13 no loss of accuracy.

14 **Q. WHAT AGGREGATIONS OF CUSTOMER LOCATIONS MAKE SENSE**
15 **FOR AN IMPAIRMENT ANALYSIS?**

16 A. Impairment analysis for mass market switching must identify substitutes to the
17 incumbent’s local circuit switch “as a means of accessing the local loop.”
18 *Triennial Review Order, ¶ 429.* Wire centers are the centers of outward-radiating
19 ILEC loop facilities, and determine the point at which access to the incumbent’s
20 loops must occur. Because impairment regarding the local switching UNE is so
21 closely related to access to the incumbent’s loops, the wire center provides a
22 natural unit of analysis. Insofar as an entrant in a particular wire center is not
23 impaired in its ability to expand service to all customers served by loops in that

1 wire center, it is reasonable to aggregate customers and consider impairment
2 issues at the wire center level.

3 **Q. WHAT LIMITATIONS MUST BE IMPOSED ON THE AGGREGATION**
4 **OF CUSTOMER LOCATIONS TO THE WIRE CENTER LEVEL?**

5 A. The crucial limitation is that a UNE-L CLEC's entry at a wire center must afford
6 that CLEC the opportunity to expand to serve any customer in that wire center.
7 The failure of this condition implies that aggregation of customers to the wire
8 center level will introduce misleading evidence and lead the Commission to
9 mistaken conclusions about impairment. The nature of this requirement is
10 explained in the following quotation from a popular antitrust law text:

11 "Competitors, supply substitution, and entry. (a) Expansion by immediate
12 competitors.] The demand for Alpha Company's product is obviously affected by
13 the ability of its direct competitors to deliver the same product. But if the others
14 are to limit Alpha's actions, they must be able to expand their production when
15 Alpha increases its prices because consumers cannot turn to other suppliers if
16 those suppliers are unable to expand their output." Antitrust Analysis: Problems,
17 Text, and Cases, Fifth Edition, Phillip Areeda and Louis Kaplow, Copyright 1997
18 by the President and Fellows of Harvard College, page 570, ¶342

19 I will discuss below several specific conditions that can limit the ability of
20 a CLEC in a particular wire center to serve certain customers in that wire center,
21 but aggregating customers to the level of the wire center presumes the absence of
22 one overarching limitation on the CLEC's ability to expand. That overarching
23 limitation is the possibility that there are operational barriers to the CLEC's

1 expansion. If a CLEC that has entered a particular wire center cannot adequately
2 expand its operations in that wire center, due to the presence of operational
3 barriers, then it is not reasonable to aggregate customers and consider the question
4 of impairment at the wire center level.

5 **Q. ARE THERE OTHER FACTORS THAT SUPPORT A MARKET**
6 **DEFINITION AT THE WIRE-CENTER LEVEL?**

7 A. Yes. In most cases, CLEC self-provisioning of local switching will require
8 collocation at each wire center the CLEC intends to serve. In those cases in
9 which all competitive facilities deployed are available to serve any loop in the
10 wire centers in which they offer service, trigger analysis can proceed with the
11 wire center as the geographic market definition, observing the distinction between
12 business and residential customers that is necessary because of the prevalence of
13 price discrimination, as well as other differences, between the two groups. In
14 such cases, analysis of the prescribed triggers can proceed at the wire-center level
15 with little or no loss of accuracy. The use of competitive switching facilities to
16 serve any business customer or any residential customer in a wire center can be
17 regarded as evidence that operational and economic barriers to providing service
18 to all business customers, or residential customers respectively, can be overcome.

19 For several reasons, the wire center also provides a natural unit of analysis
20 for the investigation of potential deployment. First, because a portion of the costs
21 of establishing service in a previously unserved wire center will be sunk costs,
22 CLEC entry decisions will have to be justified at the wire center level. This
23 justification will require the CLEC to compare the stream of net operating income

1 projected for a wire center to the sunk cost that must be incurred to establish the
2 collocation or other arrangements needed to offer service in the wire center.
3 Further, various costs and revenues that must be considered in analysis of
4 potential net operating revenue vary, sometimes dramatically, between wire
5 centers. To mention only two: 1) potential revenue from serving a wire center
6 will vary with the number of lines in the wire center and the profile of the typical
7 customer at the wire center, and, 2) the cost of backhauling traffic from the wire
8 center will vary with the wire center's proximity to other elements of the CLEC's
9 network.

10 **Q. IS IT MOST PRACTICAL TO CONDUCT IMPAIRMENT ANALYSIS AT**
11 **THE WIRE-CENTER LEVEL?**

12 A. Yes. For the analysis of triggers, the logical data to rely on initially – facilities in
13 place in the incumbent's wire centers, capabilities of competitors' facilities,
14 capacity available for expansion – are data that are available and most accurately
15 interpreted at the wire center level. ILEC tariff data needed for the impairment
16 analysis – UNE loop zones and retail rates - is also readily available on a wire
17 center basis. Also, information on customer demographics can be obtained on a
18 wire center basis, either from the data collected for universal service models or
19 from other public sources.

1 **Q. IS IT IMPORTANT TO CONDUCT AN IMPAIRMENT ANALYSIS AT A**
2 **LEVEL AS GRANULAR AS THE WIRE CENTER?**

3 A. Yes. Because the CLEC's entry decision will be made at the wire-center level,
4 examination of pertinent data at a higher level of aggregation will be less helpful
5 at best, and very possibly misleading.

6 For example, it would be an error to conclude that entry is feasible in two
7 wire centers because the present value of potential revenues net of operating costs
8 in the two wire centers exceeds the sunk costs of entering the two wire centers.
9 The two wire centers may be like a bucket of ice water and a bucket of boiling
10 water, which, on average, are a comfortable temperature. The fact that entry is
11 feasible in one wire center but not the other will not be revealed from examination
12 of average or total costs for the two wire centers. If the Commission finds no
13 impairment in both wire centers, the result will be that end users in one of the
14 wire centers will lose the competitive alternatives that would be available to them
15 if CLECs were to retain unbundled access to the incumbent's local circuit switch.

16 If the Commission conducted its trigger analyses under a market definition
17 that lumps together more than one wire center, it would need criteria to determine
18 whether competitive facilities satisfy the requirement of the trigger or not. The
19 analysis would nevertheless be likely to result in error. The trigger analysis treats
20 each qualifying competitive carrier as evidence that barriers to entry have been
21 overcome and no impairment exists. In fact, in a collection of two wire centers, a
22 competitive switching provider that is offering service to customers in one wire
23 center does not show absence of impairment in the other wire center. As

1 suggested above, analysis of potential deployment in the wire center, which has
2 not experienced actual deployment, may show that competitive entry without
3 access to the local switching UNE is extremely unlikely because of the cost and
4 revenue characteristics of the wire center. A finding of no impairment in such a
5 wire center, based on actual deployment in another wire center, would result in
6 customers in that wire center losing competitive alternatives based on availability
7 of the local switching UNE, with no prospect of switch-based competitors
8 actually overcoming operational and economic barriers to entry. I will show later
9 in this testimony that two wire centers located in the same exchange area may
10 have dramatically different results in terms of the potential for profitable CLEC
11 entry.

12 **Q. SOME WOULD ARGUE THAT MANY OF THE CLEC'S COSTS, SUCH**
13 **AS OPERATIONS SUPPORT SYSTEMS, SWITCHES, AND SOME**
14 **MARKETING COSTS, ARE INCURRED AND ARE USEFUL OVER**
15 **RELATIVELY LARGE MARKET AREAS. DOES THE EXISTENCE OF**
16 **THESE COSTS COMPEL A MORE EXPANSIVE MARKET DEFINITION**
17 **THAN THE INDIVIDUAL WIRE CENTER?**

18 A. No. While there is no question that it is in the interest of the CLEC to spread the
19 cost of large fixed investments over as broad a customer base as possible, the
20 decision to deploy facilities to provide connectivity to the CLEC's network still is
21 conducted on a very granular basis. As the manager of a CLEC, I may want to
22 add as many customers as possible to lower the cost of my fixed investments, but
23 I gain nothing, and lose much, if the customers in a particular wire center produce

1 negative net revenue. In deciding whether to obtain or construct collocation
2 facilities in an individual wire center, the CLEC manager must consider the
3 number of customers that reasonably can be expected to subscribe to the CLEC's
4 services, the amount of revenue that will be produced by those customer, and
5 must compare the anticipated revenue to the investments and operating expenses
6 associated with adding those collocation facilities to the CLEC's network. If the
7 wire center cannot contribute to the bottom line, it simply will not make sense for
8 the CLEC to offer services to customers in the wire center.

9 **Q. HAVE ANY REGULATORY BODIES RECOGNIZED THAT THE WIRE**
10 **CENTER IS AN APPROPRIATE BASIS FOR CONDUCTING**
11 **IMPAIRMENT ANALYSES?**

12 A. Yes. The Connecticut Department of Public Utility Control has already
13 determined that the wire center is the appropriate unit of analysis. Specifically,
14 the Department noted:

15 It is the opinion of the Department that the FCC intended to
16 perform the granularity analysis at the lowest reasonable level
17 possible. The Department believes that since data is collected and
18 compiled at the wire center level as well as the fact that the wire
19 center level is the principal point of interconnection with
20 competitive providers, it represents a consistent point of analysis
21 and comparison for this exercise. After considering the questions
22 raised by the parties at the Technical Meeting, the Department
23 finds no compelling reason for further discussion on this matter
24 from any party or to delay the definition to a later date. By
25 adopting a definition that directly corresponds to the principal
26 building block of the ILEC's network the Department is confident
27 that it will have sufficient empirical evidence upon which it can
28 form its judgment regarding the state of competitive presence in
29 Connecticut.

30 *Procedural Order* in Connecticut Department of Public Utility Control Docket

31 No. 03-09-01, Ph. 01, October 8, 2003, at 5. For the reasons that I outlined

1 above, and the additional practical reasons identified by the Connecticut
2 Department of Public Utility Control, I recommend that this Commission adopt
3 the wire center as its principal unit of analysis for determining whether
4 competitors are impaired without access to unbundled switching.

5 **Q. DO ALL CUSTOMERS IN A WIRE CENTER NECESSARILY FALL**
6 **INTO THE SAME MARKET?**

7 A. Not necessarily. There are two circumstances when a finer level of
8 disaggregation may be necessary. The first is where the CLEC is unable to offer
9 the same package of services as the ILEC. The second is where there is a
10 longstanding practice of price discrimination between two groups of customers.

11 **Q. PLEASE EXPLAIN THE CIRCUMSTANCES UNDER WHICH THE**
12 **CLEC WILL BE UNABLE TO OFFER THE SAME PACKAGE OF**
13 **SERVICES AS THE ILEC.**

14 A. The *Triennial Review Order* determined that the ILEC does not need to unbundle
15 its network to enable a competitive carrier to offer Digital Subscriber Line
16 (“DSL”) service on ILEC loops that are provisioned with Digital Loop Carrier
17 (“DLC”) equipment. *Triennial Review Order* at ¶ 213. This will place the CLEC
18 at a competitive disadvantage relative to the ILECs, which in many cases have
19 deployed DLC equipment capable of providing their own retail customers with
20 DSL service. Further, the ILECs generally have refused to provide DSL service
21 to customers that purchase voice telephony services from the CLECs. Therefore,
22 CLECs will be foreclosed from offering local service from the set of customers
23 that demand DSL service, but which can only be served over the ILECs’ DLC

1 equipment. This group of customers is not in the same market as other customers
2 in the same wire center for whom this competitive imbalance does not exist, either
3 because the customers do not desire DSL or they can be served by the CLECs and
4 the ILECs on a nondiscriminatory basis.

5 3. Price Discrimination

6 **Q. PLEASE EXPLAIN THE ROLE THAT PRICE DISCRIMINATION**
7 **PLAYS IN DEFINING MARKETS.**

8 A. Basic economic principles require a departure from the ordinary process of
9 market definition in the presence of price discrimination – “charging different
10 prices for the same product, for example.” *HMG 1.12 Product Market Definition*
11 *in the Presence of Price Discrimination*. If the characteristics of the product and
12 its buyers permit profitable price discrimination, then market definition must
13 recognize “particular use or uses by groups of buyers” and “particular locations of
14 buyers” that would be targeted for higher prices. *HMG 1.12 Product Market*
15 *Definition in the Presence of Price Discrimination, and HMG 1.22 Geographic*
16 *Market Definition in the Presence of Price Discrimination*.

17 This situation arises whenever the hypothetical monopolist in a tentatively
18 defined market “can identify and price differently to those buyers (“targeted
19 buyers”) who would not defeat the targeted price increase by substituting to other
20 products.” When this situation arises, the tentative market has been defined too
21 broadly, and must be divided to recognize “targeted buyers,” whether identified
22 by location, by the nature of their use of the product, or by membership in an
23 identifiable group of buyers.

1 **Q. HOW DOES THE POSSIBILITY OF PRICE DISCRIMINATION**
2 **AFFECT THE MARKET DEFINITION YOU HAVE JUST DESCRIBED?**

3 A. As I discussed above, market definition in the presence of price discrimination
4 must treat as separate markets those groups of “targeted buyers” who cannot
5 effectively avoid a “targeted price increase by substituting to other products.”
6 *HMG 1.12 Product Market Definition in the Presence of Price Discrimination.*
7 The price difference between small business customers and residential customers
8 receiving essentially identical service is a classic example of this form of price
9 discrimination.

10 The FCC specifically directs state commissions to recognize, for market
11 definition purposes, that “competitors often are able to target particular sets of
12 customers.” *Triennial Review Order*, n. 1539, interpreting accompanying text at
13 ¶ 495. CLECs provisioning their own switches can, and do, target business
14 customers, even to the exclusion of residential customers. This is partly because
15 the characteristics of business customers, even very small ones, are different than
16 residential customers, suggesting differences in CLECs’ abilities to serve these
17 different groups of customers – a factor this Commission must consider in
18 defining markets. Further, because of the long-standing ILEC practice of
19 targeting business customers for higher rates than residence customers, CLECs
20 can also target this group and price differently. The customer class distinction
21 was upheld in the 96-98 First R&O with regard to resale (962) and in the UNE
22 Remand Order (*Triennial Review Order* ¶126).

1 While the Commission need not find that residential and small business
2 customers constitute separate markets, it must recognize that the provision of
3 local exchange services to small businesses – where relatively high revenues per
4 customer and a relatively low number of customers are the rule -- differs from the
5 provision of local exchange services to residential customers, where the average
6 revenue per customer is lower and where a much larger number of customers is
7 involved. In particular, evidence that a CLEC is providing switch-based services
8 only to small business customers, without also providing services to residential
9 customers -- should not be taken as evidence that residential customers would
10 have access to competitive alternatives in the absence of UNE-P.

11 **IV. THE CLEC'S DEPLOYMENT DECISION (ORDER NO. PSC-03-1265-**
12 **PCO-TP, ISSUE 5)**

13 **Q. PLEASE DESCRIBE THE CONSIDERATIONS THAT ENTER INTO A**
14 **CLEC'S DECISION TO DEPLOY SWITCHING FACILITIES.**

15
16 A. To determine whether to enter a particular market using UNE-L, a CLEC must
17 first assess the operational barriers. A CLEC obviously will not even consider
18 making the substantial investment involved in UNE-L service until it is persuaded
19 that available systems are sufficient to provide the service, and until it is able to
20 evaluate the costs involved in overcoming operational barriers.

21 The most substantial of these operational barriers are analyzed in the
22 testimony of James Webber and Sherry Lichtenberg submitted in this proceeding.
23 As detailed in that declaration, the operations support systems ("OSS") required
24 for processing CLEC orders for UNE loops are significantly more complex than
25 those required for UNE-P orders, and the prospect of shortcomings in those

1 systems impose great risks on the revenues and costs that enter into the feasibility
2 of deploying facilities for UNE-L based service. Whereas UNE-P orders can be
3 handled electronically, with no rearrangement of physical components of the
4 network required, an order to change a customer's service from the ILEC to a
5 UNE-L based CLEC requires orders to (1) disconnect the customer's loop from
6 its termination on the ILEC's switch and connect that loop to CLEC equipment in
7 its collocation space, (2) change the customer's record in the number portability
8 database to reflect that the customer's number is now associated with the CLEC's
9 switch, and (3) update 911 and 411 records. Additional internal CLEC processes
10 are required to establish connectivity from the collocation space to the CLEC's
11 switch, and to establish the customer's service within the CLEC's switch and in
12 its billing systems.

13 Further, it is critical that these processes be closely coordinated. Failures
14 of coordination can lead to disruption to the customer's telephone service. It is
15 likewise critical that the operations support systems in place to process these
16 orders be reliable and predictable, and that they be scalable to allow for a large-
17 scale transition of customers from UNE-P to UNE-L based service, and to handle
18 subsequent migration of customers among competing carriers. In addition to the
19 costs incurred to ensure that this process works smoothly, a CLEC considering
20 self-deployment of switching facilities will evaluate the possibility of failures in
21 operational coordination, and the risks associated with such failures.

22 The cost of these systems and the risk that such costs may not be
23 recoverable constitutes a substantial barrier to entry. Some of these systems, such

1 as systems for tracking the assignment of transport trunks and systems for
2 entering customer records into CLEC switches, will be related to the CLEC's
3 overall operations, and will be usable in each geographic market that the CLEC
4 decides to enter. The cost of other systems, such as interfaces to the number
5 portability and 411 and 911 databases, may vary from region to region. In
6 making its evaluation of the profitability of a UNE-L based local service, the
7 CLEC will consider whether its potential customer base, both nationally and in
8 specific geographic markets, is sufficiently large that the CLEC can reasonably
9 expect to recover the costs of developing and implementing its operational
10 support systems.

11 **Q. HOW ARE OPERATIONAL BARRIERS CONSIDERED IN YOUR**
12 **ECONOMIC FEASIBILITY ANALYSIS?**

13 A. In the analysis that follows, I assume that these operational barriers all are
14 overcome. My understanding, however, is that many of these barriers have not
15 been overcome, and that this assumption is counter-factual. I stress, therefore,
16 that unless and until these operational issues have been addressed both as a
17 technical matter and as a cost matter (that is, that the costs of addressing these
18 operational barriers is accounted for in some competitively neutral manner), no
19 further analysis is necessary – if UNE-L service cannot be provided in a way that
20 meets the consumers' legitimate demands for high-quality service, any rational
21 carrier would be extremely unlikely to make the investment necessary to provide
22 that service. Moreover, even if these issues have been addressed sufficiently to

1 permit entry, the CLEC will have to take any remaining difficulties into account
2 in assessing the risk of entry.

3 **Q. APART FROM OPERATIONAL BARRIERS, WHAT OTHER**
4 **CONSIDERATIONS INFLUENCE A CLEC'S DECISION TO ENTER**
5 **THE MARKET?**

6 A. In order to come to a decision to enter a particular market, the CLEC must
7 conclude that it has a reasonable prospect of obtaining sufficient revenue from its
8 customers both to defray its operating expenses and to recover any investments
9 that it must make to enter the market. In other words, the CLEC must determine
10 that it will make a profit taking into account likely revenues and costs. The CLEC
11 must also take account of the risks that it will not make a profit despite its best
12 estimate that it will. The greater the uncertainty of entry, the less likely the CLEC
13 is to enter.

14 The economic calculus may differ between the “hypothetical efficient
15 entrant” that does not already have some investment in network facilities and in
16 its establishment of collocation facilities to serve a particular wire center and an
17 actual carrier, such as MCI, that may already have some sunk investment in place.
18 The *Triennial Review Order* requires analysis of a generic hypothetical efficient
19 entrant, which is the construct underpinning the analysis that follows. *Triennial*
20 *Review Order*, at ¶ 517. In a subsequent section, I will address certain issues
21 relevant to a carrier with sunk investments.

1 **Q. PLEASE PROVIDE AN OVERVIEW OF YOUR ANALYSIS OF THE**
2 **FEASIBILITY OF POTENTIAL DEPLOYMENT.**

3 A. My analysis separately assesses costs and revenues in order to determine whether
4 entry in a particular wire center is likely to be profitable under a variety of
5 scenarios. The scenarios are used to determine the likelihood of profitability.

6 In order to assess cost of entry using a UNE-L strategy, I used an
7 analytical tool adapted from a model constructed by Dr. David Gabel on behalf
8 of the National Regulatory Research Institute. Dr. Gabel's model, while quite
9 detailed and comprehensive, did not consider several aspects of the cost problem
10 facing the CLEC. The model has been extended to provide flexibility to consider
11 a wide range of services, including services for small business, services for large
12 enterprise customers, and ADSL services provided both to residential and
13 business customers. The structure of the model also was modified to permit a
14 very granular analysis of the individual cost components that contribute to the
15 total per-line and total per-wire center costs faced by the CLEC. A number of
16 different scenarios are considered, including virtual, cageless, and caged
17 collocation options, and unbundled dedicated transport, special access, and EEL
18 transport options. Among these options, the impairment analysis tool chooses the
19 least-cost combination of options, and compares the cost of providing a range of
20 services with the revenues derived from customers for those services in order to
21 calculate the net revenue available to a CLEC contemplating facilities-based entry
22 into each wire center.

1 A. **CLEC Costs**

2 **Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR TESTIMONY?**

3 A. In this section I will describe the costs that a CLEC would incur to obtain
4 switching to support entry under a UNE-L strategy. I will also describe which of
5 these costs are fixed and sunk, and which of these costs provide the ILEC with a
6 cost advantage over the CLEC.

7 I begin by describing those costs that are identical (or similar) for a CLEC
8 and ILEC. I then describe those costs that a CLEC would incur that an ILEC
9 would not incur. To do this, I will compare the processes that the ILEC and
10 CLEC must undertake to connect the exact same loops to their switches. It will
11 be readily apparent that it costs the CLEC a great deal more than it does the ILEC
12 to connect the loop to the switch, greatly raising the CLEC's costs. This is
13 important, because, as explained above, it is well recognized that cost differences
14 can be an important barrier to entry. *Triennial Review Order* ¶¶ 87-90 (barriers
15 include scale economies, first-mover advantages and absolute cost disadvantages).
16 I also describe which costs are sunk, as sunk costs can pose a particularly
17 formidable barrier to entry. *Id.* ¶ 88. Finally, I'll describe in general terms the
18 calculations that the analytical tool performs in estimating the costs that will be
19 considered by a CLEC considering the deployment of facilities to offer service on
20 a UNE-L basis.

21 **Q. WHAT CATEGORIES OF COSTS MUST BE CONSIDERED?**

22 A. The broad categories of cost to be considered are loops, switches, the connection
23 between the loop and the switch, collocation of the CLEC's facilities in the

1 ILEC's wire center, the cost of digitization, concentration and aggregation,
2 transport to the CLEC's switch, and the cost of cutting over the loops. As a rule, I
3 estimate TELRIC costs.

4 **Q. WHY IS IT APPROPRIATE TO USE TELRIC COST ESTIMATES?**

5 A. The TELRIC standard has been designed to estimate the cost that would be
6 incurred by an efficient carrier serving the relevant demand in the relevant
7 market, using the most efficient currently available technologies and methods. As
8 such, it comports with the FCC's directive that, in considering potential
9 deployment of switching and transport facilities, the cost that would be faced by
10 an efficient carrier be considered.

11 **Q. PLEASE DISCUSS YOUR TREATMENT OF THE COST OF LOOPS.**

12 A. The cost of loops used in the model is the rate established by this Commission in
13 each of the three UNE rate zones. Thus, for each wire center the UNE rate
14 applicable to the rate zone to which the wire center is assigned is the cost to the
15 CLEC of providing the loop portion of local exchange service. In addition, the
16 cost of interconnection between the ILEC's facilities and the CLEC's collocation
17 space, or to Enhanced Extended Loop ("EEL") facilities is considered.

18 **Q. PLEASE DISCUSS THE COST OF SWITCHES.**

19 A. A CLEC evaluating the possibility of deploying facilities to provide UNE-L
20 service must consider the cost of the switch. Switches are readily available from
21 the various switch manufacturers as well as in secondary markets. Unlike many
22 of the other costs faced by the CLEC, the cost of the switch is predictable and
23 consistent (for any given level of demand) for all geographic markets that the

1 CLEC might contemplate entering. And, although much of the price of a switch
2 constitutes a fixed cost, since it is necessary to purchase an entire switch
3 processor and switch matrix to serve even one customer, it is not a sunk cost. (As
4 discussed below, however, the cost of installing and configuring the switch may
5 be a sunk cost.) For these reasons, the purchase of the switch itself does not in and
6 of itself constitute an insuperable entry barrier.

7 Although local exchange switches are readily available and can be rapidly
8 deployed, the CLEC must evaluate, on a market-by-market basis, whether the
9 potential customer base is sufficiently large that the costs that are sunk in
10 installing and configuring a switch may reasonably be expected to be recovered.
11 Parts of modern switches (*e.g.*, line units and line cards) are designed to be
12 scalable to customer demand; thus, the corresponding portion of the cost of
13 switches is variable with respect to the number of customers served.
14 Nevertheless, there may still be significant sunk costs incurred before the first
15 customer can be served. These costs include engineering costs; the costs of
16 purchasing, transporting, and installing the switch; the costs of acquiring space to
17 house the switch and to supply it with power, climate control, and necessary
18 testing equipment.

19 In the impairment analysis tool found in Exhibit MTB-2, I use the default
20 values for per-port switching investment presented by Dr. Gabel in his CLEC
21 cost model as the input for the CLEC's switching cost. I would note that the
22 switch investment inputs used in the Gabel model result in a per-line monthly cost
23 roughly the same as the unbundled local switching rate established by this

1 Commission. By using a per-line investment input (with a simple mark-up for
2 land and building investments and other ancillary costs), I have ignored any
3 economies of scale that may be present in provision of the switching function. In
4 effect, I am assuming that CLEC customers can be served by a switch located in
5 such a way as to take full advantage of economies of scale in switching, without
6 regard to the actual location of those customers. This approach obviates any
7 concern that my wire-center market definition might be too narrow to allow the
8 CLEC to take advantage of pertinent economies of scope and scale in switching.

9 **Q. PLEASE DISCUSS THE COST OF THE CONNECTION BETWEEN THE**
10 **LOOP AND THE CLEC SWITCH.**

11 A. In addition to the costs of the loop and the switch, the CLEC must incur
12 substantial costs to connect the leased loop to its switch – costs that the ILEC
13 does not have to incur. These costs will vary for every wire center. These costs
14 include the cost of establishing the collocation space and equipping that space
15 with the necessary electronics to terminate purchased UNE loops, and the cost of
16 establishing transport facilities to carry customer traffic from each collocated
17 ILEC wire center to the CLEC’s switch location. In both instances, the costs
18 include non-recurring charges by the ILEC for establishing collocation and
19 transport arrangements, as well as costs incurred by the CLEC for engineering
20 and purchasing loop termination and transport equipment. These costs too are
21 both sunk and fixed costs. Moreover, they are costs that are not incurred by the
22 ILECs. In what follows, I describe the costs in more detail.

1 Voice telephone service has traditionally been provided by connecting a
2 customer's premises to the ILEC's central office with a twisted pair of copper
3 wires (i.e., the local loop). The local loop terminates in the central office on a
4 Main Distribution Frame ("MDF"). The local loops terminate on one side of the
5 frame, the "customer facing side." On the other side of the frame – the "network
6 facing side," short wires (referred to as "jumper wires") connect to ports on the
7 ILEC's switch. This configuration allows for easy and flexible connections
8 between loops and the local switch. The connection between the local loop and
9 the ILEC switch consists of a single jumper wire, running from 15 to 100 feet in
10 length. The cost of providing this jumper wire is very small, probably on the
11 order of 2¢ a month.

12 This simple, inexpensive connection to the ILEC's switch is possible
13 because the local network architecture was specifically designed and engineered
14 to permit efficient and economical loop access to a monopoly local carrier. The
15 placement of ILEC central office, and the configuration of the wires that connect
16 these offices to the homes and businesses they serve, was based in part on
17 engineering considerations. The ILECs' networks were designed to limit the
18 length of most copper loops to 15,000 to 18,000 feet, to avoid having to add
19 equipment to enhance the quality of the voice signal. Outside of rural areas, this
20 allowed the ILECs to deploy switches that were sufficiently large to take
21 advantage of scale economies.

22 To provide comparable service, the CLEC offering UNE-L service must
23 substitute for this jumper wire a much more complex physical connection

1 between the MDF and its own switch. This is so because the CLEC switch will
2 never be located as the ILEC switch is, 15-100 feet from the ILEC main
3 distribution frame. It would be economically impossible for a CLEC to install a
4 switch of its own at or near each ILEC central office, because those CLEC
5 switches would serve too few customers to be cost-effective. Neither is it
6 possible to collocate Class 5 switches in the existing ILEC offices, both because
7 of space limitations and because existing rules do not permit it. Hence, unlike the
8 ILEC, the CLEC cannot use an inexpensive 100-foot copper jumper to connect
9 the local loop to its own switch. Rather, a CLEC must locate its switches in
10 central locations and transport the traffic from the loop to that centralized
11 location.

12 That transport involves a great deal more than simply connecting a very
13 long jumper wire to connect the loop to the CLEC switch, for two reasons. First,
14 for technical reasons, the signal would be unlikely to survive this form of
15 transport to the distant CLEC switch. Second, even if this technical limitation
16 were ignored, it would be very costly and inefficient to run so many wire pairs
17 from the various central offices the entire distance to the CLEC's centralized
18 switch.

19 Instead of a connecting a simple jumper cable, the network operations
20 necessary for CLECs to connect UNE loops to CLEC switches involve four
21 stages. First, the CLEC must rent space in the ILEC's central office to
22 "collocate" its own network equipment. Second, the CLEC must purchase and
23 install electronic equipment in the collocation space that converts the analog loop

1 signal into a digital signal, and at the same time aggregates and concentrates
2 multiple loops into more efficient copper or fiber transmission facilities. Third,
3 the CLEC must purchase or construct transport facilities to carry the traffic to its
4 switch location. Fourth, when all of these connections are established, the ILEC
5 and CLEC must coordinate a “cut over” of the loop from the ILEC’s main
6 distribution frame to the “POTS bay” at the CLEC’s collocation space. I will
7 describe each of these processes and discuss the type and nature of the costs
8 involved in each step. The FCC recognized that an analysis of each of these costs
9 is important to determine whether entry is economic. *Triennial Review Order*, ¶¶
10 481, 484 n. 1497, 520.

11 **Q. PLEASE DESCRIBE THE COST OF COLLOCATION.**

12 A. The first thing a CLEC must do to provide UNE-L telephone service is to obtain
13 collocation space at the ILEC central office at which the customer’s loop
14 terminates. Collocation is basically the rental of a small portion of central office
15 space. There are three forms of collocation—(1) physical, caged collocation, (2)
16 physical, cageless collocation, and (3) virtual collocation. Physical collocations
17 are space assigned within an ILEC central office in which a CLEC can deploy its
18 own hardware and equipment. This space is generally caged (*e.g.*, enclosed by
19 meshed wire), to provide security. In physical, cageless collocation, a CLEC is
20 generally assigned space in the ILEC’s common equipment room where the
21 CLEC can deploy its own equipment, but this space is not enclosed. In virtual
22 collocations, CLECs purchase equipment; however, the ILEC takes ownership of
23 the equipment (and responsibility for maintenance) and installs the hardware in

1 the ILEC's equipment lineup. The type of collocation selected by a CLEC is
2 often driven by the availability (or lack thereof) of space in a given central office.
3 Establishing the collocation involves a number of activities that will vary
4 depending on the type of collocation established.

5 **Q. PLEASE DESCRIBE THE ACTIVITIES INVOLVED IN ESTABLISHING**
6 **A COLLOCATION.**

7 A. In general, these activities include: (1) obtaining the necessary space in the
8 ILEC's central office; (2) engineering the collocation; (3) arranging with the
9 ILEC to provide the collocation (for physical caged collocations) as well as fire
10 protection, heating, ventilation and air conditioning ("HVAC") and power, or, in,
11 the case of a virtual collocation, to install the necessary equipment in ILEC-
12 controlled space; and (4) establishing and pre-wiring the "POTS bay," which
13 enables loops from the ILEC MDF to be connected to the CLEC's equipment at
14 the collocation. While the cost of each element of establishing or continuing in a
15 collocation arrangement is usually well defined by a tariff, Statement of Generally
16 Available Terms and Conditions ("SGAT"), or interconnection agreement,
17 determining the cost of collocation for a particular entry plan may be difficult and
18 subject to substantial uncertainty. For instance, for a "cageless" collocation, some
19 of the ILEC make-ready work is unnecessary. CLECs need to obtain direct
20 current ("DC") power and emergency power from the ILEC to operate collocated
21 equipment, and the nature of these arrangements can vary substantially. The
22 specific equipment needed to provide this functionality includes the battery
23 distribution fuse bay ("BDFB") and the DC power cabling that is extended from

1 the BDFB to the collocation arrangement. The BDFB is a large fuse bay or
2 junction point where a large feed of DC power from the ILEC's power plant is
3 broken down into smaller power units. The DC power cabling, consisting of
4 copper cables in protective sheaths, is necessary to complete a power circuit from
5 the BDFB to the collocation arrangement. In some cases, the CLEC may install
6 its own BDFB in the collocation arrangement. In cases where it does not, it will
7 usually install its own fuse and alarm panel in the collocation cage. Further, as
8 described in the Transport section below, in most situations, a second collocation
9 cage and transmission equipment are required to further aggregate traffic for the
10 purpose of efficiently "backhauling" traffic from ILEC central offices to the
11 CLEC's switch. It can cost the CLEC in the range of \$75,000 to \$150,000 to
12 establish a collocation, and up to several thousand dollars in monthly fees to use a
13 collocation. The impairment analysis tool calculates the cost of collocation by
14 considering the number and type of lines that must be connected from the ILEC's
15 main distribution frame and DLC systems to the CLEC's collocation space, and
16 calculates, based on the ILEC's UNE tariffs, interconnection agreements, or
17 SGATs, as appropriate, the cost not only of establishing and equipping the
18 collocation space, but also the cost of connecting individual customer lines from
19 the ILEC to the CLEC. Some of these costs are incurred as monthly recurring
20 costs, and are incorporated into the cost analysis directly as a monthly cost per
21 line. Other costs are incurred either as non-recurring charges imposed by the
22 ILEC, or are incurred by the CLEC as capital investment. In some cases, these
23 costs are treated as a one-time expense that is amortized over a user-adjustable

1 period of time. In other cases, particularly in the case of capital investments, the
2 asset is depreciated over an appropriate economic depreciation life, and the capital
3 carrying cost of the asset is included as a part of the monthly cost per line.

4 **Q. PLEASE DESCRIBE THE CHARACTER OF THESE COSTS AS SUNK,**
5 **FIXED, ETC.**

6 A. A substantial portion of collocation costs is fixed, i.e., there is a large cost
7 associated with providing service to the first UNE-L customer served. Moreover,
8 most of the up-front costs are sunk, which means they cannot be recovered if the
9 CLEC exits the market. As discussed in the *Order*, the existence of substantial
10 sunk costs creates a significant entry barrier, which has profound effects on UNE-
11 L competition.

12 **Q. PLEASE DISCUSS THE COSTS OF DIGITIZATION, CONCENTRATION**
13 **AND AGGREGATION.**

14 A. As a consequence of the CLEC's need to place its switch at a substantial distance
15 from the ILEC's wire center, in order for the CLEC to be able to carry the traffic
16 from its collocation space all of the way to its switch, it must install in its
17 collocation space equipment that digitizes and encodes the analog signals
18 delivered over the customers' loops to that collocation space. The equipment
19 used to perform this function is sometimes referred to as DS0 (that is, voice
20 grade) equipment infrastructure. This equipment includes DLC equipment, high
21 capacity digital cross-connection frames (DSX or DACS), power distribution and
22 remote test equipment.

1 The DLC equipment is the equipment that receives the analog
2 communications from the loop via the POTS bay and both digitizes and
3 concentrates the communication for transmission to the CLEC's switch.
4 Digitization of the analog signals from the loop is necessary in order to interface
5 the signal efficiently with the fiber optic transmission facilities that are used in
6 interoffice transmission paths. Concentration of the signal permits the CLEC to
7 more efficiently use interoffice transmission capacity. The DLC also
8 interoperates with the CLEC switch to provide and receive signaling necessary for
9 call supervision, including the provision of dial tone and ringing current, digit
10 reception and related functions.

11 The CLEC must also install other equipment at the collocation to provide
12 UNE-L service. A digital cross connection frame (or DSX-3) is needed to
13 connect the DLC and the transport facility. In addition, a CLEC needs to install
14 equipment that enables it to monitor its collocation equipment remotely, thereby
15 permitting the CLEC to maintain its equipment and to diagnose and subsequently
16 repair any service disruptions that may occur.

17 As in the case of the collocation costs, there are substantial fixed costs
18 associated with these functions. The largest costs are for the DLC equipment,
19 which even at its smallest size costs approximately \$20,000. This input, as well
20 as many of the other investment inputs used in the impairment analysis tool are
21 those proposed by Dr. Gabel in the original version of the NRRRI model. These in
22 turn were derived from a variety of industry sources, including the FCC's
23 synthesis model and various *ex parte* presentations made to the FCC by

1 representatives of both CLECs and ILECs. And even if a CLEC can utilize the
2 smaller DLC equipment efficiently, it will not be able to operate at the lowest
3 possible cost unless it can achieve sufficient volume to capture the scale
4 economies inherent in DLC technology.

5 The engineering and installation cost for these functions are sunk once
6 they are committed to a particular central office. The purchase prices of the DLC
7 and other equipment are not sunk with respect to the provision of service at a
8 particular location, because they could be moved elsewhere. Nevertheless, if the
9 CLEC were to exit the market entirely, it might have a hard time recovering
10 substantial portions of the equipment cost if UNE-L-based service failed to
11 succeed across much of the CLEC industry.

12 **Q. PLEASE DISCUSS THE COST OF TRANSPORT TO THE CLEC'S**
13 **SWITCH.**

14 A. Once the CLEC customers' signals have been prepared for transport to the CLEC
15 switch, the CLEC must arrange for transmission facilities to deliver traffic from
16 the collocation to its switch. In most cases, a CLEC will not be able to use its
17 own network facilities to connect the collocation to its switch because the traffic
18 volumes present at a given collocation are typically too low to afford the
19 economies of scale necessary to justify CLEC construction of transport facilities
20 solely for this purpose. Rather, the CLEC will use the ILECs' transport facilities
21 to connect its collocation either directly to its switch or to a "hub" location at
22 which traffic from several sub-tending collocations in the area are aggregated and
23 subsequently transported to the CLEC's switching location. Given appropriate

1 traffic volumes, this hub location may be connected to the CLEC's switching
2 office via the CLEC's own optical fiber transport facility. In either case, whether
3 purchased from the incumbent or self-provisioned by the CLEC, a CLEC must
4 procure transport facilities between its collocations and switching locations to
5 backhaul customer loops to its switch.

6 There are some sunk costs associated with providing transport for UNE-L
7 based local service. If the CLEC leases transport from the ILEC, there will be
8 sunk costs associated with any nonrecurring charges, term commitment plans, and
9 any costs associated with "grooming" circuits to handle increased and/or changed
10 traffic demand. If the CLEC has transport facilities already in place, then its costs
11 were sunk before it decided to provide UNE-L based local service.

12 The CLEC will face significant scale effects on transport leased from the
13 ILECs. Most transport tariffs provide substantial volume discounts, and unless
14 the CLEC has enough traffic to utilize a DS3 or higher circuit, it will pay a high
15 per unit cost for using DS1 circuits. Also, because transport circuits are provided
16 in "lumpy" amounts (for example a DS1 circuit can carry 24 voice grade circuits,
17 but the next larger size circuit, a DS3, carries 672 voice grade circuits), a CLEC
18 will be less likely to use transport facilities efficiently, the smaller its total
19 demand for transport.

1 **Q. PLEASE DISCUSS THE PROCESS AND COSTS ASSOCIATED WITH**
2 **CUTTING OVER THE LOOP SERVING A CUSTOMER CHOOSING TO**
3 **BE SERVED BY A UNE-L BASED CLEC.**

4 A. Once the necessary network infrastructure is in place, the CLEC is in a position to
5 connect individual customer loops to its collocation (and ultimately to its switch).
6 To accomplish this, the CLEC must arrange for what is typically referred to as a
7 coordinated hot cut. The hot-cut process involves multiple activities that require
8 coordination among both CLEC and ILEC personnel and includes, among other
9 things (1) physically moving the CLEC customers' loops from the ILEC MDF to
10 the POTS bay at the CLEC collocation and (2) coordinating the porting of the
11 customer's telephone number to the CLEC's switch so that calls dialed to the
12 customer's number can be properly completed. Once the hot-cut has been
13 successfully completed, a CLEC can then provide service to its end-user using its
14 own switch.

15 In calculating the costs a CLEC would have to pay the ILEC for a hot cut,
16 I used the rates established by this Commission for a hot cut. In calculating the
17 internal costs for a CLEC to oversee a hot cut, I assume that the CLEC will incur
18 costs of \$10.00 per line as a baseline input.

19 The cost of the hot cut required to serve a particular customer amounts to
20 an investment the CLEC makes to acquire the stream of revenue it expects from
21 that customer. As such, the investment loses its value entirely if the customer
22 switches to another provider. The CLEC must therefore recover this cost within
23 the period over which it can expect to retain the customer. Thus, the average

1 period over which a CLEC can expect to retain a customer is the appropriate
2 amortization period for customer acquisition costs, including hot cut costs. As
3 such, the average customer life, or retention period, is a crucial element of the
4 cost that a CLEC must evaluate in deciding whether to deploy facilities for UNE-
5 L service or not. This average customer life is conceptually related to the concept
6 of “churn” experienced by telecommunications even in a monopoly environment,
7 as customers enter and leave the provider’s serving area, and move from place to
8 place within the serving area. Estimates of churn can be significant in some
9 conventional cost studies, but churn in a monopoly environment is relatively
10 stable and subject to fairly reliable approximations. Very much to the contrary,
11 average customer life in a competitive environment depends on the nature of
12 competition. In this case, the competitive environment to be considered is the
13 environment after UNE-L based entry. While we have good reason to believe that
14 the character of competition will be significantly different after UNE-L based
15 entry – because a UNE-L competitor will have incurred greater sunk costs and
16 face much lower marginal costs than a UNE-P based competitor – the precise
17 character of that competition, and its implications for average customer life, must
18 remain subject to a great deal of uncertainty. While conventional economic
19 models are available to approximate market prices, hence expected revenues after
20 entry, conventional economic modeling has little to say about the likely dynamics
21 of competition after entry. This uncertainty is relevant, not only to the present
22 modeling exercise, but to the CLEC’s evaluation of risk associated with potential
23 deployment of facilities to support UNE-L based service.

1 **Q. PLEASE DISCUSS THE OTHER IMPORTANT INPUTS TO THE TOOL.**

2 A. As I noted earlier, many of the inputs used in the impairment analysis tool are
3 those proposed by Dr. Gabel in the original version of the model he developed.
4 Where additional inputs were needed in connection with services or collocation
5 elements not considered in Dr. Gabel's model, a variety of sources were
6 consulted, including prominently the HAI Model and the HAI xDSL Adjunct
7 Model. The sources of the inputs used in the model are documented within the
8 model itself, in the form of comments attached to the description of each input
9 cell. Most of the costs we have described in this section are both sunk and fixed.
10 It is difficult, if not impossible, for the CLEC to recover these costs from anyone
11 other than the customer who ordered the service. Also, because the ILEC does
12 not incur most of these costs to serve its embedded base, these costs fall within
13 the classic definition of an entry barrier: namely, a sunk cost that the incumbent
14 never had to incur.

15 **Q. PLEASE DESCRIBE THE IMPAIRMENT ANALYSIS TOOL'S**
16 **CALCULATIONS.**

17 A. The analysis tool is organized as a set of four worksheets that provide inputs to its
18 calculations, a number of worksheets that calculate various cost components, and
19 two (or three) worksheets that summarize its calculations. Inputs are contained on
20 the worksheets entitled "Inputs," "Tariff Tables – FL," and "WC Inputs." The
21 "WC Inputs" worksheet contains detailed information on each wire center in the
22 ILEC's operating area, including the number of lines in each of several service
23 categories, and the distance from the wire center to a CLEC switch assumed to be

1 located near the largest ILEC switch in each LATA. The “Tariff Tables –FL”
2 worksheet contains detailed information on the rates charged by the ILEC for all
3 aspects of collocation and interconnection arrangements. This information was
4 compiled by MCI and provided to me for use in this model. Finally, the “Inputs”
5 worksheet contains a large number of user-adjustable assumptions that are used in
6 the analysis tool to calculate costs. These include the assumed market share
7 captured by a single CLEC for each of several services, estimates of CLEC
8 internal costs for activities such as accepting hot cuts and customer acquisition
9 and retention, and estimates of the purchase price of various items of equipment
10 required by the CLEC in providing UNE-L based local exchange service,
11 including DLC equipment, switches, DSL-related equipment, and digital cross-
12 connect equipment.

13 Several worksheets perform calculations relating to the costs of
14 establishing and operating a collocation space in each wire center. This includes
15 all recurring and non-recurring costs incurred in establishing the collocation
16 space, the costs of interconnection between the ILEC’s loop facilities and the
17 collocation space, and the capital costs incurred by the CLEC in equipping the
18 collocation space. The analysis tool develops costs in each worksheet for virtual
19 collocation, cageless collocation, and caged collocation. In addition, the
20 worksheets calculate the cost of concentration and cross-connection equipment
21 located in the ILEC wire center where EEL transport is used by the CLEC. These
22 worksheets are:

- 1) "Collocation" – which calculates the collocation costs associated with voice grade residential and small business services;
- 2) "ADSL Collocation" – which calculates the combined collocation costs associated with voice grade services as well as ADSL services for residential and small business customers, and;
- 3) "DS1-DS3 Combined Collocation" and "DS1-DS3 Only Collocation" which calculate the collocation costs associated with the provision of DS1 and DS3 services in combination with voice grade and ADSL services, and collocation costs associated with the provision of DS1 and DS3 services only, respectively.

Another set of worksheets performs calculations relating to the costs of acquiring transport facilities in order to carry traffic from each ILEC wire center to the CLEC's switch or hub. A number of possible scenarios are considered, including DS1 and DS3 unbundled dedicated transport, DS1 and DS3 special access transport, and EEL transport. For each form of transport, the non-recurring and recurring charges imposed by the ILEC for cross-connection, multiplexing and transport fixed and per-mile components are calculated, and non-recurring charges amortized as appropriate to produce a monthly per-line cost for each scenario. These worksheets are:

- 1) "Transport" – which calculates the transport costs associated with voice grade services for residential and small business customers;

1 2) “ADSL Transport” – which calculates the transport costs associated
2 with voice grade services as well as ADSL services for residential and
3 small business customers, and;

4 3) “DS1-DS3 Transport” – which calculates the cost of transport
5 associated with DS1 and DS3 services.

6 A final set of worksheets is used to summarize the outputs of the
7 collocation and transport worksheets and to select a least-cost alternative. These
8 worksheets are:

9 1) “Minicost” – which summarizes collocation and transport costs
10 pertaining to voice grade services for residential and small business
11 customers;

12 2) “Minicost ADSL” – which summarizes the collocation and transport
13 costs pertaining to voice grade services combined with ADSL services
14 for residential and small business customers, and;

15 3) “ADSL Increment” – which determines the additional costs incurred
16 as a result of a decision to offer ADSL services and restates those
17 results as a per-DSL line cost.

18 Finally, the results of the calculation worksheets are summarized in the
19 worksheet “Summary Calcs.” This worksheet brings together the results of the
20 various collocation, transport, and hot cut worksheets and, for each type of
21 customer calculates the monthly cost per line and the total monthly cost. The
22 results are presented for each transport type. The analytical tool determines
23 whether the least-cost alternative is to configure transport facilities as DS1 or DS3

1 facilities, and selects the least-cost alternative among the various collocation
2 types. These costs are compared to the monthly per-line revenues for each service
3 type, and a total net revenue per line per month and a total net revenue per month
4 is calculated for each service type for each wire center. As a final step, the “best
5 case” is presented for the CLEC, choosing among the various transport and
6 collocation options.

7 While ADSL costs and revenues are calculated for each wire center, the
8 ADSL service is included in the net revenue and “best case” results only where
9 the net revenue for ADSL is positive. In some wire centers, where very few
10 ADSL customers are available to the CLEC, the cost of the transport facilities
11 needed to support the service cannot be justified given the available revenues. In
12 such cases, it assumed that the CLEC would decide not to offer ADSL services to
13 customers in that wire center.

14 A final summary worksheet – “Summary” – compiles information
15 computed in the “Summary Calcs” worksheet and permits analysis of the
16 variation in profitability among wire centers given variations within a range of
17 inputs to the impairment analysis tool. As I have previously explained,
18 considerable uncertainty must attend any analysis of the dynamic competitive
19 situation that will be faced by a CLEC attempting to provide local service using
20 its own switching facilities. Accordingly, the impairment analysis tool is
21 designed to present a range of possible outcomes. Any two wire centers can be
22 entered into the worksheet for comparative analysis. Six of the most important
23 inputs to the analysis tool are shown on the worksheet and, for each, a range of

1 possible variation is provided. A button on this electronic worksheet – “Generate
2 Random Scenarios” – activates a macro procedure that populates the analytical
3 tool input with random numbers within the specified range, calculates the result
4 for 100 random scenarios, and presents the results graphically as a histogram
5 showing the net revenue for each of the two wire centers. This permits a view of
6 the range of possible outcomes in each wire center, with the most likely outcomes
7 represented by the net revenue categories with the highest frequency.

8 ***B. Anticipated Revenues***

9 **Q. PLEASE PROVIDE AN OVERVIEW OF THE PROCESS YOU USE TO**
10 **ESTIMATE REVENUE.**

11 A. First, it should be clear that the revenue estimate that is relevant to a CLEC
12 considering potential deployment will be the revenue the CLEC expects to
13 recover in the market as it will exist after UNE-L based competition has become
14 established. Thus, an appropriate estimate of revenue to evaluate potential
15 deployment is an estimate of future revenue in a different competitive
16 environment than exists today. My judgment as to a reasonable estimate begins
17 with existing prices, and is informed by simulations based on two widely used
18 models of competitive interactions. These models are based on the costs faced by
19 the ILEC and the CLECs, differentiating among costs that are fixed, sunk, or
20 marginal, and specifying the nature of consumer demand for local exchange
21 service. After forming estimates of costs and revenues that may obtain after
22 deployment of facilities for UNE-L based provision of service, a CLEC
23 considering potential deployment would compare future net revenues to the initial

1 cost of entering the market; my calculation mimics the CLEC's investment
2 decision.

3 **Q. YOU STATED THAT REVENUE PROJECTIONS SHOULD BE BASED**
4 **ON FUTURE REVENUES UNDER A DIFFERENT COMPETITIVE**
5 **REGIME. PLEASE EXPLAIN.**

6 A. To determine whether to serve a market using UNE-L, the CLEC must consider
7 not only its costs, it must also consider the likely revenues from the services it
8 offers, including all categories of potential revenues. *Triennial Review Order ¶¶*
9 484-85. Economic theory predicts that a CLEC will enter and compete against
10 the ILEC only if the CLEC can expect to earn sufficient profits post-entry to
11 enable it to earn an adequate return on the cost of the capital that it must commit
12 to enter the market, recognizing the risk associated with the investment. Given
13 the CLEC costs discussed above, and given the retail rates the competitor will be
14 able to charge, the competitor may or may not be able to recover the costs it
15 would have to incur to enter the market in the first place, in addition to the
16 incremental cost of providing service.

17 In other words, before it enters a market, a competitor would need to
18 understand its costs, estimate the revenue it would expect to receive, and
19 determine whether entry would be profitable. Its revenue projections would be
20 based on the rates it could charge, accounting for the effect of entry on
21 competition, and the number of customers it expects to purchase its services.
22 And, its rates are highly dependent upon the rates the other market participants
23 would charge for substitutable services. The CLEC's price must be competitive

1 with the ILEC's if the CLEC is to be successful. A CLEC considering potential
2 deployment cannot rationally assume it will be able to charge \$40 for phone
3 service in the BellSouth region if BellSouth is likely to respond to entry by
4 offering a similar service for \$35.

5 **Q. IS IT REASONABLE TO BEGIN YOUR ANALYSIS OF ANTICIPATED**
6 **REVENUE WITH THE ILEC'S EXISTING RATES?**

7 A. Yes, but only as a starting point. The ILEC's existing rates represent the highest
8 conceivable rates that a CLEC might hope to charge after entry, and for reasons
9 discussed below, it is not really plausible that those rates could be maintained
10 after UNE-L competition becomes established.

11 Because a new entrant must generally offer rates that are no higher than
12 those currently charged by the incumbent, existing retail rates are an optimistic
13 starting point for any analysis of anticipated CLEC revenue. But, analysis of
14 existing rates is only the starting point. Firms contemplating entry into new
15 markets rationally base their entry analysis on the prices they expect will prevail
16 after they enter, and not on current prices. This proposition is widely accepted in
17 industrial organization economics, and the FCC understood it to be an important
18 factor in an impairment analysis. *Triennial Review Order* ¶ 88 (“an entrant that
19 knows that an incumbent LEC has incurred substantial sunk costs may be
20 disinclined to enter a market because the incumbent LEC is likely to drop its
21 prices, possibly to levels below average cost, in response to entry). See also *id.* ¶
22 75 n. 250, ¶ 83; 157 (“telecommunications prices are not static, and will change
23 over time in response to increased competition.”) Consideration of post-entry

1 prices in calculating potential revenue is particularly important in the case at hand
2 because the entrant (or entrants) will be adding new capacity to a market (new
3 switches and new transport); unless other firms are willing to watch their facilities
4 operate well below capacity, prices will have to fall, following the well
5 understood rules governing supply and demand. Because there is no reason to
6 believe that other firms in the market will act unilaterally to reduce output to fully
7 offset the increase in capacity by the new entrants, prices certainly will fall unless
8 the firms in the market collude to constrain capacity.

9 **Q. ARE THERE REASONS SPECIFICALLY RELATED TO A TRANSITION**
10 **FROM UNE-P COMPETITION TO UNE-L COMPETITION THAT**
11 **SUGGEST LOWER PRICES AFTER ENTRY?**

12 A. Yes. There are two reasons related to marginal costs of the ILEC and CLECs that
13 strongly suggest price reductions as UNE-L competitors become established and
14 replace UNE-P competitors. First, the costs of providing UNE-P service largely
15 take the form of monthly charges for the required UNEs. These costs are not
16 fixed or sunk costs, but vary with the number of customers served. These variable
17 or marginal costs create a floor, below which a UNE-P competitor will never
18 allow price to fall. If the UNE-P competitor cannot recover its marginal costs,
19 which comprise the bulk of its costs, it will not offer service. On the other hand, a
20 UNE-L competitor faces a substantially different cost structure. For a UNE-L
21 competitor, a large portion of costs is sunk, and the marginal costs, those that vary
22 with the number of customers served, comprise a smaller fraction of total costs.
23 Thus, once the initial costs of entry have been “sunk” into the business, a UNE-L

1 competitor will be willing to reduce price down to its lower marginal cost in order
2 to acquire or retain customers. The urgency of covering the sunk cost of entry,
3 which can only be accomplished by having customers that contribute something,
4 even a small amount, above marginal cost, creates a competitive environment that
5 is much more likely to involve substantial price reductions, than is the
6 environment of UNE-P competition. So, under UNE-L competition, the CLECs
7 face lower marginal costs and are under pressure to recover sunk costs by
8 increasing volume.

9 When UNE-L competition becomes established, the ILEC also has a
10 stronger incentive to win, or retain, a customer instead of having that customer
11 served by a competitor. This is the case because the ILEC receives revenues
12 related to a customer in two forms: If the customer chooses the ILEC at the retail
13 level, the ILEC receives the retail price the customer pays for service. If the
14 customer chooses a CLEC at the retail level, the ILEC still receives revenue for
15 this customer, in the form of wholesale UNE revenue from the CLEC chosen by
16 the end user customer. But the ILEC receives more UNE revenue from a UNE-P
17 customer than from a UNE-L customer, as the UNE-P customer pays the ILEC
18 for both switching and loops. In other words, the ILEC is worse off when a
19 customer leaves it for a UNE-L CLEC than for a UNE-P CLEC and has a greater
20 incentive to win the customer back. As a result, the ILEC is likely to cut prices
21 further in the face of UNE-L competition than UNE-P competition.

22 Finally, as the market matures, CLECs' offerings should come to be
23 regarded as closer and closer substitutes to the traditional ILEC's offerings. In the

1 early days of competition consumers' lack of familiarity with CLECs' services
2 provides a source of product differentiation that leads to a less rigorous form of
3 competition. As the different providers' offerings come to be regarded as
4 perfectly good substitutes for each other, price takes on greater importance as the
5 locus of competition, and entrants must anticipate corresponding reductions in
6 market price. Potential entrants will also have to consider whether other firms
7 will also enter the market at the same time that they do. More entry, at least when
8 there are few firms in the market, generally will result in more aggressive price
9 competition and lower market prices, which further reduces the post-entry profit
10 margins of the entrants (as well as of the incumbent).

11 **Q. BEYOND THE RELATIVELY SIMPLE NOTION OF "MARKET PRICE,"**
12 **WILL POTENTIAL ENTRANTS CONSIDER OTHER FACTORS?**

13 A. Yes. A CLEC must consider what the prices are likely to be for particular types
14 of customers in particular geographic markets. The revenue a CLEC is likely to
15 earn is strongly affected by the ability of the incumbent to cut prices selectively in
16 response to entry. The more the incumbent can fine tune its prices and target only
17 those customers (by geographic area or other marketplace characteristic) where
18 entry has occurred or is threatened, the lower the cash flows an entrant can expect.
19 When the incumbent has greater ability to price discriminate, it has a greater
20 incentive to cut prices in response to initial, small-scale entry. The reason is that
21 the incumbent does need not to lose profits by "unnecessarily" cutting prices to
22 customers who have no competitive alternatives.

1 **Q. WOULD SUCH SELECTIVE PRICE CUTTING AMOUNT TO**
2 **PREDATORY PRICING?**

3 A. Not necessarily. It is important to recognize that the incumbent does not need to
4 set prices at predatory levels to deter future entry. The conventional definition of
5 predatory pricing defined it as pricing below variable or marginal cost, with the
6 intention of driving competitors out of the market. In a case where entry requires
7 substantial fixed and sunk costs and the incumbent can target price reductions,
8 however, the incumbent can set prices at a level at which the entrant can recover
9 its variable costs, but will not be able to recoup its sunk costs. In that situation,
10 while the entrant will remain in the markets to which it already has committed, it
11 will not recover its sunk costs in those markets, and will learn not to enter new
12 markets and challenge the incumbent.

13 Once the CLEC has estimated the price the ILEC likely will charge for
14 services when faced with competitive entry, the CLEC must consider the extent to
15 which it will be required to offer service at a discount from whatever price the
16 ILEC is willing and able to charge, or incur the cost of developing additional
17 features to differentiate their product, in order to take business away from the
18 incumbent. Customers cannot be expected to switch from the incumbent to the
19 new entrant simply because the new entrant has entered the market. New entrants
20 can only obtain customers from incumbents by pricing their services below the
21 level of the incumbent's prices or by offering distinctive services at a higher cost.
22 At lower prices, all else equal, the entrant will earn lower margins (i.e., will
23 receive less cash flow) from each of its customers than will the incumbent. The

1 higher costs associated with product differentiation likewise will result in lower
2 margins for the new entrant.

3 **Q. HOW DO YOU FORM AN OPINION AS TO THE EXTENT OF PRICE**
4 **AND REVENUE REDUCTIONS A CLEC WOULD PROJECT IN**
5 **EVALUATING POTENTIAL ENTRY ON A UNE-L BASIS?**

6 A. In addition to observing the nature of competition now in progress, I consider two
7 formal models of the process in which prices change as a result of competitive
8 entry. That is, it is possible to show how an ILEC, seeking to maximize its
9 profits, will adjust its rates in response to competition from a new entrant. And, it
10 is equally possible to show the prices that CLECs would charge in response, so
11 that they too would maximize profits. It is then possible to calculate the revenue
12 the competitor would receive if it charged those prices to the customers it would
13 attract by offering those prices.

14 Based on modeling of the competitive interactions among the carriers
15 following entry by CLECs as UNE-L-based providers, I would expect prices to
16 decline somewhere in the range of 11% to 20% over the course of time following
17 entry by UNE-L based CLECs. Some of the price decline should happen very
18 quickly, with continued declines occurring over time.

19 Armed with this information, it is then possible to make a realistic
20 assumption about whether competitors will enter the market given the costs to
21 provide service and the expected revenues that would be gained by a competitor.
22 That is, my ultimate aim is to compare those expected revenues with projected
23 costs. If projected revenues are below projected costs, then a competitor would

1 not enter the market, because it would lose money if it did. If, on the other hand,
2 the projected revenues allowed the competitor to recover its sunk costs, cover its
3 operating expenses, and earn a reasonable rate of return on its investment, it
4 would enter the market (although the competitor might enter the market only in a
5 limited way, charging relatively high prices to relatively few customers).

6 **Q. ARE YOU CONFIDENT OF THE PRECISION OF YOUR ESTIMATES**
7 **REGARDING THE COMPETITIVE ENVIRONMENT AFTER UNE-L**
8 **BECOMES ESTABLISHED?**

9 A. No, it is inevitable that substantial uncertainty must accompany any estimates of
10 the nature of competition after substantial UNE-L entry. For one thing, it is
11 important to recognize that a formal model may overestimate the opportunity for
12 CLEC entry. In calculating CLEC costs and revenue opportunities, we have to
13 make simplifying assumptions about the way in which a CLEC would operate in a
14 world in which it relies on the ILEC to provide UNE loops and other network
15 functions, but utilizes its own switches. For example, my quantitative analysis
16 assumes that the ILECs provide UNEs to the CLECs on terms that are
17 indistinguishable from their self-provisioning of these same elements. If this
18 assumption is violated, then it is not possible to draw any conclusions from a
19 quantitative analysis, for two separate and important reasons. This point cannot
20 be overemphasized.

21 First, deficiencies in ordering or provisioning of UNEs will raise the
22 CLECs' costs above our estimate levels, possibly by a very large amount.
23 Second, if ILECs provide poor service to the CLECs, then the CLECs' customers

1 will perceive that the CLECs' services are inferior to the ILECs. I note that
2 opportunities for things to "go wrong" and result in inferior service for CLECs are
3 much greater in the more complicated UNE-L arrangement than with UNE-P.
4 This will reduce the demand for the CLECs' services and force the CLECs to
5 either set lower prices or sell less service. My quantitative analysis assumes that
6 customers do not perceive any actual difference in the quality of ILECs' and
7 CLECs' services.

8 The specific conditions that must be satisfied for my quantitative analysis
9 to be applicable to this Commission's determination of impairment include the
10 following:

- 11 ▪ Customer cutovers from ILECs to CLECs and from CLECs to
12 CLECs must be seamless. Cutovers must be available in a short
13 time frame, and there should be virtually no possibility of cutting
14 off service to a customer.
- 15 ▪ All the UNEs still provided by the ILEC must be available on a
16 non-discriminatory basis, to include TELRIC pricing, efficient and
17 rapid ordering, provisioning, support and post-installation quality
18 of service (e.g., static, cross-talk, downtime, echo, dial-up modem
19 throughput, *etc.*).
- 20 ▪ Operations Support Systems must be robust enough to support a
21 much larger volume of customer orders than would be apparent
22 from the size of the CLECs' customer base. Systems must allow

1 for significant customer turnover that is likely to occur as the
2 ILECs engage in vigorous “winback” programs.

3 If these conditions are not met, the possibility of CLEC entry is likely to
4 be much less than is shown by my analysis.

5 **C. Impairment Analysis Tool Results**

6 **Q. WHAT ARE THE RESULTS OF THE ANALYTICAL PROCESS THAT**
7 **YOU HAVE UNDERTAKEN?**

8 A. I will first provide a snapshot view of the results of the analytical process. For
9 any given set of input values, the impairment analysis tool produces the monthly
10 cost per line for each wire center in the state of Florida. This cost estimate
11 includes all of the fixed and variable costs associated with serving the residential
12 and business customers served out of a wire center. Fixed costs are amortized
13 over the expected lifetime of the equipment, or serving arrangement (in the case
14 of nonrecurring fees), or customer life (in the case of customer acquisition and hot
15 cut costs). I also assume that the CLEC constructs an optimal-sized network to
16 serve the expected customer base, and that the “steady-state” customer base is
17 reached immediately.

18 The cost inputs selected for the base case are mostly from the original
19 model prepared by Dr. Gabel. As explained above, I have added revenues and
20 costs from business customers and DSL service. Other key inputs in this case are:

- 21 • Market Share: 5% across all markets and services (business and
22 residential, voice and DSL). This is based on an assumed 15%
23 market share for the CLEC industry, spread evenly across three

1 CLECs. The range of market share considered in the model is
2 between three and eight percent.

3 • Revenue (excluding SLC): \$40/month for residential voice, and
4 \$44/month for business voice. Residential voice is based on the
5 current nationwide average revenue *per household*, excluding taxes
6 and SLCs. This is well in excess of the average revenue *per*
7 *subscriber line*, because many households – including those in the
8 sample from which this estimate was derived -- have two or more
9 lines. I would consider \$40 to be a good benchmark for the
10 revenue per line for the mid to higher-end of the residential market.
11 For example, MCI's Neighborhood Advantage 200, which
12 includes unlimited local service, several vertical services, and 200
13 long distance minutes, is priced at \$39.99. Business voice is based
14 on the calculation of the differential between the bundled price for
15 residential and business services sold by MCI in Florida for
16 customers using 200 minutes of long distance service.

17 • The range of variation in revenue considered is between \$30 and
18 \$50 for residential voice services and between \$34 and \$54 for
19 business voice services. This is not based on a specific result of
20 the analysis of expected price declines in the market, although I
21 expect UNE-L-based competition to drive prices down to the low
22 end of this range.

- 1 • Customer life is twelve months, which is based on the recent
2 experience of MCI. The range in variation considered is between
3 eight and sixteen months.
- 4 • Customer acquisition costs are set at \$130, which a range between
5 \$110 and \$150 considered.
- 6 • CLEC costs to accept hot cut transitions from the ILEC to the
7 CLEC's service is estimated at \$10.00, with a range considered
8 between \$7.00 and \$13.00.

9 The results for each wire center market are reported in the impairment
10 analysis tool on the "Summary Calcs" worksheet.

11 **Q. ARE THE RESULTS OF THE BASE CASE SENSITIVE TO THE INPUTS**
12 **THAT YOU SELECTED?**

13 A. Yes. The results are highly sensitive to the inputs selected. To illustrate this
14 point, I have selected two wire center markets in the same LATA in Florida, and
15 run the analysis tool using a range of plausible inputs. This demonstrates that the
16 CLEC will face significant uncertainty as to its prospects of recovering its sunk
17 cost investment in most market.

18 I have selected two wire centers in the Miami to illustrate how the impact
19 of input selections will itself be a function of the characteristics of the wire center,
20 including: the number of residential and business customers; the extent to which
21 customers are served by DLC, which forecloses the CLEC from providing DSL
22 service; and the distance to the CLEC switch. Exhibit MTB-3 shows how average
23 net revenue varies in response to changes in the inputs.

1 In this chart, the results of the impairment analysis tool are shown for two
2 wire centers in the Miami exchange area. The histogram displays the number of
3 cases, out of 300 scenarios, where the net revenue per line for the wire center fell
4 into each of 52 categories, ranging from \$(40.00) or less per month to \$10.00 or
5 more per month. While the MIAMFLBA wire center tends to be somewhat closer
6 to profitability than the MIAMFLDB wire center, it still produces negative net
7 revenue in 167 out of the 254 scenarios (56%). The MIAMFLDB wire center
8 produces positive net revenue per line in only 9 of the 254 cases.

9 Note that although the two wire centers are both located in the Miami
10 exchange area, the characteristics of each wire center cause dramatically different
11 results given the same set of inputs. This reinforces the point I made at the
12 beginning of this testimony; that the ability of a CLEC profitably to provide local
13 exchange services in one wire center is not proof that other wire centers in the
14 same exchange, the same metropolitan area, or the same LATA also can be
15 served.

16 **V. MCI IS DIFFERENT**

17 **Q. WOULD YOUR CONCLUSIONS ABOUT THE HYPOTHETICAL CLEC**
18 **BE DIFFERENT FOR AN ACTUAL CLEC, SUCH AS MCI, THAT WAS**
19 **NOT STARTING FROM SCRATCH?**

20 **A.** Under many circumstances my analysis of the hypothetical CLEC would apply to
21 the case of an existing CLEC like MCI. There are other circumstances in which
22 an actual CLEC would face a different business case than the base case of the
23 hypothetical CLEC, which I have shown in the impairment analysis tool. The

1 main factors that would cause the situation of the actual CLEC to differ from the
2 hypothetical CLEC are: (1) the CLEC is already serving large business customers
3 in the same wire center with special access or UNE transport; (2) the CLEC is
4 already collocated in the wire center; and, (3) in addition to being collocated, the
5 CLEC also is connected to the collocation with its own transport facilities.

6 In the case of a CLEC already serving business customers at that wire
7 center, but not yet collocated, there is the potential that it could build a new
8 collocation to serve enterprise and mass market customers. The benefit to the
9 CLEC is that it could take advantage of any economies of scale (or scope) in the
10 costs of collocating and transport. This may cause some collocations that are
11 marginally unprofitable for UNE loops alone to become profitable. The
12 impairment analysis tool has been built with the capability of measuring the
13 economies of scope between the enterprise market and the mass market.
14 Therefore, if I were to be given information on the number of DS1 and DS3
15 circuits at every wire center in Florida, I could run scenarios to test whether entry
16 conditions are much more favorable for a CLEC already serving enterprise
17 customers.

18 If a CLEC were already collocated in a wire center, it could benefit from
19 certain economies of scale and scope. For example, some nonrecurring costs
20 associated with the establishment of the collocation could be spread over a larger
21 volume of business, and per-unit costs therefore may be lower. Also, it is
22 possible that in the short-term the CLEC would have excess, unused capacity for
23 some components, e.g. racks that are used for the DS1 and DS3 customers. Even

1 so, the CLEC would still have to have enough UNE-L customers to achieve
2 economies of scale in many of the cost components related to its mass market
3 service. For example, DLC equipment is not used for DS1 and DS3 customers,
4 and the CLEC would need enough customers to achieve scale economies in the
5 use of this equipment. As in the first case mentioned above, it would be possible
6 to measure the impact of existing collocations on a CLEC's costs using the model
7 that I have developed for the UNE-L business case of a hypothetical CLEC.

8 The third case listed above would be even more favorable to UNE-L based
9 entry by the CLEC. The reason is that the incremental cost to the CLEC of
10 transporting traffic from UNE-L customers would be lower than when it must
11 lease transport from the ILEC. Once again, this does not mean that the CLEC
12 will always enter the UNE-L market, because it still must invest in additional
13 collocation space and DLC equipment. Whether this would alter the outcome in a
14 specific case can only be answered with the aid of the model and additional
15 information on the capabilities and capacity of the CLEC's fiber ring.

16 **Q. WHAT STEPS CAN THE FLORIDA PUBLIC SERVICE COMMISSION**
17 **UNDERTAKE TO ENCOURAGE FACILITIES BASED COMPETITION**
18 **BY COMPANIES LIKE MCI THAT ALREADY HAVE ESTABLISHED**
19 **SOME LOCAL FACILITIES?**

20 A. I earlier identified certain operational problems that must be overcome before any
21 consideration of the economics of UNE-L based service to mass market
22 customers by any CLEC can take place. These include rapid and seamless
23 cutovers from ILECs to CLECs and from CLECs to CLECs, the

1 nondiscriminatory availability and efficient provisioning of the unbundled
2 elements that the ILECs are still required to provide at TELRIC-based prices, and
3 the development of robust operations support systems capable of handling large
4 volumes of customer migration.

5 The economic analysis that I have presented shows that perhaps the most
6 crucial factors affecting the economic viability of UNE-L based local service to
7 mass market customers are the level of cost for customer-specific investments and
8 nonrecurring charges and the period of time over which those costs may be
9 recovered. The FCC specifically cited economic impairment resulting from hot
10 cut costs as a concern and requires future hot cut processes to be implemented by
11 the state public utility commissions be more efficient and have lower costs than
12 the processes currently in place. (See, for example, Triennial Review Order at ¶
13 473). While it is not my intention here to recommend a specific price rate
14 elements related to hot cuts, I do recommend that the Commission determine hot
15 cut costs based upon the most efficient, least-cost technologies, processes and
16 procedures which can be utilized in order to effectuate seamless transitions
17 between carriers switches. Moreover, I recommend the Commission consider
18 whether costs incurred by ILECs in performing hot cuts are most appropriately
19 recovered through nonrecurring charges, or whether some other rate structure
20 would reduce the likelihood of impairment. The Commission could, for example,
21 contemplate the development of a competitively neutral cost recovery mechanism
22 whereby the costs of implementing loop portability sufficient to eliminate

1 impairment can be spread across all participants who may benefit from such
2 portability similar to equal access or LNP cost recovery mechanisms.

3 **VI. CONCLUSION**

4 **Q. WOULD YOU PLEASE SUMMARIZE YOUR CONCLUSIONS AND**
5 **RECOMMENDATIONS?**

6 A. Yes. I have shown that the most appropriate definition of the relevant market
7 both for purpose of the actual deployment “triggers” analysis and for the purpose
8 of analyzing potential deployment of CLEC switching facilities in the absence of
9 UNE-P. While economic theory would compel a market definition at the level of
10 the individual customer location, administrative practicality as well as the nature
11 of CLEC deployment decisions strongly indicate the wire center as the
12 appropriate level of analysis, rather than some larger aggregation of wire centers
13 such as the exchange, the metropolitan statistical area, the LATA, or the UNE rate
14 zone. CLECs may decide to offer local exchange service in a larger market area,
15 but whether individual customers will actually have a choice among competitive
16 carriers depends upon the economic characteristics of the wire center in which
17 each is located. That local exchange service can profitably be offered in one wire
18 center is not proof that the same service can be located in nearby wire centers –
19 CLECs will not choose to offer services in those wire centers that will reduce
20 profitability.

21 Any analysis of the profitability of CLEC local exchange service in the
22 absence of UNE-P must make a number of assumptions regarding the situation
23 that the CLEC will face. Market share and customer “churn” may be highly

1 dependent upon the marketing activities and “winback” programs undertaken by
2 the incumbent LEC (and by other CLECs). Average revenue per customer
3 likewise will depend upon the aggressiveness of the incumbent in cutting prices
4 and upon the discount that the CLEC must offer to attract new customers. The
5 external and internal costs of migrating customers from UNE-P to UNE-L service
6 are only partially under the control of the CLEC, and any systemic problems in
7 implementing hot cuts may affect churn, market share and average revenue.

8 Each of these factors is crucial in determining the profitability of CLEC
9 UNE-L based local exchange service. Each is, to a greater or lesser extent,
10 interdependent with the other factors. And each is only partially under the control
11 of the CLEC. Given the uncertainty faced by the CLEC in a post-UNE-P
12 environment, no one can say with certainty that any wire center in Florida is
13 feasible for economic deployment of CLEC local exchange service in the absence
14 of UNE-P. At best, one might say that some wire centers in Florida might be
15 profitable under some set of optimistic assumptions. At worst, one would be
16 forced to conclude that no wire center in Florida can profitably be served by
17 UNE-L based CLECs.

18 As I explained at the beginning of this testimony, the consequences of an
19 erroneous finding of non-impairment are serious and irreversible. The
20 consequences of an erroneous finding of impairment are minor and largely will be
21 self-correcting. In view of the uncertainty surrounding any analysis of the
22 potential deployment of CLEC UNE-L based local exchange service, I believe the

1 Commission must find that the FCC's finding of CLEC impairment in the absence
2 of access to unbundled switching should be sustained.

3 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

4 A. Yes, it does.

I received the Ph.D. degree from the College of Communications of the University of Texas at Austin, in December, 1982. My doctoral program concentrated on the economics and regulation of the telecommunications and broadcast industries. The title of my dissertation was "Competition, Concentration, and Diversity of Expression in the Cable Communications Industry." It was an analysis of the trend toward increasing vertical and horizontal integration in the cable communications industry, and the implications of that trend for competition within that industry.

Following completion of my doctoral program, I was appointed Assistant Professor in the Department of Telecommunications at the University of Kentucky. In that position, I taught both graduate and undergraduate courses in telecommunications and broadcast regulation, in statistics, and in television programming, including graduate seminars in the regulation of telecommunications utilities and the history and implications of the MFJ. I also was responsible for the development of a new curriculum for the College of Communications in the regulation of telecommunications utilities.

I assumed the position of Staff Administrator with MCI Telecommunications in September of 1984. From April of 1985 until January of 1991, I was Manager, Texas Regulatory Affairs for MCI. From January of 1991 until September of 2002, I was Executive Staff Member, Regulatory and Economic Analysis in MCI's corporate regulatory organization. In that current position, I was responsible for the analysis of regulatory proceedings at the FCC and in various states across the nation, and for assisting in the development of MCI policy in regulatory matters.

I currently am self-employed as a consulting economist.

I have previously filed testimony in the following proceedings:

Docket

Public Utility Commission of Texas

- 5610 Application of GTE Southwest, Inc. for a Rate Increase
- 7160 Application of Southwestern Bell Telephone Company for Authority to Implement Rates and Regulations for Intrastate Interim 800 Service.
- 7330 Inquiry into WATS Competition on Multi-Jurisdictional WATS Access Lines.
- 7790 Petition of the General Counsel for an Evidentiary Proceeding to Determine Market Dominance Among Interexchange Telecommunications Carriers.
- 8585 Inquiry of the General Counsel into the Reasonableness of the Rates and Services of Southwestern Bell Telephone Company.
- 8790 Application of Southwestern Bell Telephone Company to Offer an Experimental Optional Calling Plan (Discounted IntraLATA Rates).
- 9301 Southwestern Bell Telephone Company Statement of Intent and Application under Subst. R. 23.27 Requesting the Service Market for Central Office Local Area Network (C.O. LAN) Service to be Declared Subject to Significant Competition and to use Customer Specific Pricing.
- 10131 Petition of Southwestern Bell Telephone Company for Approval of Maximizer 800 Common Line 800 Service.
- 10817 Treatment of franchise tax reduction under SWB incentive regulation program.
- 18515 Compliance Proceeding for Implementation of the Texas High Cost Universal Service Plan.

In addition, I testified in Travis County District Court, Cause No. 458,204, *US Sprint, et. al., v. P.U.C of Texas, et. al.*

Oklahoma Corporation Commission

- PUD 000837 In the Matter of the Application of Southwestern Bell Telephone Company for Approval of Telestate/21, A Proposal for Rate Stability, Network Modernization, and Price Regulation.

California Public Utility Commission

- I.87-11-033 In the Matter of Alternative Regulatory Frameworks for Local Exchange Carriers.
- 01-02-035 Application of AT&T Communications of California, Inc. (U 5002 C) and WorldCom, Inc. for the Commission to Reexamine the Recurring Costs and Prices of Unbundled Loops in Its First Annual Review of Unbundled Network Element Costs Pursuant to Ordering Paragraph 11 of D.99-11-050.

Washington Utilities and Transportation Commission

- U-89-3245-P Evaluation of US West Incentive Regulation Program.

UT-911488 WUTC v. US West Communications
UT-911490 Centrex Plus Costing and Pricing
UT-920252

South Carolina Public Service Commission

93-036-C Generic Proceeding to Review Intrastate Open Network Architecture (ONA) Services

Illinois Commerce Commission

94-0048 Consolidated proceedings generally dealing with conditions necessary for
94-0049 the establishment of local exchange competition
94-0096
94-0117
94-0146

Pennsylvania Public Utility Commission

I-940035 Formal Investigation to Examine and Establish Updated Universal Service Principles
and Policies for Telecommunications Services in the Commonwealth

M-00001353 Re: Structural Separation of Bell Atlantic-Pennsylvania, Inc.'s Retail and Wholesale
Operations

New Mexico Public Regulation Commission

Utility Case 3495 In the Matter of the Consideration of Costing and Pricing Rules for OSS, Collocation,
Shared Transport, Non-Recurring Charges, Spot Frames, Combination of Network
Elements, and Switching

Federal Communications Commission

CC 96-98 Implementation of the Local Competition Provisions in the Telecommunications Act of
1996 (First Triennial Review, 1999). Declaration regarding economies of scale in the
provision of local exchange services.

CC 96-98 Implementation of the Local Competition Provisions in the Telecommunications Act of
1996 (Second Triennial Review, 2002). Declaration regarding economies of scale in the
provision of local exchange services.

CC 99-273 In the Matter of Provision of Directory Listing Information Under the Communications
Act of 1934, as amended. Declaration regarding economic feasibility of implementing 411
presubscription.

Japanese Ministry of Posts and Telecommunications, Tokyo, Japan

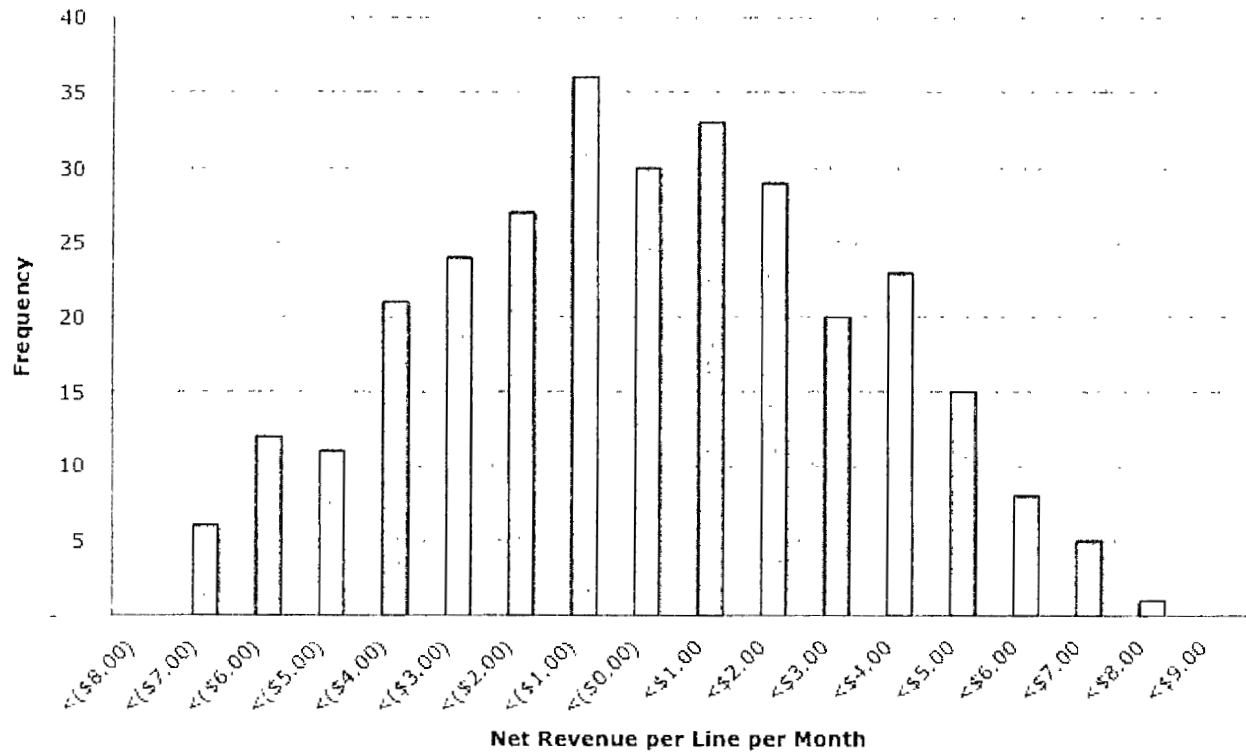
Public Hearing on Interconnection Rates and Rate Structure (11/99)

Selected Papers and Presentations at Professional Meetings and Conferences

- 9/92 Paper, “Unbundling of Local Exchange Network Functions and Related Costing Issues.” Eighth NARUC Biennial Regulatory Information Conference, Columbus, OH
- 6/93 Panelist, NASUCA Mid-Year Meeting, St. Louis, MO
- 6/93 Panelist, 16th Annual NARUC Regulatory Attorneys Conference, Whitefish, MT
- 12/93 Panelist, NTIA Hearings on Universal Service, Albuquerque, NM
- 8/94 Panelist, TSTCI Futures Conference, Austin, TX
- 12/95 Panelist, Telecommunications Policy Research Conference, Williamsburg, VA
- 11/96 Panelist, NARUC Annual Convention, San Francisco, CA
- 1/97 Panelist, Federal-State Joint Board workshops on Universal Service, Washington, DC
- 3/97 Panelist, New Mexico State University Center for Public Utilities Annual Conference, Santa Fe, NM
- 6/97 Panelist, University of Florida workshops on Universal Service, Gainesville, FL
- 6/97 Panelist, NARUC Summer Meetings, San Francisco, CA
- 11/97 Panelist, NARUC Annual Convention, Boston, MA
- 11/00 Panelist, NARUC Annual Convention, San Diego, CA

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