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Witness:	**Brian Staihr**
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BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION

In the Matter of the Access Rates Charged by Competitive Local Exchange Telecommunications Companies in the State of Missouri	))))	Case No. TR-2001-65

REBUTTAL TESTIMONY
OF
BRIAN K. STAIHR
ON BEHALF OF
SPRINT MISSOURI, INC.

AUGUST 1, 2002

Rebuttal Testimony of Dr. Brian K. Staihr on Behalf of Sprint

Missouri Case No. TR-2001-65

I. BACKGROUND/PURPOSE

Q. *Please state your name, title, and business address.*

A. My name is Brian K. Staihr. I am employed by Sprint Corporation as Senior Regulatory Economist in the Department of Law and External Affairs. My business address is 6450 Sprint Parkway, Overland Park, Kansas 66251.

Q. *Please briefly describe your educational background and work experience.*

A. I hold a B.A. in Economics from the University of Missouri-Kansas City, and an M.A. and Ph.D. in Economics from Washington University in St. Louis. My field of specialization is Industrial Organization, including Regulation.

I have been a part of Sprint's Regulatory Policy Group since 1996. In my current position I am involved with the development of state and federal regulatory and legislative policy for all divisions of Sprint Corporation. I am also involved with the coordination of policy across business units. My particular responsibilities include 1) ensuring that Sprint's policies are based on sound economic reasoning, 2) undertaking or directing economic/quantitative analysis to provide support for Sprint's policies, and 3) conducting original research. The specific policy issues that I address include universal service, pricing, costing (including cost of

capital), access reform, reciprocal compensation and interconnection, local competition, and more.

In my position I have appeared before the Kansas Corporation Commission, the Florida Public Service Commission, the New Jersey Board of Public Utilities, the Pennsylvania Public Utility Commission, the North Carolina Utilities Commission, the Public Service Commission of South Carolina, the Public Service Commission of Nevada, the Texas Public Utilities Commission, the Illinois Public Service Commission, and the Missouri Public Service Commission. I have also worked extensively with the Federal Communication Commission's staff and presented original research to the FCC. My work has also been used in congressional oversight hearings.

In January 2000 I left Sprint temporarily to serve as Senior Economist for the Federal Reserve Bank of Kansas City. There I was an active participant in the Federal Open Market Committee process, the process by which the Federal Reserve sets interest rates. In addition, I conducted original research on telecommunication issues and the effects of deregulation. I returned to Sprint in December 2000.

For the past six years I have also served as Adjunct Professor of Economics at Avila University in Kansas City, Missouri. There I teach both graduate and undergraduate level courses.

Prior to my work in Sprint's Regulatory Policy Group I served as Manager-Consumer Demand Forecasting in the marketing department of Sprint's Local Telecom Division. There I was responsible for forecasting the demand for services in the local market, including basic local service, and producing elasticity studies and economic and quantitative analysis for business cases, opportunity analyses, etc.

Q. *What is the purpose of your rebuttal testimony?*

A. In my testimony I address specific issues, inconsistencies, and misstatements regarding the economic theory of costing found in the direct testimony of Dr. Ben Johnson (on behalf of Commission Staff) and Barbara Meisenheimer (on behalf of the Office of Public Counsel).

II. TESTIMONY OF DR. BEN JOHNSON

Q. *What are some of the specific misstatements or inconsistencies found in the testimony of Staff witness Dr. Ben Johnson regarding the economic theory of costing?*

A. The misstatements/inconsistencies fall into four main categories:

- The discussions regarding stand-alone cost as a price ceiling and its role in determining the existence of cross-subsidies.

- Misstatements regarding how incremental cost measures should be used and applied, and misleading discussions in which various measures of incremental cost are incorrectly used interchangeably.
- Incorrect statements regarding common costs.
- The misrepresentation of the local loop as a common cost.

III. STAND ALONE COSTS

Q. *In his testimony Dr. Johnson defines and calculates stand-alone costs and suggests that stand-alone costs are of some use in this proceeding. Do you agree with his definition of stand-alone costs and his suggestion that these costs are useful to the Commission?*

A. In general I agree with the basic definition of stand-alone costs that Dr. Johnson presents on page 7 of his testimony. But stand-alone cost is a concept that is not particularly useful or appropriate in this proceeding. As Dr. Johnson states on page 5, quoting the Commission's March 14th Order Clarifying the Scope of this Proceeding, the purpose of this proceeding is to "investigate all of the issues affecting exchange access service, including particularly the actual costs incurred in providing such service..." Since switched access is not provided on a stand-alone basis in Missouri the stand-alone cost of providing switched access has nothing to do with (as stated in the Order) "the actual costs incurred in providing such service." As Sprint witness Randy Farrar has stated, Sprint believes that the most appropriate measure of cost to be used in this proceeding is forward-looking

economic cost, which is TSLRIC plus a contribution to common costs, because it is grounded in the reality of a LEC offering multiple services over a single network.

Q. *On page 7 of his testimony Dr. Johnson suggests that stand-alone costs are useful in developing ceiling prices. Do you agree?*

A. On a practical level, no. It is a popular exercise in the theoretical economic literature to discuss stand-alone costs as a measure of price ceilings (or ceiling prices as Dr. Johnson calls them). In a few very specific situations the theory has some applicability on a practical level. But in the overwhelming majority of instances attempts to measure and use stand-alone costs are of almost no practical use. As Dr. William Taylor of National Economic Research Associates has stated, "In reality, the stand-alone cost is a toothless concept as far as cross-subsidy tests and subsidy-free pricing in a multi-service environment are concerned."[1]

Q. *Theoretically, how is a stand-alone cost supposedly used in determining a price ceiling?*

A. First and foremost, it is used as a measure of a price ceiling when evaluating the effect that pricing will have on the potential entry of competitors. In a market with free entry no provider could charge a price greater than stand-alone cost without inducing other firms to enter. So when the terms "stand-alone cost" and

[1] W.E. Taylor, "Costing and Pricing Principles for Determining Fair and Reasonable Rates Under Competition," NERA White Paper, September 24, 1998.

"price ceiling" are used together it is not in the sense that firms should or should not be permitted to set prices greater than stand-alone costs. Rather, it is that if market forces are allowed to operate unencumbered then no firm will be in a position to successfully charge a price above stand-alone cost. Therefore the stand-alone cost functions as a price ceiling.

With regard to subsidies, in the case of a multi-product firm where there are common or shared or joint costs, if a product's price exceeds stand-alone cost then a situation is created where that product is in a position to subsidize another product. Of course, sometimes this type of subsidy is intentional and desirable.[2] But if this type of subsidy is <u>not</u> intentional or desirable there are a few limited cases where capping a price at stand-alone cost (or setting a price ceiling) could prohibit a cross-subsidy.

For example, consider a firm that produces only two products, Product A and Product B. In this firm there is one piece of common equipment that is required to produce either product. So the stand-alone cost of *each* product includes the cost of the common equipment. But the TSLRIC of *each* product (as described by Dr. Johnson on page 8 of his testimony) does not include the cost of the common equipment. If one product, Product A, is priced above its stand-alone cost then it is possible for the other product, Product B, to be priced below its

[2] For example, the FCC's Sixth Report and Order in CC Docket Nos. 96-262 and 94-1 ("CALLS Order") released May 31, 2000, paragraph 23, explicitly describes the situations where states "have permitted LECs to charge rates for certain services that significantly exceeded the costs of providing those services, thereby enabling those LECs to charge below-cost rates for other services."

TSLRIC (and therefore be subsidized) and the firm will still cover its costs. If, for some reason, this was a not desirable pricing scheme then using the stand alone cost as a price ceiling for Product A prohibits Product A from subsidizing Product B. By capping the price for Product A at stand-alone cost, Product B is now forced to "pull its own weight" so to speak, and recover its own TSLRIC.

Q. *So where does this theory fall short of practical applicability?*

A. As soon as the example is extended to a three-product firm. Assume the firm now makes three products, A, B and C. As before, there is one piece of common equipment required by the production of each product. Therefore *each* product's stand-alone cost includes the cost of the common equipment. And again, the TSLRIC of each product does not include the cost of the common equipment. Assume that Product A is priced so as to recover its own TSLRIC plus 60% of the cost of the common equipment, and Product B is *also* priced to recover its own TSLRIC plus 60% of the common equipment. In that case both Product A and Product B are priced below their stand-alone costs, but the cost of the common equipment is over-recovered by 20%. That 20% can be used to allow Product C to be priced below its TSLRIC. Therefore a price ceiling of stand-alone cost for each service does not prohibit subsidization in this three-product firm. I have included a simple numerical example of this as Attachment BKS-R1, for illustrative purposes only.

Setting aside the issue of subsidization completely, it is sometimes argued that using stand-alone costs as a price ceiling prohibits over-recovery of costs. Again, it is easy to show that this does not hold in many circumstances. In the example above, if Products A and B are priced as I indicated (each recovering its own TSLRIC plus 60% of common costs) and Product C is priced at its TSLRIC, total costs are over-recovered by 20% despite the fact that no product is priced above stand-alone costs. Stand-alone costs as a price ceiling serve no purpose in this case.

Q. *On pages 17 and 18 of his testimony Dr. Johnson claims that switched access cannot be subsidizing another service unless it is priced above its stand-alone cost. Is that statement correct?*

A. No. As the example above showed, in the case of a multi-product firm it is relatively easy to come up with situations where a service can be priced below its particular stand-alone cost and still provide a subsidy. Dr. Johnson's statement is only correct in the case of a two-product firm which, of course, telecom carriers are not.

It is not unusual to find economists and non-economists over-simplifying, and therefore misstating, the relationship between stand-alone costs and subsidy-free pricing (see my response to Ms. Meisenheimer below). The reason this happens is because when economists analyze stand-alone costs and cross subsidies they

often use certain assumptions that lead to specific results, and sometimes these results are misapplied.[3]

For example, assume a regulated firm is earning just its cost of capital, which means it is operating at zero economic profits. In that case, if any service is priced *above* its stand-alone cost then there must be another service that is priced *below* its TSLRIC, and therefore is being subsidized. We know this has to be so, because if *no* other service was receiving a subsidy (that is, if every other service recovered its TSLRIC and all common costs are covered) then the firm would be earning *more* than just its cost of capital, and we have assumed that it is not.

This can lead to a classic case of a misapplication of the *"If A Then B"* logic. Referring to the example above, let us suppose "A" is "Some individual service is priced is above stand-alone cost" and "B" is "Some other service is being subsidized". Under the assumption of zero economic profits, *"If A Then B"* does indeed hold: A service priced above its stand-alone cost means some other service is subsidized. But the mistake comes when it is assumed that *"If Not A Then Not B"* holds as well. That would suggest that if there is *no* service priced above its stand-alone cost then there is *no* other service being subsidized. And we know that that is not correct because (as my example showed) products priced below their stand-alone costs can indeed provide subsidies. In pure economic terms, an

[3] For examples of such assumptions see Dr. Steve Parsons, "Cross Subsidization in Telecommunications", *Journal of Regulatory Economics*, 13:157-182, 1998.

individual price greater than stand-alone cost is a *sufficient* condition but not a *necessary* condition for cross-subsidization.

The stand-alone cost as a test for subsidies is discussed in more detail below in my response to the testimony of Ms. Meisenheimer.

Q. *How does Dr. Johnson actually use his stand-alone cost estimates?*

A. Inappropriately. On page 126 of his testimony Dr. Johnson, having calculated what he believes are the stand-alone costs for the components of exchange access, indicates that existing rates for End Office Switching and Local Transport exceed their stand-alone costs. And because he believes that stand-alone costs "are generally viewed as a rate ceiling" he says that this "suggests the need for substantial rate reductions" (lines 5-7). What Dr. Johnson tends to ignore is that a service priced above its stand-alone cost is in a position to subsidize another service. And if it IS subsidizing another service, then there is no room for the "substantial rate reductions" Dr. Johnson mentions unless they are accompanied by substantial rate *increases* for the other service that is being subsidized.

Then, two lines below this he states that, in total, "the existing [access] rates generally do not exceed stand alone costs" and he uses this to conclude that access charges are not subsidizing other services (lines 8-10). First, as shown above, Dr. Johnson's conclusion is incorrect: it is not a necessary condition that price be greater than stand-alone cost for a service to provide a subsidy in the case of a

multi-product firm. Second, the reason that, in total, access rates do not exceed Dr. Johnson's calculation of stand-alone cost is because his calculation of stand-alone cost includes the local loop. Access rates (in their historical form) have never been designed to subsidize the entire local loop, but rather just a portion of the local loop. And to the extent that access charges are subsidizing only a portion of the local loop, it would be *expected* that access rates in total would be less than a stand-alone cost that includes the entire loop.[4]

Finally, on the last page of his testimony Dr. Johnson re-states his first finding, that switching and transport rates are above stand-alone costs and this leads him to conclude that "existing rates may be higher than appropriate" (line 6). That conclusion is only correct if access charges are not subsidizing another service.

Q. *Are access charges subsidizing another service in Missouri?*

A. Yes. According to the FCC's proxy model the weighted, average monthly cost of serving a residential or business line in Sprint's Missouri territory is $40.56.[5] The weighted, average R1/B1 rate paid by Sprint's Missouri customers in 2001 was $12.79. Obviously something is subsidizing basic local service. Even if we add the amounts contained in the subscriber line charge and additional amounts to represent explicit subsidies such as Federal USF, the amount paid by Sprint's Missouri customers for basic service comes nowhere near covering the cost of

[4] Actually, it is unclear whether Dr. Johnson's stand-alone cost includes the drop cost, but since the drop accounts for, at the absolute most, less than 10% of loop costs on average, the conclusion still holds.

providing that service.[6] Access charges do indeed provide a subsidy that covers a portion of the cost of providing basic service. Dr. Johnson's claim to the contrary is incorrect.

IV. PROPER APPLICATION OF INCREMENTAL COST CONCEPT

Q. *On pages 14-15 of his testimony Dr. Johnson discusses the concept of incremental cost and claims that this concept can be applied to estimating, for example, the costs of serving different groups of customers. Is this a standard and accurate application of the concept of incremental cost?*

A. No, it is not standard and it is not accurate. For many years Dr. Johnson has attempted to define the "increment" in incremental cost studies in non-standard ways. For example, in a 1996 universal service proceeding in New Jersey Dr. Johnson, testifying on behalf of the Ratepayer Advocate, put forth an incremental cost study. In that study, rather than estimating the change in total costs when an increment of *service* was added, the cost that was estimated was the change in total costs when an increment of *customers* was added. The result of Dr. Johnson's approach was that, according to his study, the incremental cost of basic residential service in New Jersey was one dollar and ten cents ($1.10).[7] More recently, in a universal service proceeding in Kansas Dr. Johnson proposed another unique incremental cost approach, a method that separated wire centers

[5] Sprint's own cost figure is approximatealy $47.00, a cost that more accurately reflects actual input prices that a LEC would encounter serving Sprint's Missouri territory. But for purposes of this comparison using the FCC's default cost estimate is conservative and sufficient.

[6] If we add an average of $6.50 for the residential SLC and $9.50 for the business line SLC and add $1 per line as an over-stated representation of federal USF the amount paid only rises to $20.93, approximately ½ the cost of providing service in Missouri.

into zones: an inside zone near the central office, and an outside zone for surrounding areas.[8] The costs of the outer zone were to be calculated as incremental. In other words, given that the LEC was already serving the inner zone, what were the additional costs associated with serving the outer zone? The result of such an approach is that, suddenly, customers located in outer areas became cheaper to serve than their in-town counterparts because a disproportionate share of costs were applied to the inner zone. Such a result runs contrary to the results of every other TSLRIC study I have ever encountered, where the cost of serving customers in rural areas is higher, not lower, than the cost of serving urban customers.

Q. *Why, exactly, is it a misapplication of costing theory to calculate the incremental cost of serving, for example, a particular set of customers (such as business customers, as Dr. Johnson mentions on page 15 of his testimony)?*

A. Because costs are a function of the *product*, not the customer who demands the product. They are determined by the relationship between inputs and outputs (the production function), and the prices of those inputs.[9] Costs of production are not affected by the party that purchases the good or service. For example, the statement is often made that it costs less to serve business customers than to serve residential customers. Such a statement is true only because business customers are, on average, more likely to be located closer to the switch and in more densely

[7] See Direct Testimony of Dr. Ben Johnson and Rebuttal Testimony of Dr. William Taylor Before the State of New Jersey Board of Public Utilities, Docket No. TX95020631, August 15th and August 30th, 1996.

populated areas. The correct statement would be it costs less to serve customers who are located closer to the switch, and located in more densely populated areas, and business customers tend to fall in that category.

Q. *In those cases you referenced, the New Jersey universal service proceeding and the Kansas universal service proceeding, did the Commissions ultimately adopt Dr. Johnson's incremental costing approach?*

A. No, they did not in either case.[10]

V. MIS-STATEMENTS IN DR. JOHNSON'S TESTIMONY

Q. *You indicated that there were other misstatements in Dr. Johnson's testimony regarding various definitions of cost and applications of costing theory. Could you identify some of these misstatements?*

A. Yes. First, on page 11 of his testimony Dr. Johnson defines common costs and he writes, "An increase in production of any one good will tend to increase the level of common costs." And on page 2 of his Schedule 9 he again refers to common costs varying with the output of individual services. These statements are incorrect. Common costs are, by definition, costs that do *not* vary with the level of output. As the FCC explicitly stated in their Local Competition Order[11], and as Sprint witness Randy Farrar cited in his direct testimony filed July 1, 2002,

[8] See Direct Testimony of Ben Johnson and Rebuttal Testimony of Brian Staihr before the Kansas Corporation Commission in Docket No. 99-GIMT-326-GIT filed April 27, 1999 and May 24, 1999 respectively.
[9] See, for example, Hal Varian, *Microeconomic Analysis,* W.W. Norton and Company, New York, 1984.
[10] Kansas adopted a zoned approach with regard to distributing support, but not with regard to calculating incremental costs.
[11] FCC's First Report and Order in CC Docket 96-98, released August 8, 1996.

common costs are "costs that are incurred in connection with the production of multiple products or services, and remains [sic] unchanged as the relative proportion of those products or services varies."

Next, on pages 13-14 of his testimony Dr. Johnson presents a discussion regarding the difference between average costs and marginal or incremental costs. While I have no problem with portions of the discussion, Dr. Johnson tends to move somewhat casually between his use of the term "marginal" and the term "incremental" and the result is that certain statements in the testimony are misleading.

First, to clarify, marginal cost is but one specific type of incremental cost. ANY incremental cost measures the change in total cost when more or less of some product is produced. The distinctions, as Dr. Johnson correctly states, come from *how much* more or *how much* less, and whether it's the same product or a different product. For example, TSLRIC is the change in total costs that results from adding the total output of an entirely new service. Marginal cost, on the other hand, is the change to total costs that result from producing one more unit (or a very small number of units) of an already existing service. On page 14 lines 5 and 6 Dr. Johnson explains that marginal costs tend to be less than average total cost. This is true in the presence of large fixed costs and economies of scale and scope. However, on the very next line he switches the comparison to TSLRIC and average costs and states that TSLRIC will be substantially lower than average

total cost. This statement is not true in many cases, in fact, for a single-product firm TSLRIC will actually equal average forward-looking cost. And it is also not true in many cases for multi-product firms. In the illustrative example provided in Attachment BKS-R1 the three products have TSLRICs that are, respectively, substantially below, slightly below, and substantially above average cost.[12] Whether or not TSLRIC (expressed on a per-unit basis) will be greater than average cost depends on, among other things, the relative level of common costs the firm incurs.

VI. LOOP AS A COMMON COST

Q. *In his Schedule 9 Dr. Johnson uses the local loop as an example of a joint or common cost. Is this a point of view that is shared by the majority of economists working in telecommunications today?*

A. No it is not. The majority of today's leading regulatory economists working in telecom do not support the view that the local loop is a common or shared cost. Rather, the predominant view among economists is that the cost of the loop is a direct cost of connecting to the public switched network.[13]

Because this issue has been argued extensively for many years, and because innumerable pages of testimony have been filed on this issue with the Missouri

[12] The average cost in the example is $2500/300 or $8.33. The three products' TSLRICs are $6, $8 and $10.

Public Service Commission, the FCC, and undoubtedly every other state commission or board across the country, for the sake of efficiency I will not repeat all of Sprint's arguments here. Instead, I include below a quote from Dr. Alfred Kahn, testifying on this subject before the Pennsylvania Public Utility Commission. This is followed by six simple facts:

> "The arguments proffered by these witnesses [that the loop is a shared cost] are the most persistent weeds in the regulatory garden. Other mainstream economists and I have dealt with and debunked these claims for years—and I suppose this will remain our task for as long as parties to proceeding such as this insist on conflating the politics of setting prices with the economics of determining costs."[14]

Fact #1: The local loop is a *functionality* or *capability* that allows an end-user to have access to the first point of switching. It provides the end-user with the opportunity to place and receive calls.

Fact #2: That functionality comes from the loop. Not a portion of the loop, the entire loop.

Fact #3: There is a cost that the LEC incurs when it provides this capability to a customer.

Fact #4: Once the cost of providing this functionality has been incurred by the LEC, nothing the end-user does affects the cost of his or her loop. *Specifically,*

[13] For a list of economists supporting this view please see the 1994 article in the Yale Journal on Regulation by Dr. Steve Parsons entitled *"Seven Years After Kahn and Shew: Lingering Myths on Costs and Pricing Telephone Service."* The article provides an excellent discussion and overview of this topic.

the manner in which a customer uses his or her loop has no impact on, and nothing to do with, the cost of that loop or the proper method for recovering that cost

Fact #5: Following directly from Fact #4, *joint use has nothing to do with joint cost.*

Q. *But isn't it correct that if two services use the same piece of equipment then that equipment is part of the cost of providing each service?*

A. No. To see why this is so, a person need only glance at the television set sitting in his or her living room. This is a piece of equipment that is necessary to view network television programming, to view cable programming, and to view video cassettes. It is *used* to view all three. If the logic was correct that "joint use implies joint cost" then it would be correct that the price of a video rental and the price of cable television should include a portion of the price of the television set. Of course, in reality such a pricing scheme is not correct—and market forces on their own would not support such a pricing scheme and that is why we don't see it in the real world—because the cost that the television manufacturer incurs when he provides a customer with a television set has nothing to do with the cost of providing cable television or video cassettes. Just as the cost a LEC incurs when it provides a customer with the ability to place/receive calls has nothing to do with

[14] Rebuttal testimony of Dr. Alfred Kahn before the Pennsylvania Public Utility Commission, Docket No. I-940035, February 15, 1996.

the cost of providing long distance service. And while it is impossible to place a long-distance call without using a local loop, it is also impossible to watch a video cassette without a television set. But the cost of the television set is not a joint or common cost of a video rental.

In his testimony Dr. Johnson uses a well-known example of cattle-feed being part of the cost of providing both beef and leather. His example is correct; cattle feed is a joint cost in the production of beef and leather. But this is because it is impossible to separate the production of beef from the production of leather, and so an input to one process is by definition an input to the other process. This is not the case with regard to telecom services.

VII. TESTIMONY OF MS. BARBARA MEISENHEIMER

Q. *Are there misstatements in the testimony of Ms. Meisenheimer similar to those found in Dr. Johnson's testimony?*

A. Yes. Like Dr. Johnson, Ms. Meisenheimer mistakenly refers to the cost of the local loop as a common cost (page 5) and follows this with an inappropriate discussion of the impact of failing to allocate this "common cost" correctly.

Q. *You stated above that the majority of economists working in telecom today do not view the loop as a common cost. Why do many other parties insist on treating the loop as a common cost?*

A. There are generally two reasons. The first, as I mentioned above, is that they confuse joint use with joint cost. Ms. Meisenheimer makes this mistake on page 5 of her testimony when she refers to the "ever increasing variety of services" that makes use of the loop. To see the flaw in this logic we need only look at, for example, the "ever increasing variety of services" that makes use of a personal computer: standard software, Internet access, DVDs, etc. If Ms. Meisenheimer's logic is correct, then part of the cost of the computer should be included in the cost of Internet access or a DVD.

The second reason is that the pricing of basic local service (which includes the functionality provided by the loop) has historically been determined by political and social goals, rather than economic goals.[15] One way to keep the price of basic service artificially low is to recover a portion of the cost of providing that service through the prices of other services. In this case parties confuse the historical practice of cost recovery with the concept of cost causation. This is what Dr. Kahn refers to as the "politics of setting prices" in the quote I have included above.

Q. *Are there other misstatements in Ms. Meisenheimer's testimony with regard to economic theory of costing?*

[15] See, for example, Sixth Report and Order in FCC Dockets 96-262, 94-1 ("CALLS Order"), paragraph 21. Also, regarding the definition of basic service, the FCC defines basic local service as including voice grade access to the public switched network providing the ability to place and receive calls, which is the exact functionality provided by the loop. Report and Order, FCC Docket 96-45, released May 8, 1997.

A. Yes. On page 8 Ms. Meisenheimer discusses measures of cost and, like Dr. Johnson, mistakenly claims that a "service priced below stand-alone cost is not providing a subsidy." As I demonstrated above, this is not correct in the case in a multi-product firm. And to the extent that switched access might be priced below its stand-alone cost in Missouri, it is definitely still providing a subsidy for basic local service in the state.

Q. *Why is it that many parties make incorrect statements regarding prices above or below stand-alone cost as a test for subsidies among services?*

A. Because they do not understand that in the case of a multi-product firm (which all telecom carriers are) it is not enough simply to compare a product to its stand-alone cost. One must evaluate the stand-alone cost of *groups* of services, as well as the stand-alone cost of individual services. It is not enough to determine that switched access is below its own stand-alone cost; it must also be determined that for every group of services that switched access could be a part of, that *group of services* is collectively priced below that group's stand-alone cost. Only then can it be stated irrevocably that subsidization is or is not taking place.

The relationship between stand-alone cost and subsidies was first rigorously addressed in the economic literature by Dr. Gerald Faulhaber in 1975. In an article in the *American Economic Review* Dr. Faulhaber provided a formal (in the mathematical sense of the word) discussion of the necessary conditions for

subsidy-free pricing.[16] His conclusions in that article are often misinterpreted and misapplied.

The source of the misinterpretation is an incomplete understanding of Dr. Faulhaber's condition for subsidy-free pricing: The prices (or revenues) from each individual service and the prices and revenues from each group of services must be less than the stand-alone cost of each service and each group of services. In other words, a service can provide a subsidy even though it is priced below its stand-alone cost *if it is part of a group of services that, collectively, are priced above their (combined) stand-alone cost.* We can use the example contained in Attachment BKS-R1 to illustrate this fact. In that attachment I showed the following:

Stand-Alone Cost of Apples	$700 (or $7 per unit)
TSLRIC of Apples	$600 (or $6 per unit)
Stand-Alone Cost of Peaches	$900 (or $9 per unit)
TSLRIC of Peaches	$800 (or $8 per unit)

And in that attachment I showed that each of those products can be priced below its stand-alone cost (at $6.75 and $8.75, respectively) and they can still provide a subsidy to the third product, cherries. What the attachment does not show is why this is possible: Because the stand-alone costs of each product contains the SAME common cost and therefore the stand-alone cost of the two products combined is lower than the average stand-alone cost. The table below shows this:

[16] Gerald R. Faulhaber, "Cross-Subsidization: Pricing in Public Enterprises", *American Economic Review*, Volume 65, Issue 5, December 1975.

Stand-Alone Cost of Apples	$600 + $100 or $700 (or $7 per unit)
Stand-Alone Cost of Peaches	$800 + $900 (or $9 per unit)
Stand-Alone Cost of [Apples + Peaches]	$600 + $800 + $100 or $1500 (or $7.50 per unit)
TSLRIC of [Apples + Peaches]	$600 + $800 or $1400 (or $7 per unit)

In the attachment we can see that the average of the two prices ($6.75 and $8.75), which is $7.75, is indeed above the stand-alone cost for the two products combined ($7.50). But each individual price is still below each product's own stand-alone cost.

In reality it is extraordinarily difficult, if not impossible, to accurately calculate the stand-alone costs of each individual service and each group of services in a multi-product firm. But that would be the only way to accurately demonstrate that a service, such as switched access, is not providing a subsidy to another service. Any other attempted application of Dr. Faulhaber's findings, such as the statement Ms. Meisenheimer makes that a "service priced below stand-alone cost is not providing a subsidy" is simply incorrect.[17]

Q. *Does this conclude your testimony?*

A. Yes it does.

[17] As part of my background investigation in preparing this testimony I discussed this issue with other economists having particular expertise on this subject matter, including Dr. Faulhaber. Dr. Faulhaber strongly agreed that it would be a fatal error to apply the stand alone costs test and the incremental cost test to an individual service and not to all groups of services which is exactly the error committed by Dr. Johnson in his testimony.

Simple Numerical Example of Subsidization in the Case of Price < Stand-Alone Cost

The firm is a fruit-stand that buys fruit from local farmers and sells it by the side of the road. The stand is staffed by volunteers, so labor is not a cost of production. The stand itself was paid for years ago, so is fully depreciated and is no longer a cost of production. The only costs of production are the wholesale purchase price of the fruit, and the electricity that lights up the sign above the stand. The electricity represents the common cost: it does not vary with output (e.g. the quantity of fruit sold), and it does not go away (as a cost) unless the firm goes out of business.

Assume three products: apples, peaches and cherries.

Wholesale price of apples: $6 per bushel
Wholesale price of peaches: $8 per bushel
Wholesale price of cherries: $10 per bushel

Cost of electricity per month: $100.

Assume 100 bushels of each fruit are produced and sold per month.

TSLRIC of apples: $600 or $6 (on per unit basis)
Stand-alone cost of apples: $700 or $7 (on per unit basis)

TSLRIC of peaches: $800 or $8 (on per unit basis)
Stand-alone cost of peaches: $900 or $9 (on per unit basis)

TSLRIC of cherries: $1000 or $10 (on per unit basis)
Stand-alone cost of cherries: $1100 or $11 (on per unit basis)

Total Costs per Month: $600 + $800 + $1000 + $100 = $2500

Assume now that apples and peaches are each priced above TSLRIC but below stand-alone cost:
Price of apples -- $6.75
Price of peaches -- $8.75

Assuming no elasticity effects, at this price the sale of apples and peaches produces $675 + $875 = $1550. As a result, cherries must now recover only ($2500 - $1550) = $950. Thus, cherries can be priced at $9.50, which is below their TSLRIC, and total costs are recovered.

In this example the production of cherries is clearly subsidized by the other two goods (since cherries are priced below TSLRIC) but neither of the goods providing the subsidy is priced above its stand-alone cost.

BEFORE THE PUBLIC SERVICE COMMISSION
STATE OF MISSOURI

In the Matter of an Investigation of the Actual Costs Incurred in Providing Exchange Access Service and the Access Rates to be Charged by Competitive Local Exchange Telecommunications Companies in the State of Missouri.	))))))	Case No. TR-2001-65

AFFIDAVIT OF BRIAN K. STAIHR

STATE OF KANSAS)
) ss:
COUNTY OF JOHNSON)

I, BRIAN K. STAIHR, being of lawful age and duly sworn, dispose and state on my oath the following:

1. I am presently Senior Regulatory Economist for Sprint Corporation.

2. I have participated in the preparation of the attached Rebuttal Testimony in question and answer form to be presented in the above entitled case;

3. The answers in the attached Rebuttal Testimony were given by me; and,

4. I have knowledge of the matters set forth in such answers and that such matters are true and correct to the best of my knowledge and belief.

Brian K. Staihr

Subscribed and sworn to before me on this 30th day of July, 2002.

NOTARY PUBLIC

My Appointment Expires:

MICHAEL G. McCAIN
Notary Public, State of Kansas
My Appt. Exp. 4/24/2003