Exhibit No.:

Issue:	Upper Bound of Analog Mass Market and Geographic Area for Impairment Analysis
Witness:	Joseph Gillan
Sponsoring Party:	CLEC Coalition
Type of Exhibit:	Direct Testimony
Case No.:	TO-2004-0207

CLEC COALITION

DIRECT TESTIMONY

OF

JOSEPH GILLAN

TO-2004-0207

FILED
FEB 0 9 2004
Missouri Public Service Commission

December 18, 2003

Exhibit No. 11
Case No(s). TO-2004-0207
Date 1-27-04 Rptr KF

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of a Commission Inquiry into The Possibility of Impairment without Unbundled Local Circuit Switching When Serving the Mass Market	))))	**Case No. TO-2004-0207**

AFFIDAVIT OF JOSEPH GILLAN

I, Joseph Gillan, being duly sworn, state that I am a consultant working for the CLEC Coalition. I have participated in the preparation of the attached Direct Testimony in question and answer form to be presented in this case, and the answers were given by me. I have knowledge of the matters set forth in such answers and that such answers are true and correct to the best of my knowledge and belief.

Dated this 18th day of December 2003.

Joseph Gillan

STATE OF Illinois)
) **ss**
COUNTY OF Cook)

SUBSCRIBED AND SWORN TO before me this 18th day of December 2003 by Joseph Gillan who certifies that the foregoing is true and correct to best of his knowledge and belief.

Witness my hand and official seal.

Notary Public

My commission expires:

May 12, 2007

OFFICIAL SEAL
MARGARET M PLUCINSKY
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES: 05-12-07

BEFORE THE PUBLIC SERVICE COMMISSION
STATE OF MISSOURI

In the Matter of a Commission Inquiry into the Possibility of Impairment without Unbundled Local Circuit Switching When Serving the Mass Market.	**)** **)** **)** **)**	**Case No. TO-2004-0207** **Filed: December 18, 2003**

DIRECT TESTIMONY AND EXHIBITS OF
JOSEPH GILLAN
ON BEHALF OF
THE CLEC COALITION

Table of Contents

Introduction and Witness Qualification

Q. Please state your name and address.

A. My name is Joseph Gillan. My business address is P. O. Box 541038, Orlando, Florida 32854. I am an economist with a consulting practice specializing in telecommunications.

Q. Please briefly outline your educational background and related experience.

A. I am a graduate of the University of Wyoming where I received B.A. and M.A. degrees in economics. From 1980 to 1985, I was on the staff of the Illinois Commerce Commission where I had responsibility for the policy analysis of issues created by the emergence of competition in regulated markets, in particular the telecommunications industry. While at the Commission, I served on the staff subcommittee for the NARUC Communications Committee and was appointed to the Research Advisory Council overseeing the National Regulatory Research Institute.

In 1985, I left the Commission to join U.S. Switch, a venture firm organized to develop interexchange access networks in partnership with independent local telephone companies. At the end of 1986, I resigned my position of Vice President-Marketing/Strategic Planning to begin a consulting practice. Over the past twenty years, I have provided testimony and/or sworn affidavits before more than 35 state commissions, five state legislatures, the Commerce Committee of the United States Senate, the Federal Communications Commission, and the Federal/State Joint Board on Separations Reform. In addition, I have provided expert reports to the Canadian Radio-television and Telecommunications Commission, as well as the Finance Ministry of the Cayman Islands. I currently serve on the Advisory Council to New Mexico State University's Center for

Regulation. A complete listing of my qualifications, publications and expert testimony is attached in Exhibit JPG-1.

Q. On whose behalf are you testifying?

A. I am generally testifying on behalf of a Coalition of Competitive Local Exchange Carriers ("CLEC Coalition" or "Coalition"), an ad hoc coalition of carriers offering competitive services to residential and/or small business customers in the State of Missouri. Members of the Coalition are: AT&T Communications of the Southwest, Inc., AT&T Local Services on behalf of TCG St. Louis, Inc. and TCG Kansas City, Inc., (collectively, "AT&T"), Birch Telecom of Missouri, Inc., and Z-Tel Communications, Inc. AT&T is individually sponsoring a more sophisticated methodology to compute the DS0/DS1 crossover than the simplified approach that I present, however, and is therefore not sponsoring that portion of the testimony.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to address the two threshold issues identified by the Commission for this phase of the proceeding: (1) determining the "upper bound" of the analog mass market (i.e., the point at which the Commission will define a multiline voice customer as an enterprise customer for purposes of SBC's

unbundling obligations),[1] and (2) to establish (at least on a tentative basis) the geographic area to be used in the impairment analyses scheduled for the second phase of this proceeding.

Q. Will your direct testimony recommend a specific crossover and geographic area for the Commission to use in Phase II of this proceeding?

A. No, not at this time. It is important to understand that this proceeding begins with a national finding that "… requesting carriers are impaired without access to unbundled local circuit switching when serving mass market customers."[2] Given the national finding by the FCC that entrants *do* require access to unbundled local switching to serve mass market customers, it should be SBC's obligation (at least, in the first instance) to explain *why* and *where* impairment does not exist, with that claim being tested by other parties in this proceeding. As a result, my testimony provides overall guidance as to how the Commission should approach

[1] Throughout this testimony I use the phrase "unbundling obligation" as a shorthand description for situations where SBC is required to offer a network element in accordance with Section 251 of the federal Act. It is useful to remember, however, that SBC has voluntarily accepted, under the terms of Section 271's social contract, the obligation to offer unbundled local switching (at least as long as it desires to offer long distance services in Missouri) at rates that are "just and reasonable and nondiscriminatory" and which provide entrants "meaningful access." (TRO ¶ 603). As a result, even in the unlikely event that the Commission determines that SBC is no longer required to offer unbundled local switching in Missouri in accordance with Section 251 of the Act, the Commission would still need to determine (as the arbiter of interconnection disputes) rates that comply with the just and reasonable pricing standard that applies to all elements listed in Section 271 of the Act.

[2] TRO ¶ 419.

these questions, while specific recommendations will be provided after I have reviewed the SBC's direct testimony.

Q. Before you turn to these specific issues, do you have any preliminary comment?

A. Yes. As the Commission approaches the issues in this docket, it is important that it fully appreciate the direct impact that its decisions will have on the residential and small businesses customers in this state. This is not an abstract debate with intellectual appeal but little practical effect – the decisions that the Commission reaches in this proceeding will have a real and immediate impact on the choices available to Missouri consumers and on the prices that they pay for their telecommunications services.

The stark reality is that before UNE-P became generally and operationally available to CLECs, there was no meaningful mass-market competition. As the table demonstrates, only UNE-P provides entrants access to SBC's legacy loop network at volume:

Table 1: Loop Access Methods in Missouri[3]

Access Method	June 2002	December 2002	Growth
UNE-L	29,981	33,345	3,364
UNE-P	115,406	167,970	52,564

[3] Source: SBC Responses to the FCC's Form 477 Local Competition Survey.

These state-specific statistics are consistent with national data filed at the FCC during the Triennial Review proceeding (and summarized below). As the following table shows, UNE-P is critical to POTS competition for residential customers *and* small businesses that desire analog-based telephone service.

Table 2: UNE-P Penetration in Mass Market[4]

Holding Company	Penetration Rate	
	Business	Residential
BellSouth	12.2%	4.6%
Qwest	7.4%	2.1%
Verizon (Bell Atlantic)	7.6%	7.7%
SBC	6.2%	8.5%
Total	7.6%	6.7%

If UNE-P is eliminated prematurely, there will be no viable alternative for the mass market in Missouri and the market will revert to a monopoly once again. The bottom line is that UNE-P brought needed competition to the POTS market to a degree that nothing else has (or can). The Commission must not eliminate the one entry strategy that is bringing competition and choice to the mass market throughout the state, until and unless it is confident that something else stands ready to take its place.[5]

[4] Source: UNE-P lines are from RBOC *Ex Parte* Filings in CC Docket 01-338, or as reported by Commerce Capital Markets, December 20, 2002. Vintage of data varies, but is generally from August or September, 2002. Relative penetration rate calculated as UNE-P lines (business or residential) as a percentage of residential and business analog lines. Source: ARMIS 43-08.

[5] As I explain further in the section of my testimony addressing the geographic area that the Commission should use to evaluate impairment, UNE-P is bringing competition to consumers

Establishing the Upper Bound of the Analog Mass Market

Q. What is meant by the term "mass market"?

A. The term "mass market" (as used by the FCC) is generally synonymous with the traditional term "POTS market" – that is, the market of customers purchasing analog voice service. The POTS marketplace (i.e., *the mass market*) has long been the focus of traditional regulation, with users principally interested in basic voice services – dial tone, vertical features, local and long distance calling. Demonstrating the importance of this customer segment is the fact that a centerpiece of federal and state public policy has been the goal of "universal service" – i.e., assuring the widespread availability of these services at affordable prices. It would make little sense to adopt a commitment to the availability of POTS (i.e., universal service), without being equally committed to assuring that this same customer segment enjoys competitive choice. In essence, that is the basic issue in this proceeding – defining the mass market, and then determining whether it will enjoy competitive choice.

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and small businesses throughout the State of Missouri, without regard to the size of the exchange. SBC would have this Commission eliminate this broad competition, however, by eliminating UNE-P in those wire centers that serve the most customers. Although UNE-P is being used to provide competitive choice to customers throughout the state, most of the mass market lives and works within the three MSAs that SBC is claiming there is no impairment. In fact, approximately 85% of the UNE-P lines in the state – both for residential and small business customers – are located in wire centers where SBC is seeking a finding of non-impairment.

Q. How does the FCC define the mass market customer?

A. The TRO provides a basic definition of the "mass market customer" and contrasts it with the "enterprise customer." The mass market customer is:

(a) primarily interested in basic voice POTS service;

(b) widely geographically dispersed; and

(c) unaccustomed to complex or disruptive provisioning schemes.

As the FCC explains, "mass market customers are analog voice customers that purchase only a limited number of POTS lines, and can only be economically served via DS0 lines."[6] Mass market customers are not located just in concentrated geographic locations, such as central business districts; rather residential and small business customers are located across all urban, suburban, and rural locations. These customers expect that using their telephone services, as well as changing service providers, will not be a complicated transaction.[7]

Q. Does the mass market include both residential and business customers?

[6] TRO ¶ 497.

[7] As TRO explained, "…mass market customers demand reliable, easy-to-operate service and trouble-free installation," TRO ¶ 467.

A. Yes. Perhaps because we are all residential customers, we intuitively appreciate the fact that the residential marketplace is part of the mass market. The forgotten customer of telecommunications policy, however, is the average (which is to say in this context, voice-centric) small business customer. There are many business customers that still rely on traditional POTS service for their telecommunications needs (for example, restaurants, garages, plumbers, florists and others for whom higher-speed enterprise services are simply unnecessary).

Q. How does an "enterprise" customer differ from a "mass market" customer?

A. Enterprise customers demand a level of service and capacity – particularly for data services – that is quite different from that demanded by the mass market customer. As the FCC explained: "DS1 enterprise customers are characterized by relatively intense, often data centric, demand for telecommunications services sufficient to justify service via high-capacity loops at the DS1 capacity and above."[8]

Q. Does the TRO recognize this distinction in the DS0/DS1 cutover analysis to be performed by the Commission?

[8] TRO ¶ 451.

A. Yes. The TRO provides that a customer should be considered part of the DS1 enterprise market when "it is economically feasible for a competitive carrier to provide voice service with its own switch using a DS1 or above loop. We determine that this includes all customers that are served by the competing carrier using a DS1 or above loop and all customers meeting the DS0 cutoff,"[9] with the cutoff defined as "the point where it makes economic sense for a multi-line customer to be served via a DS1 loop."[10]

Q. How should the DS0/DS1 cutover point be established?

A A very simple approach would be to establish the cutover through a straightforward calculation that determines when the cost of a UNE DS1 (including non-recurring activities and the installation of customer premises equipment necessary to utilize DS1 level service) is less than continued use of multiple UNE analog loops for voice service. This point would form the "upper bound" of the analog mass-market, i.e., the point at which a mass market customer should be considered an enterprise customer based on the number of analog lines used to obtain voice service.

[9] TRO ¶ 421, n.1296.

[10] TRO ¶497.

Generally, to estimate the line-count of mass-market lines at which a DS-1 is the more efficient choice, the following formula would be used:

$$\text{Crossover} = \frac{(\text{CPE} + \text{UNE DS-1})}{\text{UNE Loop}}$$

Where "CPE" includes all the costs associated with the equipment and inside-wire changes needed to make the customer's analog service compatible with a DS-1 loop, and where the values for "UNE DS-1" and "UNE Loop" include all relevant costs of leasing these facilities from the incumbent (including non-recurring charges to establish service). There are other factors not included in the simple formula above that would more accurately capture real-world constraints that would (as I explain below) increase the crossover.[11] Moreover, a more realistic calculation would include additional costs to use UNE-L (such as collocation and backhaul) that are not incurred to use UNE-P. Although additional complication could be added to the formula, at a minimum the crossover should comply with this simplified approach.

Q. Are there other considerations that the Commission should keep in mind when it adopts the "DS0/DS1" crossover?

[11] For instance, the approach presented in the testimony of AT&T witness John Finnegan would more closely approximate the "real world" point at which it might make economic sense to move a multiline voice customer to a DS-1 based UNE-L arrangement.

A. Yes. The role of the crossover is to establish a governmentally drawn upper boundary to the mass market – in effect, substituting the Commission's judgment of how a customer *should be* served (via a DS-1) for the customer's judgment of how it *has chosen* to be served (multiple analog loops). While the simplified formula above complies with the direction of the TRO, the Commission should be aware that this simple calculation does not take into account a number of factors that, in the real world, would explain why a customer with multiple voice loops might not want to move its POTS service to a higher-capacity facility.

For example, a customer may not desire a DS1-based service because of the requirement that it make space available for channel bank equipment on its premises. Customers may not want to give up the space for such equipment, or may resist the telecommunications provider's need to have access to the premises to maintain or repair the equipment. Alternatively, because of provisioning problems or the customer's individual traffic patterns, the CLEC might need to use higher priced special access rather than UNE DS1 facilities (which would significantly increase the crossover). In these circumstances, the customer would have good reasons to preserve its analog POTS service, even if it were at or above the theoretical cutover point described above. In addition, a customer served by multiple analog lines is less vulnerable to network failure than a customer whose entire service is being provisioned over a single DS-1. And finally, as noted above, the calculation does not consider any of the additional costs associated

with using a UNE loop (such as collocation and backhaul) that are not incurred when service is provided using UNE-P.

By failing to consider these factors, the minimalist DS0/DS1 cutover as calculated above will strand some customers from competitive choice because they will not *really* be in a position to take advantage of a DS-1 connection, they will only be *presumed* able to do so. Consequently, the Commission should be aware that a crossover calculated under the above formula would represent the *lowest* reasonable crossover and, while simple, would still be likely to adversely affect some customers.

The Appropriate Geographic Area for the Evaluation of Impairment

Q. What general approach should the Commission use in selecting the geographic area for its impairment analysis?

A. To begin, I think it is useful for the Commission to view its task as establishing "impairment evaluation zones," recognizing at the outset that this is the singular purpose to which they will be put.[12] This is not the same exercise as defining a

[12] See, for instance, ¶ 495: "State commissions must first define the markets in which they will evaluate impairment by determining the relevant geographic area to include in each market." Defining the geographic area from the perspective of impairment is exactly how the FCC drew the relevant geographic markets for loops and transport (footnote 1536, emphasis added):

> Although the incumbent LECs argue that we [the FCC] should apply a zone

market as an economic abstraction; its sole purpose is to facilitate a state commission's evaluation of the extent of competition made possible with access to a network element, and to *contrast* that competition to the competition that would result if access were denied.[13] By comparing the competitive profiles of alternative entry strategies (for instance, by contrasting the competitive profiles of UNE-P to UNE-L), the Commission can evaluate whether *measures* of actual competition (i.e., triggers) demonstrate that the national finding of impairment is not appropriate in Missouri.

The basic structure of the TRO is to look at the areas being served by a particular network element and determine whether an alternative could reasonably produce the same result. Such an approach is appropriately customer-centric, with the states being directed to consider, among other things:

* The locations of customers actually being served (if any) by competitors;

* The variation in factors affecting competitors' ability to serve each group of customers; and,

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approach to transport and loops, we define the relevant geographic market for transport as route-by-route, and the relevant geographic market for enterprise loops as customer-by-customer, *because of the economic and operational issues associated with alternative transport and loops deployment*.

[13] Of course, if competitive activity would significantly decline as a result, then a significant impairment must be present that is being corrected through the entrant's access to the network element in question.

* The competitors' ability to target and serve specific markets economically and efficiently using currently available technologies.[14]

The only bounds that the FCC placed on the state's discretion in determining the geographic contours of a "market" (or, more properly stated, an impairment evaluation zone) is that the area must be smaller than an entire state. At the same time, it must not be so small that "…a competitor serving that market alone would not be able to take advantage of available scale and scope economies from serving a wider market."[15]

Q. Have you reviewed data that identifies "the locations of customers actually being served (if any) by competitors?"

A. Yes. My review demonstrates that UNE-P exhibits a very distinct competitive profile – that is, UNE-P brings competitive choice throughout the serving territory of SBC. As the Commission approaches its impairment analysis, it is important that it define "geographic areas" in a manner that permits it to recognize the unique competitive signature of UNE-P, so that it may test other entry strategies to see whether they could produce the same level of competitive choice.

[14] TRO ¶ 495.

[15] *Ibid.*

Exhibit JPG-2 analyzes the competitive profile of UNE-P in the exchanges served by SBC.[16] The bar chart in Exhibit JPG-2 plots the competitive penetration achieved by UNE-P in each of SBC's wire centers in Missouri, ranked by the size (measured in total access lines) of the exchange. SBC's largest exchange (McGee, 120,000 lines) is farthest on the left, while SBC's smallest exchange (Paynesville, 160 lines) is on the right. SBC's remaining exchanges are arranged in-between according to size.

As the Exhibit JPG-2 clearly shows, CLECs utilizing UNE-P to serve mass market customers have brought competition to essentially *every* SBC exchange in Missouri, irrespective of the size of the exchange.[17] The significance of this competitive profile cannot be overstated – the competitive signature of the UNE-P entry strategy is its ability to serve the mass market across the *entire* mass market without geographic limitation. No other competitive entry strategy can provide this result.

[16] Exhibit JPG-2 estimates the competitive market share achieved by UNE-P by comparing the UNE-P volumes provided by SBC in response to CLEC Coalition DR 1-2 to the total number of retail lines at each wire center used by the FCC in the Hybrid Cost Proxy Model (used to determine High Cost Support). In comparing these two data sources, however, there were a total of four wire centers (out of more than 200) that could not be matched and have not been included in the analysis.

[17] According to SBC's response to CLEC Coalition DR 1-2, there are only two wire centers in the State of Missouri without UNE-P based competition.

Q. What conclusion should the Commission draw from the competitive profile illustrated in Exhibit JPG-2?

A. The competitive profile of UNE-P clearly demonstrates that "the locations of customers actually being served (if any) by competitors" is, in fact, the entire territory of the incumbent. This is not to say that *every* carrier offers service across the entire profile, but rather the *strategy* itself supports competition in each wire center. As the Commission judges alternatives to UNE-P, it should do so fully aware that UNE-P produces statewide competition – and it should not restrict the availability of unbundled local switching and UNE-P unless it can conclude that an alternative will produce a similar competitive profile.

Q. Have you also reviewed data that identifies "the locations of customers actually being served (if any) by competitors using UNE-L?

A. Yes. Accepting SBC's quantification of "mass market"[18] UNE-L customers as accurate,[19] Exhibit JPG-3 contrasts the competitive profile of these two entry

[18] As indicated earlier, the term "mass market" is limited to analog voice customers up to the DS0/DS1 crossover that has not yet been established in this proceeding. SBC has provided data based on a "default" crossover of 3 lines that it has not -- and I believe cannot -- justify as reasonable. Because the data supplied by SBC is the only data on the potential number of "mass market" UNE loops available, however, my analysis relies on the information at this point in the proceeding (although I do not endorse its accuracy).

[19] I note that SBC's data may include legacy loops from failed or abandoned business plans that may be potentially misleading. A more reasonable approach to determine how different network elements are being used to serve different customers would be to focus exclusively on

strategies. As Exhibit JPG-3 demonstrates, UNE-L is far more geographically limited – and far less effective in the mass market – than UNE-P. Mass market UNE-L penetration in Missouri (as measured by SBC) is trivial where it exists at all (never more than 2%), and is absent entirely from more than 80% of the wire centers in the state.

Q. What does this mean for the geographic areas selected by the Commission to evaluate impairment?

A. As I indicated earlier, I intend to first wait to evaluate the testimony of SBC before making a recommendation. In addition, I believe that it is important that the Commission only adopt a tentative market definition in this phase of the proceeding, given the potential importance of other information (such as, for instance, "the variation in factors affecting competitors' ability to serve each group of customers; and the competitors' ability to target and serve specific markets economically and efficiently using currently available technologies")[20] that is not easily developed within the accelerated time frame of this phase.

current data (for instance, the change in UNE-P and UNE-L lines by wire center over the past year), and excluding UNE-L lines (such as fax lines) going to CLEC enterprise customer locations. However, even using SBC's estimates of UNE-L penetration, it is clear that the geographic profile of UNE-L is quite different than the profile achieved by UNE-P.

[20] TRO ¶ 495.

Based on the "profile of customers actually being served," however, it is important that the Commission not select an area for the evaluation of impairment that is so small that it fails to appreciate the unique competitive signature exhibited by UNE-P. This factor would suggest relatively large areas for impairment evaluation (such as the LATA), so that the Commission not mistake some limited entry in a relatively small area as evidence of non-impairment.[21]

Q. Do you believe that broad statewide competition was intended by the federal Act?

A. Yes. It is clear that one of the goals of the federal Act is to encourage broad competition throughout an entire state. For instance, the Act fundamentally judges whether local markets are open (in Section 271) on a state-by-state basis:

> The requirement of an operational competitor is crucial because ... whatever agreement the competitor is operating under must be made generally available throughout the State. Any carrier in another part of the State could immediately take advantage of the "agreement" and be operational fairly quickly. By creating this potential for competitive alternatives to flourish rapidly throughout a State, with an absolute minimum of lengthy and contentious negotiations once an initial agreement is entered into, the

[21] Of course, if the Commission adopts relatively large areas in order to *avoid* the mistake of interpreting some geographically limited entry as evidence that impairment does not exist, it is important that the Commission retain this same understanding as it evaluates potential candidates to be included as "triggers." Although not relevant for this phase of the proceeding, this means that the Commission should only include switch trigger candidates that exhibit a competitive profile similar to that achieved by UNE-P.

> Committee is satisfied that the "openness and accessibility" requirement is met.[22]

The bottom line is that the Commission is observing in the market exactly the type of statewide competitive activity that the U.S. Congress hoped to see when they opened these markets to competition. Consequently, the Commission should take great care that it not take any action to curtail UNE-P based competition, unless it is confident that an alternative would produce the same result.

Summary

Q. Please summarize your testimony.

A. The Commission has decided to bifurcate its impairment analysis into two phases. In this phase, the Commission will set the regulatory "upper bound" of the mass market by determining the point at which (at least in theory) a customer with multiple analog voice lines would be more efficiently served with a DS-1. In addition, the Commission will establish (at least tentatively), the "geographic market" in which it will evaluate impairment in the next phase of this proceeding.

In the testimony above, I outline the basic approach the Commission should use to evaluate SBC's specific proposals. As to determining the DS0/DS1 "crossover,"

[22] *Ameritech Michigan Order*, Federal Communications Commission, CC Docket 97-298,

the analysis is fundamentally algebraic – i.e., the testimony presents an objective *mathematical* point at which a DS-1 is less costly than multiple analog loops, recognizing that a crossover calculated in the simplified manner suggested would be a minimum given its simplifying assumptions and the fact that it does not consider a number of subjective factors that might prevent a customer from making this choice in the real world.

Selecting the appropriate "geographic market" for purposes of an impairment analysis requires that the Commission understand the geographic profile of the competition made possible by unbundled local switching. As shown above, unbundled local switching produces *statewide* competition. The core purpose of the geographic area selected for an impairment analysis is that it reasonably capture the breadth of competition made possible by unbundled local switching so that it may be contrasted with the breadth of competition from alternative strategies. My analysis suggests, therefore, that the area chosen should be reasonably broad so that the Commission can reject, as a substitute to unbundled local switching, entry strategies that are unable to produce a competitive outcome of similar breadth. While I make no specific recommendation in this round of testimony, I would generally encourage the Commission to make its decision tentative until it may consider the full evidence of Phase II.

Footnote 169, citing House Report, emphasis added.

Q. Does this conclude your direct testimony?

A. Yes.

Education

B.A. Economics, University of Wyoming, 1978.
M.A. Economics, University of Wyoming, 1979.

Professional History

Gillan Associates, Economic Consulting (1987-Present)

In 1987, Mr. Gillan established a private consulting practice specializing in the economic evaluation of regulatory policies and business opportunities in the telecommunications industry. Since forming his consulting practice in 1987, Mr. Gillan has advised business clients as diverse as AT&T and TDS Telecom (a small entrant seeking the authority to compete in a rural area).

Vice President, US Switch, Inc. (1985-1987)

Responsible for crafting the US Switch business plan to gain political acceptance and government approval. US Switch pioneered the concept of "centralized equal access," which positioned independent local telephone companies for a competitive long distance market. While with US Switch, Mr. Gillan was responsible for contract negotiation/marketing with independent telephone companies and project management for the company's pilot project in Indiana.

Policy Director/Market Structure - Illinois Commerce Commission (1980-1985)

Primary staff responsibility for the policy analysis of issues created by the emergence of competition in regulated markets, in particular the telecommunications industry. Mr. Gillan served on the staff subcommittee for the NARUC Communications Committee and was appointed to the Research Advisory Council overseeing NARUC's research arm, the National Regulatory Research Institute.

Mountain States Telephone Company - Demand Analyst (1979)

Performed statistical analysis of the demand for access by residential subscribers.

Professional Appointments

Guest Lecturer	School of Laws, University of London, 2002
Advisory Council	New Mexico State University, Center for Regulation, 1985 – Present
Faculty	Summer Program, Public Utility Research and Training Institute, University of Wyoming, 1989-1992
Contributing Editor	Telematics: The National Journal of Communications Business and Regulation, 1985 - 1989

Professional Appointments (Continued)

Chairman	Policy Subcommittee, NARUC Staff Subcommittee on Communications, 1984-1985
Advisory Committee	National Regulatory Research Institute, 1985
Distinguished Alumni	University of Wyoming, 1984

Selected Publications

"The Local Exchange: Regulatory Responses to Advance Diversity", with Peter Rohrbach, Public Utilities Fortnightly, July 15, 1994.

"Reconcentration: A Consequence of Local Exchange Competition?", with Peter Rohrbach, Public Utilities Fortnightly, July 1, 1994.

"Diversity or Reconcentration?: Competition's Latent Effect", with Peter Rohrbach, Public Utilities Fortnightly, June 15, 1994.

"Consumer Sovereignty: An Proposed Approach to IntraLATA Competition", Public Utilities Fortnightly, August 16, 1990.

"Reforming State Regulation of Exchange Carriers: An Economic Framework", Third Place, University of Georgia Annual Awards Competition, 1988, Telematics: The National Journal of Communications, Business and Regulation, May, 1989.

"Regulating the Small Telephone Business: Lessons from a Paradox", Telematics: The National Journal of Communications, Business and Regulation, October, 1987.

"Market Structure Consequences of IntraLATA Compensation Plans", Telematics: The National Journal of Communications, Business and Regulation, June, 1986.

"Universal Telephone Service and Competition on the Rural Scene", Public Utilities Fortnightly, May 15, 1986.

"Strategies for Deregulation: Federal and State Policies", with Sanford Levin, Proceedings, Rutgers University Advanced Workshop in Public Utility Economics, May 1985.

"Charting the Course to Competition: A Blueprint for State Telecommunications Policy", Telematics: The National Journal of Communications Business, and Regulation, with David Rudd, March, 1985.

"Detariffing and Competition: Options for State Commissions", Proceedings of the Sixteenth Annual Conference of Institute of Public Utilities, Michigan State University, held in Williamsburg, Virginia, December 1984.

Listing of Expert Testimony – Court Proceedings

Dwayne P. Smith, Trustee v. Lucent Technologies (Civil Action No. 02-0481 Eastern District of Louisiana)(Entry and CLEC Performance)

BellSouth Intellectual Property v. eXpeTel Communications (Civil Action No. 3:02CV134WS Southern District of Miss.)(Service definition, industry structure and Telecom Act of 1996)

CSX Transportation Inc. v. Qwest International, Inc. (Case No. 99-412-Civ-J-21C Middle District of Florida) (industry structure and wholesale contract arrangements).

Winn v. Simon (No. 95-18101 Hennepin Cty. Dist. Ct.)(risk factors affecting small long distance companies)

American Sharecom, Inc. v. LDB Int'l Corp. (No. 92-17922, Hennepin County District Court) (risk factors affecting small long distance companies)

World Com, Inc. et al. v. Automated Communications, Inc. et al. (No. 3:93-CV-463WS, S.D. Miss.) (damages)

International Assignments

Recovering Contribution: Lessons from the United States' Experience, Report submitted to the Canadian Radio-television and Telecommunications Commission on behalf of CallNet.

Forcing a Square Peg into a Round Hole: Applying the Universal Service Cost Model in the Cayman Islands, Analysis Presented to the Government of the Cayman Islands on behalf of Cable and Wireless.

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
Missouri	Case TW-2004-0149	Switching Impairment	CLEC Coalition
Michigan	Case No. U-13796	Switching Impairment	CLEC Coalition
Florida	Docket No. 030851-TP	Switching Impairment	FCCA
Ohio	Case 03-2040-TP-COI	Switching Impairment	AT&T/ATX
Wisconsin	05-TI-908	Switching Impairment	AT&T
Washington	UT–023003	Local Switching Rate Structure	AT&T/MCI
Arizona	T-00000A-00-0194	UNE Cost Proceeding	AT&T/WCOM
Illinois	Docket 02-0864	UNE Cost Proceeding	AT&T
North Carolina	P-55, Sub 1013 P-7, Sub 825 P-19, Sub 277	Price Cap Proceedings	CLEC Coalition
Kansas	02-GIMT-555-GIT	Price Deregulation	Birch/AT&T
Texas	Docket No. 24542	Cost Case	AT&T
North Carolina	Docket P-100, Sub 133d	UNE Cost Proceeding	CLEC Coalition
Georgia	Docket No. 11901-U	DSL Tying Arrangement	WorldCom
Tennessee	Docket No. 02-00207	UNE Availability/Unbundling	CLEC Coalition
Utah	Docket No. 01-049-85	Local Switching Costs/Price	AT&T
Tennessee	Docket No. 97-00309	Section 271 Compliance	CLEC Coalition
Illinois	Docket No. 01-0662	Section 271 Compliance	AT&T
Georgia	Docket No. 14361-U	UNE Availability/Unbundling	CLEC Coalition
Florida	Docket 020507-TL	Unlawful DSL Bundling	CLEC Coalition
Tennessee	Docket No. 02-00207	UNE Availability/Unbundling	CLEC Coalition
Georgia	Docket No. 14361-U	UNE Costs and Economics	AT&T/WorldCom
Florida	Docket 990649-TP	UNE Cost and Price Squeeze	AT&T/WorldCom
Minnesota	P-421/CI-01-1375	Local Switching Costs/Price	AT&T
Florida	Docket 000075-TP	Intercarrier Compensation	WorldCom
Texas	Docket No. 24542	Unbundling and Competition	CLEC Coalition
Illinois	Docket 00-0732	Certification	Talk America
Indiana	Cause No. 41998	Structural Separation	CLEC Coalition

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
Illinois	Docket 01-0614	State Law Implementation	CLEC Coalition
Florida	Docket 96-0768	Section 271 Application	SECCA
Kentucky	Docket 2001-105	Section 271 Application	SECCA
FCC	CC Docket 01-277	Section 271 for GA and LA	AT&T
Illinois	Docket 00-0700	Shared Transport/UNE-P	CLEC Coalition
North Carolina	Docket P-55 Sub 1022	Section 271 Application	SECCA
Georgia	Docket 6863-U	Section 271 Application	SECCA
Alabama	Docket 25835	Section 271 Application	SECCA
Michigan	Case No. U-12622	Shared Transport/UNEs	AT&T
Ohio	Case 00-942-TP-COI	Section 271 Application	AT&T
Alabama	Docket No. 25835	Structural Separation	SECCA
Alabama	Docket No. 27821	UNE Cost Proceeding	ITC^Deltacom
Louisiana	Docket U-22252	Section 271 Application	SECCA
Mississippi	Docket 97-AD-321	Section 271 Application	SECCA
South Carolina	Docket 2001-209-C	Section 271 Application	SECCA
Colorado	Docket 99A-577T	UNE Cost Proceeding	AT&T
Arizona	Case T-00000A-00-0194	UNE Cost Proceeding	AT&T
Washington	Docket UT-003013	Line Splitting and Combinations	AT&T
Ohio	Case 00-1368-TP-ATA Case 96-922-TP-UNE	Shared Transport	AT&T/PACE
North Carolina	P-100 Sub 133j	Standard Collocation Offering	CLEC Coalition
Florida	Docket 990649-TP	UNE Cost Proceeding	CLEC Coalition
Michigan	Case No. U-12320	UNE Combinations/Section 271	AT&T
Florida	Docket 00-00731	Section 251 Arbitration	AT&T
Georgia	Docket 5825-U	Universal Service Fund	CLEC Coalition
South Carolina	97-239-C	Universal Service Fund	CLEC Coalition
Texas	PUC Docket 22289/95	ETC Designation	Western Wireless
Washington	Docket UT-003013	UNE Costs and Local Competition	AT&T
New York	Docket 98-C-1357	UNE Cost Proceeding	Z-Tel

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
Colorado	Docket 00K-255T	ETC Designation	Western Wireless
Kansas	99-GCCZ-156-ETC	ETC Designation	Western Wireless
New Mexico	98-484-TC	ETC Designation	Western Wireless
Illinois	Docket 99-0535	Cost of Service Rules	AT&T/MCI
Colorado	Docket 00-B-103T	U S WEST Arbitration	ICG Comm.
North Dakota	PU-1564-98-428	ETC Designation	Western Wireless
Illinois	Docket 98-0396	Shared Transport Pricing	AT&T/Z-Tel
Florida	Docket 981834-TP	Collocation Reform	CLEC Coalition
Pennsylvania	M-00001353	Structural Separation of Verizon	CompTel/ATX
Illinois	Docket 98-0860	Competitive Classification of Ameritech's Business Services	CompTel/ AT&T
Georgia	Docket 6865-U	Complaint re: Combinations	MCIWorldcom
Virginia	Case No. PUC 990100	GTE/Bell Atlantic Merger	AT&T
Florida	Docket 990649-TP	UNE Cost and Pricing	CLEC Coalition
Nebraska	Application C-1960/PI-25	IP Telephony and Access Charges	ICG Communications
Georgia	Docket 10692-U	Pricing of UNE Combinations	CLEC Coalition
Colorado	Docket 99F-141T	IP Telephony and Access	Qwest
California	Case A. 98-12-005	GTE/Bell Atlantic Merger	AT&T/MCI
Indiana	Case No. 41255	SBC/Ameritech Merger	AT&T
Illinois	Docket 98-0866	GTE/Bell Atlantic Merger	AT&T
Ohio	Case 98-1398-TP-AMT	GTE/Bell Atlantic Merger	AT&T
Tennessee	Docket 98-00879	BellSouth BSE	SECCA
Missouri	Case TO-99-227	§ 271 Review: SBC	AT&T
Colorado	Docket 97A-540T	Stipulated Price Cap Plan/USF	CLEC Coalition
Illinois	ICC Docket 98-0555	SBC/Ameritech Merger	AT&T
Ohio	Case 98-1082-TP-AMT	SBC/Ameritech Merger	AT&T
Florida	Docket 98-1121-TP	UNE Combinations	MCI WorldCom
Georgia	6801-U	§ 251 Arbitration: BellSouth	AT&T
Florida	92-0260-TL	Rate Stabilization Plan	FIXCA

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
South Carolina	Docket 96-375	§ 251 Arbitration: BellSouth	AT&T
Kentucky	Docket 96-482	§ 251 Arbitration: BellSouth	AT&T
Wisconsin	05-TI-172/5845-NC-101	Rural Exemption	TDS Metro
Louisiana	U-22145	§ 251 Arbitration: BellSouth	AT&T
Mississippi	96-AD-0559	§ 251 Arbitration: BellSouth	AT&T
North Carolina	P-140-S-050	§ 251 Arbitration: BellSouth	AT&T
Tennessee	96-01152	§ 251 Arbitration: BellSouth	AT&T
Arizona		§ 251 Arbitration: US West	AT&T Wireless
Florida	96-0883-TP	§ 251 Arbitration: BellSouth	AT&T
Montana	D96.11.200	§ 251 Arbitration: US West	AT&T
North Dakota	PU-453-96-497	§ 251 Arbitration: US West	AT&T
Texas	Docket 16226	§ 251 Arbitration: SBC	AT&T/MCI
Alabama	Docket 25703	§ 251 Arbitration: BellSouth	AT&T
Alabama	Docket 25704	§ 251 Arbitration: GTE	AT&T
Florida	96-0847-TP	§ 251 Arbitration: GTE	AT&T
Kentucky	Docket 96-478	§ 251 Arbitration: GTE	AT&T
North Carolina	P-140-S-51	§ 251 Arbitration: GTE	AT&T
Texas	Docket 16630	§ 251 Arbitration: SBC	LoneStar Net
South Carolina	Docket 96-358	§ 251 Arbitration: GTE	AT&T
Texas	Docket 16251	§ 271 Review: SBC	AT&T
Oklahoma	97-0000560	§ 271 Review: SBC	AT&T
Kansas	97-SWBT-411-GIT	§ 271 Review: SBC	AT&T
Alabama	Docket 25835	§ 271 Review: BellSouth	AT&T
Florida	96-0786-TL	§ 271 Review: BellSouth	FCCA
Georgia	Docket 6863-U	§ 271 Review: BellSouth	AT&T
Kentucky	Docket 96-608	§ 271 Review: BellSouth	AT&T
Louisiana	Docket 22252	§ 271 Review: BellSouth	AT&T
Texas	Docket 16226	UNE Cost	AT&T/MCI
Colorado	97K-237T	Access Charges	AT&T

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
Mississippi	97-AD-321	§ 271 Review: BellSouth	AT&T
North Carolina	P-55 Sub 1022	§ 271 Review: BellSouth	AT&T
South Carolina	97-101-C	§ 271 Review: BellSouth	AT&T
Tennessee	97-00309	§ 271 Review: BellSouth	AT&T
Tennessee	96-00067	Wholesale Discount	AT&T
Tennessee	97-00888	Universal Service	AT&T
Texas	Docket 15711	GTE Certification as CLEC	AT&T
Kentucky	97-147	BellSouth BSE Certification	SECCA
Florida	97-1056-TX	BellSouth BSE Certification	FCCA
North Carolina	P691 Sub O	BellSouth BSE Certification	SECCA
Florida	98-0696-TP	Universal Service	FCCA
New York	97-C-271	§ 271 Review: Bell Atlantic	CompTel
Montana	D97.5.87	§ 271 Review: US West	AT&T
New Mexico	97-106-TC	§ 271 Review: US West	AT&T/CompTel
Nebraska	C-1830	§ 271 Review: US West	AT&T
Alabama	Docket 25980	Universal Service	AT&T
Kentucky	Admin 360	Universal Service	AT&T
North Carolina	P100-S133B	Universal Service	AT&T
North Carolina	P100-S133G	Universal Service	AT&T
Illinois	95-0458/0531	Combined Network Elements	WorldCom
Illinois	96-0486/0569	Network Element Cost/Tariff	WorldCom
Illinois	96-0404	§ 271 Review: Ameritech	CompTel
Florida	97-1140-TP	Combining Network Elements	AT&T/MCI
Pennsylvania	A-310203-F0002	Local Competition	CompTel
Georgia	6415-U/6527-U	Local Competition	CompTel
Illinois	98-NOI-1	Structural Separation	CompTel/Qwest
New York	98-C-690	Combining Network Elements	CompTel
Texas	Docket 17579	§ 251 Arbitration: SBC (2nd)	AT&T/MCI
Texas	Docket 16300	§ 251 Arbitration: GTE	AT&T

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
Florida	Docket 920260-TL	Price Cap Plan	IXC Coalition
Louisiana	Docket U22020	Resale Cost Study	AT&T/LDDS
California	Docket R.93-04-003	Rulemaking on Open Network Architecture	LDDS/WorldCom
Tennessee	Docket 96-00067	Avoidable Cost/Resale Discount	AT&T
Georgia	Docket 6537-U	Unbundled Loop Pricing	CompTel
Georgia	Docket 6352	Rules for Network Unbundling	AT&T
Pennsylvania	Docket A-310203F0002	Introducing Local Competition	CompTel
Florida	Docket 95-0984-TP	Interconnection Terms and Prices	AT&T
Kentucky	Case No. 365	Local Competition/Universal Service	WorldCom
Mississippi	Docket 95-UA-358	Introducing Local Competition	AT&T/WorldCom
Florida	Docket 95-0984-TP	Interconnection Terms and Prices	AT&T
Illinois	Docket 95-0458	Wholesale Local Services	WorldCom
California	Dockets R.95-04-043/044	Local Competition	WorldCom
Florida	Docket 95-0696-TP	Universal Service and Carrier of Last Resort Obligations	IXC Coalition
Georgia	Docket 5755-U	Removing Subsidies from Access	AT&T
South Carolina	Docket 95-720-C	Price Regulation	ACSI
Michigan	Case No. U-10860	Interconnection Agreement	WorldCom
Mississippi	Docket 95-US-313	Price Regulation Plan	WorldCom/AT&T
Missouri	Case TR-95-241	Expanded Local Calling	MCI
Washington	Docket UT-941464	Interconnection Complaint	IXC Coalition
Maryland	Case No. 8584 – Phase II	Introducing Local Competition	WorldCom
Massachusetts	DPU 94-185	Introducing IntraLATA and Local Competition	WorldCom
Wisconsin	Docket 6720-TI-111	IntraLATA Equal Access	Schneider Com.
North Carolina	Docket P-100, Sub 126	Expanded Local Calling	LDDS

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
Georgia	Docket 5319-U	IntraLATA Equal Access	MCI/LDDS
Mississippi	Docket 94-UA-536	Price/Incentive Regulation	LDDS
Georgia	Docket 5258-U	Price Regulation Plan	LDDS
Florida	Docket 93-0330-TP	IntraLATA Equal Access	IXC Coalition
Alabama	Docket 23260	Access Transport Rate Structure	LDDS
New Mexico	Docket 94-204-TC	Access Transport Rate Structure	LDDS
Kentucky	Docket 91-121	Alternative Regulation Proposal	Sprint, AT&T and LDDS
Texas	Docket 12784	Access Transport Rate Structure	IXC Coalition
Illinois	Docket 94-0096	Customer's First Proposal	LDDS
Louisiana	Docket U-17949-D	Alternative Regulation	AT&T, Sprint and LDDS
New York	Case No. 93-C-0103	Rochester Plan-Wholesale/Retail	LDDS
Illinois	Dockets 94-0043/46	Access Transport Rate Structure	IXC Coalition
Florida	Docket 92-1074-TP	Expanded Interconnection	Intermedia
Louisiana	Docket U-20800	Access Transport Rate Structure	LDDS
Tennessee	Docket 93-008865	Access Transport Rate Structure	LDDS
Ohio	Docket 93-487-TP-ALT	Alternative Regulation	Allnet/LCI/LDDS
Mississippi	Docket 93-UN-0843	Access Transport Rate Structure	LDDS
South Carolina	Docket 93-756-C	Access Transport Rate Structure	IXC Coalition
Georgia	Docket 4817-U	Access Transport Rate Structure	IXC Coalition
Louisiana	Docket U-20710	Pricing and Imputation Standards	LDDS
Ohio	Case 93-230-TP-ALT	Alternative Regulation	MCI/Allnet/LCI
New Mexico	Docket 93-218-TC	Expanded Local Calling	LDDS
Illinois	Docket 92-0048	Alternative Regulation	LDDS
Mississippi	Docket 93-UN-0038	Banded Rates for Toll Service	LDDS
Florida	Docket 92-1074-TP	Expanded Interconnection	Florida Coalition
Louisiana	Docket U-20237	Preferential Toll Pricing	LDDS, MCI and AT&T

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
South Carolina	Docket 93-176-C	Expanded Local Calling	LDDS & MCI
Mississippi	Case 89-UN-5453	Rate Stabilization Plan	LDDS & ATC
Illinois	Docket 92-0398	Local Interconnection	CLEC Coalition
Louisiana	Docket U-19993	Payphone Compensation	MCI
Maryland	Docket 8525	Payphone Compensation	MCI
South Carolina	Docket 92-572-C	Payphone Compensation	MCI
Georgia	Docket 4206-U	Payphone Compensation	MCI
Delaware	Docket 91-47	Application for Rate Increase	MCI
Florida	Docket 88-0069-TL	Comprehensive Price Review	Florida Coalition
Mississippi	Case 92-UA-100	Expanded Local Calling	LDDS & ATC
Florida	Docket 92-0188-TL	GTE Rate Case	MCI & FIXCA
Wisconsin	Docket 05-TI-119	IntraLATA Competition	MCI & Schneider
Florida	Docket 92-0399-TP	Payphone Compensation	MCI & FIXCA
California	Docket I,87-11-033	Alternative Regulation	Intellical
Florida	Docket 88-0068-TL	Rate Stabilization	Public Counsel and Large Users
New York	Case 28425, Phase III	Access Transport Rate Structure	Empire Altel
Wisconsin	Docket 05-TR-103	Intrastate Access Charges	MCI & CompTel
Mississippi	Docket 90-UA-0280	IntraLATA Competition	Intellicall
Louisiana	Docket U-17949	IntraLATA Competition	Cable & Wireless
Florida	Docket 88-0069-TL	Rate Stabilization	Florida Coalition
Wisconsin	Docket 05-TR-103	Intrastate Access Charges	Wisconsin IXCs
Florida	Docket 89-0813-TP	Alternative Access Providers	Florida Coalition
Alaska	Docket R-90-1	Intrastate Toll Competition	Telephone Utilities of Alaska
Minnesota	Docket P-3007/NA-89-76	Centralized Equal Access	MCI & Telecom*USA
Florida	Docket 88-0812-TP	IntraLATA Toll Competition	Florida Coalition
Wisconsin	Docket 05-TR-102	Intrastate Access Charges	Wisconsin IXCs
Wisconsin	Docket 6655-NC-100	Centralized Equal Access	Wisconsin IXCs

Summary of Expert Testimony and Affidavits – Regulatory Proceedings

State	Docket/Case	Topic	Sponsor(s)
Florida	Docket 88-0069-TL	Rate Stabilization	Florida Coalition
Wisconsin	Docket 05-NC-100	IntraLATA Toll Competition	Wisconsin IXCs
Florida	Docket 87-0347-TI	AT&T Regulatory Relief	Florida Coalition
Illinois	Docket 83-0142	Intrastate Access Charges	Illinois Consolidated
Texas	Docket 8218	WATS Prorate Credit	TEXALTEL
Iowa	Case RPU 88-2	Centralized Equal Access	MCI & Teleconnect
Florida	Docket 87-1254-TL	Regulatory Flexibility for LECs	Microtel
Wisconsin	Docket 05-TR-5, Part B	IntraLATA Competition and Access Charges	Wisconsin State Telephone Assc.
Florida	Docket 86-0984, Phase II	Intrastate Loop Cost Recovery	Florida Coalition

Exhibit JPG-2

Competitive Profile of UNE-P – SBC Territory in Missouri
(Competitive Share by Wire Center – Ranked from Largest Wire Centers to Smallest)

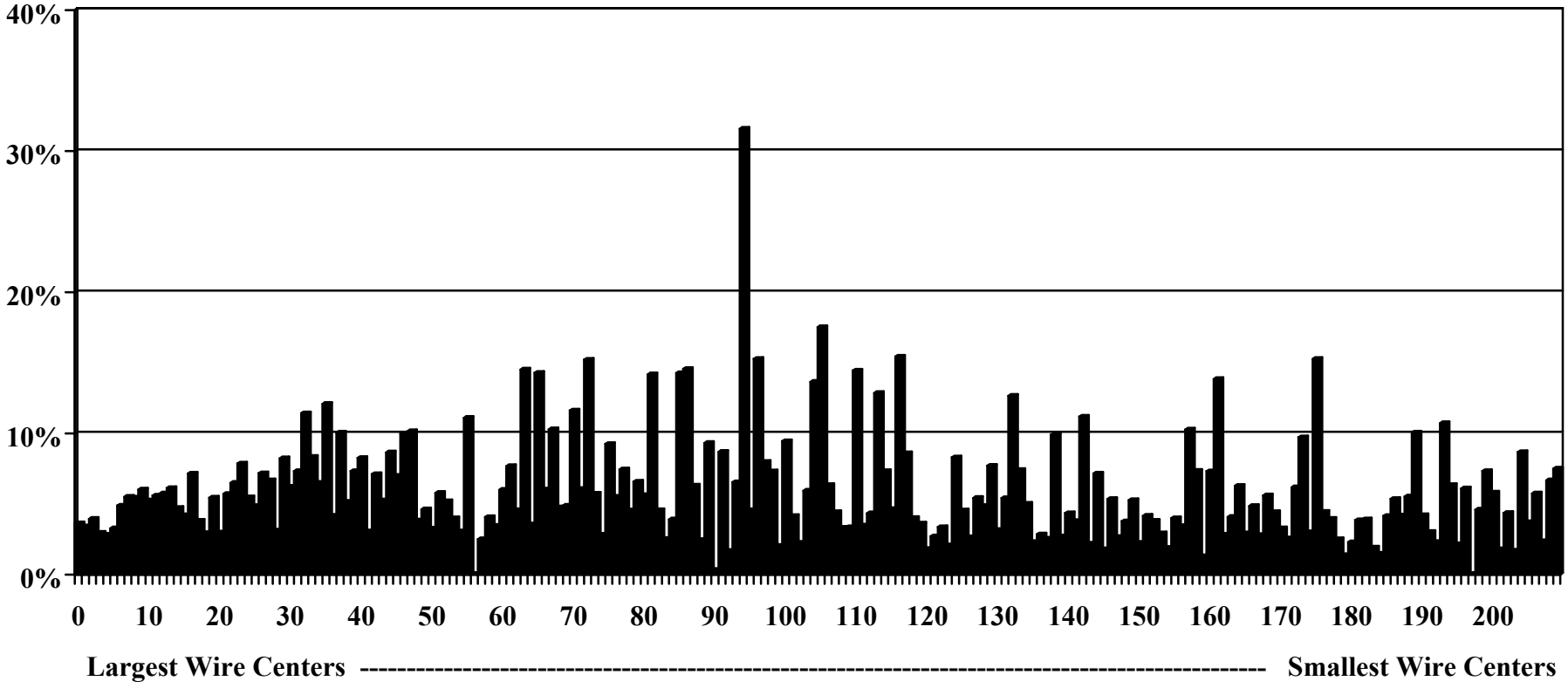
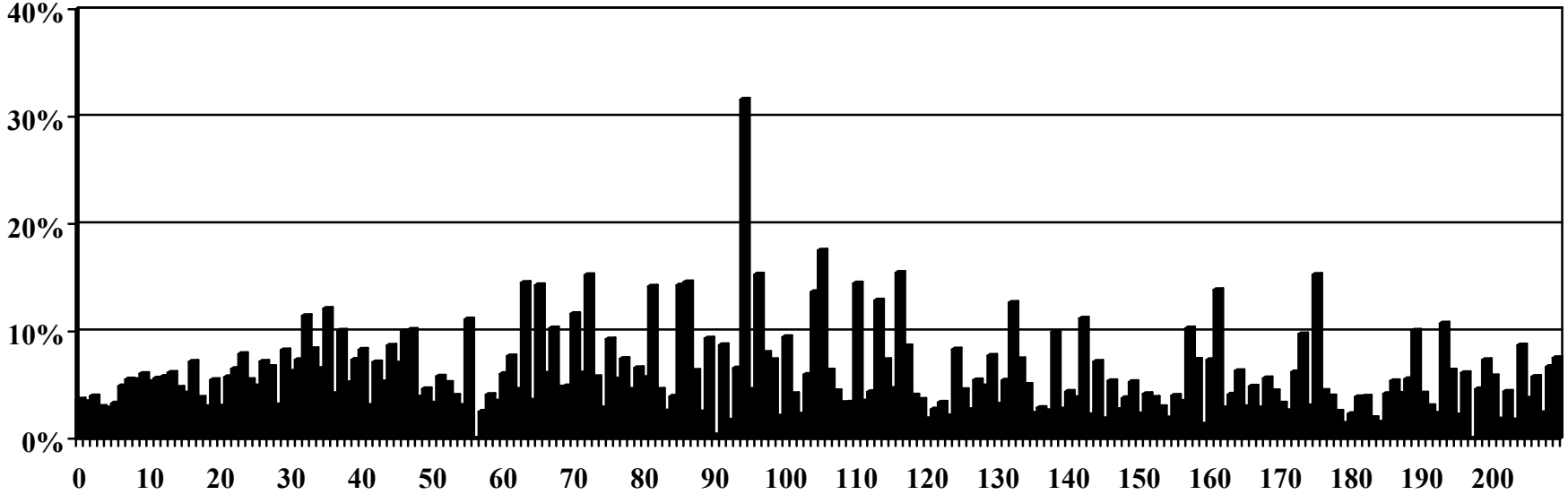
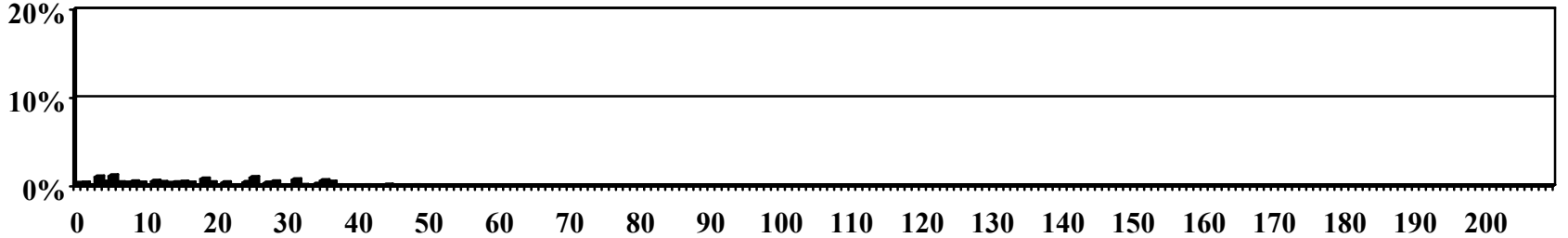


Exhibit JPG-3
Comparing UNE-P to UNE-L



Largest Wire Centers ---------- Smallest Wire Centers

Competitive Profile of Mass Market UNE-L – SBC Territory in Missouri (Statewide)



Largest Wire Centers ---------- Smallest Wire Centers