

**BEFORE THE WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION**

<p>VERIZON SELECT SERVICES, INC.;</p> <p>MCI METRO ACCESS</p> <p>TRANSMISSION SERVICES, LLC;</p> <p>MCI COMMUNICATIONS SERVICES,</p> <p>INC.; TELECONNECT LONG</p> <p>DISTANCES SERVICES AND</p> <p>SYSTEMS CO. d/b/a TELECOM USA;</p> <p>AND TTI NATIONAL, INC.</p> <p>Complainants</p> <p>v.</p> <p>UNITED TELEPHONE COMPANY OF</p> <p>THE NORTHWEST, d/b/a Embarq</p> <p>Respondent.</p>	<p>Docket No. UT-081393</p>
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REBUTTAL TESTIMONY OF

DR. KENT A. CURRIE

ON BEHALF OF

AT&T COMMUNICATIONS OF THE PACIFIC NORTHWEST, INC.,
TCG OREGON, INC., AND TCG SEATTLE, INC.

REDACTED PER PROTECTIVE ORDER
IN WUTC DOCKET UT-081393

June 5, 2009

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Rebuttal Attachment	Description	Exhibit
1	Experience Summary	Exhibit No. ____ (KAC-2)
2HC	Quantifiable Corrections to Embark's Cost Study - Highly Confidential	Exhibit No. ____ (KAC-3HC)
3HC	United's Response to AT&T's Data Request No. 4-111 - Highly Confidential	Exhibit No. ____ (KAC-4HC)
4HC	United's Response to Staff Data Request No. 2 – Highly Confidential	Exhibit No. ____ (KAC-5HC)
5HC	United's Response to AT&T's Data Request No. 4-121 - Highly Confidential	Exhibit No. ____ (KAC-6HC)
6HC	Transmittal letter that accompanied a price quote provided in United's Response to AT&T's Data Request No. 3-79 Highly Confidential	Exhibit No. ____ (KAC-7HC)
7	United's Response to AT&T's Data Request No. 3-96	Exhibit No. ____ (KAC-8)
8	United's Response to AT&T's Data Request No. 4-133	Exhibit No. ____ (KAC-9)
9	United's Response to AT&T's Data Request No. 4-134	Exhibit No. ____ (KAC-10)
10	United's Response to AT&T's Data Request No. 3-104	Exhibit No. ____ (KAC-11)
11	United's Response to AT&T's Data Request No. 3-105	Exhibit No. ____ (KAC-12)
12	United's Response to AT&T's Data Request No. 3-103	Exhibit No. ____ (KAC-13)
13	Docket No. UT-082119 Response to Public Counsel Data Request Data Request No. PC-48 – Redacted	Exhibit No. ____ (KAC-14)
14	United's Response to AT&T's Data Request No. 4-123	Exhibit No. ____ (KAC-15)

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Kent A. Currie and my business address is 45 Erieview Plaza, Room 1545, Cleveland, Ohio, 44114.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by AT&T Services, Inc. as an Area Manager - Rates/Tariffs within the Cost Analysis Division. This group provides cost analysis and regulatory support to various AT&T subsidiaries such as AT&T Communications of the Pacific Northwest, Inc., TCG Oregon, Inc. and TCG Seattle, Inc.

Q. WHAT ARE YOUR JOB RESPONSIBILITIES?

A. My job responsibilities are similar to my previous positions at Ameritech and SBC, where I was responsible for developing and maintaining the methodological framework for economic cost studies for telecommunications services. These cost methods are used in many studies, such as Total Service Long-Run Incremental Cost ("TSLRIC") studies and Total Element Long-Run Incremental Cost ("TELRIC") studies. In order to monitor the application of these methods, I direct, supervise, and prepare studies using these methods. In addition, my responsibilities have included the internal and external dissemination of AT&T's policies regarding studies using these methods and related issues. Furthermore, my responsibilities have included the review and evaluation of cost studies performed by other parties including companies not affiliated with AT&T.

1 **Q. Please describe your educational background.**

2 A. I received a Ph.D. in economics from the University of Iowa in 1973. In addition, I have
3 a Master of Science degree in economics from the University of Iowa, and a Bachelor of
4 Science degree in mathematics from Bradley University. I specialized in microeconomic
5 theory and industrial organization, concentrating in public utility economics. After
6 completing my graduate studies, I held full-time teaching and research appointments at
7 two engineering universities.

8 **Q. PLEASE BRIEFLY DESCRIBE YOUR TELECOMMUNICATIONS WORK**
9 **EXPERIENCE.**

10 A. I began my telecommunications career in 1980 at Ohio Bell Telephone Company. I have
11 performed, directed, and supervised many telecommunications cost analyses across the
12 entire range of services offered by AT&T's incumbent local exchange companies
13 ("ILECs"). Furthermore, I have developed and monitored cost methods used in such cost
14 studies, and I have reviewed cost studies performed by local exchange carriers not
15 affiliated with AT&T.

16 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE ANY REGULATORY**
17 **COMMISSIONS?**

18 A. Yes. I have testified on cost and other economic issues in regulatory proceedings before
19 many regulatory commissions, although I have not previously testified before the
20 Washington Utilities and Transportation Commission ("WUTC"). Currie Rebuttal –
21 **Attachment 1** summarizes my testimonies and lists my other pertinent experience and
22 activities.

1 **Q. HAVE YOU READ THE TESTIMONY OFFERED BY THE EMBARQ**
2 **WITNESSES IN THIS PROCEEDING?**

3 A. Yes, I have read the testimony of Christian M. Dippon, John M. Felz, and Henry J. Roth
4 all offered on behalf of United Telephone Company of the Northwest, d/b/a Embarq
5 (“Embarq”). My testimony will primarily address Embarq’s cost study and the testimony
6 of Mr. Dippon and Mr. Roth.

7 **Q. YOU MENTIONED EARLIER THAT YOU HAVE EXPERIENCE REVIEWING**
8 **ECONOMIC COST STUDIES. WHAT KIND OF COST STUDY HAS EMBARQ**
9 **EMPLOYED AND ARE YOU FAMILIAR WITH THAT PARTICULAR TYPE?**

10 A. Embarq provided a study using its Economic Cost Model (“EMC”). The EMC purports
11 to estimate the costs of the loop, switching, interoffice transport and expenses. Embarq
12 offers this study as consistent with its TSLRIC obligations. A fundamental characteristic
13 of TSLRIC is to measure forward-looking costs, which are costs a carrier, such as
14 Embarq, expects to incur efficiently on a going forward basis. I am very familiar with
15 economic cost studies generally, and TSLRIC studies specifically.

16 **Q. PLEASE SUMMARIZE YOUR REBUTTAL TESTIMONY.**

17 A. Embarq’s interstate switched access rates are presumptively compensatory. As such the
18 Commission need not engage in a detailed examination of Embarq’s costs. Nonetheless,
19 Embarq submitted a “cost” study that purports to show its composite cost for intrastate
20 switched access services exceeds its composite intrastate rate, which is substantially
21 larger than its composite interstate rate. This “cost” study has significant deficiencies
22 which cause Embarq’s costs to be significantly overstated. Without correction, Embarq’s
23 study does not provide a reasonable measurement of Embarq’s costs for intrastate access
24 services. Furthermore, while Embarq admits that intrastate switched access rates are

1 inflated so as to provide a subsidy to basic exchange service, Embarq's study does not
2 provide a reasonable estimate of any needed subsidy.

3 The most significant deficiencies of Embarq's unnecessary study revolve around the
4 inclusion of non-switched access costs in the measurement of switched access costs.

5 Most glaringly, Embarq includes as "costs" the local loop cost, which is not appropriately
6 an economic cost of providing switched access service. Removing them from Embarq's
7 analysis reduces its estimate of the costs of providing switched access by three-fourths.

8 In addition, Embarq has implicitly assumed that the vast majority of network investment
9 beyond the local loop and the line port on switches is caused by usage. This unsupported
10 assumption is inaccurate for Embarq based on its own cost study. A large portion of
11 switching investments in Embarq's study is not volume-driven by either lines or usage.
12 Since cost causation is a fundamental tenant for measuring economic costs, volume-
13 insensitive costs must be properly recognized and assigned. It is incorrect to include
14 volume-*ins*ensitive costs that are shared costs in developing the direct costs of switched
15 access. The result of properly removing volume-insensitive switching costs from usage
16 rate elements reduces the estimate of Embarq's usage-driven switching costs by roughly
17 another half.

18 In addition, common costs are inappropriate to include in the service-specific costs of a
19 service, where the purpose of developing direct costs is to determine price floors of
20 services or identify services receiving economic subsidies. Price floors and the
21 identification of subsidies are proper objects of analysis, although Embarq's exercise of

1 providing its cost study turns out to be a diversion. Nevertheless, common costs are not a
2 part of the direct cost of Embarq's intrastate switched access rates.

3 Various important inputs, such as cost of money, fill factors, switching equipment prices
4 and copper cable prices, also need correction. Likewise, Embarq's maintenance factor
5 development must be modified in order to be forward looking, which is a necessary
6 requirement of economic costs. Other changes should be made, but I will only pursue the
7 errors identified here in this proceeding. All of my quantified corrections result in a
8 composite cost for intrastate switched access service that is far below a composite rate
9 whose components mirror interstate switched access rates. These results are shown in
10 Currie Rebuttal – **Attachment 2HC**.

11 Lastly, Mr. Dippon argues that Washington consumers will not benefit from any decrease
12 in Embarq's switch access charges. But, economic theory implies and historical
13 experience confirms that lower access charges result in lower long distance prices – an
14 obvious benefit to consumers.

15 **II. SCOPE OF ANALYSIS**

16 **Q. WHAT IS THE SCOPE OF YOUR ANALYSIS?**

17 A. I will provide a critique of the cost study sponsored by Mr. Roth in his responsive
18 testimony.¹ In addition, I will make reasonable and necessary modifications to this study
19 that reduce substantially the estimated costs for basic local exchange service and

¹ A print out of the cost study is Exhibit No. __ HC (HJR-4HC) – Cost Study, which is attached to the Responsive Testimony of Henry J. Roth on Behalf of Untied Telephone Company of the Northwest d/b/a Embarq, April 17, 2009. Embarq has provided the electronic version of the study to AT&T.

switched access services. Finally, I will discuss certain economic analyses made by Mr. Dippon in his testimony.

Q. IS IT YOUR INTENT TO PERFORM A COMPREHENSIVE APPRAISAL AND RE-STATEMENT OF EMBARQ'S COSTS?

A. No. My analysis is sufficient to show that the Commission should not rely upon Embarq's study. It is not my intention nor is it necessary to conduct a comprehensive appraisal and re-statement of Embarq's costs. Embarq's own composite estimate of economic costs for intrastate switched access service is above the more reasonable composite of rates recommended by AT&T.² , I have appraised Embarq's cost study in this context and I have found significant deficiencies, which undermine its reliability. In fact, just correcting for major deficiencies lowers Embarq's cost estimates for intrastate switched access services sufficiently to demonstrate that Embarq's intrastate switched access services are collectively compensatory using AT&T's recommended rates.³ Furthermore, my proposed corrections also substantially lower Embarq's cost estimates for basic local exchange service, which is currently the recipient of significant implicit intrastate subsidies. While less significant deficiencies may remain, no useful purpose is satisfied by pursuing them further in this proceeding, and I have not done so.

Q. FROM A COST PERSPECTIVE IS THERE ANY MATERIAL DIFFERENCE BETWEEN AN INTRASTATE SWITCHED ACCESS MINUTE OF USE AND AN INTERSTATE SWITCHED ACCESS MINUTE OF USE ("MOU")?

A. No. From a cost perspective, the portion of switching that is usage sensitive does not depend on what "type" of minute is being switched, be it an intrastate access minute, an

² This result is based on comparing line 22 of column A to line 22 of column D from Bax Rebuttal – Appendix 1HC.

³ This result is based on comparing line 22 of column B to line 22 of column D from Bax Rebuttal – Appendix 1HC.

interstate access minute, a reciprocal compensation minute or a local minute. That is, the composition of minutes switched on a particular piece of equipment makes no material difference in costs among these different types of switched minutes.⁴ Likewise, the portion of interoffice transport equipment and facilities that is usage sensitive does not depend on what “type” of minute is being transported. Given that Embarq’s rate structure in Washington is substantially the same for both intrastate switched access and interstate switched access, there should be no material difference in Embarq’s economic cost between intrastate access MOUs and interstate access MOUs for each rate element. The fact the costs don’t differ supports AT&T’s position that Embarq’s intrastate rates should mirror its interstate rates.

III. MIRRORING INTERSTATE SWITCHED ACCESS RATES & UNDERSTANDING ECONOMIC COST ANALYSIS

Q. WHAT ARE THE ISSUES THAT SHOULD BE EXAMINED IN REVIEWING THE COST STUDY SUBMITTED BY EMBARQ?

A. Interstate switched access rates are presumptively compensatory for interstate services, *i.e.*, these rates generate sufficient interstate revenues to cover the economic costs of interstate switched access. The mirroring of the interstate rate structure and rates for intrastate switched access should be similarly compensatory for intrastate services. Thus, one of the primary cost issues for this proceeding is whether or not mirroring interstate rates on an intrastate basis would be fully compensatory after reasonable adjustments are made to Embarq’s cost study. My review shows that Embarq’s study is sufficiently flawed to require substantial corrections to yield more reliable estimates of the economic costs of Embarq’s switched access. Once a minimal number of these

⁴ Generally, it is busy-hour, busy-season usage that matters if usage matters at all.

1 corrections are made, the original presumption that mirroring is compensatory is still
2 valid. Further review becomes superfluous.

3 Another issue that arises is whether or not intrastate switched access is providing a cross-
4 subsidy to basic local exchange service. Economic costs do have role in providing a
5 coherent identification of cross-subsidies, and the role of cost information used to analyze
6 these two issues is interrelated.

7 **Q. WHAT IS A CROSS-SUBSIDY?**

8 A. The concept of cross-subsidy deals with the circumstance where the buyers of a particular
9 service are "helped out" by the buyers of other services. In particular, the buyers of a
10 service are cross-subsidized by the buyers of other services if the revenues of the
11 subsidized service are so low that it would not be offered were it not for the help of the
12 other services. It is in this sense that the offering of the subsidized service cannot be cost
13 justified.

14 **Q. WHAT ARE THE APPROPRIATE ECONOMIC PRINCIPLES THAT GOVERN**
15 **THE ROLE OF COSTS IN PRICING DECISIONS?**

16 A. The first principle is that the price received from any unit of service sold should not be
17 less than the (economic) cost caused by the production and sale of that unit of service.
18 This principle assures that the value of each unit sold exceeds the value of the resources
19 used to produce that unit. Hence, the sale of each unit of service is economically
20 efficient.

21 The second principle is that the revenue received from a service should not be less than
22 its associated (economic) cost. This principle assures that the total value of the service to

1 consumers exceeds the total value of the resources that could have been used elsewhere,
 2 *i.e.*, the offering of the service is economically efficient. Also, a violation of this second
 3 principle would demonstrate that the service is being subsidized.⁵

4 The satisfaction of these principles generally promotes the efficient and fair use of
 5 society's resources by having the benefit exceed the cost of a decision. These principles
 6 provide a means to evaluate pricing decisions, but do not *per se* determine prices.

7 **Q. WHAT ARE ECONOMIC COSTS?**

8 A. Economic costs include all costs that are affected by the decision under consideration and
 9 exclude costs that do not change as a result of the decision. Since economic costs arise
 10 from a decision, the circumstances surrounding the decision provide the framework from
 11 which economic costs are calculated. *Economic costs are avoidable, forward-looking*
 12 *and incremental.*

13 **Q. WHY ARE ECONOMIC COSTS AVOIDABLE?**

14 A. When a resource such as a piece of equipment is devoted to a particular activity, it cannot
 15 be used in some other way at the same time. So a cost of a decision consists of the value
 16 of resources that have been committed by the decision which could have been employed
 17 elsewhere if the decision to devote resources to the particular employment had not been
 18 made. That is, the economic or opportunity cost of using a resource is the value of the
 19 resource in its best alternative use. Thus, the economic cost of a decision is the cost that

⁵ This test for identifying a subsidy excludes consideration of demand and cost interdependencies and is known as the Gross Incremental Cost test. A more complicated test called the Net Incremental Cost test takes into account demand and cost interdependencies. See Steve G. Parsons, "Cross-Subsidization in Telecommunications," *Journal of Regulatory Economics*, 13 (2), March 1998, pp. 157-182.

could be avoided if the decision is not taken. The market price of a resource is a practical and reliable measure of this avoidable cost.

Q. WHAT ARE FORWARD-LOOKING ECONOMIC COSTS?

A. They are decisions involve the evaluation of alternative future courses of action. They consider what might happen, not what has happened. Consequently, the pricing decision, in particular, uses a forward-looking cost. This cost looks forward to the firm's future, not backward to its past. The economic costs, therefore, occur in the future.

Q. ARE HISTORICAL COSTS ECONOMICALLY RELEVANT FOR PRICING DECISIONS?

A. No. By their very nature historical or embedded costs are not affected by current pricing decisions. While such costs are useful for accounting purposes, they are not useful *per se* for making decisions about current or future prices. Economics proceeds on a simple condition that our decisions can only affect outcomes in the future and not in the past.

Q. DOES THIS MEAN THAT THE PAST IS IRRELEVANT?

A. No. The culmination of all past decisions has resulted in the current circumstances surrounding a pricing decision. The past obviously did matter, but because it is the past, it has no further avoidable consequences. Of course, a forward-looking cost under some circumstances can be unavoidable. It is the circumstances surrounding a proposed course of action, not the recording of irreversible transactions, which determines whether a forward-looking cost is avoidable. An unavoidable cost can be paid in the future if past actions have resulted in an irreversible consequence.

Q. WHY ARE ECONOMIC COSTS INCREMENTAL?

A. Decision-making is an evaluation of competing courses of action. The cost of a decision is the value of the resources that could have been avoided if that decision is not made. Consequently, this opportunity cost is the differential or incremental cost between two courses of action. Economic costs are, thus, incremental and in accordance with the reality of decision-making in the business world.

Q. WHAT IS THE DIRECT COST OF A SERVICE?

A. The direct or service-specific cost of a service is the economic cost incurred by the firm of adding this service to its product mix while holding constant the production and sales levels of all other services produced by the firm, or, equivalently, the cost avoided of removing this service from the product mix, *ceteris paribus*. The direct cost of a service is the incremental cost of the entire volume of service produced. Normally, the direct cost of a service includes both volume-sensitive and product-specific volume-insensitive costs.

Q. PLEASE EXPLAIN THE DISTINCTION BETWEEN VOLUME-SENSITIVE AND PRODUCT-SPECIFIC VOLUME-INSENSITIVE COSTS.

A. Volume-sensitive cost is the cost of doing business, since it represents the cost that varies with the volume of business. The volume-sensitive cost of a particular level of output is the sum of the marginal cost of each unit produced up to the total production. On the other hand, volume-insensitive cost is the cost of being in business. Both volume-sensitive and volume-insensitive costs are avoidable, forward-looking and incremental.

1 **Q. WHY HAVE YOU NOT USED THE TERMS “VARIABLE” AND “FIXED” TO**
 2 **DESCRIBE COSTS?**

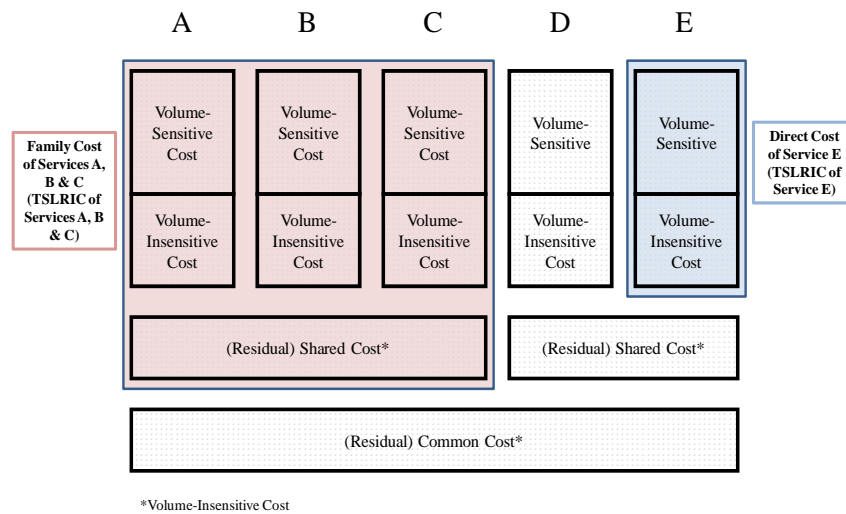
3 A. The volume-based terms “volume-sensitive” and “volume-insensitive” are more precise
 4 than the old terms “fixed” and “variable” since they more specifically describe variability
 5 (and fixity) with respect to volume. Also, the old terms can lead to confusions, especially
 6 when making statements about the long run. In the context of analyzing cost, “variable”
 7 sometimes can mean “avoidable,” which is broader than “volume-sensitive.” Hence, to
 8 say “all costs are variable in the long run” is usually intended to say “all costs are
 9 avoidable in the long run” and not to say the generally incorrect statement that “all costs
 10 are volume-sensitive in the long run.” Similarly, the popular belief that “there are no
 11 fixed costs in the long run” can be confusing give the acknowledgement in the economics
 12 literature of the existence of long-run fixed costs.⁶ Hence, I have used the more precise,
 13 and less confusing, terms.

14 **Q. IS THE DISTINCTION BETWEEN VOLUME-SENSITIVE AND SERVICE-**
 15 **SPECIFIC VOLUME-INSENSITIVE COSTS SUFFICIENT TO CATEGORIZE**
 16 **ALL ECONOMIC COSTS FOR A TELEPHONE COMPANY?**

17 A. No. For a single service or product firm, the volume-sensitive and service-specific
 18 volume-insensitive costs encompass all economic costs for such a firm. However, this
 19 categorization must be extended for multi-service firms such as Embarq. For multi-
 20 service or multi-product firms, costs can be classified into three distinct categories: direct
 21 (service-specific) costs, shared costs and common costs, as shown in the accompanying
 22 diagram.

⁶ For example, see William J. Baumol, John C. Panzar and Robert D Willig, *Contestable Markets and the Theory of Industry Structure*, New York: Harcourt Brace Jovanovich, Inc., 1982, p. 280.

Taxonomy of Costs for Multi-Product Firm



This diagram displays a firm having five services or products (A, B, C, D and E). The direct cost of Service E is the sum of its volume-sensitive and volume-insensitive costs. The direct cost of a family of services is the economic cost incurred by the firm of adding the family to its product mix while holding constant the production and sales levels of all other services produced by the firm, or, equivalently, the cost avoided by removing this service from the product mix, *ceteris paribus*. For example, the direct cost of product E is blue shaded and is the sum of its volume-sensitive and volume-insensitive costs. If a volume-insensitive cost for a resource used to produce a service is not avoided when the service is removed from a firm's service offerings, then that volume-insensitive cost is not attributable to that service. That is, some volume-insensitive costs may not be caused by an individual service offering and must be categorized elsewhere.

The shared cost of a family of services is the direct cost of the family beyond the direct costs of the family members – in other words, the shared cost is the residual left over

1 after removing service-specific direct costs. For example, a right-to-use fee paid per
 2 central office switch for a software package which is used to provide several individual
 3 services that a company offers would be a shared cost to that family of services. Also, a
 4 shared cost never contains a volume-sensitive cost, since a volume-sensitive cost can
 5 always be attributed to a specific service or product.⁷ In the diagram, the family cost for
 6 Service A, B and C is red shaded and is the sum of the direct costs for Services A, B and
 7 C and the shared cost for the family of these services. While the diagram shows only two
 8 family groupings that have shared costs, any grouping of two or more services, but less
 9 than all services, may have a shared cost.

10 Finally, the common cost for a multiproduct firm is the additional cost incurred by the
 11 firm for its entire product offerings beyond the direct costs of all the individual services
 12 and the shared costs of all families of services, or the cost avoided by the firm ceasing to
 13 exist beyond the direct costs of all the individual services and the shared costs of all
 14 families of services. Common cost is only avoidable when the firm goes out of business.
 15 A company's annual business license is an example of a common cost. Thus, common
 16 cost is also a residual cost and also includes only volume-insensitive costs.

17 Cost causation is the driving principle used in this taxonomy. Hence, the costs of
 18 resources used to provide switched access are assigned to a category by examining the
 19 cost causative relationships of adding or removing switched access from the list of
 20 offerings made by a telephone company. Knowing that a particular investment or facility

⁷ I have avoided using the term “joint” because of possible confusion of this term’s use in describing a special type of production activity found in the economics literature – namely, production occurring in fixed proportions. A well-known example of such fixed-proportions production is the production of cotton and cotton seed. I do not view joint production to be important enough for telephone companies to need explicit incorporation into this taxonomy.

is used by more than one service is insufficient to determine whether the cost associated with that investment or facility is a direct, shared or common cost.

Q. WHAT TIME HORIZON IS APPROPRIATE FOR MEASURING ECONOMIC COSTS OF A DECISION?

A. The prospective period of time that matters is a duration of sufficient length to include any significant economic impacts in timing or magnitude that are caused by a decision. The specific circumstances surrounding the decision being contemplated should provide insight into determining an appropriate time horizon.

Economists often separate costs into two abstract time-horizon categories, “long run” and “short run,” in order to explain the consequences of decisions. “Long run” and “short run” are not specific periods of calendar time. These “runs” are used by economists for determining which costs are relevant for explaining decision-making behavior. When actually making decisions, these “runs” provide the bounds of the appropriate focus for a decision.

Long-run cost reflects the cost impacts of an action, such as stimulating increased toll usage, after the firm has fully adapted to the change. For example, the construction cost of new network facilities required to serve a permanent increase in toll usage would be considered a long-run cost. Long-run cost is relevant for decisions that have permanent or sustained economic impacts after adapting to change.

Short-run cost reflects the cost impacts of an action, such as stimulating increased toll usage, subject to the constraint that some resources will not change as the result of the action. For example, the short-run cost of serving increased toll usage could include the

cost of using the existing network facilities but not include the cost of constructing new plant to accommodate the change. Short-run cost is relevant for decisions that have temporary or immediate economic impacts without any further impacts.

Q. WHAT RUN IS APPROPRIATE FOR THE COST ANALYSIS NEED IN THIS PROCEEDING?

A. A long-run cost analysis best matches the pricing and subsidy issues being investigated in this proceeding.

IV. TSLRIC METHODOLOGY TO ESTIMATE ECONOMIC COSTS

Q. WHAT SPECIFIC COST METHODOLOGY SHOULD ACTUALLY BE EMPLOYED TO MEASURE EMBARQ'S SWITCHED ACCESS COSTS FOR THIS PROCEEDING?

A. The standard industry practice for measuring economic costs for telecommunications is to use a cost methodology called by various names –TSLRIC and Long-Run Service Incremental Cost (“LRSIC”) being two of the more common names. For simplicity, I will use the “TSLRIC” moniker. I recommend the use of a TSLRIC methodology to measure Embarq’s economic costs.

Q. PROVIDE A BRIEF DESCRIPTION OF THE PRINCIPLES OF THE TSLRIC METHODOLOGY.

A. Most generally, the TSLRIC methodology follows the economic cost taxonomy I have described. Five specific TSLRIC principles summarize the core rules to implement the taxonomy of economic costs:

- 1) The firm is assumed to operate in the long run.
- 2) The relevant increment of output should be the total company sales of each service studied.
- 3) The technology used for the analysis should be the least-cost, most efficient technology commercially available to the firm.

1 4) Costs should be forward-looking.

2 5) Cost identification should follow cost causation.

3 In addition to these cost principles, Embarq should have the burden of proof in
4 developing cost estimates because of Embarq's privileged and asymmetric access to the
5 information necessary to calculate Embarq's TSLRICs. Also, all cost studies submitted
6 by Embarq in this proceeding should be transparent, open and verifiable by others.
7 Consequently, my review of Embarq's cost study relies on these principles and
8 requirements.

9 **Q. DOES EMBARQ'S COST STUDY FOLLOW YOUR FIRST PRINCIPLE TO**
10 **ASSUME THE LONG RUN?**

11 A. I have been unable to confirm that Embarq has fully adapted all inputs to the quantities
12 used in the model. This would be something to investigate further in a cost proceeding,
13 but I find it unnecessary for my purpose here.

14 **Q. DOES EMBARQ'S COST STUDY FOLLOW YOUR SECOND PRINCIPLE TO**
15 **CONDUCT THE ANALYSIS BASED ON TOTAL SALES FOR EVERY**
16 **STUDIED SERVICE?**

17 A. Probably. However, my concerns are not material, and I would expect that Embarq could
18 satisfactorily respond in a full cost proceeding. Thus, I find no meaningful concern
19 regarding Embarq following this principle.

20 **Q. DOES EMBARQ'S COST STUDY FOLLOW YOUR THIRD PRINCIPLE TO**
21 **USE THE "BEST" TECHNOLOGY?**

22 A. It may not. For example, Embarq uses packet switches to provide access services in at
23 least one state in which Embarq operates.⁸ However, Embarq has not included packet

⁸ Embarq has stated in a public response to AT&T (AT&T-Embarq-4.7) in a Kansas switched access proceeding, Docket No. 08-GIMT-1023-GIT, that Embarq "has, in one of the states in which it operates, converted totally to

switches in its modeling here nor has Embarq provided as part of supporting work papers any analysis that shows the modeled switching equipment is somehow lower cost and more efficient than packet switching equipment, to which Embarq has fully converted in some state. Consequently, Embarq has not demonstrated that its cost study uses the “best” switching technology commercially available to them. To the degree that a better technology exists, I would expect lower costs for switched access than I discuss below, since ultimately that is what a better technology ordinarily means.

Q. DOES EMBARQ’S COST STUDY FOLLOW YOUR FOURTH PRINCIPLE TO BE FORWARD LOOKING?

A. In some significant respects, no. As I discuss in greater depth below, various inputs in Embarq’s cost study are not reasonable, because they do not reflection circumstances facing an efficient, forward-looking Embarq. This problem in Embarq’s cost study is exemplified by Mr. Roth’s future expectations of Embarq’s resource prices.

Q. MR. ROTH INDICATED AT PAGE 14 OF HIS RESPONSIVE TESTIMONY THAT HE DID NOT EXPECT EMBARQ’S COSTS TO DECLINE, APPARENTLY IN PART, BECAUSE OF “INCREASES IN THE COSTS OF LABOR (INCLUDING HEALTH CARE), COMMODITIES, AND ENERGY.” ARE MR. ROTH’S EXPECTATIONS REASONABLE?

Q. No. Mr. Roth’s expectations are far too general. Certainly, some prices for resources used by Embarq are reasonably expected to increase in the future. For example, hourly wages are likely to increase — even this presumption is questionable nowadays — but what may happen to benefit costs may be significantly impacted by decisions of the Obama administration. Next, while electricity may become more expensive in other parts of the nation, the relative prevalence of hydroelectric power generation in Washington

packet switching technology.” While the Kansas response did not identify the state, an examination of the Currie Rebuttal -- **Attachment 3HC**, which is the confidential attachment to Embarq’s response to ATT 4-111, indicates that **[BEGIN HIGHLY CONFIDENTIAL]XXXXXXXXXXXX[END HIGHLY CONFIDENTIAL]**.

1 may insulate Washington's electric customers from some forces that might cause
2 electricity prices to increase in the future.⁹ Furthermore, commercial power is not a
3 financially important input for telephone companies.

4 Nevertheless, prices for some resources – namely, switching and circuit equipment –
5 have been declining for many years, and there is no reason to expect this to change.¹⁰

6 While the equipment prices for circuit equipment used in Embarq's study may not be the
7 best values to estimate forward-looking costs, I have not determined what, if any,
8 changes might be appropriate to make Embarq's circuit equipment prices current.

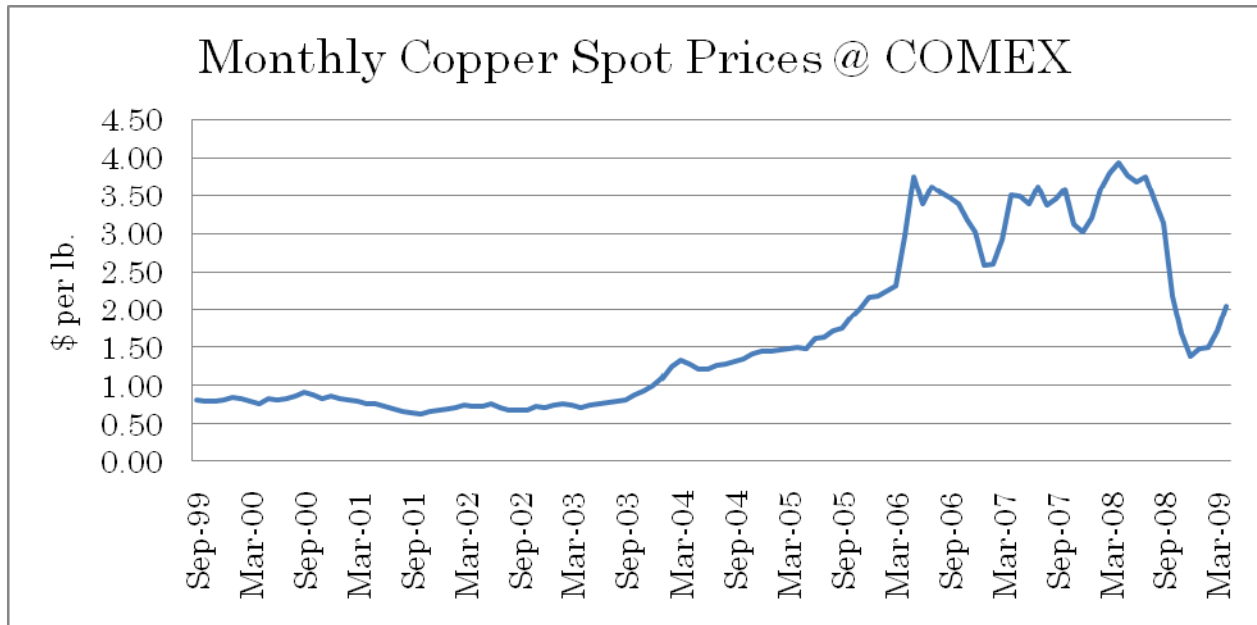
9 However, the equipment prices for switching equipment appear more than five years old
10 and dated, and I will propose adjustments to the old prices for switching equipment that
11 appear in Embarq's study.

12 Finally, it is efficient industry practice to link copper cable prices to the market price for
13 copper, although the effective discount paid will differ between telephone companies and
14 cable vendors. That is, an efficient telephone company should periodically have the
15 prices it pays for copper cables change in proportion to changes in the commodity price
16 for copper. A qualification to this efficient process is that there will ordinarily be a lag of
17 one to three months in the copper price. Contrary to Mr. Roth's general claim about
18 increases in the costs of commodities, copper prices have decreased significantly
19 throughout 2008, although there has been a minor rebound in the past few months, as
20 clearly is apparent in the accompanying figure showing monthly copper spot prices. The

⁹ Based on public 2007 data submitted to the WUTA by Avista, Pacific Power and Puget Sound Energy, $(3,688,781+1,726,953+1,154,233)/(8,623,093+2,009,438+7,329,058) = 36.6\%$ of Washington's electric power generation comes from hydroelectric plants.

¹⁰ See David M. Byrne and Carol A. Corrado, "Prices for Communications Equipment: Updating and Revisiting the Record," Federal Reserve Board, September 10, 2007 ("Byrne-Corrado paper").

recent decline in copper prices has not been adequately recognized in Embarq's study, but it should be. Consequently, I will propose a modification to the copper cable prices found in Embarq's study.



Q. DOES EMBARQ'S COST STUDY FOLLOW YOUR FIFTH PRINCIPLE TO USE COST CAUSATION TO CATEGORIZE COSTS?

A. No. This is the biggest deficiency in Embarq's cost study, which I will discuss in much detail later in my testimony. At this stage I will merely say that Embarq's study frequently and significantly violates this principle often confusing the mere use of a facility with cost causation. Because of the importance of this deficiency, I will provide remedies, for without these cures Embarq's study is fatally flawed as a TSLRIC study.

Q. IN ADDITION TO THE FIVE TSLRIC PRINCIPLES, YOU MENTIONED THAT EMBARQ ALSO BEARS THE BURDEN OF PROOF REGARDING ALL ASPECTS OF ITS COST STUDY. ARE YOU SATISFIED?

1 A. Unfortunately, no. Embarq has failed to document adequately its implementation of the
2 fifth TSLRIC principle regarding usage-based assignments of costs. In addition, Embarq
3 has provided inadequate support in its maintenance factor development. I have taken
4 steps to remedy part of this deficiency, but Embarq's inadequate responses to certain data
5 requests have left me at a dead end for some of the needed corrections. I will discuss
6 both issues later in my testimony.

7 **Q. FINALLY, YOU MENTIONED THAT EMBARQ'S COST STUDY SHOULD BE**
8 **TRANSPARENT, OPEN AND VERIFIABLE BY OTHERS. ARE YOU**
9 **SATISFIED?**

10 A. Generally, yes. Embarq's ECM is transparent, open and verifiable by others, since it
11 primarily relies on standard capabilities of Microsoft's Excel™ program, which is a
12 common tool used by business, consultants and regulators alike. However, I am unable
13 to assess the Geographic sub-Module that is a part of the Loop Module, because Embarq
14 did not include it with the electronic version of Embarq's ECM nor did AT&T request it
15 as is consistent with my limited appraisal of Embarq's ECM for this proceeding.
16 Nevertheless, I encountered various inconveniences for which I found workarounds.¹¹

17 **V. COSTS THAT DO NOT BELONG IN EMBARQ'S TSLRIC STUDY**

18 **Q. WHAT ARE THE SERVICES INCLUDED IN EMBARQ'S COST STUDY?**

19 A. Embarq develops recurring TSLRICs for eight switched access services, which Mr. Roth
20 treats as Embarq's entire family of intrastate switched access services. Using the cost
21 study, Mr. Roth also derives cost estimates of Embarq's family of "intrastate regulated
22 retail service," which Mr. Roth appears to say includes basic local exchange services,

¹¹ The most severe problem that I encountered was that Embarq's ECM does not appear to work properly with Excel 2007™. This was remedied by using Excel 2003™.

vertical features and state toll as well as intrastate switched access and reciprocal compensation.¹²

Q. WHAT DOES EMBARQ CLAIM IS THE COST OF PROVIDING INTRASTATE SWITCHED ACCESS SERVICE?

A. Embarq claims that its weighted average cost of providing intrastate switched access is [BEGIN HIGHLY CONFIDENTIAL] XXXXX [END HIGHLY CONFIDENTIAL] per minute, as shown in Roth Exhibit HJR-2HC. This weighted average costs consist of eight components of intrastate switched access service and an allocation of loop-related costs.¹³ Mr. Roth uses this cost result at page 8 of his responsive testimony to claim that Embarq's costs of providing intrastate switched access exceed its intrastate switched access rates. I have verified that the cost study together with data Embarq provided in response to Staff Data Request No. 2a does yield the weighted average cost reported by Mr. Roth. The data I used for this verification is found in columns A and B on my Attachment 2HC. The resulting weighted average cost is found on row 10 of column B.

Q. IS MR. ROTH'S COST ANALYSIS VALID?

A. No. This analysis has numerous problems. Most importantly, Mr. Roth's calculation of Embarq's switched access costs includes items that are not costs of switched access functionality at all, but rather are subsidy elements that Embarq wishes to continue to charge carriers; in particular it includes recovery of *loop* costs.¹⁴ In other words, these are the very subsidy elements that access reform is intended to ultimately eliminate from carrier switched access fees. It is tautological that if one includes as a "cost" the subsidies

¹² Roth Responsive Testimony at p. 12.

¹³ Mr. Roth's components correspond to the following intrastate switched access rate elements: (1) local transport termination, (2) local transport facility, (3) tandem switching, (4) common multiplexing, (5) local switching, (6) common trunk port, (7) DS1 dedicated trunk port, and (8) DS0 dedicated trunk port.

¹⁴ Roth Responsive Testimony, Exhibit HJR-2HC.

that are embedded in the current rate structure, then one's rate will have to include those subsidy amounts in order to cover that "cost." Such an "analysis" nevertheless provides the Commission no information regarding whether Embarq's intrastate rates or interstate rates for switched access service cover Embarq's economic costs of providing intrastate switched access service.

A. LOOP COSTS SHOULD NOT BE INCLUDED

Q. WHY IS IT INCORRECT TO INCLUDE LOOP COSTS IN A CALCULATION OF DIRECT COSTS FOR USAGE-RATED SWITCHED ACCESS SERVICES?

A. The reason is simple — loop costs are not direct costs of usage-rated switched access services. Hence, it is incorrect to include such costs in a calculation of direct costs for these services. Loop costs are also not shared costs for the family of all usage services, of which switched access service is a part. In fact, most loop costs are direct costs of basic exchange service.¹⁵

The local loop is the transmission line between a customer's premises and the local switch serving that location. It is indisputable that the loop is a major part of local exchange service, and that loop costs are a major component of the costs of basic local service. Local loop costs are recurring costs that are incurred when the customer first places an order for local service. Loop costs do not vary according to how the customer uses the loop; the costs are the same regardless of whether the customer makes only local calls, only long distance calls, or no calls at all. Thus, once a LEC incurs the loop cost to establish local service, there is no further cost to use that loop for *other* services. The

¹⁵ Loop costs are direct costs for some non-usage-rated access services such as entrance facilities. See Embarq's Washington Access Tariff WN U-9, Sections 6.1.3(A)(1), 6.2.8(A)(1) and 6.8.2(A). Mr. Roth's Responsive Testimony and Embarq's cost study makes no mention of entrance facilities.

1 cost of a local loop cannot be avoided by not making toll calls, nor is it increased by
 2 making numerous toll calls; the cost of a loop can only be avoided by *not* ordering local
 3 service. Thus, based on elementary, sound and well-accepted cost causation principles,
 4 the local loop cost is attributable exclusively to local service. Local exchange service
 5 costs are *not* a cost of providing switched access.

6 The bottom line is that Embarq's inclusion of loop costs in its access cost analysis is
 7 simply an attempt to bury an implicit subsidy for local service in its cost calculation. That
 8 is wrong. A cost study for switched access service should not hide or perpetuate implicit
 9 subsidies. Rather, it is supposed to determine the cost of switched access unencumbered
 10 with subsidy allocations so that implicit subsidies can be *identified* and then eliminated.

11 **Q. HAVE EMBARQ WITNESSES ACKNOWLEDGED ELSEWHERE THAT LOOP**
 12 **COSTS SHOULD NOT BE INCLUDED IN AN ACCESS COST STUDY?**

13 **A.** Yes, many times, but outside of *this* docket. Most recently, in a very recent proceeding in
 14 Pennsylvania, Embarq presented testimony from Ms. Christy Londerholm stating that the
 15 "cost causer" for local loops is local service, not switched access:

16 When a customer contacts Embarq for service it is to establish basic local
 17 exchange service. Embarq builds loops to customers to provide basic local
 18 exchange service. Therefore the cost causation to Embarq for the loop is basic
 19 local exchange service. Dial tone requires a loop to a requesting customer. If
 20 a customer chooses to add other services, such as long distance or a custom
 21 calling feature, the dial tone must be there first. Loop investment is a direct
 22 cost of basic local exchange service.¹⁶

23 In addition, Dr. Brian Staihr, as Embarq's economic expert witness, has testified
 24 frequently and consistently that the cost of switched access does not include any costs for

¹⁶ *Investigation regarding Intrastate Access Charges and IntraLATA Toll Rates of Rural Carriers and the Pennsylvania Universal Service Fund*, Pennsylvania Public Utility Commission, Docket No. 1-00040105, Rebuttal Testimony of Christy V. Londerholm, submitted January 15, 2009, at p. 7.

1 the loop. He has vigorously argued in many proceedings across the country over many
 2 years that loop costs should *not* be included in any cost study related to switched access.

3 (1) In a 1999 Kansas proceeding, Dr. Staihr argued that loop costs should not be
 4 allocated to access charges, stating, “Under the [then] current allocation method a
 5 customer pays for part of a loop every time he or she makes a toll call through access
 6 charges. It is *inefficient, uneconomical, and unfair* to recover loop costs this way.”¹⁷
 7 He explained “... in fact it makes more economic sense to recover the loop cost as a
 8 part of basic local service than through any other means currently available.”¹⁸

9 (2) Two years later, in another Kansas proceeding, Dr. Staihr affirmed that it is
 10 “*detrimental* to perpetuate a system in which the cost of a non-traffic sensitive item,
 11 the local loop, is recovered through a traffic-sensitive mechanism, access charges,”
 12 and that “[e]very time a customer makes a toll call he or she pays a part of a loop cost
 13 through access charges. It is simply *uneconomical and unfair to recover loop costs*
 14 *this way*.”¹⁹

15 (3) In a 2002 testimony before the Missouri Public Service Commission, Dr. Staihr
 16 stated, “the issue at hand is to determine the actual cost of switched access, and the

¹⁷ *In re Investigation into the Kansas Universal Service Fund (KUSF) Mechanism for the Purpose of Modifying the KUSF and Establishing a Cost-based Fund*, Kansas Corporation Commission, Docket No. 99-GIMT-326-GIT, Rebuttal Testimony of Brian K. Staihr on behalf of Sprint, May 24, 1999 at p. 6 (emphasis supplied).

¹⁸ *Ibid.*

¹⁹ *In re General Investigation into the Reformation of Intrastate Access Charges*, Kansas Corporation Commission, Docket No. 0 I-GIMT-082- GIT, Rebuttal Testimony of Brian K. Staihr on behalf of Sprint, July 13, 200 I, at pp. 7, 9 (emphasis supplied).

1 *actual cost of switched access does not include the cost of the loop, any more than it*
 2 *contains the cost of the telephone handset.”*²⁰

3 (4) In a 2003 Florida proceeding, Dr. Staihr cited Dr. Alfred Kahn's testimony from a
 4 Pennsylvania proceeding to support his argument that loop costs should not be
 5 allocated to access services: “The arguments proffered by these witnesses [that the
 6 loop is a shared cost among multiple services] are the most persistent weeds in the
 7 regulatory garden. Other mainstream economists and I have dealt with and debunked
 8 these claims for years - and I suppose this will remain our task for as long as parties
 9 to proceedings such as this insist on conflating the politics of setting prices with the
 10 economics of determining costs.”²¹ Dr. Staihr's direct testimony in that same Florida
 11 proceeding stated that his objective was to “convert ... implicit subsidies generated on
 12 a per-minute-of-use basis to flat-rate charges directly recovered from the cost-causer
 13 (the end-user).”²²

14 Given Dr. Staihr's long and unwavering history of arguing *against* the very approach to
 15 loop costs Embarq has presented in this case, and given that Ms. Londerholm has also
 16 argued against Embarq's approach here, it is hardly surprising that Embarq has not
 17 invited them to express any opinions on this subject in this proceeding.

²⁰ *In re Investigation of the Actual Costs Incurred in Providing Exchange Access Service and the Access Rates to be Charged by Competitive Local Telecommunications Companies in the State of Missouri*, Case No. TR-200 165, Surrebuttal Testimony of Dr. Brian R. [sic] Staihr dated August 26, 2002, at pp. 5-6. (emphasis added).

²¹ *Petition of Sprint-Florida, Inc. to Reduce Intrastate Switched Network Access Rates to Interstate Parity in a Revenue Neutral Manner Pursuant to Section 364.1 64(1), Florida Statutes*, Florida Public Service Commission, Docket No. 030868-TL, Rebuttal Testimony of Brian K. Staihr on behalf of Sprint, November 19, 2003, at pp. 6-7, quoting rebuttal testimony of Dr. Alfred Kahn before the Pennsylvania PUC in Docket No. 1-940035, February 15, 1996.

²² *Ibid.*

1 **Q. DOES THE INCLUSION OF LOOP COSTS IN THE DEVELOPMENT OF**
2 **ACCESS COSTS VIOLATE ANY COMMISSION RULE?**

3 A. Yes. As stated in paragraph (3) of WAC 480-120-540, “Local loop costs ... must not be
4 included in the *cost* of terminating access.” (emphasis added) Appropriately, Embarq
5 does not separately develop the cost of terminating access from the cost of originating
6 access. From a cost perspective and in the context of Mr. Roth’s testimony, the inclusion
7 of local loop costs in Embarq’s development of access costs violates this Commission
8 Rule.

9 **Q. WHERE HAS EMBARQ MADE ITS IMPROPER ALLOCATION OF LOOP**
10 **COSTS TO THE DIRECT COSTS OF SWITCHED ACCESS?**

11 A. While the final step is the inclusion of the “Loop Access Cost Allocation” in Mr. Roth’s
12 calculation of the “Weighted Switched Access Cost” per minute found at page 1 of Roth
13 Exhibit HJR-2HC, the development of this improper allocation is found at page 2 this
14 exhibit. In my verification of Mr. Roth’s final calculation, this improper allocation is
15 shown on row 1 under column B of my Attachment 2HC.

16 **Q. DESCRIBE THE COSTS BEYOND LOOP COSTS THAT ARE INCLUDED IN**
17 **EMBARQ’S “LOOP ACCESS COST ALLOCATION.”**

18 A. Embarq’s “Loop Access Cost Allocation” allocates **BEGIN HIGHLY**
19 **CONFIDENTIAL] XXXXX [END HIGHLY CONFIDENTIAL]** per minute to
20 switched access and is made up of two parts: “Loop & Local NID” and “Central Office
21 Termination.” Central office termination costs are the smaller of the two parts. Central
22 office termination or line termination costs are not direct costs of any switched access
23 service, but are direct costs of basic service lines. Embarq’s allocation of a portion of

1 line termination costs to switched access is also improper. All of the reasons why loop
2 costs are not a direct cost of switched access also apply to line termination costs.²³

3 Amazingly, the monthly cost per line for “Loop & Local NID” includes more than loop
4 costs, as explained by Embarq’s response to a Staff data request and attached as Currie
5 Rebuttal – **Attachment 4HC**, even though nothing in Mr. Roth’s Responsive Testimony,
6 Embarq’s cost study or Embarq’s accompanying work papers gave a reasonable hint that
7 anything beyond loop costs was included with “Loop & Local NID.” Nevertheless,
8 Embarq has allocated a portion of “Customer Operations” expenses to switched access.
9 These costs include expenses for Product Management (Account 6611), Sales (Account
10 6612), Product Advertising (Account 6613), Number Services (Account 6622) and
11 Customer Services (Account 6623).²⁴ Embarq states that the monthly “Customer
12 Operations” cost used in developing the “Loop & Local NID” amount is [BEGIN
13 **HIGHLY CONFIDENTIAL**] XXXX [END **HIGHLY CONFIDENTIAL**] per line.²⁵

14 There are numerous problems with including this “Customer Operations” cost in the
15 direct cost of switched access except for any portion that might be directly attributable to
16 switched access. Based on the documentation provided by Embarq, none of the
17 “Customer Operations” cost is a direct cost of switched access. But, Embarq identifies
18 “Wholesale Customer Operations Expense” at Row 273 at page 171 of Roth Exhibit
19 HJR-4HC. While Embarq has not documented this expense, by its title it is not a direct
20 cost of retail services. Since wholesale services should include special access, unbundled

²³ Generally, entrance facilities, which may be purchased as part of switched access, are loops that have trunk terminations or ports rather than line terminations or ports on switches.

²⁴ Embarq’s explanation appears to exclude expenses for directory assistance operators and their supervisors, which are included in Number Services expenses, from its calculation of “Customer Operations” expenses allocated to switched access.

²⁵ I have been unable to verify this amount based on Embarq’s explanation contained in my Attachment 4HC.

1 network elements and reciprocal compensation in addition to switched access, it is not a
 2 direct cost of switched access. Further, it is reasonable to presume “Wholesale Customer
 3 Operations Expense” is contained in the rows that make up the “Customer Operations”
 4 expenses. Less than 2% of the “Customer Operations” expenses, as described by Embarq
 5 in my Attachment 4HC, is a shared cost of wholesale services. I conclude that none of
 6 the “Customer Operations” expenses is directly attributable to switched access, and,
 7 therefore these expenses are not a direct cost of switched access.²⁶

8 While I may have additional concerns regarding this allocation of “Customer Operations”
 9 expenses to switched access, it is not necessary to enumerate them here. Nevertheless,
 10 Embarq’s proposed inclusion of these expenses in switched access may also be anti-
 11 competitive to the degree that it forces purchasers of switched access such as IXC’s to pay
 12 a portion of Embarq’s costs for marketing and selling Embarq’s or an affiliate’s services
 13 that compete with other carriers’ offerings as well as a portion of customer care activities
 14 Embarq undertakes to support its or an affiliate’s offerings that compete with other
 15 carriers’ offerings.

16 **Q. WHAT IS THE IMPACT OF REMOVING THE LOOP-ASSOCIATED COSTS**
 17 **ON MR. ROTH’S WEIGHTED AVERAGE COST OF SWITCHED ACCESS?**

18 A. The weighted average cost of providing intrastate switched access becomes [BEGIN
 19 **HIGHLY CONFIDENTIAL**] XXXX [END **HIGHLY CONFIDENTIAL**] per minute
 20 with the removal of loop-associated cost. This necessary correction reduces the cost
 21 estimate by [BEGIN **HIGHLY CONFIDENTIAL**] XXXXX [END **HIGHLY**

²⁶ As discuss later in my testimony, these “Customer Operations” are not direct costs exchange access, of which local loops are the most significant part.

CONFIDENTIAL] per minute or more than three-fourths. These results are shown under column C of my Attachment 2HC.

B. TRAFFIC INSENSITIVE COSTS SHOULD NOT BE INCLUDED

Q. HOW DOES EMBARQ'S COST STUDY ALLOCATE COSTS TO COST CATEGORIES THAT CORRESPOND TO THE SWITCHED ACCESS COST PER MOU ELEMENTS SHOWN AT PAGE 1 OF ROTH EXHIBIT HJR-2HC?

A. The basic process is quite simple, although there are many details. Embarq's model develops the costs for all of the pieces of its modeled switches having separate prices charged by the switch vendor. Also, the model put costs associated with POTS (loop start) and ISDN BRI line cards along with associated main distribution frame ("MDF") equipment into a "line termination" bucket. Then, the model *assumes* everything else is caused by usage so that any remaining switching costs will go into "traffic" or "usage" buckets such as "line usage" and "trunk usage." The usage costs are expressed on a duration or MOU basis. The costs in the "line usage" bucket go into local switching costs, whereas "trunk usage" goes into local switching, tandem switching, common trunk port, DS1 dedicated trunk port and DS0 dedicated trunk port costs. But the crucial aspect of the allocation process made in Embarq's model needs repeating – the model *assumes* that almost all switching equipment cost is traffic or usage sensitive.²⁷ In what is nearly an afterthought, the model does "size" a few switch components using usage information. Otherwise, Embarq provides no justification to its allocation of switching costs to "usage" buckets.

²⁷ Specifically, the monthly cost in the "line termination" bucket is the study area total for line termination found in row 23 and column E of Exhibit HJR-4HC at page 7. The monthly cost for total switching bucket is found in row 43 for the same column. The usage-sensitive portion of total switching monthly cost is **[BEGIN HIGHLY CONFIDENTIAL]** XXXXXXXXXXXXXXXXXXXX **[BEGIN HIGHLY CONFIDENTIAL]**.

Q. WHAT ARE EXAMPLES OF SWITCHING EQUIPMENT COSTS THAT ARE USAGE INSENSITIVE, BUT EMBARQ ASSUMES ARE USAGE SENSITIVE?

A. The most prominent examples of switching equipment costs that are usage insensitive, which Embarq incorrectly assumes are traffic or usage sensitive, are switch processor and switch software costs. In reality, these costs are volume-insensitive costs and are not avoided if switched access were removed from Embarq's service offerings. That is, if Embarq's switched access usage dropped precipitously, or even disappeared, Embarq would incur the same switch processor and switch software costs.²⁸ In addition, Embarq includes other volume-insensitive costs that are similarly unavoidable. Hence, Embarq has not properly followed the cost causation principle, and Embarq's switched access study should be corrected.

1. Switch Processor & Software Costs Should Not Be Included

Q. WHAT ARE SWITCH PROCESSOR COSTS?

A. Switch processor costs include those costs incurred by procuring, placing, and operating the central processing or core electronic equipment within a switch. It is sometimes called a "getting started" cost, because it is incurred when a switch is initially placed in operation. The explicit price received from the vendor, net of any discounts, for the central processor comprises the gross *investment* for the processor. Annual Charge Factors ("ACFs"), which include annual costs of depreciation, cost of capital, income tax, maintenance, and other related costs, convert the investment to an annual *cost* when applied.

²⁸ Properly formulated for the facts involving Embarq in this proceeding, this would hold even if all usage service offerings were removed.

Q. HOW DID EMBARQ MODEL ITS SWITCH PROCESSOR COSTS FOR ITS SWITCHED ACCESS COST STUDY?

A. The extent of Embarq's narrative description of this investment is as follows: "Processor Investment - is the initial processor (XA-Core) investment and spares."²⁹ Beyond this, an analyst must explore the model and work papers for any substantive information on Embarq's methodological treatment of switch processor cost. Embarq identifies one central processor and one spare central processor for each modeled host switch, which are inputs that are not calculated by the model.³⁰ The confidential work paper Embarq provided, "Highly Confidential Circuit Switching Unit Price Support.xls," provides the vendor list price and discount percentage quoted to Embarq. After applying the relevant discount, the "lumpy" investment amounts for the processors and spares are carried forward without change to the Switch Module within the broader model. From there it is linked to the investment/cost development that Embarq performs for each modeled switch. Investment loadings and an ACF are applied with the resulting expense for the initial processors and spares allocated to *usage* buckets.³¹

Q. WHY IS THIS A PROBLEM?

A. This is a problem, because Embarq has provided no causal link between usage and efficient processor requirements. A causal link is a prerequisite for properly assigning costs following the fifth principle for TSLRIC studies. Embarq has not provided one. Since it is Embarq's burden of proof, which Embarq has failed to satisfy, to explain how

²⁹ Exhibit HJR-3 to Mr. Roth's Responsive Testimony at p. 5.

³⁰ These details are not shown on Exhibit HJR-4HC. Nevertheless, the model has "hidden" tabs, which can be examined by those having access to the electronic version of Embarq's ECM. The investment for the single central processor is developed on the "Central Processor Calc" tab of the model, while the single spare central processor investment calculation is found on the "Spares" tab.

³¹ A small portion is allocated to feature costs.

processors are usage sensitive, it would be reasonable to stop here and make my recommendation to remove processor costs from any usage-sensitive cost assignment.

Q. ARE YOU CLAIMING THAT PROCESSOR COSTS CAN NEVER BE USAGE-SENSITIVE?

A. No.

Q. IF A VENDOR OFFERS DIFFERENT SIZES OF PROCESSORS, DOES THAT AUTOMATICALLY QUALIFY PROCESSORS AS ATTRIBUTABLE TO SWITCHING MINUTES OF USE?

A. No. Additional analysis would be needed in these circumstances. However, this is academic for this proceeding, because Mr. Roth's testimony, Embarq's cost study and supporting work papers—including the vendor's price quote attached to Embarq's response to AT&T's Data Request 79—contain no mention of different processor sizes.

Q. AT PAGE 22 OF HIS RESPONSIVE TESTIMONY, MR. ROTH DEFINES THE TERM "LONG RUN" AS REFERRING "TO A PERIOD OF TIME LONG ENOUGH SO THAT ALL OF A FIRM'S COSTS BECOME VARIABLE OR AVOIDABLE." ARE YOU SATISFIED WITH THIS DEFINITION?

A. Not completely. As I previously discussed, "long run" is a hypothetical circumstance in which all of a firm's resources are treated as fully adaptable. Consequently, the allusion to calendar time is unnecessary. Further, as I also discussed, confusion can arise with the use of the term "variable."

Q. IS YOUR UNEASE ABOUT MR. ROTH'S DEFINITION OF "LONG RUN" PURELY ACADEMIC?

A. No. Embarq's response to AT&T's Data Request No. 121, which is attached as Currie Rebuttal – **Attachment 5HC**, appears to reveal a misunderstanding of the meaning of the "long run." When AT&T requested of Embarq to identify which switch investments vary by lines and trunks, Embarq answered in part by quoting the same excerpt from page 22

1 of Mr. Roth's testimony that is in my previous question above. Mr. Roth, as the preparer
 2 of this response, then concluded, “[a]s such, all switch investment and cost become
 3 variable...” Embarq then went on to state that it “does not agree with the statement that
 4 certain costs ‘would not vary with respect to lines or trunks’,” and that overall increases
 5 in demand would “potentially require[.] the addition of each and every type of
 6 equipment required to provision switching services in United's Washington serving
 7 territory.” Embarq seems to state that practically any and all of its modeled switching
 8 investment will “vary,” if not by lines and trunks, then by switching minutes of use. My
 9 concern with Mr. Roth’s definition of “long run” is exemplified by his failure to
 10 recognize that volume-insensitive costs do exist in the long run even for switching
 11 equipment. Yet, this misunderstanding provides a potential explanation for Embarq’s
 12 unreasonable assumption that almost all switching investments and costs are usage
 13 sensitive.

14 **Q. IS THERE ADDITIONAL EVIDENCE FROM EMBARQ THAT FURTHER**
 15 **CONFIRMS SWITCH PROCESSOR COSTS ARE VOLUME INSENSITIVE IN**
 16 **EMBARQ’S COST STUDY?**

17 **A.** Yes. The processor investment, which includes spare, for each modeled host switch is
 18 **[BEGIN HIGHLY CONFIDENTIAL] XXXXXXXX [END HIGHLY**
 19 **CONFIDENTIAL].**³² What is revealing is the number of lines and, more importantly,
 20 volumes of usage vary substantially across these switches with the range of monthly line-
 21 side call attempts going from a low of **[BEGIN HIGHLY CONFIDENTIAL] XXXXX**
 22 **[END HIGHLY CONFIDENTIAL]** to a high of **[BEGIN HIGHLY**
 23 **CONFIDENTIAL] XXXXXXXX [END HIGHLY CONFIDENTIAL]**, the range of

³² Embarq did not print out this relevant information at page 11 on row 16 of its Exhibit HJR-4HC, but the missing columns are found on the “Investment” tab of the Switch Module in the electronic version of the cost study.

1 monthly trunk-side call attempts going from a low of [BEGIN HIGHLY
 2 CONFIDENTIAL] XXXXX [END HIGHLY CONFIDENTIAL] to a high of
 3 [BEGIN HIGHLY CONFIDENTIAL] XXXXXX [END HIGHLY
 4 CONFIDENTIAL], the range of monthly line-side billable minutes going from a low of
 5 [BEGIN HIGHLY CONFIDENTIAL] XXXXXXXX [END HIGHLY
 6 CONFIDENTIAL] to a high of [BEGIN HIGHLY CONFIDENTIAL] XXXXX
 7 [END HIGHLY CONFIDENTIAL], the range of monthly trunk-side billable minutes
 8 going from a low of [BEGIN HIGHLY CONFIDENTIAL] XXXXXXXX [END
 9 HIGHLY CONFIDENTIAL] to a high of [BEGIN HIGHLY CONFIDENTIAL]
 10 XXXXXX [END HIGHLY CONFIDENTIAL], the range of lines terminating directly
 11 on a host switch going from a low of [BEGIN HIGHLY CONFIDENTIAL] XXXXX
 12 [END HIGHLY CONFIDENTIAL] to a high of [BEGIN HIGHLY
 13 CONFIDENTIAL] XXXXX [END HIGHLY CONFIDENTIAL], and the range of
 14 remote lines terminating indirectly on a host switch going from a low of [BEGIN
 15 HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] to a high of
 16 [BEGIN HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL].³³
 17 If the processor were volume sensitive, then one would expect to see varying levels of
 18 processor investments. But, as can be seen in Embarq's cost model that is not the case.

19 **Q. ARE YOU SAYING THAT SWITCH PROCESSOR COSTS CAN NEVER BE**
 20 **VOLUME-SENSITIVE COSTS?**

21 A. No, I am not. What I am saying is that it is unreasonable to assume switch processor costs
 22 are volume sensitive without performing an analysis that justifies this assumption.

³³ Again, Embarq did not print out this relevant information at page 10 on rows 14, 15, 25, 26, 30 and 44 of its Exhibit HJR-4HC, but the missing columns are found on the "Demand" tab of the Switch Module in the electronic version of the cost study.

Embarq has performed no such analysis, and the cost information provided in Embarq's study contradicts this assumption.

Q. WHAT ANALYSIS WOULD EMBARQ NEED TO PERFORM TO DEMONSTRATE THAT PARTICULAR INVESTMENTS SUCH AS SWITCH PROCESSOR INVESTMENTS ARE NOT ENTIRELY VOLUME INSENSITIVE?

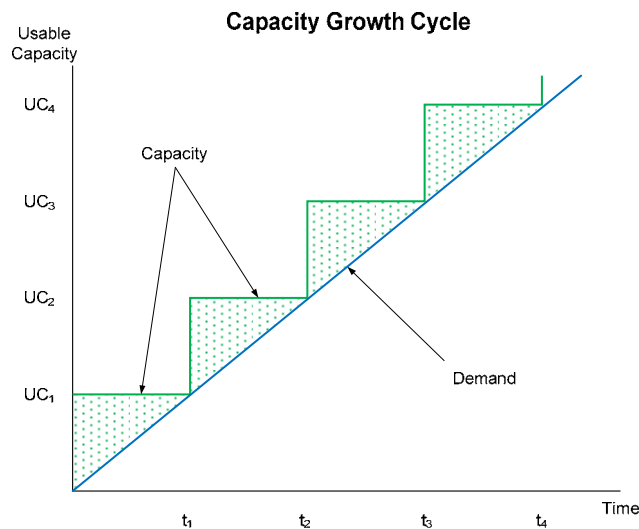
A. Now, the identification of the volume-sensitive portion of investments can be particularly vexing when analyzing "lumpy" investments, which is common for telecommunications investments. One approach would ask whether or not efficient provisioning would change the amount of "lumpy" investment if volumes changed. The amount that changes would measure the volume-sensitive amount and the amount that does not change would measure the volume-insensitive amount. While this approach is technically adequate, potentially it can require a lot of work, since it would need to be pursued for every "lumpy" investment and every potential volume dimension to identify the volume-sensitive portion of all investments. In particular, it would likely require multiple price quotes reflecting different volumes from each equipment vendors so that equipment could be efficiently sized for different volumes – a daunting prospect in the real business world.

Q. IS THERE A MORE PRACTICAL APPROACH TO IDENTIFY VOLUME-SENSITIVE COSTS ASSOCIATED WITH "LUMPY" INVESTMENTS?

A. Yes. The "capacity costing" methodology provides another equally reasonable approach. It is typically used for TSLRIC studies, at least in part, because it relies on information that is less problematic to obtain.

Q. WHAT IS THE “CAPACITY COSTING” METHODOLOGY?

A. The capacity costing methodology relies on the divisibility of time to make the costs of lumpy investments appear divisible. The underpinning of capacity costing is that the long term capital cost impacts of decisions to expand or contract the volume of a service are the changes in cost due to advancing or deferring the timing of the next growth in capacity. Generally, most investments for telephone companies are manufactured and purchased in indivisible “lumps” of capacity. This is certainly true for the processor investment included in Embarq’s Switch Module. A new lump of capacity is purchased when the existing installed capacity nears exhaust. New capacity is purchased and installed ahead of demand and, thereby, becomes spare capacity. A telephone company normally grows into this spare capacity over time through the growth in demand. This capacity growth cycle is illustrated below.



For example, suppose that a switch line unit has the capacity to support up to 256 line terminations. In addition, assume that six terminations are required for administrative spare and are, thus, not available to satisfy demand. So, the usable capacity of each

1 purchased switch line unit is 250 terminations. Hence, in the illustration, UC_1 is 250
 2 terminations, UC_2 is 500 terminations, UC_3 is 750 terminations and UC_4 is 1000
 3 terminations for this example. In year zero, before any demand has been served, there is
 4 a spare capacity of 250 terminations that acts as an inventory ready to serve. As time
 5 passes and demand grows the inventory becomes committed to serve the new demand.
 6 At time t_1 – say three months – demand exhausts the existing inventory of line
 7 terminations and another switch line unit must be purchased. If growth follows this
 8 illustration, demand will also exhaust the existing inventory at 6 months and 9 months.
 9 This using up of spare capacity until more capacity is purchased is the basis for
 10 identifying volume-sensitive investments and, thereby, volume-sensitive costs for
 11 equipment or facilities purchased in lumps.

12 Now, suppose that a switch vendor charges \$2,000 for each line unit. The line card
 13 investment per usable line termination is $\$8.00 = \frac{\$2,000}{256 - 6}$. In practice, the denominator is

14 often reformulated by using a fill factor so that $(256 - 6)$ becomes $\left(\frac{250}{256}\right) \times 256$, where

15 $\frac{250}{256}$ is a fill factor. This fill factor converts designed capacity into usable capacity. For
 16 this example, \$8.00 per line termination is the volume-sensitive unit investment for the
 17 line unit equipment. However, this does not reflect the total amount spent on capacity,
 18 because it will not include the shaded area in the illustration of the capacity growth cycle.
 19 This shaded area is the average amount of spare capacity on hand due to the lumpy nature
 20 of capacity additions, which is sometimes called breakage. It is (roughly) the value of
 21 half a unit of capacity, or for the line unit example \$1,000. Clearly, breakage is not

1 volume-sensitive. This illustrates how capacity cost identifies volume-sensitive and
2 volume-insensitive costs.

3 **Q. ARE THERE ANY CAVEATS IN USING CAPACITY COSTING TO IDENTIFY**
4 **VOLUME-SENSITIVE AND VOLUME-INSENSITIVE COSTS ASSOCIATED**
5 **WITH ANY PURCHASE OF A LUMPY INVESTMENT?**

6 A. Yes. There are two crucial conditions that are necessary for applying the capacity costing
7 methodology to identify volume-sensitive costs. First, demand must be expected to
8 outgrow the existing capacity prior to planned replacement for technological or other
9 non-use related reasons. Generally, the economic life of the associated equipment is a
10 reasonable estimate of the time to planned replacement. If this condition is not satisfied,
11 there may be no future cost impacts, *i.e.*, the advancement or deferments in timing of
12 capacity purchases, caused by volume changes that increase or decrease the use of spare
13 capacity. In these circumstances, there are only volume-insensitive costs. Second,
14 changes in demand must be sufficiently permanent so as to affect future capacity
15 purchases. In simpler terms, new demand cannot merely replace old demand. An
16 important corollary for applying the capacity costing methodology is that the limiting
17 capacity, *e.g.*, measured in lines or MOUs, that ultimately causes an additional capacity
18 purchase should be clearly stated and quantified in order to execute this methodology
19 properly.

20 **Q. ARE ANY PROCESSOR COSTS DEVELOPED BY EMBARQ FOR THIS**
21 **PROCEEDING VOLUME SENSITIVE IN LIGHT OF YOUR DISCUSSION OF**
22 **THE CAPACITY COSTING METHODOLOGY?**

23 A. No. Processor performance had dramatically improved over the past 30 years when
24 digital circuit switching systems were initially deployed in the United States. The
25 components used to construct switch processors have benefited from the profound

1 improvements of the Computer Revolution that continue to follow Moore's Law.³⁴

2 Today, switch processor performance has improved to the point where it no longer
3 effectively limits the capabilities of modern switches to terminate lines and trunks and to
4 handle calls. Modern processor investments are not exhaustible, although processors
5 associated with older technologies may have been. This means according to the capacity
6 costing methodology that processor investments have no volume-sensitive costs;
7 processor investments only have volume-insensitive costs.

8 **Q. DID YOU TAKE STEPS TO EXCLUDE PROCESSOR COSTS FROM THE**
9 **VOLUME-SENSITIVE COST CATEGORY?**

10 A. Yes. I made all the adjustments in the Switch Module of my work papers. Initially, I
11 identified the central processor equipment investments on the "Central Processor Calc"
12 tab and the central processor spare investments on the "Spares" tab. I brought these
13 values forward to the "Summary" tab, in which investments for remotes are rolled up
14 with their corresponding host investments. Next, calculations were made on the
15 "Investment" tab to include loadings for power, telco EF&I and applicable sales tax.
16 Then, the investments were converted to costs on the "Expenses" tab and the usage-
17 sensitive identification was made. Of course, the usage-sensitive portion of processor
18 costs is zero. Now, only the usage-sensitive processor costs are included in line usage
19 and trunk usage on the "Duration" tab. Also, because only the usage-sensitive processor
20 investment can be causally linked to features, the processor investment found on the
21 "Feature Invest and Cost" tab was tied to the usage-sensitive process investment. I
22 highlighted my changes with a yellow background and plum fonts. Finally, I

³⁴ Generally, Moore's Law says the number of transistors in a processor doubles about every 18 months.

1 summarized these changes along with some minor cosmetic changes on the
 2 “Introduction” tab in my work papers.

3 **Q. ARE YOU ELIMINATING SWITCH PROCESSOR COSTS ENTIRELY FROM**
 4 **THE STUDY?**

5 A. No. I am following cost causation to determine that switch processor costs are not caused
 6 by usage alone. In particular, they should be excluded from the direct costs for switched
 7 access, but they are part of Embarq’s total company economic costs.

8 **Q. HAS THE FCC TREATED SWITCH PROCESSOR COSTS AS VOLUME-**
 9 **INSENSITIVE COSTS?**

10 A. Yes. The FCC’s Wireline Competition Bureau stated in its *Virginia Arbitration Cost*
 11 *Order*:

12 ...Given the record evidence that modern switches typically have large
 13 amounts of excess central processor and memory capacity, the usage by any
 14 one subscriber or group of subscribers is not expected to press so hard on
 15 processor or memory capacity at any one time as to cause call blockage, or a
 16 need for additional capacity to avoid such blockage. Thus, no one subscriber
 17 or group of subscribers is any more or any less causally responsible for the
 18 processor or memory capacity costs. Principles of cost causation, therefore,
 19 support a per line port cost recovery approach... (footnotes excluded)³⁵

20 **Q. WHAT ARE SWITCH SOFTWARE COSTS?**

21 A. Although switch software costs can be broad enough to include any software related to
 22 the functions of the switch (including certain vertical features), the primary purpose of
 23 switch software typically includes operational functions such as call processing control,

³⁵ Memorandum Opinion and Order, *In the Matter of Petition of WorldCom, Inc. Pursuant to Section 252(e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia Inc., and for Expedited Arbitration*, CC Docket No. 00-218, and *In the Matter of Petition of AT&T Communications of Virginia Inc., Pursuant to Section 252(e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia Inc.*, CC Docket No. 00-251, 18 FCC Red 17722 (WCB 2003) (“*Virginia Arbitration Cost Order*”), ¶ 463.

1 fault identification, hardware control, system integrity diagnostics, database, and
 2 administration. The relevant amount of “switch software” *per se* will be the initial
 3 amount of software required for the switch, sometimes referred to as the right-to-use
 4 (“RTU”) software or base load switch software. Like the processor, this investment for
 5 Embarq is based upon the net discounted vendor price and multiplied by the applicable
 6 ACF to produce an annual cost. And, like the processor, the central TSLRIC issue is
 7 whether this equipment is attributable, or caused by, switch minutes of use.

8 **Q. HOW DID EMBARQ MODEL ITS SWITCH SOFTWARE COSTS FOR ITS**
 9 **SWITCHED ACCESS COST STUDY?**

10 A. The extent of Embarq's description of this investment is as follows: “The investments
 11 include all hardware investment in the central office and base load software required to
 12 provide basic switching functionality.”³⁶ Again, further descriptive information must be
 13 discerned from the model and Embarq’s work papers. Embarq’s confidential Excel™
 14 work paper named “Highly Confidential Circuit Switching Unit Price Support.xls”
 15 provides the discounted vendor price (from list price) applicable to Embarq. This lumpy
 16 investment for software for the central processor – *ergo*, base load software, or what I
 17 simply call switch software – is entered in the cost model.³⁷ Now, the cost development
 18 follows a path similar to Embarq’s treatment of processor investments. So, after the
 19 switch investment is loaded into the model, it is linked to the investment/cost
 20 development that Embarq performs for each modeled switch. Investment loadings and an
 21 ACF are applied with the resulting expense for the switch software allocated to *usage*
 22 buckets.

³⁶ Exhibit HJR-3 to Mr. Roth’s Responsive Testimony at pp. 5-6.

³⁷ I include Spectrum Peripheral Module (“SPM”) software in analysis discussed in my next section of testimony.

1 **Q. WHY IS THIS A PROBLEM?**

2 A. Embarq's assumption that switch software is usage sensitive makes no more sense than
 3 its similar assumption dealing with switch processors. Embarq has provided no evidence
 4 that switch software is usage sensitive. Also, arguments analogous to my discussion
 5 regarding why switch processor costs are not usage sensitive apply equally to switch
 6 software costs. For example, the switch software investment for each modeled host
 7 switch is [BEGIN HIGHLY CONFIDENTIAL] XXXXXX [END HIGHLY
 8 CONFIDENTIAL].³⁸ In addition, the FCC, consistent with its reasoning for treating
 9 processor costs as usage insensitive, explained its analogous treatment of software costs
 10 by saying "...we find that RTU fees should be recovered on a per port [per line] basis for
 11 reasons similar to those set forth above with respect to 'getting started' costs and EPHC
 12 [Equivalent Port Half Calls] costs."³⁹ Therefore, like processor costs, switch software
 13 costs are not direct costs of switched access, and Embarq's cost study should be corrected
 14 by removing all switch processor and software costs from the development of TSLRICs
 15 for switched access.

16 **Q. HOW DO YOU PROPOSE CORRECTING EMBARQ'S COST DEVELOPMENT**
 17 **SO AS TO TREAT SWITCH SOFTWARE COSTS AS USAGE INSENSITIVE?**

18 A. The necessary corrections for treating switch software costs as usage insensitive are very
 19 similar to the steps needed to correct the treatment of switch processor costs. My work
 20 papers document these corrections. Again, all adjustments were made to the Switch
 21 Module. The switch software investments are found in the "Software" tab. These
 22 investments were brought forward to the "Summary," "Investment," "Expense" and

³⁸ Again, Embarq did not print out this relevant information at page 11 on row 18 of its Exhibit HJR-4HC, but the missing columns are found on the "Investment" tab of the Switch Module in the electronic version of the cost study.

³⁹ *Virginia Arbitration Cost Order*, ¶ 472.

“Duration” tabs analogous to the treatment of processor investments. Because of the similarity in the reasons for treating all processor costs and all switch software costs as volume-insensitive and the similarity in implementing changes to the Switch Module, I combined these changes into a single scenario.⁴⁰

Q. WHAT IS THE IMPACT OF REMOVING THE SWITCH PROCESSOR AND SOFTWARE COSTS FROM THE COST CALCULATION OF SWITCHED ACCESS SERVICES?

A. The weighted average cost of providing intrastate switched access becomes [BEGIN HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute with the exclusion of usage-insensitive costs associated with the switch processor and software from usage-driven rate elements. This necessary correction reduces the cost estimate by an additional [BEGIN HIGHLY CONFIDENTIAL] XXXXX [END HIGHLY CONFIDENTIAL] per minute or by another 40%. These results are shown under column D of my Attachment 2HC.

2. Other Volume-Insensitive Costs Should be Removed

Q. ARE THERE OTHER VOLUME-INSENSITIVE COSTS THAT EMBARQ HAS IMPROPERLY ASSIGNED TO SWITCHED ACCESS?

A. Yes. While switch processor and switch software costs are the most obvious candidates to review for violating the cost causation standard associated with developing direct costs, other switch equipment may also be misclassified by Embarq given that Embarq performed little, if any, analysis to identify usage-sensitive switching costs. Hence, I reviewed each tab in the Switch Module for the amount of equipment used to develop switching costs.

⁴⁰ My work papers highlight and document all of the corrections I made to Embarq’s model.

Q. WHAT DID YOU DISCOVER IN THIS REVIEW?

A. I found numerous examples where investments were exactly the same across modeled host switches or across modeled remote switches because only a single unit of capacity was needed. For example, only one ENET Module was designed for each host switch.⁴¹ Also, spare equipment that was explicitly modeled had a single unit for each host switch or for each remote switch.⁴² In addition, Embarq developed total costs for each type of switching equipment component having a separate vendor price. As I discussed previously, Embarq made no attempt to identify usage-sensitive switch costs, although such information is necessary to justify assigning any switch cost to the direct cost of switch access. Given Embarq's burden of proof, Embarq's cost study could be reasonably discarded. Yet, I offer reasonable and conservative corrections to this flaw in Embarq's switching cost development beyond the corrections dealing with switch processor and switch software costs.

Q. WHAT ADDITIONAL CORRECTIONS DO YOU RECOMMEND TO EMBARQ'S STUDY TO REMOVE ANY REMAINING USAGE-INSENSITIVE SWITCH COSTS IMPROPERLY ALLOCATED TO THE DIRECT COST FOR SWITCHED ACCESS?

A. First, I recommended that for each equipment component modeled in Embarq's study for which only a single unit is needed, the cost for that entire component should be treated as usage insensitive. These components have no usage-sensitive costs. Second, I recommend that for each equipment component modeled in Embarq's study for which more than one unit is needed, the capacity costing methodology should be followed. Thus, the cost for a half unit of such components is classified as a usage-insensitive cost.

⁴¹ See row 39 on the "ENET Calc" tab of the Switch Module.

⁴² See rows 38-42 on the "Spare" tab of the Switch Module.

1 This provides a conservative adjustment to Embarq's cost development for switched
2 access.

3 **Q. HOW IS THIS A CONSERVATIVE ADJUSTMENT?**

4 A. Except for a small number of components that are sized based on usage information in
5 Embarq's ECM, it would be reasonable to view all remaining costs as volume insensitive.
6 If usage in Embarq's ECM were reduced to reflect the removal of switched access traffic
7 or even eliminated altogether, few investments would likely change.⁴³ If this more
8 unforgiving approach were followed, even a greater portion of switch costs could be
9 treated as usage insensitive and not included in the direct cost development of switched
10 access.

11 **Q. WHAT STEPS DID YOU TAKE TO IMPLEMENT YOUR**
12 **RECOMMENDATION?**

13 A. As was the case for removing switch processor and switch software costs from the
14 development of direct costs for switched access, the corrections are made in the Switch
15 Module. Eight separate tabs are examined to determine whether an equipment
16 component has been modeled to have a single unit or more than a single unit. The usage-
17 insensitive investment following my recommendation can then be calculated for each
18 equipment component. These amounts are brought forward to the "Summary" tab, where
19 host rollups are made, and then to the "Investment" tab, where investment loadings are
20 applied. Then, the investments are converted to costs on the "Expenses" tab. At this

⁴³ Only investments developed on the "LGC Calc" worksheet are directly sized based on the Poisson table found in the model, while some investments on the "LCM Calc" worksheet are indirectly tied to the Poisson table. But, most of these investments are breakage, which is volume insensitive. Also, Embarq's model is not designed to develop properly a hypothetical network that is capable of handling calls, but has no calls.

stage total switch costs are split into usage-sensitive and usage-insensitive costs. Now, only usage-sensitive costs are assigned further to usage rate elements.

**Q. WHAT IS THE IMPACT OF REMOVING THE REMAINING USAGE-
INSENSITIVE SWITCH COSTS FROM THE COST CALCULATION OF
SWITCHED ACCESS SERVICES?**

A. The weighted average cost of providing intrastate switched access becomes [BEGIN
HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute
with the exclusion of the remaining usage-insensitive switch costs from usage-driven rate
elements. This necessary correction reduces the cost estimate by an additional [BEGIN
HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute
or by another 25%. These results are shown under column E of my Attachment 2HC.

C. Common Costs Should Not Be Included in a TSLRIC Study

**Q. MR. ROTH AT PAGE 24 OF HIS RESPONSIVE TESTIMONY STATES THAT
“EMBARQ INCLUDES A CONTRIBUTION TO COMMON COSTS IN ITS
TSLRIC STUDY RESULTS.” IS IT CONSISTENT WITH DEVELOPING
TSLRICS TO INCLUDE ANY COMMON COSTS AS A PART OF TSLRICS?**

A. No. By definition, TSLRIC identifies the costs a firm avoids if deciding to discontinue a
service; that is, the exclusion of any costs not directly attributable to the studied service.
Equivalently, TSLRIC measures the change in total cost directly associated with, or
attributed to, providing a service. Therefore, any costs shared between, or among, a
subset of services, *i.e.*, shared costs, or shared among all services the firm offers, *i.e.*,
common costs, are not part of a TSLRIC study. In an attempt to distinguish between costs
that include common costs and those that do not, Embarq does present its results under
the headings of “excluding Common” and “with Common.” However, it needs to be
clearly stated that only the former represents TSLRIC results properly speaking. The

1 latter is an attempt to price the service, which TSLRIC does not do nor is it designed to
2 do. The closest TSLRIC gets to pricing is that the TSLRIC result is a “price floor.” The
3 “floor” aspect indicates that any price below it would indicate that the service would be
4 receiving a subsidy.

5 **Q. ARE YOU SUGGESTING THAT EMBARQ IS NOT ENTITLED TO RECOVER**
6 **ITS COMMON COSTS?**

7 A. No. It is important to keep in mind that any meaningful discussions of "recovery" of
8 common costs need to consider the multiple products and services of the relevant firm
9 (Embarq), not merely a single service. Some products and services may have high
10 contribution, others a modest amount, and still others very little to no contribution. None
11 can be analyzed meaningfully in isolation, at least not in the context of whether the entire
12 firm is recovering its entire common costs. Rather, the broader array of services needs to
13 be considered for that exploration. The point is that Embarq has represented its costs
14 results putatively as “TSLRIC” results and, as such, the TSLRIC standard is what should
15 be defined and adhered to. AT&T does agree that TSLRIC is a reasonable methodology
16 to identify the direct cost of switched access, but common costs are not a part of the
17 direct cost of any individual service.

18 **Q. WHAT IS THE IMPACT OF EXCLUDING COMMON COSTS FROM THE**
19 **DIRECT COST CALCULATION OF SWITCHED ACCESS SERVICES?**

20 A. The weighted average cost of providing intrastate switched access becomes [BEGIN
21 **HIGHLY CONFIDENTIAL]** XXXX [END HIGHLY CONFIDENTIAL] per minute
22 with the exclusion of common costs from usage-driven rate elements. This necessary
23 correction reduces the direct cost estimate by an additional [BEGIN HIGHLY

CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute or by another 12%. These results are shown under column F of my Attachment 2HC.

**VI. DEFICIENCIES IN COST DEVELOPMENT OF COSTS
THAT BELONG IN EMBARQ'S COST STUDY**

Q HAVE YOU IDENTIFIED DEFICINCIES IN THE COST DEVELOPMENT OF THE COSTS THAT DO BELONE IN EMBARQ'S STUDY?

A. Yes. There are six deficiencies I would like to address here. They are: (1) overstated cost of capital; (2) out-of-date switching hardward ware prices; (3) non-forward-looking copper cable prices; (4) defective plant maintenance factor development; (5) unreasonable fill factors; and (6) lack of merger synergy consideration.

1. Overstated Cost of Capital

Q. WHAT IS THE COST OF CAPITAL EMBARQ USED IN ITS COST STUDY?

A. **[BEGIN HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL]**, which is found on row 9 at page 163 of Roth Exhibit HJR-4HC.

Q. WHAT ARE THE COMPONENTS USED BY EMBARQ TO CALCULATE THIS COST OF CAPITAL?

A. The following table displays the cost of equity, the cost of debt and the debt/equity ratios used to develop Embarq's weighted average cost of capital ("WACC")

Embarq's Proposed Weighted Average Cost of Capital

[BEGIN HIGHLY CONFIDENTIAL]

	Cost	Weight	Weighted Cost
Debt	XXXX	XXXX	XXXX
Equity	XXXX	XXXX	XXXX
WACC			XXXX

[END HIGHLY CONFIDENTIAL]

Q. ARE THE COST OF EQUITY, COST OF DEBT AND DEBT-EQUITY RATIO USED BY EMBARQ REASONABLE TO DEVELOP TSLRICS FOR SWITCHED ACCESS SERVICES?

A. No. First, Embarq's proposed cost of debt is greater than its proposed cost of equity. If that were a reasonable expectation of financial markets, then an efficient Embarq would have no debt, and Embarq has a capital structure with debt. I conclude that Embarq has not used a reasonable cost of debt. Second, Embarq's proposed cost of equity also appears too large. Finally, given that the capital structure used by Embarq is very close to the market capital structure of comparable firms, I view Embarq's proposed composition of debt and equity as reasonable.

Q. WHAT COST OF DEBT AND COST OF EQUITY ARE MORE REASONABLE TO USE?

A. I view that a market-based cost of debt of 8.51% is reasonable to use. Using the Capital Asset Pricing Model ("CAPM"), I find that a reasonable cost of equity to fall between 9.10% and 9.84%. I recommend using the midpoint of this range or 9.47% as the cost of equity.

Q. WHAT IS THE REASONABLE COST OF CAPITAL TO USE FOR DEVELOPING COSTS IN THIS PROCEEDING?

A. The following table displays the development of my recommended WACC for use in Embarq's cost study.

Revised Weighted Average Cost of Capital

[BEGIN HIGHLY CONFIDENTIAL]

	Cost	Weight	Weighted Cost
Debt	XXXX	XXXX	XXXX
Equity	XXXX	XXXX	XXXX
WACC			XXXX

[END HIGHLY CONFIDENTIAL]

1 **Q. WHAT IS THE IMPACT ON SWITCHED ACCESS COSTS USING YOUR**
2 **RECOMMENDED COST OF CAPITAL?**

3 A. The weighted average cost of providing intrastate switched access becomes [BEGIN
4 **HIGHLY CONFIDENTIAL**] XXXX [END **HIGHLY CONFIDENTIAL**] per minute
5 using a more reasonable WACC. This necessary correction reduces the direct cost
6 estimate by an additional [BEGIN **HIGHLY CONFIDENTIAL**] XXXX [END
7 **HIGHLY CONFIDENTIAL**] per minute or by another 6%. These results are shown
8 under column G of my Attachment 2HC.

9 **2. Out-of-Date Switching Hardware Prices**

10 **Q. WHAT IS THE VINTAGE OF THE SWITCH EQUIPMENT PRICES THAT**
11 **EMBARQ USED IN ITS COST STUDY?**

12 A. The vintage of switch equipment prices that Embarq used in its cost study is [BEGIN
13 **HIGHLY CONFIDENTIAL**] XXX [END **HIGHLY CONFIDENTIAL**] according to
14 the transmittal letter that accompanied the price quote, which is attached as Currie
15 Rebuttal – **Attachment 6HC**.⁴⁴ However, the price summary pages of the quote indicate
16 [BEGIN **HIGHLY CONFIDENTIAL**] XXX [END **HIGHLY CONFIDENTIAL**].
17 For purposes of my analysis, I assume the later year. In any case the prices reflect
18 circumstances many years ago and are not reasonable for current prices without
19 adjustment.

20 **Q. DO YOU HAVE OTHER CONCERNS THAT AFFIRM THE CONCLUSION**
21 **THAT EMBARQ'S VENDOR PRICES FOR MATERIAL, SOFTWARE,**
22 **ENGINEERING, INSTALLATION AND FIRMWARE FOR SWITCH**
23 **EQUIPMENT USED IN EMBARQ'S COST STUDY REQUIRE ADJUSTMENT?**

⁴⁴ This transmittal letter is part of Embarq's Highly Confidential Attachment ATT-79.

A. Yes. It is apparent from the transmittal letter that this price quote was not to Embarq's procurement organization, but was provided to Embarq's regulatory group.⁴⁵ Thus, the price quote does not demonstrate that Embarq has bought anything based on these prices. In addition, Embarq has the burden of providing forward-looking prices, and Embarq has used old switch equipment prices in its cost study.

Q. WHAT DO YOU RECOMMEND BE DONE WITH THESE OLD SWITCH EQUIPMENT PRICES?

A. Using Embarq's switch equipment prices without any adjustment is unreasonable. To mitigate, although not to eliminate, the problem of Embarq's cost study violating the fourth TSLRIC principle, I proposed to adjust only the material prices. Using the best economic evidence currently publicly available concerning digital switch equipment prices, I recommend that the material switch prices used in Embarq's work paper, Highly Confidential Circuit Switching Unit Price Support.xls, be decreased by 21.1%.⁴⁶ This adjustment results in new equipment prices, which replace prices found on rows 7-22, 24 and 26-35 in the "Switch_Unit_Prices" tab of Embarq's Input Module.

Q. WHAT IS THE IMPACT ON SWITCHED ACCESS COSTS USING YOUR MODIFIED SWITCH EQUIPMENT PRICES?

A. The weighted average cost of providing intrastate switched access becomes [BEGIN
HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute

⁴⁵ See the subject lines and first paragraph of Currie Rebuttal – Attachment 6HC.

⁴⁶ The Byrne-Corrado paper provides the most comprehensive and most current estimates of price indices for communications equipment, including digital switching equipment, in the United States. While they do not provide yearly price indices in their paper, they report in Table 4 that wireline switching equipment prices declined by 20.1% per year from 2000 to 2005. They do not report more recent periods. Based on my own examination of digital switching equipment prices prior to 2000, which is used by Byrne and Corrado, and my general knowledge of the thinness of the digital circuit switching equipment market since 2000, I decided to take a more conservative approach to revising Embarq's switching equipment prices. Namely, I cut the Byrne and Corrado annual price decline in half to 10.05% per year and reflect only two years of decline. Consequently, Embarq's prices should be reduced at a minimum by $21.1\% = (1+10.5\%) \times (1+10.5\%) - 1$. More specifically, I use the 20.1% factor to adjust Embarq's switching hardware prices to closer to current prices.

with modifying Embarq's switch equipment prices. This necessary correction reduces the direct cost estimate by an additional [BEGIN HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute or by another 5%. These results are shown under column H of my Attachment 2HC.

3. Non Forward-Looking Copper Cable Prices

Q. WHAT IS THE VINTAGE FOR THE COPPER CABLE PRICES THAT EMBARQ USED IN ITS COST STUDY?

A. The vintage for copper cable prices that Embarq used in its cost study is October 2008, as shown in Currie Rebuttal – **Attachment 7**. Given the historical chart of average monthly copper prices provided earlier in my testimony, it should come as no surprise that under current circumstances October 2008 copper cable prices are no longer forward looking and must be adjusted.

Q. WHAT DO YOU RECOMMEND BE DONE WITH THESE OLD COPPER CABLE PRICES?

A. Like Embarq's switch equipment prices, using Embarq's copper cable prices without any adjustment is unreasonable. As I discussed previously, an efficient telephone company should adjust their copper cable prices in sync, although lagged, with the market price for copper. Assuming Embarq's copper cable prices are modified with only a month lag, the October 2008 vintage prices would be proportional to September 2008 copper prices, which was \$3.14293 per lb. The most currently available month for copper spot prices is April 2009 and had a monthly price of \$2.04614 per lb. Thus, each copper cable price should be multiplied by $65.10\% = \frac{2.04614}{3.14293}$. Effectively, this adjustment factor is a discount off Embarq's reported copper prices. Embarq's ECM has an input, called

Copper Cost Ratio, in the “Loop Module – Inputs” that “is used in concert with copper cable investment and represents any normal discounts that a company may receive.”⁴⁷ Since the copper cable prices found in the “Loop Costs Inputs” tab already reflect Embarq’s discounted material prices for copper cables, I changed the Copper Cost Ratio from 100% to 65.1%.

Q. WHAT IS THE IMPACT ON SWITCHED ACCESS COSTS USING YOUR MODIFIED COPPER CABLE PRICES?

A. The weighted average cost of providing intrastate switched access becomes [BEGIN HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute with modifying Embarq’s copper cable prices. This necessary correction reduces the direct cost estimate by an additional [BEGIN HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute. This insignificant change is expected, since copper cable prices should have little, if any, impact of direct costs for switched access. Instead, this decrease in copper cable prices should and does cause a substantial decrease in the direct costs for local loops. These results are shown under column I of my Attachment 2HC.

4. Defective Plant Maintenance Factor Development

Q. WHAT IS THE PROBLEM WITH EMBARQ’S PLANT MAINTENANCE FACTOR DEVELOPMENT?

A. The basic problem with Embarq’s plant maintenance factor development is the reliance on historical costs without adjustments that would yield forward-looking costs. That is, Embarq’s maintenance factor development violates the fourth TSLRIC principle. Based on the information currently available, there are two specific issues: (a) inadequate

⁴⁷ Roth Responsive Exhibit HJR-3 at p. 60.

support for Embark's claim that nonrecurring expenses have been removed from the plant maintenance factor development; and (b) the mismatch in comparing booked maintenance expenses to booked plant.

a. Inadequate Support for Removal Nonrecurring Expenses

Q. HOW DOES EMBARQ CALCULATE ITS PLANT MAINTENANCE FACTORS?

A. While Mr. Roth's testimony does not describe how Embark calculates its plant maintenance factors, the basic development is easy to understand. First, Embark averages by various investment accounts beginning-of-year booked plant in service with end-of-year booked plant in service to yield an average booked plant in service. These amounts are then divided into the corresponding booked maintenance expenses, which yields Embark's maintenance factors. The accounts for which plant maintenance factors are developed and the values used in the calculation are shown at page 172 of Roth Exhibit HJR-4HC. While the plant-in-service amounts are inputs on this page, the plant maintenance expenses are based on amounts found on rows 13, 34-35, 42-43, 48, 50-53, 55-56, 58-61 and 66 under column H at pages 166-167.

Q. SHOULD NONRECURRING EXPENSES BE INCLUDED IN FORWARD-LOOKING MAINTENANCE FACTORS USED FOR DEVELOPING RECURRING COSTS?

A. No. Nonrecurring expenses are expenses incurred in the process of satisfying customer-specific requests for installation, removal or changes in service. Including nonrecurring expenses as part of recurring maintenance factor development would be a mismatch between recurring and nonrecurring costs. This is a violation of the cost causation principle for TSLRIC studies. This potential double counting of costs, however, is easily

remedied by explicitly removing nonrecurring expenses in the maintenance factor development.

Q. DOES EMBARQ'S COST STUDY HAVE THE CAPABILITY TO REMOVE PROPERLY NONRECURRING EXPENSES IN ITS MAINTENANCE FACTOR DEVELOPMENT?

A. Yes. Embarq's cost study has the capability to remove properly nonrecurring expenses in its maintenance factor development. Specifically, Embarq's algorithms can remove nonrecurring expenses, or what Embarq calls Service Order ("SO") Plant Related Costs, by subtracting these expenses before calculating its maintenance factors.⁴⁸

Q. THEN, WHAT IS THE PROBLEM?

A. The problem is that the values shown in column G at page 172 of Roth Exhibit HJR-4HC are all zero. If Embarq has followed the process established in its own study, this implies that for an entire calendar year Embarq had no requests for new regulated services from any retail or wholesale customer requiring some plant work to provision service and had no request to remove or to change any regulated service that required some plant work. This is entirely implausible. Thus, AT&T issued some data requests to Embarq to understand these implausible values.

Q. WHAT SPECIFIC MAINTENANCE EXPENSES SHOULD HAVE A POSITIVE ADJUSTMENT IN ORDER TO REMOVE PLANT EXPENSES ASSOCIATED WITH SERVICE ORDERS?

A. Embarq has said in response to a data request, attached as Currie Rebuttal – **Attachment 8**, four expense accounts record plant expenses associated with service orders: Digital Switching, Circuit Equipment, Aerial Cable and Buried Cable. My examination of the

⁴⁸ This is clear when examining the formulas used to develop column H at page 172 on Roth Exhibit HJR-4HC.

1 formulas in column G at page 172 of Roth Exhibit HJR-4HC indicate that these
2 correspond to the SO Plant Related Costs for rows 17, 22, 26 and 29. Furthermore,
3 Embarq said in this response that nonrecurring expenses have been excluded when
4 developing maintenance expense factors. But, I do not see anything that has been
5 excluded in the study.

6 AT&T made another request to understand better the zero values for SO Plant Related
7 Costs, which is attached as Currie Rebuttal – **Attachment 9**. But, Embarq responded that
8 the answer to a different request provided the information and this response is attached as
9 Currie Rebuttal – **Attachment 10**. This last response linked the zero values for SO Plant
10 Related Costs to values in rows 35, 43, 53 and 61 in column H at pages 166-167 of Roth
11 Exhibit HJR-4HC. Of course, I knew that by examining the electronic version of Roth's
12 exhibit in which these rows are expected to contain the booked amounts for SO Plant
13 Related Costs. But, the zero values are still unexplained. However, Embarq stated in this
14 response that the expenses on pages 166-167 "are presented net of service order
15 expenses," which is curious thing to say given that the model is built to document that
16 service order expenses have been removed.

17 **Q. HAS EMBARQ PROVIDED A WORK PAPER THAT ACTUALLY SHOWS THE**
18 **REMOVAL OF SO PLANT RELATED COSTS?**

19 A. Embarq has stated in another response to data request, attached as Currie Rebuttal –
20 **Attachment 11**, "no further work papers are available" for information found on pages
21 166-167, which corresponds to the "Expenses_Revenues" worksheet of the Input
22 Module. This is a dead end at this time, but should be pursued in a full cost investigation.
23 In this proceeding I do not have sufficiently reliable proxies to provide a correction.

b. **Mismatched Use of Accounting Data Causes Non Forward-Looking Maintenance**

Q. WHAT IS YOUR CONCERN ABOUT THE MISMATCH IN COMPARING BOOKED EXPENSES TO BOOKED PLANT IN DEVELOPING PLANT-RELATED MAINTENANCE FACTORS?

A. This concern regarding the mismatch in comparing booked expenses to booked plant in developing plant-related maintenance factors is more severe than my concern dealing with double counting nonrecurring costs. Without adjusting booked costs for plant in service to reflect current reproduction costs, most plant maintenance factors are likely to be substantially overstated. The most common way to adjust booked values so that maintenance costs are more reasonably calculated is to use current cost to booked cost ratios (“CC/BC”). AT&T requested that Embarq provide its CC/BC ratios for accounts shown on rows 26-40 in the “ACF” worksheet of the Input Module.⁴⁹ Embarq did not provide its CC/BC as request by AT&T.⁵⁰ Nevertheless, Embarq’s response confirmed the maintenance expenses and booked investments were for 2007.

Q. PLEASE EXPLAIN HOW THIS MISMATCH CAN OVERSTATE MAINTENANCE COST FACTORS.

A. To explain how this mismatch can overstate maintenance factors, consider the following simplified example based on stylized assumptions regarding aerial copper cable investment and its associated maintenance expense for a recent year – say, 2007. For convenience assume that Embarq has only one vintage of aerial copper cable still existing at the end of 2007 in Washington, and this cable was placed in service in 1977 having a booked value of \$100,000. Now, suppose that the maintenance expense (excluding any SO Plant Related Costs) in 2007 for this plant was \$5,000. With these assumptions

⁴⁹ These rows correspond to the same rows at page 163 of Roth Exhibit HJR-4HC.

⁵⁰ See Currie Rebuttal – **Attachment 12**.

Embarq's model would calculate a maintenance factor of $5.00\% = \$5,000/\$100,000$. However, if the same aerial copper cable were placed instead in 1987, the booked value would be much higher, say \$150,000.⁵¹ Then, the maintenance factor becomes $3.33\% = \$5,000/\$150,000$. Finally, if the same aerial copper cable were placed in 2007, the booked value would again be even higher, say \$400,000, which has a maintenance factor of $1.25\% = \$5,000/\$400,000$. Now, the question is which factor will best measure forward-looking maintenance expense for new investment placed today. If the amount of the investment in new aerial copper cable was \$100,000, Embarq would claim maintenance expenses still are \$5,000, but \$100,000 today will not buy as much aerial copper cable as it did 30 years ago. Based on this example, \$100,000 will buy only a quarter of the same cable as it could purchase 30 years earlier. Consequently, the maintenance factor needs to be a current expense divided by a current value of existing plant.

Q. IS THIS MISMATCH BETWEEN THE NUMERATOR, WHICH IS A CURRENT COST, AND THE DENOMINATOR, WHICH IS A BOOKED COST, IN DEVELOPING EMBARQ'S MAINTENANCE FACTORS A WELL-KNOWN CONCERN?

A. Yes. For example, the third edition of a classic book dealing with guidelines for performing engineering economy studies, warmly called the *Green Book*, mentions the potential overstatement of costs caused by this mismatch in similar circumstances:

The current expenditures for cost of removal, maintenance, and ad valorem taxes—used in deriving the percent-of-first-cost factors—represent current levels of costs. However, the associated plant investment represents equipment installed in previous years at different, and generally lower, cost levels. So if the numerator of the percent-of-first-cost fraction is based upon

⁵¹ The actual amount is usually calculated using prices indexes develop for the purpose of converting booked values to current values at reproduction prices. AT&T has used the AUS Telephone Plant Index, formerly known as the CA Turner Telephone Plant Index, for this purpose.

current cost levels but the denominator represents earlier, lower cost levels, the resulting cost factor is overstated. It is overstated relative to the result that would be obtained if the current cost were related to the associated plant installed at current cost levels.⁵²

Q. IS EMBARQ AWARE OF THIS BOOK?

A. Yes. Embarq's ECM has an Excel comment at cell C9 in the "ACF" tab of the Inputs Module that has a reference to this book as a source document.

Q. WHAT DO YOU RECOMMEND BE DONE?

A. The first best solution would be to use CC/BC ratios based on Embarq's survivors' data to adjust the denominator in Embarq's maintenance factor calculations, but Embarq has not provided this information.⁵³ Hence, I fall back to a second best recommendation to modify Embarq's booked investments by the CC/BC ratios contained in the following table.

Account	CC/BC Ratio
Poles	3.000
Aerial Cable Metallic	2.000
Aerial Cable Non-Metallic	1.250
Aerial Drop Metallic	2.000
Underground Cable Metallic	2.000
Underground Cable Non-Metallic	1.250
Buried Cable Metallic	2.000
Buried Cable Non-Metallic	1.250
Buried Drop Metallic	2.000
Conduit Systems	2.500
Circuit Equipment	1.100
SS7/Intelligent Network	1.000
Central Office Switching	0.900

⁵² American Telephone and Telegraph Company, Construction Plans Department, *Engineering Economy: A Manager's Guide to Economic Decision Making*, McGraw-Hill Book Company: New York, 1977, p. 220.

⁵³ See Currie Rebuttal – Attachment 12.

1 **Q. WHAT IS THE BASIS FOR RECOMMENDING THESE CC/BC RATIOS?**

2 A. These CC/BC ratios are my best assessment of a lower bound in absolute value of
3 Embarq's unknown CC/BC ratios. In addition to relying on my experience, I examined
4 two sets of CC/BC ratios as additional information I used. First, I looked at AT&T
5 Nevada's confidential summary of CC/BC ratios, as the closest AT&T ILEC to compare
6 to Embarq in Washington. Second, I developed CC/BC ratios for Verizon's ILEC
7 operations in Washington using information from its 2004 depreciation study submitted
8 in Docket No. UT-040520 and the proprietary AUS Telephone Plant Index.

9 **Q. WHAT IS THE IMPACT ON SWITCHED ACCESS COSTS YOUR FORWARD-
10 LOOKING MAINTENANCE EXPENSE ADJUSTMENTS?**

11 A. The weighted average cost of providing intrastate switched access becomes [BEGIN
12 **HIGHLY CONFIDENTIAL**] XXXX [END HIGHLY CONFIDENTIAL] per minute
13 with adjusting Embarq's maintenance factor development. This necessary, but partial,
14 correction reduces the direct cost estimate by an additional [BEGIN HIGHLY
15 **CONFIDENTIAL**] XXXX [END HIGHLY CONFIDENTIAL] per minute. This
16 effect on the direct cost of switched access is expected because of the minor changes to
17 maintenance factors for switch and circuit equipment. These results are shown under
18 column J of my Attachment 2HC.

19 **5. Unreasonable Fill Factors**

20 **Q. HAVE YOU REVIEWED THE FILL FACTORS USED IN EMBARQ'S COST
21 STUDY?**

22 A. Yes, I have made a cursory review of Embarq's fill factors. I have found a few that do
23 not appear appropriate in Embarq's study.

1 **Q. WHAT IS THE BASIS EMBARQ EXPLAINS FOR IT PROPOSED FILL**
2 **FACTORS?**

3 A. In general, I understand that Embarq used the judgment of its engineers, who determined
4 the fill percentage that would trigger adding additional equipment, which I will call an
5 engineering fill factor. While engineering fill factors may be appropriate for sizing
6 decisions, these factors may not be reasonable in identifying volume-sensitive costs
7 following the capacity costing methodology. Here, a usable capacity fill factor is needed,
8 which determines what portion of total capacity associated with a piece of equipment is
9 capable of provide final service, *i.e.*, capacity not needed to administer service to
10 customers. Thus, I recommend corrections to a few fill factors.

11 **Q. WHAT SPECIFIC FILL FACTORS DO YOU RECOMMEND NEED**
12 **CORRECTION SO AS MORE REASONABLY TO IDENTIFY USAGE-**
13 **SENSITIVE COSTS FOR SWITCHED ACCESS?**

14 A. I recommend correcting three sets of fill factors so as more reasonably to identify usage-
15 sensitive costs for switched access. The first set includes two line card fill factors for
16 POTS and ISDN BRI. I am unaware of any administrative need to withhold capacity
17 from customers' use. Consequently, I recommend that these factors be moved closer to
18 one, and in my judgment and experience a usable capacity fill factor of 97% is
19 reasonable. Second, I recommend a fill factor of 100% for SPM equipment, since
20 Embarq's model has explicitly modeled spare SPM equipment elsewhere. Finally,
21 Embarq's fill factors associated with transport rings seems out of line with capacity
22 costing. There, I recommend that these factors be set at 75%.

Q. WHAT IS THE IMPACT ON SWITCHED ACCESS COSTS WITH YOUR RECOMMENDED FILL FACTORS?

A. The weighted average cost of providing intrastate switched access becomes [BEGIN HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute with correcting a few fill factors. This necessary correction reduces the direct cost estimate by an additional [BEGIN HIGHLY CONFIDENTIAL] XXXX [END HIGHLY CONFIDENTIAL] per minute or by another 19%. These results are shown under column K of my Attachment 2HC.

6. Embarq Failed to Consider Synergies of Merger

Q. WHEN CENTURYTEL, INC. AND EMBARQ AGREED TO MERGE, DID THE MERGER ANNOUNCEMENT STATE ANYTHING ABOUT COST SYNERGIES?

A. Yes. The merger announcement, which can be viewed from CenturyTel's website, communicates three discrete "Benefits of the Transaction."⁵⁴ In addition to "Enhanced Competitive Position" and "Financial Strength and Flexibility," "Significant Synergy Opportunities" is highlighted. The annual synergy savings that the merged company expects due to economies of scale and scope may be as large \$400 million per year.⁵⁵

Q. WHAT IS A "SYNERGY" WITH RESPECT TO COST?

A. Underlying most mergers is the expectation that the whole (the combined entity) is greater than the sum of its parts (each firm pre-merger). Cost synergies generally revolve around the economic principle of economies of scale and, to some extent, economies of scope. Economies of scale, properly speaking, is defined as declining long run average costs as quantity increases; basically, the bigger a business becomes, the more cost advantages it

⁵⁴ http://www.centurytel.com/Pages/AboutUs/PressRoom/pressRelease.jsp?page=Corporate/Press_Release66.html.

⁵⁵ Currie Rebuttal – **Attachment 13** provides the merger partners' explanation of the source of the greater economies of scale and scope.

1 expects to realize. Obviously, a merger presents a very straightforward path to a bigger
2 business. Economies of scope reflects being able to share costs over a larger product mix.
3 Cost synergies would be the costs saved or avoided as the result of merging. These savings
4 are often attributable to the combination or elimination of redundancies or overlapping
5 functions.

6 **Q. DID EMBARQ REFLECT IN ITS COST MODEL ANY COST SYNERGIES OR**
7 **COST SAVINGS ON A FORWARD-LOOKING BASIS AS A RESULT OF THE**
8 **MERGER**

9 A. No. Not noticing any during my review of the cost model and its documentation and work
10 papers, AT&T asked Embarq in data request whether those synergies explicitly mentioned in
11 the merger announcement had been incorporated into the cost model inputs. As shown in
12 Currie Rebuttal – **Attachment 14** attached to my testimony, Embarq responded with respect
13 to its cost study that “[t]he study does not incorporate speculative predictions of future
14 events.”

15 **Q. DO YOU AGREE THAT A TSLRIC COST STUDY SHOULD NOT BE BASED**
16 **ON SPECULATIVE INPUTS?**

17 A. Yes, I do. The Commission is aware of the uncertainties of merger synergies and has
18 required the new company “to track and report annually to the Commission the costs and
19 synergy savings of the merger on both a company-wide basis and a Washington basis.”⁵⁶
20 Hence, an examination of cost synergies does not need to be pursued here, but can await
21 a future cost proceeding – perhaps “an earnings review consistent with that required in a
22 general rate case.”⁵⁷

⁵⁶ In the Matter of the Joint Application of Embarq Corporation and CenturyTel, Inc. for Approval of Transfer of Control of United Telephone Company of the Northwest d/b/a Embarq and Embarq Communications, Inc., Docket UT-082119, Order 05, Rel. May 28, 2009 at ¶ 50.

⁵⁷ Ibid. at ¶ 48.

VII. EMBARQ'S CURRENT RATES MAY VIOLATE WAC 480-120-540

Q. WHAT IS YOUR UNDERSTANDING AS AN ECONOMIST OF THE COMMISSION'S "TERMINATING ACCESS CHARGES" RULE REGARDING EXCESSIVE RATES?

A. My understanding as an economist of WAC 480-120-540 is that each switched access rate currently charged by Embarq pursuant to its intrastate access tariff for terminating traffic has a price cap.⁵⁸ This cap for a specific switched access rate element is the lowest rate charged by Embarq for the comparable terminating offering in local interconnection agreements.⁵⁹ Generally, reciprocal compensation provides the comparable offering to terminating switched access. For example, Embarq's current local switching charge in its state access tariff is \$0.0126317 per access minute, which is the same for originating and terminating minutes, would be capped at the lowest non-zero rated reciprocal compensation charge for end office switching across all of Embarq's local interconnection agreements. Since I have not examined any local interconnection agreements in Washington, I do not know the lowest current prices for reciprocal compensation offerings comparable to terminating switched access elements. However, Embarq reports that the most recent adjustment to its intrastate access rates to comply with this rule occurred in December 1998 in order to satisfy the "Terminating Access Charges" rule at the time of the rule's adoption.⁶⁰ My understanding is that the rule imposes a continuing obligation, *i.e.*, each time Embarq's has a new interconnection agreement with comparable reciprocal compensation offerings, Embarq's price caps for interstate switch access must re-examined.

⁵⁸ The full rule is attached to the Responsive Testimony of John M. Felz as Exhibit No. __ JMF-2.

⁵⁹ Local interconnection services are ordinarily offered via local interconnection agreements rather than by tariff.

⁶⁰ Responsive Testimony of John M. Felz at pages 7 and 8.

1 The rule goes on to say that if a local exchange carrier does not have any non-zero rated
 2 reciprocal compensation offering found in any local interconnection agreement, then the
 3 price cap for a terminating access service is the direct cost or TSLRIC for the service plus
 4 a reasonable contribution to common costs. This portion of the rule essentially says that
 5 if the first best information is unavailable to determine the price caps for terminating
 6 access charges, a fallback to a cost-based ceiling is a reasonable proxy to the first best
 7 information.

8 **Q. DOES EMBARQ DEVELOP SEPARATE COSTS FOR TERMINATING ACCESS**
 9 **VERSUS ORIGINATING ACCESS FOR ANY OF THE EIGHT STUDIED**
 10 **SWITCHED ACCESS SERVICES?**

11 A. No.

12 **Q. IS THERE ANY COST DIFFERENCE BETWEEN AN ORIGINATING ACCESS**
 13 **MINUTE AND A TERMINATING ACCESS MINUTE?**

14 A. No. The cost for each rate element studied by Embarq should not distinguish between
 15 originating and terminating access minutes, even though minute volumes may differ,
 16 because the direction traffic flows does not change the direct cost assignment.
 17 Appropriately, Embarq's cost study does not differentiate between originating versus
 18 terminating minutes of use.

19 **Q. WHAT IS EMBARQ'S PROPOSED TSLRIC WITH A CONTRIBUTION TO**
 20 **COMMON COSTS REPORTED BY MR. ROTH?**

21 A. Mr. Roth reports at page 1 of Roth Exhibit HJR-2HC that Embarq's proposed TSLRIC
 22 with a contribution to common costs for local switching is **[BEGIN HIGHLY**
 23 **CONFIDENTIAL] XXXXX [END HIGHLY CONFIDENTIAL]**, which is
 24 substantially below Embarq's current rate. This cost also appears on row 6 under column

B in my Attachment 2HC. In addition, I have provided corrections to Embarq's cost study on this attachment that shows Embarq's TSLRIC for local switching is substantially overstated. Consequently, I am suspicious that Embarq's current local switching rate may violate WAC 480-120-540(1)(a).

Q. WOULD YOUR OPINION CHANGE IF EMBARQ WERE TO PERFORM A NEW COST STUDY FOR RECIPROCAL COMPENSATION BASED ON THE FCC'S TELRIC METHODOLOGY?

A. Not very likely. The TSLRIC and the FCC's TELRIC methodologies are very similar, but there are differences that would make costs different. Importantly, Congress has specified that ILECs may recover in their reciprocal compensation rates only "the additional costs of terminating such calls."⁶¹ The FCC has interpreted this "additional cost" standard as limiting recovery to usage-sensitive costs. Thus, for example, the portions of an end office switch that are usage *insensitive* should not be recoverable in reciprocal compensation rates, and an ILEC should recover these costs from other sources.⁶² In other words, the first three adjustments I recommend be made to Embarq's cost study for switched access—remove loop-related costs, remove processor and switch software costs, and remove any remaining usage-insensitive costs—are all necessary to comply with the standards for reciprocal compensation rates established by Congress. Thus, the results shown in column E of Attachment 2HC, which include loadings for common costs, provide an upper bound on reciprocal compensation rates, if such rates were established today using Embarq's cost study with minimal modifications. The

⁶¹ 47 U.S.C. § 252(d)(2)(A)(ii).

⁶² First Report and Order, *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket No. 96-98, and *In the Matter of Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers*, CC Docket No. 96-98, 11 FCC Rcd 15499 (1996) ("*Local Competition Order*") at ¶ 1057.

1 upper bound for local switching would be [BEGIN HIGHLY CONFIDENTIAL]
2 XXXXX [END HIGHLY CONFIDENTIAL], which is substantially lower than
3 Embarq's current intrastate switched access rate for local switching.

4 **Q. WHY DID YOU NOT MAKE A COMPARISON REFLECTING ALL OF YOUR**
5 **CORRECTIONS AS SHOWN ON ATTACHMENT 2HC?**

6 A. Removing common costs is inappropriate when establishing reciprocal compensation
7 rates using the FCC's methodology. Also, the appropriate fill factors in developing
8 TELRICs are often different from the appropriate fill factors in developing TSLRICs, and
9 I have made no attempt to determine TELRIC-based fills for Embarq. While the
10 updating of prices for switching equipment and copper cables would also be appropriate
11 in a TELRIC proceeding, I have excluded them for this rough analysis to compensate for
12 the lack of TELRIC-based fills. Consistent with my less than comprehensive approach to
13 examining Embarq's costs, a comparison of Embarq's current rates to a new
14 determination of reciprocal compensation rates using the results shown in column E of
15 Attachment 2HC is sufficient to raise a concern regarding Embarq's compliance with
16 WAC 480-120-540(1)(a).

17 **Q. USING THE "ADDITIONAL COST" STANDARD AS LIMITING RECIPROCAL**
18 **COMPENSATION RECOVERY TO USAGE-SENSITIVE COSTS, ARE ANY**
19 **OTHER SWITCHED ACCESS RATE ELEMENTS POTENTIALLY A**
20 **CONCERN?**

21 A. Yes. By comparing the costs in column E of Attachment 2HC to Embarq's current
22 intrastate rates the individual elements shown on this exhibit, I find similar problems for
23 the following elements: tandem switching, local transport termination and local transport
24 facility.

1 **Q. IS AT&T RECOMMENDING THAT EMBARQ'S SWITCHED ACCESS RATES**
2 **SHOULD BE CAPPED AT THE AMOUNTS SHOWN IN COLUMN E OF**
3 **ATTACHMENT 2HC AND REDUCED IN EACH CASE WHERE EMBARQ'S**
4 **RATE EXCEEDS THE CAP?**

5 A. No. AT&T recommends that Embarq mirror its interstate rates, as described in Mr.
6 Bax's direct testimony. Nevertheless, Embarq has the obligation to comply with WAC
7 480-120-540, and the cost study offered by Embarq, which AT&T views as unnecessary
8 to support a mirroring policy for Embarq, introduces concerns regarding compliance with
9 WAC 480-120-540.

10 **VIII. COST STUDY DEFICIENCIES ALSO CAUSE**
11 **OVERSTATEMENT OF LOOP COSTS**

12 **Q. DO THE CORRECTIONS YOU HAVE MADE TO DEVELOP YOUR**
13 **ATTACHMENT 2HC HAVE ANY IMPACT ON LOOP COSTS AS**
14 **CALCULATED BY EMBARQ?**

15 A. Three of my corrections to develop reasonable direct costs for switched access also have
16 material impacts on loop costs. In addition, one other change is specific to Embarq's
17 loop cost development – namely, the inclusion of Customer Operations expenses in loop
18 costs. While I understand that the intent may have been to develop total regulated
19 company costs, it is, at a minimum, misleading to include Customer Operations expenses
20 in loop costs, as explained in my Attachment 4HC. While it is theoretically possible a
21 small portion of these expenses are avoidable if the local loop does not exist, Embarq has
22 provided no evidence that attributing any Customer Operations expense to the loop.

23 **Q. WHAT IS THE IMPACT OF YOUR CORRECTIONS ON LOOP COSTS?**

24 A. The impact of my corrections on the direct costs for local loops is summarized in the
25 following table:
26

1 **[BEGIN HIGHLY CONFIDENTIAL]**

2

3 **[END HIGHLY CONFIDENTIAL]**

4 Except for the removal of Customer Operations expense, all the other changes are by-

5 products of the scenarios run to correct Embarq's TSLRIC for switched access. These

6 corrections clearly show that Embarq's proposed loop cost is vastly overstated. My

7 analysis of Embarq's loop cost has been a secondary activity, since my primary focus has

8 been focusing on major concerns regarding Embarq's TSLRIC development for switched

9 access. I have not reviewed Embarq's loop design nor other cost development going into

10 Embarq's loop calculations. In spite of my tangential attention to Embarq's loop cost

11 development, Embarq has overstated its loop costs by more than 30%. Consequently,

12 any use of Embarq's proposed loop costs in this proceeding should made with extreme

13 caution.

14 **IX. LOWER ACCESS RATES & CONSUMER BENEFIT**

15 **Q. MR. DIPPON AT PAGES 74-84 OF HIS RESPONSIVE TESTIMONY DISPUTES**

16 **THE PROPOSITION THAT REDUCED INTRASTATE ACCESS RATES FOR**

17 **EMBARQ WILL BENEFIT CONSUMERS IN WASHINGTON. WHAT IS HIS**

18 **ARGUMENT?**

19 A. Mr. Dippon's argument is that "any any potential benefits of a reduction in intrastate

20 switched access rates must be measured in the market for the final good."⁶³ He goes on to

21 say that "[i]f the reduction has no effect in the downstream market, then it is of no benefit

⁶³ Dippon Responsive Testimony at. 83.

1 to consumers.”⁶⁴ Now, the final good associated with Mr. Dippon’s argument is the
 2 intrastate toll market, and the effect may be changes in intrastate toll prices or intrastate
 3 toll volumes. Thus, Mr. Dippon implies that if retail toll rates decline with decreases in
 4 access fees or if retail toll volumes increase with decreases in access fees, then consumers
 5 benefit; otherwise, they don’t. At its core, Mr. Dippon’s argument is that reduced
 6 intrastate access rates will not flow through to consumers in the form of decreased prices
 7 for long distance services.

8 **Q. DO REDUCTIONS IN ACCESS CHARGES GENERALLY FLOW THROUGH**
 9 **TO CONSUMERS IN THE FORM OF DECREASED PRICES FOR LONG**
 10 **DISTANCE SERVICES?**

11 A. Yes. Substantial empirical evidence exists in the economics literature showing that
 12 actual access rate reductions are consistently associated with commensurate declines in retail
 13 long distance prices. For example, economists Dr. William E. Taylor and Dr. Lester D.
 14 Taylor found that reductions in switched access fees corresponded to price declines in
 15 AT&T’s long-distance services from 1984 through July 1992.⁶⁵ Relying upon observed
 16 changes in AT&T’s annual revenues from its interstate tariffed switched long-distance
 17 services and its annual switched access payments, the authors found that AT&T’s prices
 18 to its customers fell by \$8.2 billion, while its switched access payments fell by \$10.1
 19 billion.⁶⁶

20 In a subsequent study, building upon the findings of Taylor and Taylor and extending the
 21 data through the first quarter of 1995, Dr. William E. Taylor and Dr. J. Douglas Zona

⁶⁴ Dippon Responsive Testimony at. 83.

⁶⁵ William E. Taylor and Lester D. Taylor, “Postdivestiture Long-Distance Competition in the United States,”
American Economic Review, 83 (2), May 1993, pp. 185-190.

⁶⁶ *Ibid.*, p. 186.

1 found similar results.⁶⁷ This study found that AT&T's nominal toll prices for interstate
 2 services generally fell, but not as much as access charges fell.⁶⁸

3 A third study by economists Dr. Robert W. Crandall and Dr. Leonard Waverman
 4 explicitly analyzed intrastate access rates and the pass through of access reductions in
 5 intrastate toll rates.⁶⁹ Their analysis examined a sample of AT&T's tariffed intrastate
 6 interLATA toll rates and intrastate access charges from 1987-1993. Consistent with the
 7 findings of the interstate studies, Crandall and Waverman determined that reductions in
 8 intrastate switched access fees were associated with a reduction in AT&T's tariffed
 9 intrastate interLATA toll rates. They also found that the type of retail pricing flexibility
 10 afforded by the state regulator had a significant influence on the extent to which access
 11 charge reductions were passed through to AT&T's tariffed intrastate interLATA prices.
 12 The authors concluded that greater retail pricing flexibility increased the amount of flow
 13 through associated with reductions in access charges, whereas less or no retail pricing
 14 flexibility reduced the amount of access fee flow through.⁷⁰

15 A more recent analysis of interstate residential long distance prices by Drs. Beard, Ford,
 16 Hill, and Saba reinforces earlier findings that access reductions are flowed through to
 17 consumers through lower long distance prices.⁷¹ Using a number of statistical tests, the
 18 authors examined the effects of mandated reductions in switched access charges on
 19 average per-minute prices for long-distance services provided by AT&T and MCI from

⁶⁷ William E. Taylor and J. Douglas Zona, "An Analysis of the State of Competition in Long-Distance Telephone Markets," *Journal of Regulatory Economics*, 11 (3), May 1997, pp. 227-255.

⁶⁸ *Ibid.*, pp. 236-237.

⁶⁹ Robert W. Crandall and Leonard Waverman, *Talk is Cheap: The Promise of Regulatory Reform in North American Telecommunications*, Washington DC: The Brookings Institution, 1995, Chapter 5, pp. 144-163.

⁷⁰ *Ibid.*, pp. 144-163 and Appendix B at pp. 182-187.

⁷¹ T. Randolph Beard, George S. Ford, R. Carter Hill and Richard Saba, "The flow through of cost changes in competitive telecommunications: Theory and evidence," *Empirical Economics*, 30 (3), October 2005, pp. 555-573.

January 1997 through July 1998. The study found that “changes in average [interstate toll] prices actually paid by customers of AT&T and MCI during this period are consistent with full flow through of access cost reductions.”⁷²

Q. HAVE THESE HISTORICAL REDUCTIONS IN ACCESS CHARGES WITH CONCOMITANT REDUCTIONS IN TOLL BEEN A REGULATORY SUCCESS?

A. Yes. The historical reductions in access charges with concomitant reductions in toll prices have been a major source of consumer benefits. The eminent regulator and economist, Dr. Alfred E. Kahn, applauds access reform that reduces the cross-subsidies inherent in the “egregious overcharging of long-distance ... services.”⁷³ In fact, Dr. Kahn finds this regulatory reform, which he calls “deregulation” or “unregulation” to be a major success story:

Long-distance rates, the overpricing of which bred huge social welfare losses under regulation, are down sharply. A very large share of that price decline was driven not by direct competition among the long-distance carriers but by reductions in the charges regulators required them to pay the incumbent local companies (ILECs) for access to their networks – regulation motivated by the political imperative subsidize basic residential charges . . . More rational pricing of long distance must therefore be counted as a major success of deregulation.⁷⁴

Q. IS IT REASONABLE TO EXPECT THAT ECONOMIC FORCES WILL CAUSE INTEREXCHANGE CARRIES TO PASS THROUGH AT LEAST SOME OF ANY FUTURE ACCESS REDUCTIONS EVEN IF CURRENT MARKET CONDITIONS MAY BE DIFFERENT THAN THOSE EXISTING DURING THE TIME PERIODS EXAMINED IN THESE STUDIES?

A. Yes. An IXC can be expected to pass through at least some of any future access reductions, not because of benevolent motivations, but because some price reductions would be profitable actions to take with a reduction in the volume-sensitive cost of an

⁷² Ibid., p. 557.

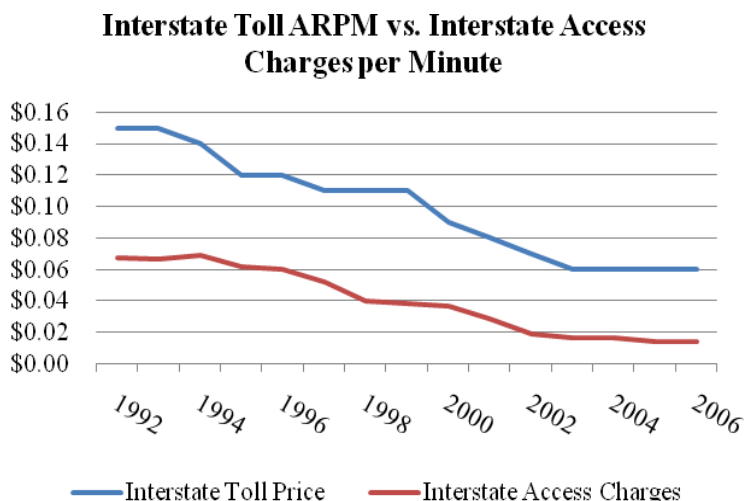
⁷³ Alfred E. Kahn, *Lessons from Deregulation: Telecommunications and Airlines After the Crunch*, AEI-Brookings Joint Center for Regulatory Studies, the American Enterprise Institute for Public Policy Research (Washington D.C.) and the Brookings Institution (Washington D. C.), 2004 at p. 22.

⁷⁴ Ibid., pp. 21-22.

IXC's toll offerings. In fact, switched access charges are likely the single largest contributor to toll volume-sensitive costs for any IXC. Further, larger reductions in access charges will tend to have a larger decline in toll prices, *ceteris paribus*. In addition, the greater is the competitive intensity, the larger the portion that would be expected to flow through to consumers through lower prices.

Q. DO YOU HAVE ANY OTHER EVIDENCE THAT INDICATES MORE RECENT ACCESS REDUCTIONS CONTINUE TO BENEFIT CONSUMERS WITH LOWER TOLL PRICES?

A. Yes. While these studies conducted econometric analyses, as is necessary, to control for other factors that might influence long distance prices, the positive correlation between switched access charges and long distance prices has continued and is evident by a simple visual examination of price trends over time, as reported by the FCC.⁷⁵



⁷⁵ *Trends in Telephone Service*, Industry Analysis and Technology Division, Wireline Competition Bureau, August 2008. See Table 1.2 for the national average total interstate access charges per minute and Table 13.4 for the average revenue per minute ("ARPM") for interstate toll calls.

Ultimately, this evidence along with standard economic principles I discuss refute Mr. Dippon's claim that consumers will not receive benefit from reduced access charges in Washington.

Q. HAVE THE CONSUMER BENEFITS OF LOWER INTERSTATE ACCESS RATES BEEN DOCUMENTED?

A. Yes. The benefits of lower access rates through past access charge reform decisions at the federal level have already been documented. As explained by former FCC Commissioner Martin in a recent proposed order on access charge reform,

The Commission's reforms during the 1980s and early 1990s yielded many public interest benefits. For example, economists have estimated that above-cost access charges reduced U.S. economic welfare by an estimated \$10–17 billion annually during the late 1980s, but that the annual welfare loss declined substantially to between \$2.5 billion and \$7 billion following the Commission's access charge reforms in the 1980s and early 1990s.⁷⁶ (footnote omitted)

Q. IS THERE ANY ADDITIONAL EVIDENCE THAT MIRRORING INTERSTATE SWITCHED ACCESS RATES FOR EMBARQ WOULD LEAD TO REDUCTIONS IN RETAIL INTRASTATE TOLL RATES IN WASHINGTON?

A. Yes. To investigate this question further and also to update the previously discussed analyses with more recent intrastate toll data, I performed my own analysis of AT&T's average intrastate toll prices in 49 states using 2008 data.⁷⁷ In rough terms this additional evidence is a cross-sectional analog to the time series comparison of interstate toll prices

⁷⁶ Order on Remand and Report and Order and Further Notice of Proposed Rulemaking, *In the Matter of High-Cost Universal Service Support and Federal-State Joint Board on Universal Service, et al.*, before the Federal Communications Commission, FCC 08-262, (released November 5, 2008), Appendix A, ¶ 168,

⁷⁷ Alaska was excluded from the analysis because I was unable to determine appropriate Alaska proxies for intrastate switched access. Washington, D.C. was not included, because it has no intrastate toll and no intrastate access tariff. The average toll price for a state is measured by ARPM for intrastate toll using AT&T's total intrastate long distance revenues and minutes. Intrastate access charges per MOU for a state is the sum of current intrastate Carrier Common Line (CCL) and Local Switching (LS2) rates for the largest ILEC in the state.

1 and access charges discussed above. The following chart plots the relationship between
2 intrastate toll prices and switched access charges for AT&T intrastate toll sales in 2008.⁷⁸

3 **[BEGIN CONFIDENTIAL INFORMATION]**

4
5 **[END CONFIDENTIAL INFORMATION]**

6 This additional evidence is consistent with conclusions found by researchers before me
7 regarding the relationship between toll prices and access charges. I found that AT&T's
8 retail prices for intrastate toll services are materially higher in states that have higher
9 access charges. Equivalently, lower intrastate access charges are associated with
10 materially lower intrastate toll price. This correlation between toll prices and switched
11 access charges is statistically significant. This correlation is shown by the plotted
12 regression line and its associated estimated equation, as found shown in the chart. This

⁷⁸ The largest ILECs in four states (Maryland, Montana, New Jersey and West Virginia) do not have tariffed CCL per minute charges, but each ILEC has a recovery mechanism substituting for the traditional CCL per minute charge. Because I have only used per minute prices from ILECs' tariffs to develop the access charges per MOU, I have included no CCL charges for these four carriers. The specific data points that correspond to these four companies are shown by 'x' marks in the chart. If these four data points are removed from the analysis, my conclusions do not change.

evidence is consistent with the expectation that if Embargo's intrastate access rates were reduced in this proceeding, intrastate toll prices will also go down.

Q. IN WHAT OTHER ECONOMIC WAYS DO EXCESSIVE ACCESS RATES HARM CONSUMERS?

A. Higher access rates result in higher retail prices for long distance services. Those higher prices not only cause consumers to pay more for long distance services, but also cause consumers to use less of the services. To an economist the discouraging effect of higher prices can be a good thing, when prices reasonably reflect the underlying (economic) cost of producing a product or service. In these circumstances prices are the means by which consumers' decisions about how much to consume something reflect the underlying cost to society of the inputs needed to create it. On the other hand, if the price of a service far exceeds its cost, consumers will respond by conserving beyond a level that is justified by the societal cost of producing the service. In these circumstances consumers unnecessarily forgo consumption and enjoyment. This distortion of consumption as a result of distorted prices is known as "allocative inefficiency." The loss of economic welfare that results from distorted prices is a permanent loss so long as the distortion persists; economists refer to the societal effect as a "deadweight loss" to the economy. When regulation causes prices to be higher than prices that reflect more closely cost-causation, allocative efficiency is reduced and consumers are harmed.

Q. IS THERE ANY ECONOMIC EVIDENCE THAT CONSUMERS DO IN FACT USE LESS LONG DISTANCE SERVICE AT HIGHER PRICES?

A. Yes. There is large literature demonstrating that consumer do use less long distance service at higher prices. The sensitivity of consumers' response to prices is often measured by price elasticity of demand. Several studies have quantified the price

elasticity of demand for different time periods and for different jurisdictions (intrastate, interstate and international). The common result is that the price elasticity of demand for long distances is negative – decreases in long-distance prices cause increased consumption of long distance services, and increases in long-distance prices cause decreased consumption of long distance services.⁷⁹

Q. MR. DIPPON ALSO CLAIMS THAT HIS REGRESSION ANALYSIS RESULTS AT PAGES 74-76 PROVES THAT THE LOSS OF TOLL MINUTES BY AT&T WAS NOT CAUSED BY EMBARQ'S HIGH ACCESS RATES. IS HE CORRECT?

A. No. Mr. Dippon's regression analysis does not prove what he claims. His regression analysis purportedly concludes that Embarq's switched access minutes are insensitive to Embarq's inflated access rates. He reached this conclusion because he allegedly observed that the coefficient from his regression equation indicates a lack of correlation between the minutes and rates variables. From this Mr. Dippon leapfrogs into an inference that this must mean Embarq's access rates would not have any impact on AT&T's toll minutes. But, Mr. Dippon's regression analysis is misspecified and flawed because the switched access minutes sold by Embarq just within its service area would not

⁷⁹ See Lester D. Taylor, *Telecommunications Demand in Theory and Practice*, Dordrecht: Kluwer Academic Publishers, 1994, pp. 129-148 and 296-314 and sources cited therein. Also see Paul N. Rappoport and Lester D. Taylor, "Toll price elasticities estimated from a sample of U.S. residential telephone bills," *Information Economics and Policy*, 9(1), March 1997, pp. 51- 70; Donald J. Kridel, "A Consumer Surplus Approach to Predicting Extended Area Service (EAS) Development and Stimulation Rates," *Information Economics and Policy*, 3(4), 1988, pp. 379-390; T.W. Appelbe, C.R. Dineen, D. L. Solvason, and C. Hsiao, "Econometric Modelling of Canadian Long Distance Calling: A Comparison of Aggregate Time Series Versus Point-to-Point Panel Data Approaches," *Empirical Economics* 17(1), March 1992, pp. 125-140; Simran K. Kahai, David L. Kaserman, and John Mayo, "Is the 'Dominant Firm' Dominant? An Empirical Analysis of AT&T's Market Power," *Journal of Law and Economics* 39(2), October 1996, pp. 499-517; Donald I. Kridel, Paul N. Rappoport and Lester D. Taylor, "IntraLATA long-distance demand; carrier choice, usage demand and price elasticities," *International Journal of Forecasting*, 18(4), October-December 2002, pp. 545-559; Armando Levy, "A Generalized additive Tobit model: An application to telecommunications demand," *Empirical Economics* 28(1), January 2003, pp. 3-22; Clement G. Krouse and Jongsur Park, "Competition in the Interexchange Telecommunication Market," *Journal of Law and Economics*, 46(1), April 2003, pp. 85-101; and David E. Burnstein, "An Examination of Market Power in the Intrastate Long-Distance Telephone Service Markets: Evidence from a Natural Experiment," *Journal of Law and Economics*, 68(1), April 2005, pp.149 -171.

1 correspond to or equal the toll minutes AT&T sold to consumers in the toll market.

2 Likewise, the switched access rates that Embarq assessed to IXC's cannot represent the

3 price on which consumers base their toll calling decision – access charges are prices to

4 IXC's and not to toll customers. All Mr. Dippon has done is confirm a point Mr. Bax has

5 made elsewhere that IXC's are captive customers of Embarq, they cannot control the

6 choice of a terminating carrier, and cannot avoid incurring charges for switched access

7 minutes from Embarq even though Embarq's access rates are unreasonably high.

8 Specifically, Mr. Dippon's no-correlation result only emphasizes the unique

9 circumstances that characterize switched access: (1) for terminating access, an IXC must

10 deliver calls to Embarq if the IXC's customer chooses to call someone that Embarq

11 serves; (2) for originating access, the IXC cannot force its customers not to choose

12 Embarq as their local exchange carrier and must pay whatever charge Embarq assesses

13 for the originated call; and (3) regulatory restrictions on deaveraging and anti-blocking

14 rules, as well as other logistical constraints make it unlikely for the IXC's to pass

15 through access charges on LEC-specific basis such that the IXC's end users do

16 not experience directly the unreasonably high access rate that Embarq assesses to the

17 IXC's and are not influenced by it. The actual price signal that the IXC's consumers get is

18 from the toll price which averages and blends the impact of access rates assessed by all

19 LECs, not just Embarq. Therefore, it comes as no surprise that Mr. Dippon finds no

20 correlation between the switched access minutes sold by Embarq and Embarq access

21 rates

22 This disconnect between the Embarq's access rates and the toll price actually paid by

23 consumer explains the reason why a consumer will still want to call someone who has

1 chosen Embarq despite Embarq's high access charges. IXC's toll customers do not pay
2 directly Embarq access rates and are not bothered by it. Hence, the access minutes sold
3 by Embarq may not be correlated with Embarq's access rate in a short run single stage
4 regression analysis like that conducted by Mr. Dippon. As explained above, Embarq's
5 access minutes are only generated (and the access charges incurred) when Embarq's retail
6 consumer either makes or receive long distance or toll calls. Neither the originating nor
7 terminating consumer pays access charges or is even aware that Embarq's switched
8 access rates exist. They only see the toll price charged by the IXCs and are able to
9 compare it with what they would pay for the same communication if they use wireless,
10 VOIP, text messaging, internet such as email and social networking.

11 Mr. Dippon's analysis fails to capture any of these dynamic circumstances, and therefore
12 cannot be relied upon to make any meaningful conclusion about how Embarq's high
13 access rates actually inflates an IXC's costs and they are subsequently blended into the
14 average toll price that the IXC must charge the end user toll customer.

15 X. CONCLUSION

16 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

17 **A.** Yes, it does.