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July 31, 2000

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Blanca Bayó
Director, Records and Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399

Re: UNE Cost Proceeding -- Docket No. 990649-TP

Dear Ms. Bayó:

Enclosed for filing on behalf of Bluestar Networks, Inc., DIECA Communications, Inc. d/b/a Covad Communications Company, and Rhythms Links Inc. (collectively the "Data ALECs") are the original and fifteen copies of the following:

(1) Direct and Rebuttal Testimony of Terry L. Murray (redacted) 09154-00

(2) Direct and Rebuttal Testimony of Joseph P. Riolo (redacted) 09155-00

A Notice of Intent to Seek Confidential Classification, together with highlighted copies of the un-redacted testimony, is being submitted by separate letter. This notice relates to certain information contained in the above testimonies which was obtained from documents of BellSouth, GTE and Sprint that were provided to the Data ALECs pursuant to Protective Agreements.

By copy of this letter, these documents have been provided to the parties on the attached service list, including electronic service to the parties on the staff's e-mail list for this docket. If you have any questions, please call.

Very truly yours,

Richard D. Melson

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09154-00

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing was furnished to the following parties by U.S. Mail, hand delivery (*) or Federal Express (**) this 31st day of July, 2000 and was served by e-mail to the parties on the PSC staff's e-mail list.

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 990649-TP

ORIGINAL

DIRECT AND REBUTTAL TESTIMONY OF
TERRY L. MURRAY
ON BEHALF OF
BLUESTAR NETWORKS INC.,
COVAD COMMUNICATIONS COMPANY AND
RHYTHMS LINKS INC.

# REDACTED VERSION

DATED: July 31, 2000

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## I. INTRODUCTION AND SUMMARY

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

A. My name is Terry L. Murray. I am President of the consulting firm Murray & Cratty, LLC. My business address is 227 Palm Drive, Piedmont, California 94610.

**Q. Have you previously filed testimony in this proceeding?**

A. Yes. I filed direct testimony on June 1, 2000, addressing Issues 6 and 9b in the current phase of this proceeding. Exhibit _____ (TLM-1) attached to my June 1st direct testimony describes my qualifications and relevant experience.

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

A. BlueStar Networks, Inc. ("BlueStar"), DIECA Communications, Inc. d/b/a Covad Communications Company ("Covad") and Rhythms Links Inc. ("Rhythms") have asked me to review and respond to the direct testimony and cost study presentations of BellSouth Telecommunications, Inc. ("BST"), GTE Florida Incorporated ("GTE") and Sprint – Florida, Incorporated ("Sprint"), (collectively, the "incumbents"). In particular, my review has focused on any issue raised in the incumbents' direct testimony and cost studies that would have a unique or disproportionate effect on providers of broadband services that use digital subscriber line technology (commonly referred to as DSL-based services).

**Q. Did you perform an exhaustive review of the BST, GTE and Sprint cost studies presented in this proceeding?**

A. No. I have focused on those DSL-related elements that appear most inconsistent with the cost levels that I would expect based on my experience with other forward-looking cost analyses.

The problems that I have found in the incumbents' analyses for the elements that I have examined increase competitors' costs dramatically. Similar flaws may be systematically present throughout all three sets of cost studies. To ensure that competition proceeds as Congress intended when it adopted the Telecommunications Act of 1996 ("Act"), the Commission should either reject other inflated incumbent results or make appropriate adjustments to those studies based on applying forward-looking costing principles.

**Q. How is your testimony organized?**

A. Section II of my testimony addresses the incumbents' recurring cost studies for unbundled loops, especially DSL-capable and ISDN-capable loops. The section opens with a discussion of the correct conceptual approach for studying the recurring costs of unbundled loops and goes on to address the errors that I have identified in the BST, GTE and Sprint recurring cost studies for each loop type.

Section III of my testimony addresses the incumbents' nonrecurring cost studies for unbundled loops, loop "conditioning" and access to loop makeup information. Again, this section opens with a discussion of the correct conceptual approach for studying nonrecurring costs and goes on to

address the errors that I have identified in the incumbents' cost studies for each of these (allegedly) nonrecurring functions.

### A. Summary of Methodological and Conceptual Flaws Identified in the Incumbents' Cost Studies.

**Q. Please summarize the conclusions you present in your testimony concerning the methodological and conceptual flaws in the incumbents' cost studies.**

A. I will show that:

- Forward-looking economic cost studies should reflect the single, consistent network architecture that each incumbent will deploy to meet the total demand for all services and functionalities, both narrowband and broadband.
- BST has wrongly assumed at least three different loop plant architectures: (1) "BST2000" — a network with a mix of all-copper and fiber-fed loops served over Universal Digital Loop Carrier ("UDLC") — for most loop-related recurring and nonrecurring cost studies; (2) "Copper Only" for cost studies related to DSL-capable loops; and (3) "Combo" — a mix similar to "BST2000" except with Integrated DLC ("IDLC") for UNE-P. The "combo" network architecture is a relatively efficient design that most closely corresponds to the forward-looking network architecture described in

BST's own outside plant engineering guidelines and deployment plans.

- BST (and the other incumbents) can and will provision DSL-based services over the same forward-looking network that they use to provide voice-grade services, as engineering expert Mr. Joseph P. Riolo confirms in his concurrently filed testimony. In other words, "a loop is a loop." Therefore, as both GTE and Sprint have done, BST should have assumed the same forward-looking network architecture in its recurring cost study for DSL-capable loops that it assumed in its recurring cost study for voice-grade loops.
- Although I generally endorse the use of the network architecture assumptions in the incumbents' recurring cost studies for voice-grade loops, I do not agree that the BST cost study can be used as filed. I summarize the needed corrections to the BST cost study below. The Commission should also make corrections to correct errors that other parties may identify based on their more extensive review of these studies.
- The incumbents have also made errors in their studies of the recurring cost of ISDN-capable loops. Competitors such as BlueStar, Covad and Rhythms should be able to purchase ISDN-capable loops for only an increment over the cost of basic voice-grade loops. This cost increment should reflect the higher cost of an ISDN line card relative

to the POTS card that the incumbent would otherwise place at the Digital Loop Carrier ("DLC") for a fiber-fed loop.

- As parties to this proceeding stipulated, the incumbents should have studied nonrecurring costs using the same network architecture assumptions as they did for recurring costs. None of the incumbents has applied this principle across-the-board. Where the incumbents have departed from this principle, the resulting nonrecurring charges overstate total forward-looking economic costs because they recover costs for functions already accounted for in the incumbents' recurring cost studies.
- Loop "conditioning" does not represent an exception to the principle that all recurring and nonrecurring cost studies should reflect a single, consistent network architecture. The recurring loop cost studies of all three incumbents include the full cost of building "conditioned" loops that meet modern outside plant engineering guidelines. Therefore, adoption of any nonrecurring "conditioning" charges would violate the requirement that the total recurring and nonrecurring charges for "conditioned" loops be limited to total forward-looking economic cost.
- To comply with Federal Communications Commission ("FCC") requirements, the incumbents must provide competitors with the same efficient access to loop makeup information that the incumbents make available to their own (or their affiliates') personnel. The incumbents provide their own personnel with mechanized access to loop makeup

databases. Therefore, the price for access to loop makeup information should reflect the cost of such mechanized access. In a forward-looking environment, the cost of mechanized access to loop makeup information is *de minimis* on a "per database dip" basis.

## B. Summary of Recommended Commission Actions with Respect to the Incumbents' Cost Studies.

**Q. Does your testimony include specific recommendations as to how the Florida Commission should set prices for DSL-capable loops, ISDN-capable loops, "conditioning," and loop makeup information?**

A. Yes. In the sections of my testimony that follow, I explain the adjustments that this Commission should make to the incumbents' cost studies before setting recurring and nonrecurring charges for DSL-capable loops and the basis for my recommendations. Although I have focused most heavily on BST's cost studies, I have also reviewed and made recommendations with respect to portions of the GTE and Sprint cost studies.

**Q. Please summarize your recommended adjustments to BST's recurring cost studies.**

A. I recommend that the Commission make the following adjustments to BST's recurring cost studies for unbundled loops:

- ADSL/UCL(short)/UCL(long)/HDSL loops. BST should offer a single type of two-wire DSL-capable loop. The recurring costs and prices for this loop type should be the same as the Commission-

adopted costs and prices for an undesigned voice-grade loop, which BST calls a Service Level ("SL") 1 loop.

- ISDN-capable loops. The recurring costs and prices for ISDN-capable loops should be the same as recurring costs and prices for SL-1 loops, plus an increment to account for the higher cost of an ISDN card as compared to a POTS card. The increment should reflect the cost of the card, weighted by the percentage of loops that BST would provision over fiber feeder in its forward-looking network architecture.
- SL-1 loops. The Commission should modify the recurring costs and charges for SL-1 loops (and for DSL-capable and ISDN-capable loops, as I have described above) to reflect the forward-looking network architecture assumptions of the BST "combo" study. The Commission should also reject BST's proposed "in-plant" factors, which overstate the costs of installing loop plant. Because my analysis has primarily focused on costs that uniquely or disproportionately affect the competitive provision of DSL-based services, I have not attempted to identify the best possible alternative for calculating BST's costs of installed loop plant and defer to other parties on this issue.

**Q. Please summarize your recommended adjustments to BST's nonrecurring cost studies.**

A. I recommend that the Commission make the following adjustments to BST's nonrecurring cost studies for unbundled loops, "conditioning" and access to loop makeup information:

- Loop installation NRCs. The Commission should correct BST's costs for installing all loop types to reflect the tasks and task times identified in Mr. Riolo's accompanying testimony.
- Loop "conditioning." The Commission should not permit BST to impose any nonrecurring "conditioning" charges because its recurring charges recover the total forward-looking costs of "conditioned" loops. If the Commission does decide to adopt any nonrecurring "conditioning" charges at this time, it should base those charges on the efficient "conditioning" practices described in Mr. Riolo's concurrently filed testimony. The resulting charges, for which Mr. Riolo provides illustrative cost support, are a small fraction of the charges that BST has proposed.
- Access to loop makeup information. The Commission should reject BST's per-use charge for mechanized access to loop makeup information because BST is attempting to recover costs for its portion of the OSS interface, contrary to Florida Commission precedent. Even if it were appropriate for BST to recover such costs from competitors, the Commission should still reject BST's proposed charge because it reflects excessive and unsupported costs. The Commission should also reject BST's proposed manual loop qualification charge because it does not reflect the efficient, forward-looking method that BST itself is deploying for access to loop makeup information.

**Q. Please summarize your recommendations concerning GTE's recurring cost studies.**

A. The Commission should modify GTE's cost for ISDN-capable loops so that the increment of cost above a basic voice-grade loop is no more than *** **GTE PROPRIETARY** [redacted] **END GTE PROPRIETARY*****.

**Q. Please summarize your recommendations concerning GTE's nonrecurring cost studies.**

A. I recommend that the Commission require the following adjustments to GTE's nonrecurring cost studies:

- Loop installation NRCs. The Commission should correct GTE's tasks and task times for installing all loop types to reflect the efficient practices described in Mr. Riolo's accompanying testimony;
- "Conditioning." As is true for all of the incumbents, the Commission should eliminate all GTE-proposed charges for loop "conditioning." If the Commission does, however, decide to permit GTE to assess a nonrecurring "conditioning" charge, the Commission should require GTE to base that charge on the tasks and task times that Mr. Riolo identifies for efficient "conditioning" practices.

**Q. Please summarize your recommendations concerning Sprint's recurring cost studies.**

A. I recommend that the Commission require Sprint to modify its costs for ISDN-capable loops to incorporate more realistic assumptions about line-card costs.

**Q. Please summarize your recommendations concerning Sprint's nonrecurring cost studies.**

A. I recommend that the Commission require the following adjustments to Sprint's nonrecurring cost studies:

- Loop installation NRCs. The Commission should correct Sprint's tasks and task times for installing all loop types to reflect the efficient practices described in Mr. Riolo's accompanying testimony.
- "Conditioning." The Commission should eliminate all charges for loop "conditioning." If the Commission does, however, decide to permit Sprint to assess a nonrecurring "conditioning" charge, the Commission should require Sprint to base that charge on the tasks and task times that Mr. Riolo identifies for efficient "conditioning" practices.
- Access to loop makeup information. The Commission should eliminate its charge for manual loop qualification and provide mechanized access to loop makeup information at no charge to the competitor.

**Q. Have you prepared an exhibit that shows the effect of your recommendations on the incumbents' proposed recurring and nonrecurring prices?**

A. Yes. Exhibit ____ (TLM-2) displays the incumbents' proposed recurring and nonrecurring prices and, to the extent possible, shows the prices that result from making my recommended adjustments to their cost studies. In several cases, however, the complexities of the incumbents' cost models and the requisite time to perform recalculations of those studies prevented me from identifying the final effect of my recommended adjustments. This is especially true in the case of BST's recurring cost studies for unbundled loops, which rely on a cost model that takes an extraordinarily long time to run. I therefore suggest that the Commission require each incumbent to submit a "compliance" run of its cost studies, showing the effect of all Commission-adopted modifications to those studies. Interested parties should have an opportunity to review these "compliance" runs and to identify for the Commission any instances in which the incumbents' implementation of Commission-adopted modifications does not accurately reflect Commission directives.

### C. The Effect of the Eighth Circuit Opinion on My Analysis and Recommendations.

**Q. The United States Court of Appeals for the Eighth Circuit ("8th Circuit") issued an opinion on July 18, 2000, in the matter of *Iowa Utilities Board, et***

***al., Petitioners v. Federal Communications Commission and United States of America, Respondents*** **("Iowa Utilities Decision" or "8th Circuit Opinion"). Have you taken this opinion into account in your cost analysis?**

A. Yes, to a limited extent. Counsel has informed me that the Iowa Utilities Decision is not yet effective and may be stayed. Thus, it is my understanding that the FCC's Total Element Long Run Incremental Cost ("TELRIC") rules remain in place at this time. It is also my understanding that the only immediate effect of the 8th Circuit Opinion, if and when it does take effect, would be to vacate one portion of the FCC's rules, namely, 47 C.F.R. §51.505(b)(1). The conclusions that I have reached concerning the incumbents' cost studies rely on forward-looking economic cost principles generally, including the remaining portions of the FCC's pricing rules that all parties agreed to apply to the cost studies in this proceeding. [Joint Stipulation of Certain Issues and Schedule of Events, FPSC Docket No. 990649-TP ¶ 3(c)(i), filed December 7, 1999.] None of those conclusions relies specifically on the language of §51.505(b)(1). Thus, I believe that the Iowa Utilities Decision has no direct effect on my analysis and conclusions.

**Q. Could the 8th Circuit Opinion have an indirect effect on your analysis and conclusions?**

A. Possibly. If the FCC revises its TELRIC rules as a result of the remand from the 8th Circuit, the revised rules could affect my analysis and conclusions. As one hypothetical example, the FCC could decide to exclude shared and

common costs from the prices for unbundled network elements and interconnection based on the 8th Circuit's statement that "[i]n our view it is the cost to the ILEC of carrying the extra burden of the competitor's traffic that Congress entitled the ILEC to recover ...." [Iowa Utilities Decision at 8.] From an economic perspective, shared and common costs are costs that do not increase if a competitor purchases unbundled network elements or interconnection from the incumbent; therefore, such costs are not part of "the extra burden of the competitor's traffic."

It is impossible to know whether, or how, the FCC will revise its pricing rules as a result of the Iowa Utilities Decision. Therefore, I have not attempted in this testimony to second-guess how the FCC's pricing rules will change, if at all, as a result of the 8th Circuit Opinion. If the FCC promulgates new pricing rules during the pendency of this case, I reserve the right to file supplemental testimony applying those rules to the DSL pricing at issue in this proceeding.

## II. ISSUE 3 — THE COMMISSION SHOULD ADOPT COSTS FOR ALL LOOPS, INCLUDING DSL-CAPABLE AND ISDN-CAPABLE LOOPS, THAT REFLECT EFFICIENT PROVISIONING OF SUCH LOOPS IN A FORWARD-LOOKING NETWORK ARCHITECTURE.

### A. The Incumbents Should Have Modeled a Single, Consistent Forward-Looking Network Architecture in All of Their Recurring and Nonrecurring Cost Studies, But Did Not Do So.

**Q. *Your testimony focuses on costs for the unbundled network elements needed to provision advanced services such as DSL-based services.* In general, how should BST, GTE and Sprint have approached the study of these elements?**

A. The starting point for any forward-looking cost study analysis should be an identification of the total array of products, services and functionalities to be studied and the total demand (both current and reasonably foreseeable demand) for all of these cost study "objects." This requirement is implicit in the FCC's definition of TELRIC as "the forward-looking cost over the long run of *the total quantity of the facilities and functions* that are directly attributable to, or reasonably identifiable as incremental to, such element, calculated taking as a given the incumbent LEC's provision of other elements." [47 C.F.R. § 51.505(b), emphasis added.] To comply with this requirement, the incumbents' cost studies in this docket should have identified the total demand for both narrowband services such as traditional voice-grade

services and advanced services such as the DSL-based services that the incumbents are offering in competition with new entrants such as BlueStar, Covad and Rhythms.

The next step in the modeling exercise is to determine the forward-looking network configuration for meeting this total demand for *all* of the products, services and functionalities under study. Incumbents such as BST, GTE and Sprint do not operate multiple networks; they each operate a single, integrated network today and will operate a single, forward-looking network architecture in the future to provision both narrowband and broadband services. Thus, each incumbent should have reflected the single, forward-looking network architecture that it plans to deploy in *all* of its recurring and nonrecurring cost studies for unbundled network elements and interconnection.

**Q. Did the Florida incumbents follow this procedure to develop recurring and nonrecurring costs for unbundled network elements required for the provision of DSL-based services?**

A. No. BST in particular has studied the costs of elements related to DSL-based services as if it would build an entirely separate network for those services, provisioned exclusively over all-copper loops. That is not the way that BST or any other carrier is building or plans to build new plant.

GTE and Sprint did not make this error in their recurring cost studies. Instead, each has appropriately studied the recurring costs for DSL-capable loops as if it would provision those loops over the same forward-looking

network architecture that it has assumed for narrowband services. But both GTE and Sprint have, to varying degrees, studied certain nonrecurring costs, particularly the costs of "conditioning" loops, based on the characteristics of their embedded copper loop plant.

In this section of my testimony, I identify errors in the incumbent's recurring cost studies for unbundled loops. I will address problems with the incumbents' nonrecurring cost studies, including their "conditioning" cost studies, in Section III below.

**Q. Should a forward-looking cost analysis consider embedded or historical costs?**

A. No. Embedded or historical costs are "sunk" costs that have no relevance to the business decisions that incumbents and competitors must make.

**Q. Does a forward-looking cost analysis require different assumptions than would be required for a study of the historical cost of provisioning unbundled network elements based on an incumbent's existing *equipment and network*?**

A. Yes. The incumbents' embedded or historical costs will obviously not match their forward-looking costs (except by pure chance) wherever they have existing long copper feeder facilities in place but would replace that copper with fiber on a forward-looking basis. Similarly, the incumbents' embedded or historical costs will not match their forward-looking costs wherever they have DLC equipment in place that pre-dates modern DLC equipment that

complies with the GR-303 standard. This sort of modern DLC equipment is commonly known as Next Generation Digital Loop Carrier or NGDLC.

There is no inherent contradiction in setting prices for access to the existing physical network based on forward-looking economic costs. Forward-looking costs are consistently recognized as promoting a competitive environment, which is one of the primary purposes of the Act.

**Q. As an economist, do you agree that prices based on forward-looking costs promote a competitive environment?**

A. Yes. The prices for goods and services sold in a competitive, unregulated market reflect forward-looking economic costs, even though the firms producing those goods and services employ processes and equipment of varying vintages. For example, a steel mill using out-of-date production methods must meet or beat the prices of competing firms employing the most modern production technologies and equipment, even if such pricing falls below the older mill's "actual" cost (based on its existing equipment). Like all firms in competitive markets, this steel mill must either lower its long-run costs to match more efficient rivals (*i.e.*, achieve "actual" costs that equate to efficient, forward-looking costs) or exit the market. Competitive markets offer no leeway for recovering "actual" costs that exceed efficient, forward-looking costs. Thus, the prices established for unbundled network elements in this proceeding can only mimic the prices that would prevail in a competitive market if the Commission treats the costing and pricing process as distinct

from the costs associated with the physical facilities that the incumbent has in place today.

**Q. Why should the Commission set prices for unbundled network elements that mimic the prices that would prevail in a competitive market?**

A. An important public policy goal of the Act is the promotion of competition. New entrants can only offer competitive retail prices if they are able to obtain inputs, such as the functionalities of unbundled network elements, at prices that are comparable to those that the incumbents (or their affiliates) are able to obtain on a going-forward basis. Thus, to promote competition, Congress required that incumbents make unbundled network elements and interconnection available to new entrants at prices that are both cost-based and nondiscriminatory. [47 U.S.C. § 251(d)(1).] This Congressional requirement addresses two important realities of the transition to competition. First, new entrants cannot overbuild the incumbents' local exchange networks overnight. Second, the economic advantage that the incumbents have gained through their historic monopoly franchises may prevent competitors from ever duplicating some portions of the network at costs as low as those that the incumbent experiences.

Without regulatory oversight of the pricing of unbundled network elements and interconnection, incumbents have every incentive to exploit the inherent competitive advantage that they obtain as a result of the limited ability for new entrants to replicate the incumbents' networks at comparable costs. The incumbents understandably would prefer that new entrants have a

higher cost structure than the incumbents will be able to achieve based on the efficient technology and network architecture that they plan to deploy for themselves. Unless this Commission forces the Florida incumbents to set prices for unbundled network elements that reflect the efficiencies reflected in the incumbents' own engineering guidelines and business plans, new entrants may never be able to offer retail services to Florida consumers at competitive prices.

## B. BST's Cost Study for DSL-Capable Loops Improperly Assumes a Hypothetical, All-Copper Network That Bears No Resemblance to Either BST's Current or Its Forward-Looking Network Architecture.

**Q. To provision DSL-based services, competitors, in many instances, have sought access to "clean copper loops." Should the recurring and nonrecurring costs for DSL-capable loops therefore be based on the costs of all-copper loops?**

A. No. The requests for "clean copper loops" reflect the realities of provisioning DSL-based services over the incumbents' existing networks. Competitors would not need to request "clean copper loops" if the incumbents had in place the forward-looking network architecture that they have assumed in their recurring cost analyses for voice-grade loops, announced plans to build and, in some cases, are actually building. For purposes of cost modeling, each incumbent should have studied the cost of DSL-capable loops based on the

manner in which it would provision such loops over its forward-looking network configuration, not its embedded network configuration. That is the only way the costs can be truly forward looking.

All three incumbents have recognized this divergence between their embedded network architecture and their forward-looking network architecture in modeling costs for basic voice-grade loops. For example, their recurring cost studies for voice-grade loops assume fiber feeder for all loops over a certain length even where copper facilities actually exist today. GTE and Sprint have also carried through the same principle in modeling the recurring costs of DSL-capable loops, basing their proposed recurring charges for such loops on the same cost studies that they use as the basis for their proposed recurring charges for voice-grade loops.

BST has not. BST has based its proposed recurring charges for a variety of "flavors" of DSL-capable loops on cost studies that assume an all-copper network architecture. To calculate these costs, BST ran a special "all-copper" scenario in its loop model; this scenario assumes that BST would provision *all* loops on copper feeder, regardless of length. This is not the network architecture that BST deploys today, much less the network architecture that the company plans to deploy in the future. In that way, BST has neither done an analysis of costs based on its existing, embedded outside plant, nor has it studied the network architecture that the company plans to deploy in the future. Instead, BST has created an entirely hypothetical all-copper network as a way to drive its rates upward and to strengthen its

monopoly hold on the advanced services markets in Florida. Of all three incumbents in Florida, only BST has violated the basic consistency requirement of forward-looking cost studies in its recurring cost studies for unbundled DSL-capable loops.

**Q. For purposes of cost modeling, how should the incumbents have defined a DSL-capable loop?**

A. The incumbents should have modeled a DSL-capable loop as if it were essentially the same as a voice-grade loop. DSL technology delivers broadband services to a residence or business over standard telephone lines. As Mr. Riolo explains in his concurrently filed direct and rebuttal testimony, an all-copper DSL-capable loop in a modern telephone network is no different from a voice-grade loop. Even for fiber-fed loops, all unbundled loops in a forward-looking network use the same copper distribution facilities and the same fiber feeder from the DLC to the central office, as well as most of the same DLC facilities. So there is no difference in the copper distribution facility and no difference in the fiber feeder facility. The only difference is the line card placed in the DLC.

In further confirmation of this fact, neither GTE nor Sprint has proposed any distinctions among various types of DSL-capable loops (with the exception of ISDN-capable loops) or between DSL-capable loops and voice-grade loops. Thus, two of the three incumbents in Florida acknowledge that a DSL-capable loop and a voice-grade loop are the same. In other words, a loop is a loop. BST is attempting to make an inappropriate distinction to

support its extremely high proposed nonrecurring and recurring charges for DSL-capable loops in Florida.

**Q. What distinctions does BST's cost study make among DSL-capable loops?**

A. BST has proposed separate recurring and nonrecurring charges for the following DSL-capable loop types (in addition to ISDN-capable loops), all of which are provisioned over "dry" copper:

- ADSL Compatible Loop (Element A.6.1) — up to 18,000 feet (inclusive of up to 6,000 feet of bridged tap);
- HDSL Compatible Loop (Element A.7.1) — up to 12,000 feet (inclusive of up to 2,500 feet of bridged tap);
- Unbundled Copper Loop - Short (Element A.13.1) — up to 18,000 feet (exclusive of bridged tap); and
- Unbundled Copper Loop - Long (Element A.13.2) — greater than 18,000 feet (exclusive of bridged tap).

BST's proposed prices for "ADSL Compatible" loops and short Unbundled Copper Loops ("UCL") loops are essentially the same. BST confirms that "[t]he recurring costs are identical [for elements A.13.1 and A.6.1] and both cost elements are treated identically in the BSTLM© for development of recurring costs. [BST's Response to Rhythms' Interrogatory 4.]

**Q. Are BST's distinctions among DSL-capable loop types and between DSL-capable loops and voice-grade loops appropriate?**

A. No. The Commission should not allow BST to dictate what services a competitor may provide over an unbundled loop. The limitations that BST seeks to impose on its competitors' use of ordinary analog loops may, without justification, increase competitors' costs or cause delays in the competitors' ability to provide service.

BST itself admits that "BellSouth does not have sufficient information on the ALEC's proposed use of the loop or the specific ALEC equipment limitations to qualify loops for a specific ALEC service." [BST's Response to Rhythms' Interrogatory 29.] That is appropriate because BST should not be in the business of qualifying loops for competitors (although it includes substantial costs for doing so in its current nonrecurring cost studies). Instead, competitors should be able to use an unbundled loop to provide any technically feasible service over that loop, without artificial restrictions.

Establishing such artificial limits, particularly in the rapidly evolving world of advanced broadband services, can only slow innovation and constrain competition. Indeed, it is just such unreasonable constraints on the potential use of unbundled loops that I understand the FCC as addressing when it states that "Section 251(c)(3) [of the Act] does not limit the types of telecommunications services that competitors may provide over unbundled elements to those offered by the Incumbent LEC." [*First Report and Order and Fourth Further Notice of Proposed Rulemaking*, In the Matters of Deployment of Wireline Services Offering Advanced Telecommunications Capability, CC Docket No. 98-147 (released March 31, 1999) at ¶ 53.]

**Q. Should prices for DSL-capable loops vary based on loop length, as BST has proposed?**

A. No, unless prices for all unbundled loops are deaveraged based on loop length. Loop length is an important *input* underlying any loop cost study because costs for all loop types vary, at least to some degree, based on loop length. DSL-capable loops are not unique in this respect. Therefore, BST's proposal to single out DSL-capable loops for what is, in effect, deaveraged pricing based on loop length is unduly discriminatory and leads to absurd results and over-recovery of costs, as I will demonstrate below.

Neither GTE nor Sprint has proposed to make pricing distinctions for any loop type — including DSL-capable loops — based on loop length. [*See* GTE, Tucek Direct, at 35, and Sprint, McMahon Direct, at 10.] I recommend that the Commission adopt the nondiscriminatory pricing approach that GTE and Sprint have proposed for the recurring charges for all DSL-capable loops and reject BST's proposed distinctions based on loop length.

**Q. If the Commission were to differentiate prices based on loop length, would BST's proposed distinction between UCL-Short and UCL-Long loops reflect an appropriate cost basis for setting prices?**

A. No. BST's proposed recurring price for a "long" copper loop, $52.66, is almost *three times* its proposed price for a "short" copper loop, $18.13. Such a pricing scheme effectively restricts DSL providers to buying loops under 18,000 feet long.

This extreme price differential does not reasonably reflect the higher cost that BST would experience to make available all-copper loops over 18,000 feet long to DSL providers. BST's UCL-Long cost study purports to measure the weighted average cost for an all-copper configuration for all loops in its network over 18,000 feet long. Given current technology, however, competitors such as BlueStar, Covad and Rhythms cannot use many of the long all-copper loops that BST has modeled to provision DSL-based services. It is my understanding that the practical length limit for providing DSL-based services over all-copper loops varies somewhat depending upon the gauge of the copper cable, but today generally does not exceed 21,000 feet. Moreover, as the BST, GTE and Sprint cost studies reflect, incumbents are generally replacing their longest copper loops with fiber-fed loops. Therefore, equipment manufacturers may not focus their efforts on developing technology to extend the loop length range of DSL-based services over all-copper loops. Thus, the average loop length included in BST's UCL-Long cost study substantially overstates the average length of the longer all-copper loops that DSL competitors are likely to request from the incumbents. Indeed, the vast majority of all-copper loops over 18,000 feet long that competitors would seek to obtain to provision DSL-based services may be only slightly over the artificial 18,000-foot limit that BST has used to distinguish between its proposed UCL-Short and UCL-Long elements. There is no cost basis whatsoever for charging a competitor buying an 18,050-foot-long loop almost three times as much as a competitor buying a loop that is only 50 feet shorter.

**Q. How should the Commission set recurring charges for DSL-capable loops?**

A. Two-wire DSL-capable loops should be priced at the two-wire basic voice-grade loop price and four-wire DSL-capable loops should be priced at the four-wire basic loop price, as both GTE and Sprint have recommended.

**Q. Has BST made any other unreasonable assumptions in establishing its proposed prices for UCL loops?**

A. Yes. BST indicates in its element description that:

> The CLEC may use BellSouth's Unbundled Loop Modification (ULM) offering to remove bridged tap and/or load coils from any copper loop within the BellSouth network. If load coils are removed from a loop, that loop will then be classified as either a UCL-short or UCL-short depending upon the total length of the loop.

[BST's cost study filing, Section 6, at 28.]

BST's proposed statewide average recurring charge for UCL-Short loops, $18.13, is greater than its proposed recurring charge for voice-grade loops, $17.88, even though the voice-grade loop price applies to loops of all lengths, not just the less costly loops under 18,000 feet long. And, as I noted above, BST's proposed recurring charge for UCL-Long loops, $52.66, is a great deal higher than either its price for UCL-Short loops or the even lower price for voice-grade loops. BST apparently envisions that, even after paying a substantial nonrecurring charge for "conditioning," a DSL competitor would

still have to pay BST a higher recurring charge than another competitor would have to pay for the same loop as an unconditioned voice-grade loop. This proposal is patently unfair.

**Q. Why do BST's costs for DSL-capable loops exceed its costs for voice-grade loops?**

A. BST has created an incredibly expensive, hypothetical all-copper network model to raise costs for DSL-capable loops. By BST's own admission, an all-copper network is not forward-looking. [*See* BST's "Loop Technology Deployment Directives" (RL: 98-09-019BT, December 8, 1998) and BST's "ADSL Planning Directives" (RL: 00-01-02BT, Feb. 14, 2000).] Furthermore, because no one is building such a network, nor has anyone done so for decades, as Mr. Riolo confirms in his testimony, this model is completely hypothetical. The longer all-copper loops in BST's cost studies of DSL-capable loops exceed the company's own economic crossover point for deploying fiber feeder and DLC, instead of copper feeder. Thus, one should expect that the average cost for a 100% copper network would exceed the average cost for a network that includes an economically efficient mix of all-copper and fiber-copper loops. By using this unreasonable and hypothetical all-copper network scenario, BST unjustifiably increases the cost of DSL-capable loops.

A second reason for the cost difference between DSL-capable loops and voice-grade loops in BST's cost studies is BST's faulty assumption that

all ADSL-compatible loops need to be "designed" to provide the loop with a test access point.

**Q. Do DSL-capable loops need to be "designed"?**

A. No. As Mr. Riolo explains in more detail in his testimony, BST does not need to design such capabilities into the loop. BST would be hard-pressed to meet the growing demand for DSL-based services if it treated each DSL-capable loop as a designed loop — unless BST is able to use this mistaken assumption to inflate its loop prices sufficiently to suppress demand to a level that would accommodate a manual, design-each-loop process. Such a result would put Florida at a severe disadvantage compared to other states with reasonably priced access to advanced services.

DSL-capable loops should be priced the same as non-designed voice-grade loops (what BST calls SL-1 loops). Mr. Riolo provides engineering support for this conclusion.

### C. The Commission Should Adjust the Costs for Basic Voice-Grade Loops to Reflect Efficient Practices and Cost Assumptions.

**Q. Should the Commission simply base the adopted prices for DSL-capable loops on the incumbents' recommended prices for voice-grade loops?**

A. No. The Commission should first correct the incumbents' costs for basic voice-grade loops before using those costs to set prices for DSL-capable loops.

**Q. Have you identified all of the errors in the incumbents' cost studies for basic voice-grade loops that the Commission should correct?**

A. No. Because the focus of my analysis has been on prices that uniquely or disproportionately affect providers of DSL-based services, I have not performed an in-depth analysis of the three incumbents' recurring cost studies for voice-grade loops. I have, however, identified enough flaws in the BST cost study to be certain that study requires modification. I have not reviewed the GTE and Sprint recurring cost studies for basic voice-grade loops in sufficient detail to determine whether similar flaws affect those cost studies.

**Q. What flaws have you identified in the BST recurring cost study for basic voice-grade loops?**

A. There are at least two major flaws in BST's recurring cost study for SL-1 unbundled loops. First, even for this loop type, BST has not assumed the efficient DLC technology that it is actually deploying and continues to plan to build. (*See* Mr. Riolo's discussion of BST's loop deployment guidelines.) Instead, the "BST2000" scenario assumes UDLC, which inflates costs relative to the IDLC configuration assumed in the "Combo" scenario that BST used to study costs for UNE-P.

Second, even though BSTLM© apparently has the ability to calculate installed costs of various materials using specific "EF&I" factors, BST has instead chosen to convert material prices from the model into installed prices by applying "in-plant" loading factors. These "in-plant" loading factors can,

in some cases, lead to substantial overstatement of the costs that BST would actually incur to install plant.

**Q. How can the use of "in-plant" loading factors lead to substantial overstatement of the costs that BST would actually incur to install plant?**

A. Two examples from BST's recurring cost studies illustrate this point. First, consider the cost to install a line card or channel unit in a remote terminal. Although the electronics on the line cards for various types of service (*e.g.*, ISDN vs. POTS) differ, the labor time required to "plug-in" the different types of cards should be essentially the same. That is not the result that BST obtains using its "in-plant" factor approach. Instead, the "in-plant" factor methodology implicitly assumes that it costs BST *** **BST PROPRIETARY** [redacted] **END PROPRIETARY** *** as much to install an ISDN line card as it costs to install a POTS line card, simply because BST assumes the same relationship between the investment cost of the two card types.

Second, consider the costs to install various sizes of copper cable. Cable installation costs exhibit what economists call "economies of scale" because the cost to install larger cables does not differ substantially from the cost of installing smaller cables. In other words, on a per-pair basis, installing a 3,000-pair copper cable is much less expensive than installing a 25-pair cable. Again, that is not the result that BST obtains using its "in-plant" factor approach. Instead, BST assumes that the cost to install cables will increase in direct proportion to the increased investment in those cables. The installation cost for a 3,000-pair copper cable in BST's model therefore is more than ***

BST PROPRIETARY ■ END PROPRIETARY *** times the cost to install a 25-pair cable because that is the ratio of BST's assumed investment costs for these two cable sizes. This modeling error fundamentally misstates one of the basic economic facts of local exchange telecommunications networks.

**Q. *Do you have any recommendations as to how the Commission could remedy these errors in BST's cost modeling?***

A. The solution to the first problem that I identified is straightforward: the Commission should require BST to use the "combo" case assumptions to model the costs for all unbundled loops. The solution to the second problem requires the identification of appropriate alternative estimates for the installation costs associated with each material type. I have not attempted such an exercise, but instead recommend that the Commission give serious consideration to the proposed solutions of other parties that have focused their analysis more intensively on BST's basic voice-grade loop costs.

**Q. Please summarize the actions you recommend that the Commission take with respect to the incumbents' recurring cost studies for voice-grade loops.**

A. I recommend that the Commission require BST to rely on its "combo" scenario to compute all unbundled loop costs. I also recommend that the Commission require BST to correct its flawed "in-plant factors." Finally, I recommend that the Commission require all three incumbents to correct

additional flaws in their loop cost studies that other parties may bring to light in their concurrently filed testimony. The corrected voice-grade loop cost studies should form the basis for pricing of DSL-capable loops.

### D. The Commission Should Adopt Costs for ISDN/IDSL-Capable Loops That Reflect the Efficient Forward-Looking Network Architecture That the Incumbents Have Announced Plans to Deploy.

**Q. Why are prices for ISDN-capable loops of special interest or concern for competitive providers of DSL-based services?**

A. Given the characteristics of the incumbents' embedded networks, competitors such as BlueStar, Covad, and Rhythms may offer IDSL-based service to customers located far from the incumbent's central office over an ISDN-capable loop. It is important to note that competitive carriers are buying simple facilities. They are free to place whatever services they wish on those facilities. For example, while BellSouth chooses to place an ISDN service on a two-wire digital or ISDN-capable loop, Covad, Rhythms and BlueStar place IDSL service on such loops. Regardless of what service the competitor places on the loop, the loop facility is the same. IDSL can be provisioned over either all-copper or fiber/DLC loops. For convenience, I shall consistently refer to these loops as "ISDN-capable" loops, although the same loops are also "ISDL-capable."

**Q. In a properly designed forward-looking cost study, what, if any, cost differences should there be between an ISDN-capable loop and an analog loop?**

A. As Mr. Riolo explains in his testimony, the facilities used to provide ISDN-capable loops do not differ from the facilities to provide voice-grade loops. Indeed, over copper, ISDN-capable loops do not differ from basic loops at all. Mr. Riolo goes on to explain that the only cost difference between a fiber-fed digital loop capable of carrying ISDN or IDSL services and a fiber-fed analog loop should be the cost of the line card or channel unit. That is, ISDN-capable loops require only additional line card investment and that only for loops provisioned over fiber. Therefore, recurring charges for ISDN-capable loops should be set at the recurring charge for basic loops, plus an increment to account for the higher cost of an ISDN card as compared to a POTS card. The increment should reflect the cost of the card, weighted by the percentage of loops that would be provisioned over fiber feeder in the forward-looking network.

**Q. Have the incumbents in this proceeding modeled the cost of ISDN-capable loops correctly?**

A. No. The incumbents' proposed recurring charges for ISDN-capable loops are unreasonably high both in an absolute sense and relative to the costs for basic analog loops. It appears that each of the incumbents has incorrectly assumed that the higher bandwidth of digital loops automatically causes it to incur greater central office and remote terminal costs for digital loops. For

example, each of the incumbents has assigned a disproportionate share of its DLC investment to ISDN-capable as opposed to voice-grade loops. As Mr. Riolo confirms, the DLC systems and associated electronics that the incumbents will deploy on a forward-looking basis are designed so that any reasonable increment of ISDN or IDSL services will not cause any incremental cost. Therefore, although the incumbents' proposal to multiply costs in relation to the relative transmission speeds of digital and analog service has a superficial plausibility, it does not reflect the manner in which the incumbents will actually incur costs.

**Q. How has Sprint calculated recurring costs for ISDN-capable loops?**

A. Sprint has calculated a monthly "ISDN-BRI/IDSL additive" that would apply in addition to the monthly analog rate for all ISDN-capable loops. [*See* Sprint, Dickerson Direct, Exhibit KWD-3.] Although this approach is similar to the one I have advocated, Sprint has erred in several of its assumptions and its implementation. Sprint's adder includes not only the incremental costs for the more expensive ISDN line card at the remote terminal, but also incorrectly includes costs for additional central office electronics, higher portion of the DLC investment, and additional span line (*i.e.*, the connection between the central office terminal and the remote terminal) requirements. For example, for large DLC systems (which are the majority), Sprint has assigned to ISDN-capable loops three times the DLC common equipment cost that it assigned to POTS loops.

**Q. Is Sprint's proposed ISDN adder reasonable?**

A. No. Sprint's proposed monthly recurring charge additive of $14.60 is excessive. This is especially apparent when compared to Sprint's proposed two-wire analog prices: Sprint's proposed ISDN adder represents an increase of almost 58% over the statewide average of Sprint's proposed monthly analog loop prices. Because the adder is not deaveraged, it represents an even higher percentage of loop prices in high-density areas. For example, for loops within "Band 1," Sprint's proposed price for ISDN-capable loops is more than double its proposed price for analog loops.

As I have explained, Sprint has incorrectly inflated central office and remote terminal costs for digital loops; this appears to account for about *** **SPRINT PROPRIETARY** [redacted] **END PROPRIETARY** *** of Sprint's proposed ISDN adder. In addition, Sprint has assumed an unreasonably high cost for an ISDN line card as compared to a POTS line card. *** **BST, GTE AND SPRINT PROPRIETARY** [redacted] *** **SPRINT PROPRIETARY** [redacted] **END PROPRIETARY** *** in investment per loop. This translates to an increase in loop prices of

*** **SPRINT PROPRIETARY** [redacted] **END PROPRIETARY** *** per month. Weighting this amount by Sprint's estimated percentage of fiber/DLC loops, 71.83% [*id.*], yields an ISDN adder price of *** **SPRINT PROPRIETARY** [redacted] **END PROPRIETARY** *** per month.

**Q. How has GTE calculated recurring costs for ISDN-capable loops?**

A. I was not able to determine exactly how ICM calculates the recurring costs for ISDN-capable loops. What is clear is that GTE has also overstated the costs of the central office and remote terminal electronics necessary for ISDN-capable loops.

**Q. Is GTE's proposed recurring charge for ISDN-capable loops reasonable?**

A. No. Although GTE's ISDN increment relative to analog loops appears more reasonable than the proposals of the other two incumbents, GTE's estimate of the cost of ISDN relative to a basic voice-grade loop is still excessive. Based on GTE's own estimate of RT line card costs, the incremental cost of an ISDN card would be only *** **GTE PROPRIETARY** [redacted] **END PROPRIETARY** ***. Weighting this incremental cost by the percentage of fiber-fed loops (45.5% according to GTE's Response to Rhythms' Interrogatory 59) produces an ISDN adder of *** **GTE PROPRIETARY** [redacted] **END PROPRIETARY** *** per month relative to the price of basic, voice-grade loops.

**Q. How has BST calculated recurring costs for ISDN-capable loops?**

A. Like the other two incumbents, BST has incorrectly assumed that ISDN-capable loops are responsible for a disproportionate amount of DLC investment. For example, BSTLM© appears to calculate the DLC common equipment investment associated with a service based on its "DS0 equivalents" [BST's Response to AT&T's Interrogatory 147], and BST has further assumed that one ISDN-capable loop is requires the equivalent of three DS0s. [BSTLM© inputs.] It may also be the case that BSTLM triples the fiber investment associated with an ISDN-capable loop. [BST's Response to AT&T's Interrogatory 147.] As Mr. Riolo confirms, transmitting a higher rate of light pulses along a fiber does not require a "fatter" fiber and therefore does not require a wider conduit. Because the capacity of fiber is so vast, there is no chance that any reasonably foreseeable demand for digital service will cause BST to invest in additional fiber feeder cable (relative to the investment already reflected in its recurring cost study). BST should therefore have modeled the fiber (and related structure costs) of ISDN-capable loops as being the same as the corresponding costs for analog loops.

BST has introduced at least three other significant errors. First, BST apparently based its estimate of ISDN costs on its current retail ISDN customers and locations. [*See*, for example, BST's Response to AT&T's Interrogatory 148.] Thus, BST's estimated cost of providing ISDN in any given wire center reflects the number and location of its existing customer base in a one-time "snapshot" of demand. If the three ISDN customers in a wire center happen to be far from the central office, for example, ISDN costs

for that wire center will be high, regardless of the average loop costs. If instead the ISDN customers chance to be close to the central office, ISDN costs will be relatively low.

This approach generates nonsensical results, with widely skewed prices. BST does not even present ISDN prices for 71 of its wire centers (36%), presumably because BST has sold no retail ISDN in those areas. In some wire centers, ISDN-capable loops appear to be significantly less costly than voice-grade SL-1 loops. (For example, BST has calculated monthly prices in wire center HAVNFLMA of $14.24 for ISDN and $32.81 for voice-grade SL1 and in wire center NDADFLOL of $10.84 for ISDN and $12.48 for voice-grade SL1.) Other wire centers have ISDN costs several times those for the basic SL-1 loop. (For example, BST has calculated monthly prices in wire center STAGFLWG of $83.00 for ISDN and $38.73 for voice-grade SL1; in wire center GCSPFLCN of $100.52 for ISDN and $31.22 for voice-grade SL1; in wire center MIAMFLCA of $29.54 for ISDN and $15.92 for voice-grade SL1.)

Competitors are free to buy any loop as an ISDN-capable loop. Thus, BST should have modeled the cost of ISDN-capable loops based on the characteristics of all loops. BST's approach to modeling the cost of ISDN-capable loops does not comport with the FCC's requirement that costs be based on a reasonable *projection* of demand.

Second, BST incorrectly assigns the cost of RT line cards entirely to the working pairs on the card:

DLC-RT Channel Unit Cards – Allocated based on number of services provided by card. If a card provides for four services by only two are working on the card, then 50% of the investment is assigned to each service.

[BST's Response to AT&T's Interrogatory 147.]

Third, BST assumes that an ISDN-capable loop must be "designed," including a test point access. Mr. Riolo explains why this needlessly inflates the cost of what is really a very standard offering.

**Q. Is BST's proposed recurring charge for ISDN-capable loops reasonable?**

A. No. BST's flawed approach to estimating ISDN costs leads to unreasonably high recurring charges. BST proposes a statewide average monthly recurring charge for ISDN-capable loops of $29.80, about 67% more expensive than BST's proposed charge for analog loops. BST's assumption that an ISDN-capable loop must be "designed" accounts for $2.33 of its cost increment for ISDN-capable loops. Based on BST's own estimate of RT line-card costs and fill, the incremental investment required for ISDN-capable loops versus analog loops would be approximately ***** BST PROPRIETARY** [redacted] **END PROPRIETARY *****. I have been unable to determine the percentage of fiber loops assumed in BST's recurring cost study. However, if one assumes the current percentage of fiber-fed loops in BST's network (42.4% according to BST's Response to Rhythms' Interrogatory 83), the weighted additional investment needed for ISDN-capable loops as compared to SL-1 loops would be ***** BST PROPRIETARY** [redacted] **END PROPRIETARY**

*** . This translates to an ISDN adder of about *** **BST PROPRIETARY** [redacted] **END PROPRIETARY** *** per month. In contrast, BST's loop model (BSTLM©) ludicrously calculates almost *** **BST PROPRIETARY** [redacted] **END PROPRIETARY** *** in additional digital circuit investment per ISDN-capable loop.

## III. THE COMMISSION SHOULD ADOPT NONRECURRING COSTS THAT REFLECT FORWARD-LOOKING COST PRINCIPLES AND EFFICIENT, PRO-COMPETITIVE PRACTICES.

### A. The Incumbents Must Assume the Same Forward-Looking Network Architecture in Their Nonrecurring Cost Studies That They Assumed in Their Recurring Cost Studies for Voice-Grade Loops; However, None of the Incumbents Has Done So Across-The-Board.

**Q. You stated in Section II.A above that each incumbent should have based all of its cost studies — both recurring and nonrecurring — on a single, consistent, forward-looking network architecture. Why is such consistency in network design assumptions important?**

A. There are at least three reasons that recurring and nonrecurring cost studies for unbundled network elements should reflect a single, consistent, forward-looking network architecture.

First, as I have already explained, each incumbent has only one integrated network over which it provides all of the functions associated with unbundled network elements both now and in the future. It does not matter whether the costs of those functions are classified as recurring or nonrecurring. Thus, simple common sense requires that all cost studies for a particular company assume the same network architecture.

Second, the FCC's pricing rules make no distinction between recurring and nonrecurring costs in discussing the appropriate technology and network configuration to assume in a forward-looking economic cost study. Under FCC rules, the total of recurring and nonrecurring charges for a given network element may not exceed the total forward-looking economic cost for that element. [47 C.F.R. § 51.507(e).] It is hard to imagine how one could test whether a cost study complies with this rule if the cost study assumes one network design in computing recurring costs for an element and a completely different network design in computing nonrecurring costs.

Third, use of a single, consistent network design prevents the incumbents from double-recovering the costs of providing a given network functionality. Avoidance of double-recovery of costs is important because the incumbents' double-recovery of costs equates to new entrants' overpayment of costs. Excessive prices for unbundled network elements will deter efficient entry, contrary to the goals of the Act. Furthermore, a "mix-and-match" approach to costing and pricing that permits double-recovery gives the incumbents improper signals concerning when to modernize their networks.

**Q. Why would a "mix-and-match" approach to costing and pricing give the incumbents the wrong signal concerning network modernization?**

A. A simple analogy explains this point. The decision to buy a new car typically involves a tradeoff between the higher monthly loan or lease payment associated with the new vehicle versus the higher maintenance cost associated with an older vehicle. At some point, the operating cost of the older car becomes so high that it is more economic to dispose of the old vehicle and buy a new one, even if the previously owned car is fully paid off and there are no monthly payments whatsoever. Now suppose, however, that the owner of the older vehicle is guaranteed recovery of the actual cost of all repairs needed to keep the car running. The owner would never have any incentive to incur the cost of buying a new car, and would continue operating the old vehicle long after doing so ceased to be economically rational (from a societal perspective). Similarly, if new entrants must reimburse the incumbents for both the recurring cost of building a brand-new, modern network (akin to the monthly payment on a new car) *and* the nonrecurring cost of maintaining and/or modifying their existing networks to provide both voice and advanced services, the incumbents will have less incentive to invest in new, forward-looking technology.

Prices that recover the total cost of building a new, fully modern network *and* selected additional costs associated with an older network design will always exceed total forward-looking economic cost. Such prices also will

always exceed the price that would prevail if unbundled network elements were provided in a competitive environment.

**Q. Have other states recognized the importance of using a consistent network design to calculate recurring and nonrecurring costs for unbundled network elements?**

A. Yes. Decisions in Texas, Massachusetts and California all endorse this fundamental principle. For example, a Texas arbitration decision states:

> [t]he Arbitrators find that the network design inconsistencies in the recurring and non-recurring cost studies do not result in correct DSL costs and rates and consequently render the proposed charges invalid.

[Public Utility Commission of Texas, Arbitration Award, Dockets Nos. 20226 and 20272, November 30, 1999, at 96 (hereafter, *Texas Arbitration Award*).]

Consistent with this finding, the Texas Arbitrators ordered Southwestern Bell Telephone to file new recurring and nonrecurring cost studies for DSL-capable loops and line "conditioning" that are "based on the same network." [*Id.* at 97.]

Similarly, the Massachusetts Department of Telecommunications and Energy has found that:

> Our aim, as stated, is to maintain consistency between the assumptions used in the TELRIC recurring cost study and the NRC study....

[Massachusetts DTE, Consolidated Petitions of New England Telephone and Telegraph Company d/b/a Bell Atlantic Massachusetts, *et al.*, pursuant to Section 252(b) of the Telecommunications Act of 1996, for Arbitration of Interconnection Agreements between Bell Atlantic-Massachusetts and the aforementioned companies, DPU/DTE 96-73/74, 96-75, 96-80/81, 96-83, 96-94-Phase 4-L, October 14, 1999, at 19.]

These rulings are consistent with an earlier California decision on the nonrecurring costs for unbundled network elements, in which the California Public Utilities Commission ("CPUC") found that:

> it makes little sense to model one type of network for unbundled elements and then assume a different network exists for ordering and provisioning the same unbundled elements. We will evaluate Pacific's [nonrecurring cost] model and parties' proposals using the forward looking network we have previously assumed.

[California Public Utilities Commission Decision 98-12-097, issued December 17, 1998, in Dockets R.97-04-003/I.93-04-002, at 34.]

The California decision also provided a specific example of the type of double-recovery that could occur if the networks assumed for recurring and nonrecurring costs were not the same.

> In D.96-08-021 and D.98-02-106, we adopted Pacific's loop and access line costs based on a mix of copper and fiber. In the recurring phase of this proceeding, Pacific assumed a

52%/48% copper/fiber ratio. We think it would be both unfair and unreasonable to allow Pacific recurring cost recovery based on this ratio and then allow a different network mix in developing its nonrecurring costs. It would amount to allowing double recovery of NGDLC costs by overstating Pacific's nonrecurring cost studies.

[*Id.* at 70.] The CPUC's concern regarding double-recovery of NGDLC costs exactly parallels the concern I will discuss below regarding the incumbents' proposals in this proceeding to recover forward-looking loop recurring costs and embedded or actual nonrecurring costs for loop "conditioning."

The decisions of these three commissions emphasize the importance of using a consistent network design for calculating both recurring and nonrecurring costs as an essential safeguard against double-recovery of costs.

**Q. Do recurring and nonrecurring charges based on a consistent, forward-looking network design fully compensate the incumbent?**

A. Yes. The incumbent always has the option of completing its build-out of the forward-looking network described in its engineering guidelines and business plans. Once the incumbent has done so, its costs will be equal to the recurring and nonrecurring costs based on that single, consistent, forward-looking network design.

Incumbents must simply make the same economic decision that confronts the owner of an old vehicle that is becoming increasingly expensive to maintain. Just as that individual never needs to incur any cost greater than

the cost of owning and maintaining a new car, an incumbent can always limit its total recurring and nonrecurring costs to the costs of owning and operating a new, modern network.

This is not merely a theoretical possibility. SBC is currently moving forward with a $6 billion plan (to be completed by the end of 2003) known as "Project Pronto" in which SBC will replace a significant portion of its loop infrastructure with new outside plant, including the deployment or upgrading of approximately 25,000 remote terminals. In fact, SBC expects that its investment will enable the company to serve 80% of its customer base using this new network. The document "SBC Announces Sweeping Broadband Initiative," October 18, 1999, which is included as Exhibit _____ (TLM-3) to this testimony, describes generally this SBC initiative. SBC has claimed that it is moving forward with its "Project Pronto" based in large part on the expectation that the total cost of owning and operating its new network architecture, inclusive of the $6 billion investment required over the next three years to evolve its network architecture, will be less than the total cost of continuing to operate its existing network. The SBC Investor Briefing emphasizes that "SBC's new network investments will have a profound impact on its cost structure; in fact, the efficiencies SBC expects to gain will pay for the cost of the deployment on an NPV basis. These efficiencies are conservatively targeted to yield annual savings of about $1.5 billion by 2004 ($850 million in cash operating expense and $600 million in capital expenditures)." [Exhibit ____ (TLM-3) at 7.] As one example of the

efficiencies inherent in the forward-looking network design, the new network architecture will eliminate any need (and cost) to "qualify" loops as suitable for DSL-based services because all loops will be "pre-conditioned" to be DSL-capable. In other words, once SBC has fully deployed the technology embodied in Project Pronto, all loops will be "DSL-capable loops."

In fact, BST's own internal documents of earlier this year show that BST has reached a similar conclusion, ***** BEGIN BST PROPRIETARY**

[redacted]

**END PROPRIETARY ***** [ADSL Planning Directives, RL: 00-01-021BT, February 14, 2000, transmittal letter, BST's Response to AT&T's Request for Production of Documents 62 (emphasis added).]

**Q. Do the incumbents appear to agree conceptually that recurring and nonrecurring cost studies should reflect a single, consistent set of technology and network architecture assumptions?**

A. All three incumbents signed the stipulation in this proceeding, which provides in part that "[t]he recurring and nonrecurring studies should assume the same network design." [Joint Stipulation, filed December 7, 1999.] Despite its

agreement to the stipulation, however, GTE's Response to Rhythms Interrogatory 32 baldly states that "[r]ecurring and nonrecurring costs should not be calculated assuming the same network design."

In contrast to GTE, both BST and Sprint appear to agree conceptually that recurring and nonrecurring cost studies should reflect the same network design, although they have not consistently implemented this principle. Sprint's primary point of departure is its "conditioning" cost study, which I will address in Section III.C below.

**Q. Please describe the divergence between BST's position in principle and its *implementation of this principle* in nonrecurring cost studies.**

A. BST admits in concept that both recurring and nonrecurring costs should reflect the same forward-looking network architecture. For example, at page 51 of her direct testimony, Ms. Caldwell states that "[t]he same network design *assumptions that provide the foundation* for the recurring costs should be utilized when developing nonrecurring costs. Thus, the network should be forward-looking, reflect BellSouth's guidelines and practices, should consider potential process improvements, and should be attainable."

Similarly, *at page 6 of his direct testimony*, BST witness Mr. Milner confirms that "[s]ignificantly, the same copper loops that are used to provide xDSL service are also utilized to provide voice service to BellSouth's customers, as well as to other ALECs' customers." In his discussion at pages 23-24, *Mr. Milner* acknowledges that BST's actual engineering practice would implement the same CSA standards that both he and Mr. Riolo confirm

support DSL-based services. At page 7 of his direct testimony, BST witness Mr. Stegeman stresses that the BST study is based on its actual engineering guidelines.

Despite BST's assertion that its recurring and nonrecurring cost studies *are* based on the same network [see BST's Response to Rhythms' Interrogatory 1], BST unfortunately did not put this theory into practice. At page 20 of her direct testimony, Ms. Caldwell indicates that individual subject matter experts supplied the key assumptions used in BST's nonrecurring cost studies. These experts have not assumed a network design that is consistent with the network assumptions in BST's recurring cost analysis.

In particular, BST's "conditioning" cost study entirely ignores the CSA design standards that Mr. Milner claims BST used and that Mr. Stegeman suggests are the basis for BST's cost modeling. Contrary to Mr. Stegeman's claim, the BST cost studies are not based on any consistent set of engineering guidelines, but instead shift among multiple network scenarios that have no relationship to BST's actual forward-looking engineering practices. For example, BST's proposed "conditioning" charges reflect an entirely hypothetical copper-based network that does not exist today and that BST has no plans to build.

**B. *Issues 8(a), (b), (d) and (e) — Many of the Nonrecurring Costs that the Incumbents Have Reported Substantially Overstate Forward-Looking Economic Cost.***

**Q. Do the incumbents' nonrecurring cost studies that you reviewed comply *with forward-looking economic cost principles?***

A. No. As Mr. Riolo shows in more detail, the incumbents' nonrecurring cost analyses include numerous tasks, task times and assumptions that are inconsistent with forward-looking economic cost principles.

At an overall level, the BST and GTE nonrecurring cost studies rely on data pertaining to their existing, embedded processes and their existing, embedded network architectures. BST and GTE consider minor modifications to their embedded or "current state" by considering process modifications that are planned in the immediate future. For example, GTE witness Ms. Casey states at page 10 of her direct testimony that GTE limited the supposed forward-looking content of its study to reflect "forward-looking efficiencies that will be gained from projects that are funded through the year 2000 but have not yet been completed." BST merely agrees that its nonrecurring cost analysis "should consider potential process improvements" [BST, Caldwell Direct, at 51], but fails to define that requirement. Moreover, although Ms. Caldwell admits that "the same network design assumptions that provide the foundation for recurring costs should be utilized when developing

nonrecurring costs [*id.*], BST's actual nonrecurring cost analysis *entirely ignores* that forward-looking requirement.

This approach — considering planned changes over a horizon of a few years at most, or, in GTE's case, through the few months remaining in the current year — *is typical of a short-run cost analysis*. In contrast, a long-run cost methodology considers all costs as variable and potentially avoidable.

The BST and GTE nonrecurring cost studies do not comply with this foundational requirement of a forward-looking cost analysis because neither company developed work flows, task times or probability factors considering a forward-looking network design. Indeed, both BST and GTE (and Sprint relative to DSL-capable loops) selected their nonrecurring cost study inputs based on their existing network architectures, wholly different network designs from those on which the incumbents based their filed recurring cost analysis.

By basing their recurring and nonrecurring costs on inconsistent network designs, BST and GTE maximize (by greatly overstating) costs. The BST and GTE proposals are analogous to charging the full purchase price for a new car bundled with a maintenance plan based on the cost of maintaining a 20-year-old car. BST's and GTE's approach of basing recurring and nonrecurring costs on different network assumptions cannot result in "the forward-looking cost over the long run of *the total quantity of the facilities and functions* that are directly attributable to, or reasonably identifiable as incremental to" an unbundled loop except by random chance.

In contrast, although its cost studies do not always consistently reflect forward-looking assumptions, Sprint at least sets up its basic unbundled element nonrecurring cost analysis to reflect long-run, forward-looking costs. For example, Sprint includes the presumption that it can fully mechanize its service order processing so that manual intervention is only required in the relatively rare event of error-driven order fallout. Even more important, Sprint observes that its basic voice-grade loop installation analysis:

> assumes NGDLC's for all DLC locations. Installation charges assume that lines for customers working through NGDLC's can be remotely migrated from the NGDLC to a separate T1 that is physically terminated in the central office.
>
> Sprint also assumes fully automated processes for "assignment," "switch activation," "order routing" and "dispatching" of UNE orders.

[Sprint, UNE NRC Study, Page 1 of 1, Installation Charges, Description and Methodology, "Installation Charges - Analog Loops."] The Commission cannot reasonably find that both the Sprint approach to nonrecurring cost analysis and the contrary approaches advocated by BST and GTE comply with forward-looking economic cost principles.

### *1. BST's Nonrecurring Cost Analysis Does Not Reflect Forward-Looking Economic Cost Principles or Efficient Practices.*

**Q. Do BST's nonrecurring cost studies for DSL-capable and ISDN-capable loops comply with forward-looking economic cost principles?**

A. No. Apart from any required "conditioning" (for which BST proposes a separate charge), provisioning an unbundled DSL-capable or ISDN-capable loop over a given all-copper loop facility does not require any additional work effort on BST's part compared to provisioning a voice-grade loop over the same facility. Therefore, as Mr. Riolo confirms, there is no legitimate basis whatever for a difference between voice-grade loops and DSL-capable loops for either service ordering or provisioning where the loop is an all-copper loop.

For DSL-capable loops provided over fiber feeder facilities (which BST does not propose to offer) and for longer ISDN-capable loops (over fiber or copper), an unbundled loop might require additional work relative to a voice-grade loop to connect a line card specific to the desired type of DSL-based service (or ISDN repeaters). The magnitude of that cost weighted by the percentage of DSL-capable loops provided over fiber would, however, be *substantially* smaller than the added cost BST reports for DSL-capable loops provided over copper.

**Q. Why should the Florida Commission reject, in whole or in part, other aspects of BST's nonrecurring cost of unbundled DSL-capable loops?**

A. The Commission should reject BST's cost analysis for several reasons, including the following:

- The BST study generally fails to reflect a network that is consistent with its recurring cost analysis.

- The BST study improperly includes fieldwork and other activities that the BST should have reflected, and probably did already include, in its recurring cost study. Elimination of such costs would cut BST's estimated nonrecurring costs by more than 30%. In addition, BST inappropriately assumes that fieldwork would also be required to disconnect DSL-capable loops.
- The BST cost study inappropriately presumes that it should bundle manual loop qualification and conditioning related costs into the cost to provision DSL-capable loops in a substantial percentage of cases. BST's proposal makes no sense for several reasons, most prominent of which is that the cost for the same tasks are already included in the BST cost estimate for *both* loop qualification and conditioning. This error accounts for roughly another 30 percent of BST's total cost for DSL-capable loop installation.
- The BST study unaccountably presumes that the company will manually perform a number of basic order processing activities. Some of these manual steps appear to be related to BST's presumption that unbundled loops used for DSL-based services must be designed. As I discussed above, the presumption that those loops must be designed is simply false.
- The BST study is based on inputs that are so poorly identified and documented that it is often impossible to determine what BST might have intended, let alone whether its inputs are valid.

**Q. Why do you state that BST's nonrecurring cost study includes fieldwork costs that should already have been (and probably are) included in its recurring cost study?**

A. BST inflates its reported cost for DSL-capable loops by assuming that it must always dispatch a technician to the field to connect and to disconnect such loops. Although all competitors would pay recurring charges for a connected loop, only competitors obtaining DSL-capable loops would be forced to pay an additional nonrecurring charge to connect the DSL-capable loop 100 percent of the time. In the example of BST's "ADSL Loop" nonrecurring cost, the field technician or "SSI&M" group costs represent well over more than 30 percent of BST's total reported cost. The notion that fieldwork dispatch is always (or ever) required is inappropriate for a forward-looking nonrecurring cost study for several reasons.

First, all of the fieldwork costs associated with providing fully connected unbundled loops are (or should be) included in the recurring cost of the unbundled loop. A forward-looking recurring cost analysis includes *all* of the investment and expense necessary to establish a complete connection from its central office main frame to the end user. In other words, the recurring cost that new entrants incur already includes costs for all of the installation work that BST also seeks to include in its nonrecurring cost study even if an end-user customer is establishing service at a "new" location. Therefore, it is inappropriate to again count portions of the fieldwork costs required to install portions of the loop as a nonrecurring cost.

Second, not only does a recurring cost analysis such as BST's include the cost of both placing and connecting a complete unbundled loop as a recurring cost, it also include the entire cost for placing a substantial quantity of spare capacity. As part of the price that a competitor pays for each and every unbundled loop, the competitor also prepays BST to carry the capacity necessary to provide whatever ultimate additional loop capacity BST built into its study assumptions. Therefore, even if one presumes that DSL-based services are more often provided over an additional line, that "fact" would not make fieldwork an appropriate component of nonrecurring costs because competitors also already pay for spare/additional connected-through loops as part of the monthly recurring charge per loop.

Finally, the notion that DSL-based services are not frequently provided over existing loops is totally unsupported by BST and is simply false.

**Q. Why is BST's proposal to bundle additional loop qualification and "conditioning" costs into the basic nonrecurring provisioning cost incorrect?**

A. In Sections III.D and III.C below, respectively, I will provide a detailed explanation of why manual loop qualification charges and nonrecurring "conditioning" charges are entirely inappropriate and unnecessary to recover forward-looking costs. BST compounds its attempt to over-recover "conditioning" costs by bundling extensive "Service Inquiry" manual tasks that appear to be related to loop qualification and/or "conditioning" as part of its basic charge to provision DSL-capable loops. The specific steps, which are

basically duplicated in all three BST studies, are listed in the loop nonrecurring cost analysis as "Service Inquiry" activities. BST states that those "CRSG, LSSC, OPSE and SAC Installation times are adjusted by 52% to reflect situations when loop and modifications are ordered at the same time." [*See* BST study file "Flvgdig.xls" assumptions.] BST provides no basis whatever for the 52% assignment other than an assertion that the figure is based on some historic ordering data (that is not provided), nor does it explain why the cost already assigned for those same tasks in loop conditioning and qualification should be incurred again.

This multiple recovery means that a competitor would have to pay for the Service Inquiry function when it orders a loop makeup inquiry. Then, that same competitor would again be assessed for a Service Inquiry when it orders loop modification/conditioning. It is even possible that the same competitor could be charged a third time for a Service Inquiry when it finally orders the loops. This triple charge is particularly ridiculous when all three processes are done together, as in a typical loop order. BST's zeal to recover "conditioning" and qualification costs at every step of the provisioning process for DSL-capable loops results in significant overrecovery. Therefore, the Commission should order BST to remove those costs from its nonrecurring cost analysis if the Commission makes any use of those (fundamentally incorrect) studies. Again, in the example of BST's "ADSL Loop" cost study, BST's attempt to collect "Service Inquiry" multiple times

causes more than 30% of BST's total reported nonrecurring cost to install a DSL-capable loop.

**Q. Why is it incorrect for BST's nonrecurring costs for an ADSL loop to include costs for engineering or designing the loop?**

A. As Mr. Riolo explains, there is no engineering requirement for a DSL-capable loop to be a "designed" circuit. Moreover, the "design" of DSL-based services is an unrequested and undesired process that BST is attempting to impose on competitors such as BlueStar, Covad and Rhythms. (BST's attempt to bundle unwanted services and facilities with the loop is a classic demonstration of the abuse of market power that can occur in a monopoly environment.) The Commission should, therefore, order BST to remove those costs from its nonrecurring cost analysis if the Commission makes any use of those (fundamentally incorrect) studies.

**Q. Please explain the basis for your statement that BST has inflated its nonrecurring cost by including inefficient manual processing.**

A. BST's nonrecurring cost analysis for DSL-capable loops appears to include numerous manual order processing tasks and costs. For example, BST assumes that it will manually perform order validation, facility assignment, work force assignments, "ensuring dispatch" and other basic steps. Such manual intervention assumptions are inappropriate in a long-run, forward-looking cost study given the current advanced state of automation in the local exchange network and related Operations Support Systems ("OSS"). Mr.

Riolo provides more detail concerning these problems with BST's study in his concurrently filed testimony.

BST's assumption of substantial manual work processes is particularly unreasonable given this Commission's early findings regarding the importance of electronic order processing. For example, in its December 31, 1996 Order No. PSC-96-1579-FOF-TP, the Commission found that "electronic interfaces for ordering processes are important for the ALEC and for the end-user customer. It appears that BellSouth is currently developing electronic interfaces for this process. Therefore, we shall require BellSouth to continue to develop electronic interfaces for order processes." BST has been on notice since 1996 that it should be automating its interfaces with competitors. Therefore, it would be doubly inappropriate to allow BST to recover manual order processing costs today.

Some of these manual costs also relate to BST's assumption of unreasonably high long-run order fallout rates. For example, reviewing just BST's notes for its "ADSL Loop" analysis, I find reported fallout rates of 10 percent, 30 percent and 15 percent for various work groups. I am also aware that other fallout assumptions are buried within BST's calculations. Therefore, BST's study assumes that more than half of all orders will experience process breakdowns somewhere in the provisioning process. Such high failure rates are plainly out of line for an efficient process. The Commission should order BST to remove those costs from its nonrecurring

cost analysis if the Commission makes any use of those (fundamentally incorrect) studies.

**Q. Are BST's reported costs inconsistent with forward-looking cost analysis of efficient practices in other ways?**

A. Yes. BST appears to have completely disregarded any reasonable constraint that its analysis should be based on efficient processes and costs. This failure appears to contaminate BST's nonrecurring cost analysis at its root. As an example, BST's analysis for the "CRSG" group includes time for several steps required for "Incremental work efforts for order complications." [*See* BST's Response to Rhythms' Request for Production of Documents 3, Attachment 1.] BST assumes that the first work effort in that category will require 20 minutes per order for one-third of all orders because BST will not process the competitor's request within the time committed. In other words, BST appears to assume that, because it will fail to meet its due date for one out of three orders for unbundled loops, competitors should pay extra for the ensuing rework. I doubt that any regulator would have found this level of missed commitments acceptable from BST in its treatment of retail customers over the last decade. Nor should any regulator accept such a presumption in a cost study for unbundled network elements.

**Q. Please explain the basis for your statement that BST's study inputs are so poorly identified and documented that it is often impossible to determine what BST might have intended, let alone the validity of its inputs.**

A. The stipulation in this proceeding requires that cost study "documentation should also enable a reviewer to identify the key assumptions underlying the cost analysis." BST's nonrecurring cost analysis falls *far* short of that requirement. Indeed, even after discovery asking for all of the documents supporting BST's nonrecurring costs, BST is still hiding the basis for its study inputs. Some BST inputs appear to come from "time and motion" studies, which BST has not produced. [*See* BST's Response to Rhythms' Request for Production of Documents 3, Attachment 2 for the "CPG" group.] Others appear to derive from a Task Oriented Cost ("TOC") analysis. [*See* BST's Response to Rhythms' Request for Production of Documents 3, Attachment 9, at memorandum dated October 10, 1999.] Yet others appear to have been simply provided by some internal "expert." [*See* BST's Response to Rhythms' Request for Production of Documents 3, Attachments 4 and 6.] A final set of inputs, such as the time for the "WMC" work group, are included in BST's NRC cost analysis with no indication as to their actual source. [*See* BST's Response to Rhythms' Request for Production of Documents 3, Attachment 3.] In no case has BST actually provided the underlying time and motion analysis, the actual TOC study data or the basis for its "expert's" opinion. This detail is centrally important to a cost analysis because each of these methods, if executed incorrectly, used in the wrong context, misinterpreted, *etc.*, can produce results that are substantially inaccurate. BST's failure to produce such foundational supporting documents means that

neither interested parties nor the Commission can determine whether any of the BST nonrecurring cost study inputs rests on a solid foundation.

**Q. Have you discussed all of the problems of which you are aware regarding BST's nonrecurring cost analysis?**

A. No. I have merely provided an overview of the major conceptual flaws in BST's analysis. Mr. Riolo discusses additional problems and provides corrections to the BST study inputs. Moreover, it is pointless to discuss every flaw in the BST analysis because, as I have shown above, BST simply did not produce a study that is relevant to the provisioning work required for DSL-capable loops in either a forward-looking network or the hypothetical all-copper architecture that BST itself assumes. If one sets aside costs related to loop qualification, then there is no basis whatever for assuming that provisioning an all-copper DSL-capable loop requires different steps or takes more time than does provisioning a loop that a competitor will use to provide only voice-grade service. Therefore, the Commission should reject BST's grossly inflated and inappropriate costs for ADSL, HDSL and all flavors of "copper" loops and find that the cost for the underlying related "basic" loop type should apply for those services as well.

### 2. *GTE's Nonrecurring Cost Analysis Does Not Reflect Forward-Looking Economic Cost Principles or Efficient Practices.*

**Q. Does GTE's nonrecurring cost analysis for DSL-capable loops do a better job of analyzing the correct functions?**

A. Only in part. GTE appears to define DSL-capable loops as "2-Wire Digital Loops" [*see* GTE nonrecurring cost study, binder 1 of 2 at 1-FL 8], for which it would apply its "Special/Advanced Basic" costs and prices. [*See also* GTE nonrecurring cost study, binder 1 of 2 at 1-FL 5.] However, GTE has since clarified that it actually intends to treat ADSL-capable loops as "Exchange-Basic," *i.e.*, the same as basic POTS loops. [*See* GTE's Response to Covad's Interrogatory 2.] Thus, GTE appears to agree with me that ADSL-capable loops do not require special design and have the same nonrecurring cost characteristics as do basic voice-grade loops. (As I will discuss below and Mr. Riolo will demonstrate, GTE's estimate of the basic exchange and the "Exchange-Complex" nonrecurring costs that it would apply to ADSL and ISDN, respectively, are also overstated.)

I note, however, that GTE's Response to Covad's Interrogatory 2 also asserts that GTE does intend to apply the "Special/Advanced Basic" costs and prices to HDSL-capable loops. If GTE intends to include two-wire loops used for HDSL in that response, then GTE's analysis is incorrect. Two-wire unbundled loops used for ADSL and HDSL are identical (with the usual exception of requiring different line cards if provided over DLC). The only other facilities in the "Special/Advanced Basic" category into which GTE would put HDSL are the "Four-Wire Digital Loop" and "Entrance Facilities." Therefore, the first error in GTE's analysis is that GTE inflates the cost it claims should apply to provision an HDSL-capable loop (*i.e.*, to cross connect the same basic copper pairs that it would provide in response to a request for

an analog loop) by mixing that analysis with costs for four-wire loops and entrance facilities — far, far less common and more complex elements. As I discussed above with respect to BST, the presumption that the nonrecurring cost to provision two-wire xDSL-capable loops, including HDSL, is substantially different from a basic voice-grade loop is incorrect. GTE's classification of HDSL-capable loops would apparently increase its provisioning price per loop from $42.17 to $573.73. [*See* Exhibit DBT-2, page 1 of 15.]

Moreover, GTE has failed to produce any analytical support for its reported installation costs for DSL-capable loops in the face of a direct request to do so. Rhythms' interrogatories asked GTE for additional detail supporting the "task descriptions and task times that GTE contends are associated with and therefore contribute to the cost of designing, provisioning, maintaining or repairing xDSL loops." GTE responded that:

> ... GTEFL utilizes the ICM-developed cost of an analog loop (2W or 4W, depending on the type of DSL) for an xDSL loop cost. Therefore, no contention is made by GTEFL as to the specific designing, provisioning, maintenance and repairing of an xDSL loop.

[GTE's Response to Rhythms' Interrogatories 81-84.] This assertion, which actually supports my statement that DSL-capable loops are substantially provisioned in the same manner as analog loops and are not specially

"designed," contradicts GTE's own reported gap — $42.17 compared with $573.73 — in the reported nonrecurring cost for the two loop types.

**Q. Are other aspects of GTE's nonrecurring cost study of unbundled DSL-capable loops also inconsistent with forward-looking cost principles?**

A. Yes. GTE's study shares several major flaws with the BST analysis, but also introduces some GTE-specific problems. The GTE study:

- generally fails to reflect a network that is consistent with its recurring cost analysis. That problem applies to its reported cost for DSL-capable loops as well. As with BST's analysis, the inconsistency between GTE's recurring and nonrecurring cost analysis results in double-counting costs.
- improperly includes fieldwork and other activities that GTE should have reflected, and probably did already include, in its recurring cost study.
- has substantial costs that are based on a manipulation of historic cost data. It is not possible to determine what is included in that analysis.
- inflates basic loop nonrecurring costs by incorporating other costs caused by its failure to provide efficient mechanized order flows for competitors as the FCC has required to implement the nondiscrimination requirements of the Act.

**Q. On what basis do you conclude that GTE's recurring and nonrecurring costs are inconsistent?**

A. In its response to Rhythms' Interrogatories 3 and 32, GTE admits that it did not use the same assumptions to develop its recurring and nonrecurring cost analysis. GTE appears to believe that this fundamental inconsistency in its analysis is acceptable because it is "entitled to recover" its costs. GTE has no entitlement to recover costs for the same functionality twice, yet, as I have already demonstrated, the inconsistency between the technology and network architecture assumptions in GTE's recurring and nonrecurring cost analyses allows precisely such double recovery.

**Q. On what basis do you conclude that GTE's study includes fieldwork costs that should already have been (and probably are) included in its recurring cost study?**

A. GTE's study should not include fieldwork costs for the same reasons that I discussed above relative to BST. GTE's summary of its ICM Expense Module, at study Tab 23, pages 1-10, indicates that GTE intended to include all such costs in its recurring cost analysis (costs required to provide a connected loop appear to have been distributed throughout GTE's expenses including the outside plant shared cost calculation, the Service Assurance component of GTE's Activity Based Costing adjustment, Operating and General Support expenses). In GTE's case, however, the redundant assignment of costs as nonrecurring is even larger than in the BST study and even more poorly supported. For example, in GTE's "Special/Advanced Basic" nonrecurring study the largest single cost is a ***** GTE PROPRIETARY** [redacted] **END**

**PROPRIETARY** *** cost for which GTE has provided no more detail than the label "field install." The installation portion of that cost can be traced back to a reported *** **GTE PROPRIETARY** [redacted] **END PROPRIETARY** *** GTE provides no detail regarding the specific types of orders on which it based its data (*e.g.*, as entrance facilities are part of the "special/advanced basic" group of services in the GTE study, GTE's sample could be partially or entirely based on large-capacity entrance facility orders), when those orders were placed, how the times were measured, *etc.* Most important, GTE's cost study personnel were apparently unconcerned that their reported result for digital loops cannot pass a "red-face test" relative to any other study for the same element. As GTE's result is entirely implausible and GTE has not supplied sufficient detail to enable parties to analyze how it might have gone wrong, the Commission should reject GTE's analysis of its "Special/Advanced Basic" loop installation costs.

**Q. Does GTE's reported source/study methodology for this element reveal any other substantial flaw in the GTE's approach to developing nonrecurring costs?**

A. Yes. Although GTE did not identify exactly which specific order data it reviewed to develop its cost study inputs, it appears that GTE based its

analysis on a sample of historical, embedded cost data. That approach is not consistent with existing FCC rules, prior Florida Commission decisions or sound economic policy because GTE merely reports historical cost results, rather than assessing forward-looking costs.

**Q. Has any other commission rejected GTE's nonrecurring cost analysis because it violates forward-looking cost principles?**

A. Yes. The California Public Utilities Commission rejected GTE California Inc.'s ("GTEC's") nonrecurring cost studies in their entirety because those studies did not properly reflect forward-looking cost principles. In the CPUC's words, "we reject GTEC's nonrecurring UNE model as incomplete and not in conformance with long run incremental costing principles ...." [*CPUC Decision* ("D.") 98-12-079 at 30.] The studies that the CPUC rejected are substantially the same, including the participation of Arthur Andersen consultants, as the nonrecurring cost studies that GTE has submitted in this proceeding.

**Q. Please explain the basis for your opinion that GTE has inflated its nonrecurring cost by including inefficient manual processing.**

A. GTE's nonrecurring cost analysis for DSL-capable loops considers only manual and partially mechanized ordering processes — which would not provide parity to competitors with the mechanized ordering capabilities that GTE enjoys for its own services. Ironically, GTE's cost study output summary is already set up to contain mechanized order processing results as it

contains columns labeled "Mechanized Order Processing," which are completed with the note "Not Included in this Filing." GTE thereby confirms that it plans on implementing, but ignored in its Florida filing, this forward-looking option.

In contrast to even BST, GTE does not contemplate fully mechanized service order processing for *any* unbundled loop, basic or advanced. Instead, GTE only considers the semi-mechanized processes it plans to have in place by the end of 2000. [GTE, Casey Direct, at 10.] Indeed, GTE apparently even includes cost for manually determining into which of the artificial cost study categories each order fits. [*Id.* at 4.] GTE's minimal nod at considering mechanized interfaces, the projection that it will achieve a 27 percent order flow-through rate [*id.*], does not even approach the level that can be considered forward-looking.

GTE's failure to study (and actually develop) fully mechanized service order interfaces combines with its unique service order cost methodology introduce a novel form of cost inflation. GTE's nonrecurring ordering cost includes what GTE describes as the "shared/fixed costs" of processing unbundled element orders. These shared/fixed costs are for the creation, staffing and support needed to create three work centers in which representatives physically process orders. At page 19 of his direct testimony, GTE witness Mr. Trimble indicates that these shared/fixed costs include the costs for "computers, buildings and similar facilities devoted to fulfilling CLEC requests." The unique issue GTE creates in reporting these "actual"

costs (presuming that they are such) is that GTE's lack of mechanization inflates the number of order processing representatives, buildings, training, *etc.*, required to process unbundled element orders. By dragging its feet in developing mechanized, flow-through order processing capabilities, GTE both directly increases the manual task time for each nonrecurring activity and simultaneously increases the facilities required to support that extra manual work effort. Commission adoption of GTE's methodology would provide a double incentive for GTE to delay implementation of efficient mechanized processes.

A forward-looking, long-run cost study should not assume substantial manual order intervention, given the current advanced state of automation in the local exchange network and related OSS. The Commission should, therefore, order GTE to remove those costs from its nonrecurring cost analysis if the Commission makes any use of those (fundamentally incorrect) studies.

**Q. Can GTE legitimately claim that it has the right or option of maintaining such inefficient manual ordering processes for the unbundled network elements that competitors require to provide DSL-based services?**

A. No. GTE's commitments to the FCC in the decision approving its proposed merger with Bell Atlantic spell out that GTE has an obligation to provide automated ordering capabilities to competitors.

> Within 90 days after the Merger Closing Date, Bell Atlantic/GTE will develop a plan to implement uniform, electronic OSS interfaces and business rules (including for pre-

ordering and ordering components used to provide digital subscriber line ("xDSL") and other Advanced Services) within the Bell Atlantic Service Areas and separately within the GTE Service Areas.

[FCC 00-221, Memorandum Opinion and Order, CC Docket No. 98-184, adopted June 16, 2000, at ¶ 18.]

Indeed, GTE is obligated to provide a 25 percent discount on all DSL-related unbundled elements until it does provide mechanized ordering capability.

Until Bell Atlantic/GTE has developed and deployed OSS interfaces for pre-ordering and ordering unbundled network elements used to provide xDSL and other Advanced Services and the interfaces referenced in this Section are used by the separate Advanced Services affiliate for pre-ordering and ordering a substantial majority (i.e., at least 75 percent of pre-order inquiries and at least 75 percent of orders) of the Advanced Services components, including line-sharing, the separate Advanced Services affiliate uses in the relevant geographic area, Bell Atlantic/GTE's incumbent LECs within the Bell Atlantic/GTE Service Area shall, beginning 30 days after the Merger Closing Date, make available through inclusion of appropriate terms in interconnection agreements with telecommunications carriers or by tariff, a discount of 25

percent from the recurring and nonrecurring charges (including 25 percent from the Surrogate Line Sharing Charges, if applicable) that otherwise would be applicable for unbundled local loops used to provide Advanced Services in the same relevant geographic area.

[*Id.* at ¶ 25.]

Given this incentive, the Commission should expect that GTE will deliver on its promise to provide mechanized ordering capabilities to DSL competitors. Therefore, it makes no sense to develop supposed "long-run" nonrecurring costs here that assume substantial manual processing of orders for DSL-capable loops.

**Q. Is there any other *significant problem with GTE's inclusion of* "shared/fixed" costs in its nonrecurring cost study?**

A. Yes. GTE's treatment of these costs for competitors is discriminatory. Costs such as buildings and computers are, in every other cost analysis that I have reviewed, treated as recurring costs. It is highly likely that GTE's retail cost analysis likewise includes the cost for buildings in which its retail representative reside as part of recurring costs. Unless the objective is to maximize barriers to entry, there is no reason whatever to shift the treatment of these types of costs into a nonrecurring analysis for unbundled elements.

**Q. How should the Commission correct this problem in GTE's analysis?**

A. The Commission should limit recovery of support investments to the level of support needed for the limited number of order processing personnel GTE would require to handle order fallout and process that fallout efficiently. The Commission should therefore both drastically reduce the total level of cost that GTE is allowed to recover for those functions and then direct GTE to incorporate that reduced cost into its recurring cost analysis for all unbundled elements.

**Q. You have shown that GTE's application of its "Special/Advanced Basic" costs and prices is entirely inappropriate for HDSL-capable loops. Should the Commission simply order the use of GTE's reported cost for the basic unbundled loop for all DSL-capable loops?**

A. Using the basic unbundled loop result is a substantial step in the right direction. But even GTE's reported cost for a basic voice-grade loop exceeds a reasonable estimate of the forward-looking cost to provision a DSL-capable loop. An example of why the Commission should dismiss GTE's reported cost is provided at the very beginning of GTE's own description of its cost analysis. Specifically, as Ms. Casey described at page 4 of her direct testimony, GTE appears to assume that a customer service representative will need to manually intercept and evaluate each order to determine which of GTE's relatively obscure cost and rate classifications would apply to the order. In other words, GTE's proposed pricing structure is apparently so complex that GTE cannot tell what cost or price will apply and what work groups will be involved based on the service type. To the best of my

knowledge, this level of artificial complexity is entirely unique to GTE and is, therefore, eminently avoidable and unnecessary.

**Q. How should the Commission determine the nonrecurring cost for basic unbundled loops in GTE's service area?**

A. The Commission should rely on the analysis of the relevant tasks and task times presented in Mr. Riolo's testimony.

**Q. Is it reasonable to apply a single cost study framework, as Mr. Riolo proposes, to establish the nonrecurring costs for all Florida incumbents?**

A. Yes. Nonrecurring cost studies are relatively simple. They consist of a list of tasks required to produce a given one-time request, an estimate of the labor times required for each such task, an estimate of the percentage of the time that a particular task will occur and a labor rate for each work group involved in the process. In a forward-looking cost analysis, these factors should not vary substantially from one incumbent to another as each company will be providing substantially the same elements over substantially the same facilities. For example, a technician at BST should be able, on average, to place a frame jumper in roughly the same time that a technician at Sprint would require to perform the same task. Therefore, the major factors that would vary from company to company are the applicable labor rate and, potentially, the percentage occurrence for some activities. The Commission could easily adjust these factors to accommodate any necessary company-specific precision within the framework that Mr. Riolo presents. This

Commission should likewise be wary of any company-specific, "special" tasks assigned to DSL. Those additional "tasks" are invariably included to inflate competitors' costs without any foundation in sound forward-looking, economic principles.

### 3. *In Some Cases, Sprint's Nonrecurring Cost Analysis Does Not Reflect Forward-Looking Economic Cost Principles or Efficient Practices.*

**Q. Does the Sprint nonrecurring cost analysis include many of the same problems as you have identified in BST's and GTE's cost studies?**

A. Yes. In contrast to the BST and GTE cost studies, Sprint's basic analog and ISDN loop studies begin on solid conceptual foundation because Sprint based its nonrecurring cost analysis on the same network design and technology assumptions as are incorporated in its recurring cost analysis. Sprint, however, also increases its reported costs by incorporating some of the same problems that I have already discussed at length with respect to the BST and GTE cost studies.

The most significant error in Sprint's loop analysis is that Sprint develops a distinct nonrecurring cost result for installation of "new" loops. That analysis includes costs that are (or should be) included in a forward-looking recurring cost analysis. For example, Sprint includes time labeled "Connect OSP" and "Install NID" in addition to related travel time in its nonrecurring cost analysis. It is entirely inappropriate to include costs such as "Install NID" as nonrecurring costs. The NID is not a service order or even a

customer-specific cost. Once placed, the NID will serve any number of future end users at a given location. Just as with the other components of the loop, the cost of the NID can and should be recovered through recurring charges over the life of the loop. The Commission should, therefore, remove these costs from Sprint's nonrecurring cost study.

**Q. Is there another problem with Sprint's analog loop analysis?**

A. Yes. Sprint also appears to make a fundamental error in the manner that it calculates its costs. Sprint's study correctly recognizes that a different work group and a number of different activities are required to provision fiber-fed loops on NGDLC systems. Sprint therefore weights the task time for provisioning fiber-fed loops by the percentage of loops on fiber. However, Sprint appears to neglect to weight the task times and activities required to provision copper-fed loops to reflect the complementary percentage of loops that are copper-fed. Therefore, Sprint's study appears to overstate costs by weighting the cost to install copper loops as if it applies to 100 percent of all loops. Instead, the study should reflect and weight accordingly the portion with the distinct cost to provision the percentage of loops that are fiber-fed vs. all-copper.

**Q. Is Sprint's nonrecurring analysis for DSL-capable loops consistent with its analysis for analog loops?**

A. No. Sprint appears either to change its underlying network architecture assumptions to exclude DLC systems or to assume that it will only provide

DSL-capable loops over copper. In sharp contrast to BST and GTE, the Sprint analysis indicates that it is slightly *less expensive* to provision DSL-capable loops than analog loops. As Mr. Riolo explains, there should be few differences among the incumbents in the nonrecurring costs for provisioning unbundled loops; therefore, I recommend that the Commission adjust Sprint's nonrecurring cost analyses for DSL-capable and analog loops to reflect the tasks and task time adjustments described in Mr. Riolo's testimony and the few company-specific factors that I identified above in my discussion of Sprint's nonrecurring cost study.

### C. Issue 11 — The Incumbents Have Overstated the Forward-Looking Economic Cost of Providing "Conditioned" Loops.

**Q. What is loop "conditioning"?**

A. In this context, "conditioning" refers to modifications to embedded loop plant facilities to remove equipment or plant arrangements that would impede the transmission of DSL-based services. Mr. Riolo's testimony provides more detail concerning the specific forms of "conditioning" for which the incumbents propose to charge competitors.

**Q. Have the incumbents properly estimated the forward-looking economic cost of providing "conditioned" loops?**

A. No. All three incumbents have overstated the forward-looking economic cost of providing "conditioned" loops. As I will explain in more detail below, all three incumbents have proposed nonrecurring "conditioning" charges based

on a completely different network architecture from the forward-looking architecture assumed in their recurring cost studies for voice-grade loops. The recurring cost studies include the full forward-looking cost of providing loops without load coils, bridged taps or other impediments to the provision of DSL-based services. Thus, the proposed nonrecurring "conditioning" charges represent a complete double-count of forward-looking economic costs.

Moreover, the incumbents' nonrecurring "conditioning" cost studies duplicate the costs included in the recurring loop cost studies in another respect. The recurring loop cost studies include operations and maintenance expenses based on historical experience. The accounting data on which the incumbents have based their expense factors include at least some costs for the very "conditioning" activities that the incumbents have singled out for nonrecurring cost treatment. Thus, the nonrecurring "conditioning" cost studies are in effect a *triple-count* of the costs of providing a "conditioned" loop.

Finally, even if it were appropriate to include nonrecurring "conditioning" costs in a forward-looking cost study, all three incumbents have overstated the efficient cost of performing the activities necessary to remove impediments to DSL-based services from embedded copper loop plant. Thus, the incumbents' "conditioning" cost studies do not even reflect efficient, pro-competitive costs for the activities that they purport to study.

*1. All Three Incumbents Have Included the Full Forward-Looking Cost of Providing "Conditioned" Loops in Their Recurring Loop Cost Studies; Thus, Any Nonrecurring "Conditioning" Charge Double Counts That Forward-Looking Cost.*

**Q. Are nonrecurring charges for loop "conditioning" consistent with forward-looking cost principles?**

A. No. The types of activities for which the incumbents propose to impose a nonrecurring "conditioning" charge can only exist if one assumes a network design incorporating repeaters, excessive bridged taps and load coils that the incumbent must remove to make certain loops DSL-capable. As Mr. Riolo explains in his concurrently filed testimony, that network design is fundamentally incompatible with the engineering guidelines under which incumbent local exchange carriers — including all three Florida incumbents — have been operating for twenty years or more.

The incumbents originally instituted these network engineering guidelines to facilitate their roll-out of ISDN, a service that has the same "conditioning" requirements as DSL-based services. Forward-looking cost studies should recognize that the incumbents will be deploying loop plant in a way that facilitates the spread of advanced services. FCC guidelines for universal service cost studies, for example, explicitly prohibit the inclusion of load coils in a forward-looking economic cost study on the basis that loops configured with such equipment do not provide universal access to advanced telecommunications services. [Federal-State Joint Board on Universal

Service, 12 FCC Rcd 8776, CC Docket No. 96-45, First Report and Order ¶ 250(1) (1997).]

**Q. Do the incumbents acknowledge that their recurring loop cost studies reflect a forward-looking network architecture in which "conditioning" would be unnecessary?**

A. Yes. As I noted above, BST witness Mr. Milner confirms that BST builds to the CSA engineering guidelines, and BST witness Mr. Stegeman claims that BST's engineering guidelines form the basis for BST's cost modeling. In its response to Rhythms' Interrogatory 70, BST admits that CSA guidelines require all loops to be unloaded.

Similarly, at page 7 of her direct testimony, GTE witness Ms. Casey notes that "GTE's MRC [monthly recurring cost] study is based on a forward-looking network that does not include devices such as bridged taps or load coils."

Sprint not only has based its recurring cost studies on a network architecture that would not require "conditioning," it has taken the position before the FCC that "conditioning" charges are inconsistent with forward-looking cost principles, stating that:

> Among the types of loops the Commission [FCC] required to be provided by ILECs are loops "conditioned" to permit use for high-speed data services (¶190). In the embedded network that exists today, such conditioning may include the removal of bridged tap, load coils, and repeaters. Such devices, however,

are not reflective of forward-looking network designs. Rather, forward-looking networks use Carrier Service Area design concepts that involve the use of feeder cable terminating to a feeder distribution interface and/or fiber-fed digital loop carrier (DLC), with extra capacity built into the distribution plant to accommodate new customers and multiple lines per customer.

...

... By paying TELRIC prices for the loop, requesting carriers are already reimbursing ILECs for the full cost of a network built free of such devices and using the Carrier Serving Area concept discussed above. Thus, requesting carriers — whether they need loops for high-speed data services or not — are paying extra for a network designed, from the ground up, to accommodate high-speed data needs. To the extent that the TELRIC price of loops is based on such a network design, it is wholly inconsistent with TELRIC also to require requesting carriers to pay costs related to removal of embedded devices from the embedded network in place and creates a disconnect between the methodology for computing monthly recurring charges and the methodology for computing non-recurring charges. Furthermore, the very purpose of TELRIC pricing is defeated if ILECs can charge extra for cost

functions simply because those cost functions exist in an embedded network.

[Petition for Reconsideration and Clarification, In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98, February 17, 2000.]

Based on the position that Sprint took in this recent filing before the FCC, Sprint's proposal for nonrecurring "conditioning" charges in this proceeding is puzzling, to say the least.

**Q. Given that an incumbent needs items such as load coils to provide basic voice service over its existing network, should those who order DSL-capable loops that require the removal of such devices pay a nonrecurring charge for their removal?**

A. No. As Sprint correctly noted in its Petition for Reconsideration before the FCC, such a conclusion would fundamentally undermine the use of prices based on forward-looking costs. Mr. Riolo explains that certain outdated network designs required load coils to provision analog service to customers with longer loops. A forward-looking network provides the same functionality through the use of fiber feeder and DLC facilities. Paying recurring prices for a fiber and DLC network plus nonrecurring prices for an all-copper-with-load-coil network loops forces competitors to pay for the same functionality twice.

Looked at another way, incumbents make decisions about forward-looking loop plant design based on the total cost to provide loops for all

service types, broadband as well as narrowband. For example, BST might be able to build "Network A," which provides only voice services, for $1 Billion. But, to provide advanced services as well, it would need to provide a parallel network architecture for an additional $1 Billion. In contrast, if BST can build "Network B," which supports all analog and digital loop-based services, for $1.5 Billion, then BST would choose the design of "Network B" as its forward-looking network architecture. It is inappropriate for BST or any incumbent to have it both ways by recovering the full cost for a forward-looking network (*i.e.*, $1.5 Billion in the example) *plus* charges for "conditioning" its existing network.

**Q. Has any of the incumbents in this proceeding offered an explanation for its belief that the Commission should permit nonrecurring "conditioning" charges based on its existing network design in addition to recurring loop charges based on a forward-looking network architecture?**

A. Yes. GTE's Response to Rhythms' Interrogatory 32 states that:

> [a]s explained in the response to Interrogatory No. 3, GTEFL is entitled to recover the costs of line conditioning. If the NRC study assumed that such conditioning was not required, then GTEFL would be unable to quantify and recover those costs. Likewise, to be useful, cost studies must be grounded in reality. Consequently, the input assumptions detailed in the response to Interrogatory No. 3 are necessary to make the resulting costs

more reflective of the actual network and operating conditions under which they will be incurred.

**Q. Do you agree with the rationale that GTE presented in the above-quoted interrogatory response?**

A. No. GTE is asking this Commission to calculate and impose on competitors the equivalent of the cost of a new car payment plus costs of maintaining its "old car" (in this case, GTE's embedded or historical network architecture). If the Commission were to adopt GTE's recommendation, it is virtually certain that GTE and the other Florida incumbents would recover more for their provision of unbundled network elements than their forward-looking economic costs. That is necessarily the case if the Commission approves nonrecurring "conditioning" charges as an addition to recurring loop charges that fully recover the forward-looking cost of providing "conditioned" loops.

**Q. Is the incumbents' position that they should be permitted to charge for loop "conditioning" consistent with their own retail DSL offerings?**

A. No. As Mr. Riolo discusses in his testimony, at least one incumbent in this proceeding, BST, offers "conditioning" as part of its federally tariffed DSL offering without requiring the kind of "conditioning" charges that BST proposes to impose on competitors. The Commission should not permit BST to impose discriminatory "conditioning" charges on competitors.

### 2. *Contrary to the Incumbents' Assertion, "Conditioning" Costs Are Not an Exception to the Principle That Recurring and Nonrecurring Costs Must Be Based on a Single, Consistent Network Architecture.*

**Q. The incumbents argue that "conditioning" costs are an exception to the requirement that costs must be based on a consistent, efficient network design, citing language in the FCC's *UNE Remand Order* [*see, e.g.*, the direct testimony of GTE witness Mr. Trimble at 29]. Does that argument reasonably reflect the complete content of the FCC's costing and pricing requirements?**

A. No. Paragraphs 193 and 194 of the FCC's *Third Report and Order and Fourth Further Notice of Proposed Rulemaking* in CC Docket 96-98 (hereafter "*UNE Remand Order*"), to which the incumbents cite, indicate generally that incumbents may recover the cost of "conditioning" loops to be capable of providing advanced services. The FCC's modified pricing rules provide additional guidance as to the methodology the incumbents must follow in establishing the cost basis for any charges for "conditioning."

The FCC has ruled that the costs of conditioning must be based on forward-looking pricing principles, should be allocated efficiently among carriers, may be recovered through recurring charges over a reasonable period, and must not permit an incumbent to recover more than the total forward-looking economic cost.

**Q. Do either the language in ¶¶ 193 and 194 of the *UNE Remand Order* or the modified pricing rules require that the Commission establish a nonrecurring charge for "conditioning"?**

A. No, for at least two reasons. First, the FCC's pricing rules do not require a nonrecurring charge for "conditioning" even if this Commission finds that there are nonrecurring costs associated with such "conditioning." Instead, §51.507(e) explicitly provides that a state commission may require an incumbent to recover any nonrecurring costs through recurring charges.

Second, the FCC's language does not explicitly consider the possibility that the incumbent's *recurring* costs and charges for unbundled loops will completely capture the forward-looking costs for providing loops free of load coils, excessive bridged tap and other devices that would impede the provision of DSL-based services. As I have already noted, however, the pricing rules do stipulate that the incumbent may not recover more than the total forward-looking cost of providing the applicable element (in this case, a DSL-capable loop that is free of load coils and other DSL-impeding devices). Therefore, if the recurring cost study reflects all of the forward-looking cost of providing such a loop, the pricing rules that the FCC adopted for "conditioning" in the *UNE Remand Order* would prohibit any additional nonrecurring charge for such "conditioning."

**Q. Incumbents often claim that forward-looking prices for unbundled network elements do not cover the cost of special situations such as**

**"conditioning." Does this argument provide a justification for special additional nonrecurring charges for items such as loop "conditioning"?**

A. No. As I explained before, at any point in time, an incumbent can always choose to replace its existing network *in its entirety* and to deploy the forward-looking network architecture and technology ubiquitously. In fact, incumbents in Florida have expressed business plans that encompass many technological advancement and process improvements for their own efficient use of the network. Thus, prices that fully recover costs based on a single, consistent, forward-looking network architecture provide ample compensation for all "special situations." Incumbents only experience those "special situations" because it is less expensive for them to utilize their embedded network, even with the added cost of dealing with "special situations," than it is to build an entire network anew today. The incumbents want to keep the cost savings associated with using a largely depreciated network and yet be compensated for the operations and maintenance expenses and capital additions necessary to make that existing network function like a brand-new network. This "eat your cake and have it too" approach is fundamentally unfair to new entrants and gives incumbents incentives to delay deployment of cost-saving technologies.

Q. **Why do you say that the incumbents are trying, inappropriately, to keep the cost savings associated with using a largely depreciated network while at the same time being compensated for the costs necessary to make that network function like a new network?**

A. Most of the physical facilities associated with unbundled loops, including the outside plant categories of aerial, buried, and underground copper cables, have economic lives of 20 years or less. Thus, for two decades or more, Florida ratepayers have been paying depreciation charges through their retail rates that should have been funding the plant modernization effort that would eliminate the need for loop "conditioning." In addition, the incumbents should have been "conditioning" their embedded loop plant as part of the ongoing maintenance of their outside plant facilities. As Mr. Riolo confirms in his concurrently filed testimony, good engineering practices over the past two decades or more have called for incumbents to eliminate unnecessary load coils, bridged taps and other impediments to advanced services whenever a technician works on the outside plant. I explain in more detail below that the incumbents' recurring cost studies already include the cost of such "conditioning" activities to the extent that the Florida incumbents have historically followed these industry guidelines for outside plant engineering. In summary, Florida ratepayers have been funding the incumbents' efforts to provide modern, "conditioned" loop plant for decades. The Commission should not now be concerned that the incumbents will suffer undue economic hardship if they must actually "condition" some of the embedded, largely depreciated plant that Florida ratepayers have already paid to modernize.

**Q. Have you identified any additional conceptual problem with the incumbents' calculations of "conditioning" costs?**

A. Yes. As I previously noted, because one-time "conditioning" activities provide the same functionality that is already included in the incumbents' recurring cost studies, nonrecurring "conditioning" costs double-count the costs of providing "conditioned" loops. Based on the way that the incumbents typically develop recurring costs, a nonrecurring "conditioning" charge may actually triple-count the incumbents' forward-looking economic costs. The incumbents include "conditioning" costs yet again in the form of the maintenance and rearrangement expenses included in loop recurring costs. For example, at Section 5, page 7 of its cost study description, BST states that its recurring cost Plant Specific Expense factor includes rearrangement and changing the location of plant not retired and repairing material for reuse. It is my understanding that any costs that the incumbents incurred for activities such as loop "conditioning" and the "pair swaps" that would be needed to free facilities for DSL-based services would be included in those expense accounts. Therefore, to at least some extent, "conditioning" expenses are also already included in the incumbents' recurring cost studies for unbundled loops.

### 3. *If the Commission, Inappropriately, Allows the Incumbents to Impose Any Nonrecurring Charge for "Conditioning," It Should Correct the Incumbents' Cost Analyses to Reflect Efficient "Conditioning" Practices.*

**Q. If the Commission (inappropriately) allows the incumbents to charge any nonrecurring charge for "conditioning," can it rely on the cost analyses that the incumbents have provided?**

A. No. Each of the incumbents has proposed a "conditioning" cost study that substantially overstates the cost that it would incur to efficiently "condition" loops for DSL by removing impediments from its older, embedded loop plant. Mr. Riolo will provide a more detailed technical explanation of the inefficient assumptions in the incumbents' "conditioning" studies. In short, however, each incumbent inflates "conditioning" costs by substantially understating the number of loops that should be "conditioned" whenever a technician is dispatched to do that type of work.

GTE's reported costs, in particular, are incorrect because they are not evenly shared among likely users of DSL-capable loops, including all future competitive providers of DSL services and the incumbents themselves. GTE's proposed charge to "condition" a single loop includes all, or nearly all, of the costs that are necessary to convert multiple loops from an embedded design that does not support DSL-based services to a more forward-looking design. In contrast, the FCC requires that the "conditioning" costs be "divided by a reasonable projection of the sum of the total number of units of the element that the incumbent LEC is likely to provide to requesting telecommunications carriers and the total number of units of the element that the incumbent LEC is likely to use in offering its own services, during a reasonable measuring period."

**Q. BST has proposed an "Unbundled Loop Modification Additive" that allegedly spreads the cost of "conditioning" multiple loops across all DSL-capable loops. Is the BST approach correct?**

A. No. BST proposes to levy a $120.98 "Unbundled Loop Modification – Additive" (Element A.17.4) nonrecurring charge for all DSL-capable loops, except UCL-Long loops. The manner in which BST calculates this proposed charge would over-recover even BST's inflated estimate of "conditioning" costs.

**Q. How does BST calculate its proposed "Unbundled Loop Modification – Additive"?**

A. BST starts with the following assumptions:

> Typically, BellSouth will unload ten pairs per conditioning request for ULM-Short. It is expected that on average two pairs will be ordered initially by the CLEC, four pairs will be used by BellSouth, and the remaining four pairs will be ordered in the future by the same or different CLEC. The costs of the last four pairs is determined as an Unbundled Loop Modification – Additive (A.17.4). This additive applies to ADSL-capable, HDSL-capable, and UCL-Short loops.

[BST cost study filing, Section 6, at 34-35.] BST further assumes that: (1) the average cost to deload each pair is $70.68; (2) the demand for DSL-capable loops from 2000 to 2002 will be ***** BST PROPRIETARY** [redacted] **END PROPRIETARY ***** will need to be "conditioned."

Based on these assumptions, BST calculates the additive as the cost of deloading one pair ($70.68) times the number of pairs for which BST does not

directly recover "conditioning" costs (four out of the ten) times the incoming "conditioning" demand ***** BST PROPRIETARY** [redacted] **END PROPRIETARY ***** divided by incoming demand for DSL-capable loops ***** BST PROPRIETARY** [redacted] **END PROPRIETARY *****.

**Q. BST witness Ms. Caldwell states at page 9 of her June 29, 2000 Rebuttal Testimony that "... the ALEC pays only 1/10th of the total cost when conditioning is requested on short loops." Does this statement accurately reflect the "conditioning" charges that competitors would pay if BST's pricing proposals were adopted?**

A. No. Under BST's pricing proposals, a competitor that orders "conditioning" must pay $70.68 + $120.98 = $191.66 per pair, which amounts to 27% of BST's alleged cost-based price for "conditioning" the ten loops it claims it would process as part of that work order — much more than then 10% that Ms. Caldwell posited. If BST's assumption were correct that the competitor would actually order two out of the ten loops "conditioned," then the competitor's combined "conditioning" and "Additive" payments to BST would cover 54% of the alleged cost of "conditioning" those ten loops up-front.

Furthermore, if competitors do subsequently order four of the remaining ten loops, they would pay BST a $120.98 "Additive" for each of those loops. In other words, BST would collect a total of $867.24 from competitors (2 x $191.66 from the competitor placing the "conditioning" order plus 4 x $120.98 from competitors subsequently using four of the

"preconditioned" loops) as compensation for the cost of "conditioning" six of the ten loops. This amount exceeds BST's total assumed "conditioning" cost for all ten loops ($706.80) by $160.44. Yet BST's own use of four of those loops presumably "caused" $282.72 (4 x $70.68) in "conditioning" costs. In this scenario, BST would not only be getting a "free ride," competitors would actually have to pay BST to use "conditioned" loops!

Even if competitors do not subsequently order some or all of the four "preconditioned" loops, BST would still be collecting the $120.98 "Additive" from competitors that use all of the DSL-capable loops that *never* required "conditioning," which creates an even greater potential for over-recovery.

**Q. Are the assumptions underlying BST's cost analysis sound and well-documented?**

A. No. Other than the cost study that supports its estimate of the cost to deload one pair, BST has provided no documentation for the remaining key assumptions in its analysis, namely, the assumptions that it will "condition" ten loops on average, the distribution of those ten loops among competitors and BST, the anticipated demand for DSL-capable loops and the percentage of loops requiring "conditioning." As even a cursory examination of BST's formula for calculating the "Additive" reveals, an error in any of the assumptions could dramatically affect BST's estimated costs.

Many, if not all, of these assumptions are likely to be in error. Mr. Riolo explains that an efficient "conditioning" process would involve deloading 50 pairs at a time on average; BST would likely use far more than

40% of these pairs for its own retail services. (And, as Mr. Riolo also explains, even BST's retail POTS customers would actively benefit from deloading to bring plant up to current engineering standards.) Moreover, the assumption that nearly half of the requested loops would require deloading is extraordinarily high (particularly in light of the exclusion of loops over 18,000 feet long from this analysis) and implies that BST has been remiss in performing the plant modernization for which Florida ratepayers have been compensating the company over the past two or more decades. Finally, the projected demand for DSL-capable loops is questionable at best — and certainly would be affected by the excessive "conditioning" additive that BST calculates using this assumption.

Both the overstatement of the percentage of loops requiring deloading and the understatement of BST's proportionate use of those loops would lead to significant overrecovery of even BST's projected costs for removing load coils. Moreover, as Mr. Riolo amply demonstrates, BST's per-loop costs for removing load coils far exceed the costs achievable through efficient "conditioning" practices.

**Q. Aside from these issues of the accuracy of BST's calculation, would it be appropriate for BST to charge competitors an "Additive" to recover the kind of "conditioning" costs reflected in this charge?**

A. No. BST describes its "Additive" as "a cost that is applied to all xDSL loops (less than 18kft) *in an effort to recover costs associated with previous modifications work that BellSouth has performed but had not previously*

*recovered*." [BST's Response to Covad's Interrogatory 2, emphasis added.] If this claim is accurate, BST's proposed charge represents the worst kind of retroactive ratemaking and appears to be a direct violation of the FCC's prohibition against inclusion of embedded costs in prices for unbundled network elements. Furthermore, as I have already explained, BST would have booked costs associated with previous modifications work to maintenance expense accounts that are reflected in its recurring loop costs; therefore, contrary to BST's representation, BST will recover a proportionate share of such costs for all competitors using unbundled loops without the need for any "Additive."

Moreover, imposition of the "Additive" would be anticompetitive and discriminatory unless BST imputed an equivalent amount per loop into the price floor for its own, or its affiliate's, retail DSL-based services. I cannot say with certainty whether BST has done so because BST objected to Covad's interrogatory concerning whether BST's retail ADSL services will incur the same charge. [BST's Response to Covad's Interrogatory 8.] As Mr. Riolo explains, however, there is no evidence that BST has included *any* "conditioning" costs in its federally tariffed retail DSL prices.

For these reasons, and because the BST "Additive" is riddled with questionable assumptions that would lead to over-recovery of even BST's claimed costs, I recommend that the Commission reject the BST "Additive."

## D. The Incumbents Propose Excessive Prices Based on Inefficient Costs for Competitors to Access Loop Makeup Information.

**Q. What is loop makeup information?**

A. Loop makeup information is information that identifies the physical characteristics of a loop. This information includes loop length, loop medium (*e.g.*, fiber or copper), the existence and location of accretions such as load coils, bridged taps and repeaters on the loop, and other information about the physical makeup of the loop. A competitor uses such information to determine the suitability of that loop for provisioning DSL-based services. The characteristics of a given loop determine whether the loop is usable at all for providing any type of DSL-based service, the modifications (if any) needed to "condition" the loop to provide DSL-based service and the type/speed of DSL-based service that may be offered over that loop, with or without "conditioning." These determinations are specific to the DSL technology and equipment that a particular carrier deploys; thus, BlueStar, Covad or Rhythms may be able to offer its DSL-based services over a loop that would not meet, for example, BST's technical specifications for DSL-based services and *vice versa*.

The carrier-specific nature of loop qualification has significant implications for the loop qualification activity for which competitors will pay the incumbent. Incumbents can only meaningfully perform the first step of the loop qualification activity — providing access to the relevant information

on loop characteristics. The new entrants' own personnel must then use this loop characteristic information to determine the suitability of a given loop for provisioning the new entrants' specific variants of DSL-based services. As I noted previously, BST itself admits that "BellSouth does not have sufficient information on the ALEC's proposed use of the use of the loop or the specific ALEC equipment limitations to qualify loops for a specific ALEC service." [BST's Response to Rhythms' Interrogatory 29.]

**Q. Has the FCC agreed that incumbents should provide direct access to the data that competitors need to do their own loop qualification?**

A. Yes. In its *UNE Remand Order*, the FCC states that incumbents must provide requesting carriers access to all available information relating to loop makeup information for DSL-based services. The pertinent information includes, but is not limited to providing information about the following:

> the components of the transmission medium, fiber optics or copper; the existence, location and type of any electronic or other equipment on the loop, including but not limited to, digital loop carrier or other remote concentration devices, feeder/distribution interfaces, bridge taps, load coils, pair-gain devices, disturbers in the same or adjacent binder groups; the loop length, including the length and location of each type of transmission medium; the wire gauge(s) of the loop; and the electrical parameters of the loop, which may determine the suitability of the loop for various technologies.

[47 C.F.R. § 51.5; *UNE Remand Order* at ¶¶ 427-8.]

The clear purpose of this FCC requirement is to compel incumbents to produce the information that will allow competitors to make their own determinations about the suitability of loops for the technologies that the competitors intend to deploy. This purpose is implicit in the FCC's finding that "under our existing rules, the relevant inquiry is not whether the retail arm of the incumbent has access to the underlying loop qualification information, but rather whether such information exists anywhere within the incumbent's back office and can be accessed by any of the incumbent LEC's personnel." [*UNE Remand Order* at ¶ 430.] BlueStar, Covad and Rhythms simply need access to information about the loop, so that they can apply their best business judgment about what type and speed of service a customer may be able to obtain. If the FCC intended for the incumbents to make the determination on behalf of entrants, there would be no reason to require the incumbents to provide competitors with the information that "back office" personnel use to perform a loop qualification analysis.

**Q. How should access to loop makeup information be provided in a forward-looking environment?**

A. The incumbents should make loop makeup information available directly to new entrants in an electronic format. As Mr. Riolo explains in more detail in his testimony, much of the basic information that a competitor would need to determine whether a loop is qualified for its intended DSL application appears to reside within incumbents' existing databases, such as BST's Loop Facilities

Assignment and Control System ("LFACS") database and GTE's Integrated Computer Graphics System ("ICGS"). Therefore, direct, read-only access to these and other relevant databases efficiently enables competitors to obtain the data that they need to perform their own loop qualification. Direct electronic access to the relevant data is entirely feasible, as the GTE and BST proposals in this proceeding demonstrate. GTE apparently provides access to loop makeup information via its Mechanized Loop Qualification and Verification program through the WISE interface. [*See,* for example, GTE's Response to Rhythms' Interrogatory 7.] BST has also proposed to offer mechanized access to loop makeup data.

Moreover, providing competitors with such access would appear to fall within the FCC's non-discrimination requirements because the incumbents' own technicians have such access. For example, BST acknowledges that "BellSouth personnel that have a need to know can access LFACS remotely." [BST's Response to Rhythms' Interrogatory 34.]

**Q. What is an appropriate price for access to loop makeup information, based on the cost of forward-looking, efficient electronic access to that information?**

A. In a fully mechanized environment, the forward-looking cost of providing loop makeup information electronically is the cost of supplying a few additional fields of data via the incumbents' OSS, *e.g.,* the additional processor capacity required for a few additional bits of data and the power required to process those bits. Given the current power and price for

processors, it is unlikely that the cost for the additional capacity required to process loop makeup data would even be measurable on a per-order basis. Therefore, the best estimate of the efficient, long-run cost for the electronic provision of loop makeup information, which new entrants can in turn use to perform their own loop qualification assessment, is $0.

**Q. Have other commissions found that a $0 or near $0 price is the appropriate forward-looking cost result for access to loop makeup information?**

A. Yes. For example, the Kansas Corporation Commission has ruled that Southwestern Bell Telephone ("SWBT") should provide access to loop makeup information for $0, based on the ability to provide the required data electronically. [*See* Arbitrator's Order (Redacted), State Corporation Commission of the State of Kansas, Docket No. 00-DCIT-389-ARB, May 9, 2000 at 20. The Kansas Corporation Commission affirmed this holding, for purposes of interim pricing, in its July 26, 2000 Order Affirming Arbitrator's Recommendation Setting Interim Rates.] Similarly, the Texas Public Utility Commission arbitration has found that "SWBT should be fairly compensated for the real time access to its OSS functionalities required" and established an interim nonrecurring "dip charge" of $0.10 per loop for loop makeup information. [*Texas Arbitration Award*, at 102-103.]

**Q. What charges has GTE proposed for access to loop makeup data?**

A. GTE's Response to Covad's Interrogatory 12 confirms that "GTE does not propose to charge competitors for access to its Mechanized Loop Qualification and Verification program." GTE's position is consistent with the forward-looking approach that the Kansas Corporation Commission has adopted.

**Q. What charges has BST proposed for loop qualification?**

A. Although it is not entirely clear from BST's filing exactly how loop qualification charges would apply, it appears that competitors would incur loop qualification charges whenever they seek to obtain a DSL-capable loop from BST, regardless of whether BST proves to have a suitable loop available at that location. BST has proposed two separate charges for loop qualification:

- a one time "dip" charge of $1.08 for mechanized access to loop makeup information; and
- a nonrecurring charge of $189.37 for manual loop qualification.

**Q. Is BST's proposed per-use charge for mechanized access to loop makeup data reasonable?**

A. No. As I demonstrate below, BST's proposed charge is both inappropriate and excessive. The Commission should disallow in its entirety BST's proposed recurring mechanized loop qualification charge.

**Q. Why is BST's proposed recovery of its investment in the loop qualification interface inappropriate?**

A. The investment that BST seeks to recover through this recurring charge is for an OSS electronic interface. The Florida Commission has already correctly determined that incumbents should bear their own cost of developing and implementing such OSS interfaces, as competitors do:

> While the costs of implementing these electronic interfaces have not been completely identified, BellSouth did provide some cost estimates and some initial costs of developing such systems. Based on the evidence, we find that these operations support systems are necessary for competition in the local market to be successful. We believe that both the new entrants and the incumbent LECs will benefit from having efficient operational support systems. Thus, all parties shall be responsible for the costs to develop and implement such systems. We note that this is the stance the FCC has recently taken with cost recovery for number portability. However, where a carrier negotiates for the development of a system or process that is exclusively for that carrier, we do not believe all carriers should be responsible for the recovery of those costs.
>
> Based on the foregoing, *each party shall bear its own cost of developing and implementing electronic interface systems, because those systems will benefit all carriers.* If a system or process is developed exclusively for a certain carrier,

however, those costs shall be recovered from the carrier who is requesting the customized system.

[Order No. PSC-96-1579-FOF-TP, at 87, emphasis added.]

**Q. Why is BST's proposed recurring charge for mechanized access to loop makeup information overstated?**

A. BST contends that the loop makeup database interfaces will require an enormous *** **BST PROPRIETARY** [redacted] **END PROPRIETARY** *** investment in computer equipment, software, and right to use ("RTU") fees. To this extraordinary investment, BST has added an additional *** **BST PROPRIETARY** [redacted] **END PROPRIETARY** *** in consulting services and third party software support for 2000-2002. The limited detail that BST has provided supporting its assumptions shows clearly that BST's investment is excessive. For example, BST proposes to recover a *** **BST PROPRIETARY** [redacted] **END PROPRIETARY** *** [Loop Qualification Database workpapers, file FLLQDB.XLS, Input sheet.] BST has provided no justification for any of the costs included in this "investment." The high level of BST's claimed "investments" lends credence to the view that BST is attempting to have competitors subsidize the upgrading of its own legacy systems.

**Q. Is the nonrecurring charge BST proposes to charge for manual loop qualification reasonable?**

A. No. Again, it is important to remember that it is the competitor that must evaluate the loop data to determine if the loop qualifies for any particular retail service. Therefore, the task that BST should have studied is the time required to pull loop information, print it and transmit it to the competitor. The cost for manual loop qualification should include nothing more than a few minutes time for a technician to retrieve the relevant data from LFACS or other relevant databases and get that information to the competitor. As Mr. Riolo establishes in his testimony, a generous average time for such a task would be no more than 30 minutes. Even if one assumes a $50 labor rate, the total cost would only be about $25. In contrast, BST has assumed *** **BST PROPRIETARY** [redacted] **END PROPRIETARY** *** for "Service Inquiry with Loop Make-Up." These inefficiencies lead to BST's overstated estimate of $189.37 for manual loop qualification. This is *** **BST AND SPRINT PROPRIETARY** [redacted] **END PROPRIETARY** *** Sprint's proposed nonrecurring charge of $23.99 for manual loop qualification.

**Q. Is Sprint's proposed nonrecurring charge for loop qualification reasonable?**

A. No. Although Sprint's proposed price for manual loop qualification is more reasonable than BST's proposed price for the same process, Sprint has failed

to offer forward-looking, mechanized access to loop makeup data. The Commission should require Sprint, along with BST and GTE, to provide nondiscriminatory electronic access to its loop plant databases. Sprint should not charge competitors for access to this loop makeup information.

**Q. Does that conclude your testimony at this time?**

A. Yes, it does.

# SUMMARY OF BLUESTAR, COVAD, RHYTHMS PROPOSALS

| | Incumbents' Proposals | | | BlueStar/Covad/Rhythms Proposal | | | |
|---|---|---|---|---|---|---|---|
| | BST | GTE | Sprint | BST | GTE | Sprint | |
| **Monthly Recurring Rates** | | | | | | | |
| **(2-Wire Loops)** | | | | | | | |
| Analog (1) | $17.88 | $28.41 | $25.38 | See note (2) | | | |
| xDSL-Capable | NA | $28.41 | $25.38 | Same as analog rate | | | |
| ADSL Compatible | $18.13 | NA | NA | NA | NA | NA | |
| HDSL Compatible | $14.17 | NA | NA | NA | NA | NA | |
| Unbundled Copper Loop-Short | $18.13 | NA | NA | NA | NA | NA | |
| Unbundled Copper Loop-Long | $52.66 | NA | NA | NA | NA | NA | |
| ISDN | $29.80 | $34.13 | $39.98 | Analog rate plus adder | | | |
| ISDN Adder (3) | $11.92 | $5.72 | $14.60 | *** | *** | *** | |
| **Nonrecurring Rates** | | | | | | | |
| **Service Order** | | | | | | | |
| Manual | | | | | | | |
| Analog | $21.73 | $38.75 | $22.54 | No manual charges should apply | | | |
| xDSL-Capable | $21.73 | $38.75 | $22.54 | No manual charges should apply | | | |
| ISDN | $21.73 | $40.56 | $22.54 | No manual charges should apply | | | |
| Manual - Disconnect | $3.87 | NA | NA | No manual charges should apply | | | |
| Semi-Mechanized | | | | | | | |
| Analog | NA | $27.60 | NA | No manual charges should apply | | | |
| xDSL-Capable | NA | $27.60 | NA | No manual charges should apply | | | |
| ISDN | NA | $25.03 | NA | No manual charges should apply | | | |
| Electronic | $2.77 | NA | $3.06 | Based on full automation | | | |
| Electronic - Disconnect | $0.43 | NA | NA | Based on full automation | | | |
| Order Coordination | $16.44 | NA | NA | No manual charges should apply | | | |
| **(2-Wire Loops)** | | | | | | | |
| **Analog (1)** | | | | | | | |
| Provisioning - First Line | $60.85 | $42.17 | $72.98 | $5.33 | $5.33 | $5.33 | (4), (5) |
| Provisioning - Additional Line | $20.65 | $38.81 | $23.61 | $5.33 | $5.33 | $5.33 | (4), (5) |
| Disconnect - First Line | $39.81 | NA (6) | NA | $4.67 | $4.67 | $4.67 | (4), (5) |
| Disconnect - Additional Line | $6.16 | NA (6) | NA | $4.67 | $4.67 | $4.67 | (4), (5) |
| **xDSL-Capable** | | | | | | | |
| Provisioning - First Line | NA | $42.17 | $68.84 | Same as analog rate | | | |
| Provisioning - Additional Line | NA | $38.81 | $19.47 | Same as analog rate | | | |
| Disconnect - First Line | NA | NA (6) | NA | Same as analog rate | | | |
| Disconnect - Additional Line | NA | NA (6) | NA | Same as analog rate | | | |
| **ADSL Compatible** | | | | | | | |
| Provisioning - First Line | $302.26 | NA | NA | NA | NA | NA | |
| Provisioning - Additional Line | $194.26 | NA | NA | NA | NA | NA | |
| Disconnect - First Line | $155.44 | NA | NA | NA | NA | NA | |
| Disconnect - Additional Line | $35.51 | NA | NA | NA | NA | NA | |
| **HDSL Compatible (2-wire)** | | | | | | | |
| Provisioning - First Line | $319.72 | NA | NA | NA | NA | NA | |
| Provisioning - Additional Line | $211.72 | NA | NA | NA | NA | NA | |
| Disconnect - First Line | $155.44 | NA | NA | NA | NA | NA | |
| Disconnect - Additional Line | $35.51 | NA | NA | NA | NA | NA | |
| **Unbundled Copper Loop-Short** | | | | | | | |
| Provisioning - First Line | $300.38 | NA | NA | NA | NA | NA | |
| Provisioning - Additional Line | $192.38 | NA | NA | NA | NA | NA | |
| Disconnect - First Line | $155.44 | NA | NA | NA | NA | NA | |
| Disconnect - Additional Line | $35.51 | NA | NA | NA | NA | NA | |

*** REDACTED

# SUMMARY OF BLUESTAR, COVAD, RHYTHMS PROPOSALS

| | Incumbents' Proposals | | | BlueStar/Covad/Rhythms Proposal | | | |
|---|---|---|---|---|---|---|---|
| | BST | GTE | Sprint | BST | GTE | Sprint | |
| **Unbundled Copper Loop-Long** | | | | | | | |
| Provisioning - First Line | $192.33 | NA | NA | NA | NA | NA | |
| Provisioning - Additional Line | $109.17 | NA | NA | NA | NA | NA | |
| Disconnect - First Line | $155.44 | NA | NA | NA | NA | NA | |
| Disconnect - Additional Line | $35.51 | NA | NA | NA | NA | NA | |
| **ISDN** | | | | | | | |
| Provisioning - First Line | $220.42 | $96.76 | $120.57 | $12.83 | $12.83 | $12.83 | (4), (5) |
| Provisioning - Additional Line | $123.02 | $26.53 | $72.93 | $12.83 | $12.83 | $12.83 | (4), (5) |
| Disconnect - First Line | $109.13 | NA (6) | NA | $4.75 | $4.75 | $4.75 | (4), (5) |
| Disconnect - Additional Line | $15.58 | NA (6) | NA | $4.75 | $4.75 | $4.75 | (4), (5) |
| **Loop Qualification** | | | | | | | |
| Mechanized - per use charge | $1.08 | $0.00 | NA | $0.00 | $0.00 | $0.00 | |
| Manual (7) | $189.37 | NA | $28.20 | $20.00 | $20.00 | $20.00 | (4), (5) |
| **Conditioning** | | | | | | | |
| Load Coil Removal | | | | | | | |
| Loops under 18kft | $70.68 | $1,448.22 | NA | $0.00 | $0.00 | $0.00 | (8) |
| Loops under 18kft - Additive (9) | $120.98 | NA | $1.44 | $0.00 | $0.00 | $0.00 | |
| Loops over 18kft | | | | | | | |
| First Line | $772.31 | $1,448.22 | NA | $0.00 | $0.00 | $0.00 | (8) |
| Additional Line | $23.96 | NA | NA | $0.00 | $0.00 | $0.00 | (8) |
| First Line (per location) - UG | NA | NA | $397.78 | $0.00 | $0.00 | $0.00 | |
| Add. Line (per location) - UG | NA | NA | $3.06 | $0.00 | $0.00 | $0.00 | |
| First Line (per location) - A/B | NA | NA | $6.96 | $0.00 | $0.00 | $0.00 | |
| Add. Line (per location) - A/B | NA | NA | $1.61 | $0.00 | $0.00 | $0.00 | |
| Bridged Tap Removal | | | | | | | |
| First Line | $82.06 | NA | NA | $0.00 | $0.00 | $0.00 | (10) |
| Additional Line | $82.06 | NA | NA | $0.00 | $0.00 | $0.00 | (10) |
| First Line - UG | NA | NA | $394.78 | $0.00 | $0.00 | $0.00 | |
| Additional Line - UG | NA | NA | $0.45 | $0.00 | $0.00 | $0.00 | |
| First Line - A/B | NA | NA | $5.74 | $0.00 | $0.00 | $0.00 | |
| Additional Line - A/B | NA | NA | $0.39 | $0.00 | $0.00 | $0.00 | |
| First Line - One occurrence | NA | $911.76 | NA | $0.00 | $0.00 | $0.00 | |
| Add. Line - One occurrence | NA | $19.93 | NA | $0.00 | $0.00 | $0.00 | |
| First Line - Multiple occurrences | NA | $1,274.26 | NA | $0.00 | $0.00 | $0.00 | |
| Add. Line - Multiple occurrences | NA | $49.83 | NA | $0.00 | $0.00 | $0.00 | |
| Travel and Engineering (11) | NA | NA | $43.62 | NA | NA | NA | |

(1) For BST, the analog rate is the rate for Voice Grade Service Level 1.
(2) To be determined by recalculation of incumbents' cost studies based on proposed changes.
(3) Sprint has proposed an "ISDN additive." For BST and GTE, adder is calculated from ISDN rates relative to analog rates.
(4) Presented in Mr. Riolo's concurrently-filed testimony.
(5) Illustrative costs based on an assumed $40/hour labor rate (which does not include markup for common or shared costs).
(6) Includes disconnect costs, as well.
(7) No manual charge should apply, unless competitor *chooses* not to do its own loop qualification.
(8) If the Commission allows conditioning charges, then we propose $8.32 per loop for load coil removal, based on an illustrative labor rate of $45/hour (which does not include markup for shared and common costs) -- presented in Mr. Riolo's concurrently-filed testimony.
(9) Would apply to *every* xDSL loop order (under 18,000 feet).
(10) If the Commission allows conditioning charges, then we propose $0.89 per loop for bridged tap removal, based on an illustrative labor rate of $45/hour (which does not include markup for shared and common costs) -- presented in Mr. Riolo's concurrently-filed testimony.
(11) Would apply for *each* conditioning job.

UG = Underground; A/B = Aerial or Buried

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Exhibit ____ (TLM-3)
Docket No. 990649-TP

Investor Briefings

*October 18, 1999* *No. 211*

# SBC Announces Sweeping Broadband Initiative

## First major post-merger initiative involves planned $6 billion investment over three years

On October 18, 1999, SBC announced its first major initiative from the merger with Ameritech. The initiative, called Project Pronto, involves the company's entire 13 state in-region territory, and is designed to transform SBC into a broadband service provider capable of meeting all customers' needs for data, voice and video products. SBC plans to invest more than $6 billion over the next three years in fiber, electronics and ATM technology in order to create a robust, comprehensive, data-centric broadband network architecture. This initiative will dramatically improve SBC's cost structure, while greatly expanding the company's ability to deliver broadband services to all its customers.

SBC's broadband initiative is much more than a local loop or DSL strategy. These investments will make broadband the standard for SBC's network, fundamentally changing the way the company operates. In addition, the investments will position SBC to effectively and efficiently capitalize on changes in technology, as well as changes in customer demand.

The time is right to make these significant investments. The performance of broadband technologies has improved dramatically while the associated costs have declined. Customer demand for broadband services is real and growing rapidly. Cumulatively, these factors present SBC with a compelling business opportunity. The network efficiency improvements alone will pay for this initiative, leaving SBC with a data network that will be second to none in its ability to satisfy the exploding demand for broadband services. This new network structure, combined with SBC's partnership with Williams Communications — which is the nation's newest, most advanced long-distance network — enables the company to deliver end-to-end broadband services locally, throughout its markets and to the 30 out-region markets SBC plans to enter.

*"The network efficiency improvements alone pay for this initiative, leaving SBC with a data network that will be second to none."*

## $6 Billion Network Investment

Of the $6 billion that SBC plans to invest over the next three years, 75 percent will be directed toward improvements to the basic local loop infrastructure (i.e., fiber feeder and next-generation remote terminals). The remaining 25 percent will fund other infrastructure improvements, especially in the tandem and interoffice network. Upon completion, SBC's next-generation network will be capable of meeting customers' voice, data and video needs with the right technology, at the right speeds and with the right reliability.

SBC's new network architecture is designed to be optimum from both a voice and data perspective. It will be scalable, with the capability to manage the ongoing shift in voice and data traffic volumes. Voice traffic today is predominantly circuit switched, but this network deployment will give SBC the flexibility to readily move to other voice protocols, including voice over ATM, voice over ADSL and, ultimately, voice over IP. Data traffic will be diverted from the circuit-switched network, packetized and adapted to Internet Protocol. This approach to voice and data traffic will allow SBC to fully utilize the capacity of the existing circuit-switched network, while focusing ongoing capital expenditures on data capabilities.

### Project Pronto Highlights

- $6 billion capital investment
- Annual savings of $1.5 billion by 2004
- Capital and expense savings pay for initiative on NPV basis
- $3.5 billion in new revenue by 2004
- 100 basis-point improvement in annual revenue growth
- Significant value creation, well in excess of $10 billion NPV

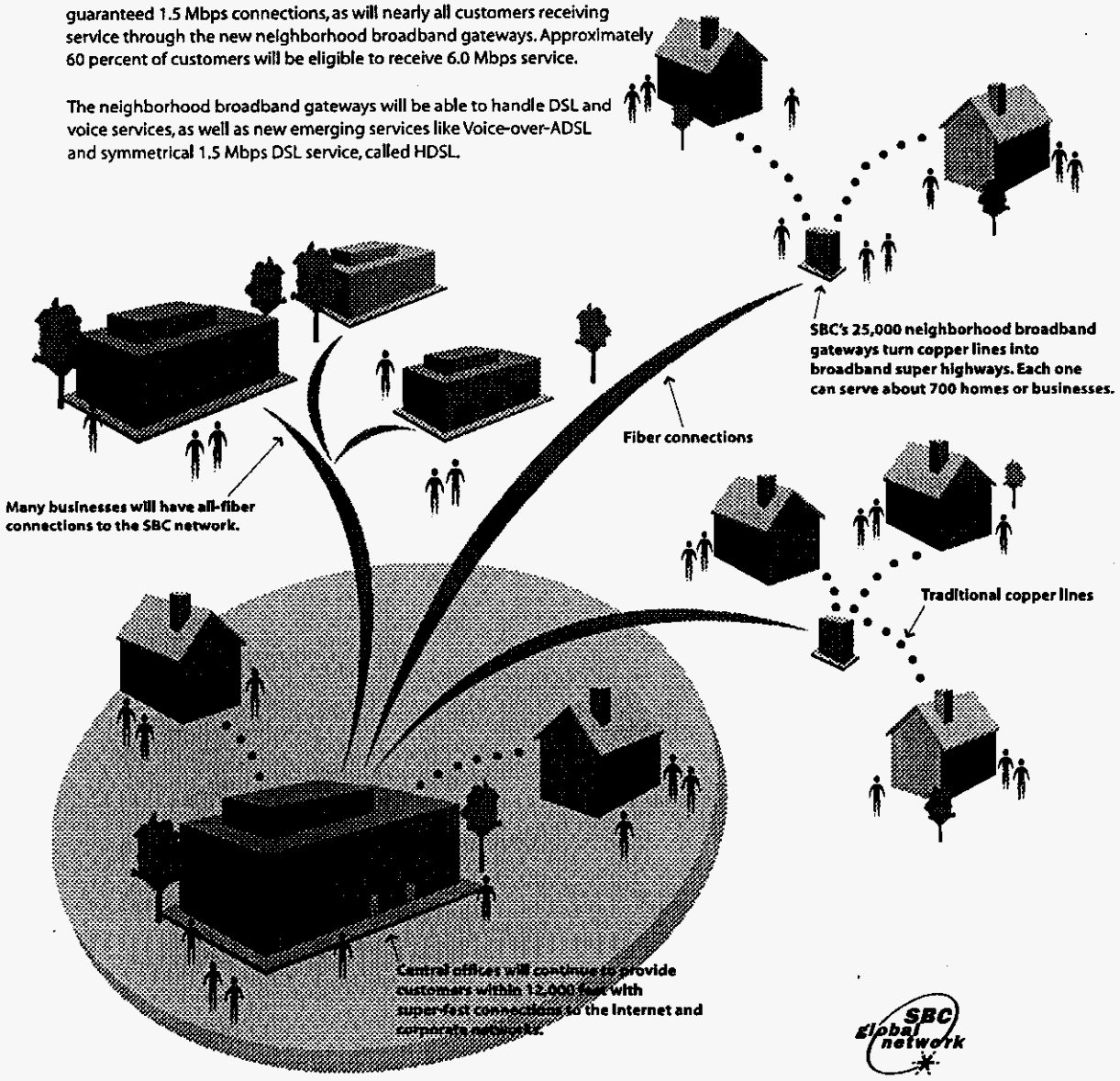
The higher speeds afforded by these network improvements will enable SBC to offer a myriad of Internet-based video products — including video streaming and video conferencing — on its landline networks. These network improvements also will allow SBC

# SBC's New Broadband Neighborhood Network

**SBC will deploy fiber deeper into neighborhoods and equip them with neighborhood broadband gateways, putting network capabilities closer to customers and making super-fast Internet access widely available.**

Customers within 12,000 feet of a central office facility will receive guaranteed 1.5 Mbps connections, as will nearly all customers receiving service through the new neighborhood broadband gateways. Approximately 60 percent of customers will be eligible to receive 6.0 Mbps service.

The neighborhood broadband gateways will be able to handle DSL and voice services, as well as new emerging services like Voice-over-ADSL and symmetrical 1.5 Mbps DSL service, called HDSL.



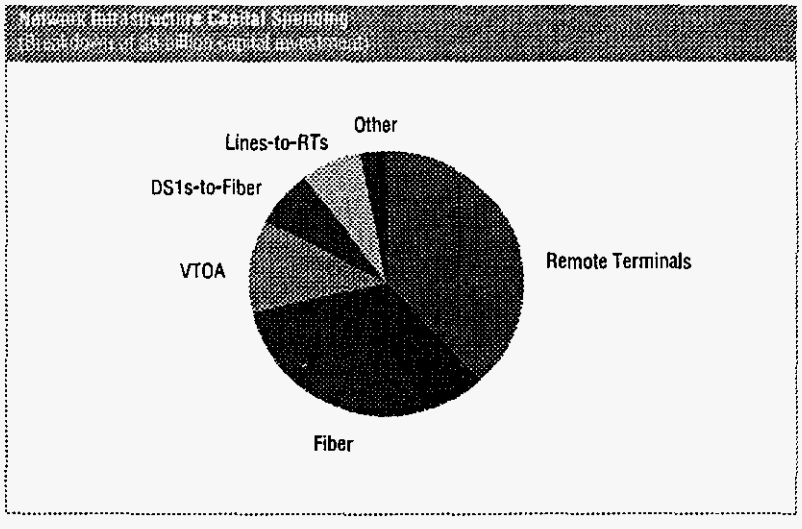
to provide television entertainment as the technology evolves and becomes financially feasible to implement. SBC will also have the flexibility to continue to offer video and Internet services using satellite transmission through its strategic marketing and distribution agreement with DIRECTV™.

SBC plans to invest approximately $4.5 billion to initially extend the reach of broadband capability to more than 80 percent of its customer base. SBC estimates that this deployment will immediately enable at least 60 percent of its broadband customer base to have guaranteed download speeds of six megabits per second (Mbps), with the remainder having guaranteed speeds of 1.5 Mbps or more. Further improvements in these speeds are expected as technology advances.

To achieve this kind of broadband penetration, SBC will place or upgrade approximately 25,000 remote terminals at an average cost of approximately $86,000 each. These next-generation remote terminals are also referred to as "neighborhood broadband gateways." Fiber backbones will be deployed to connect these neighborhood broadband gateways to about 1,400 central offices throughout SBC's 13-state territory. Fiber, as well as costs for systems and other requirements, is estimated to average about $1.7 million per central office.

The deployment of fiber and next-generation remote terminals will enable SBC to overcome loop-length and line condition limitations in its network. While one immediate advantage of this deployment is the broader availability of ADSL, it also gives SBC the flexibility to react efficiently and effectively to continuing technological improvements and market developments. Planning includes deployment scenarios for VDSL or APON (ATM Passive Optical Network) technology to address customers' television entertainment needs, as these platforms become technically and financially feasible.

SBC intends to spend an additional $1.8 billion to upgrade other portions of its network in order to improve efficiency. Forty percent of this investment is targeted for a technology that SBC is pioneering called Voice Trunking over ATM, or VTOA.



## New Broadband Products

A symmetrical 1.5 Mbps DSL service that is ideally suited for video conferencing or collaborative computing.

**Access Advantage Plus:** Provides a customer with DS1 or DS3 channelized service allowing the integration of voice and data on one single facility. The DS1 service provider up to 24 DS0 channels to which a menu of products can be connected. The DS3 service provides up to 28 DS1 channels to which a menu of products can also be connected.

**Switched Virtual Circuit (SVC):** A capability for ADSL subscribers that enables the user to accommodate multiple connections on the personal computer. Users can establish a connection to an Internet Service Provider as well as a connection to a corporate LAN without having to change the PC software configuration and reboot the PC.

**Voice Over ADSL (VoDSL):** Expands on existing DSL service capabilities by providing up to 4 derived voice channels over the ADSL line and primary POTS line. VoDSL will provide a solution for our customers' current and future integrated voice and data needs. VoDSL will offer simplicity, flexibility, convenience and cost savings. In addition to these customer realized service benefits, VoDSL will provide potential infrastructure benefits that should enable SBC to reduce operations costs and improve its ability to scale and manage network services.

**Splitterless DSL:** Provides a full rate DSL service where the customer would receive a drop shipment and self-install the equipment. The equipment would consist of a modem, NIC card and filters. The filters would be customer installed in-line, low-pass microfilters for each analog device. The purpose is to filter out high-frequency signals so that both the voice and data can share common inside wiring. Splitterless DSL would eliminate the need for a technician to install a splitter and the inside wire. It also eliminates the need for the customer to have the CPE installed by a technician.

**G.Lite:** A technology that utilizes a new international standard for use with DSL services. The use of G.Lite technology as part of SBC's ADSL offering may reduce the complexity of an on-site installation by eliminating the need for new wiring and a special signal "splitter" that separates voice and data at the user's home. G.Lite technology does, however, require the use of customer installed filters at each telephone and analog device, such as answering and fax machines. This is referred to as "plug and play" consumer installation.

**VPOP Dial Access Service (VPOP-DAS):** A cost-effective solution to modem pooling. VPOP-DAS provides for the termination of calls and interconnection to the SWBT network of Data Service Providers (DSPs). SWBT owns, maintains and monitors the modems and associated equipment. Dial Access Service allows SBC's Data Service Provider customers to receive multiple calls from end-users with analog and ISDN lines, transport data traffic to single location via SBC Frame Relay service, and avoid deployment of DSP-owned modems and related equipment.

**Traffic Aggregation Services (TAS):** Provides a complete transport solution to ISPs or businesses that are interested in purchasing volume DSL and VPOP-DAS. This service provides the customer increased flexibility to delineate groups of customers while making it easier to manage hundreds/thousands of incoming DSL/VPOP-DAS connections. Service components of TAS are:

- Aggregate DSL subscribers and delivers them over ATM using L2TP tunneling or Virtual Circuits to identify specific subscribers.
- Aggregate subscriber traffic (DSL, VPOP-DAS and FR) from multiple LATAs so that an ISP or business customer needs only one connection to SBC's nationwide network. This will be handled via a complementary carrier of the customer's choice.
- Customized solutions to customers' unique needs including specialized tunneling arrangements and CPE installation/maintenance for telecommuting applications.

**ATM Circuit Emulation Service (CES):** An enhancement to SBC's Call Relay networking family of products that allows customers with existing, or planned, Primary Rate ISDN (PRI) or SuperTrunk circuits to emulate and aggregate those circuits with their ATM traffic. As ATM is essentially a packet rather than a circuit-oriented transmission technology, it must emulate circuit characteristics in order to provide good support for Constant Bit Rate (CBR) circuit traffic. ATM CES provides customers with the capability of directly connecting standard Time Division Multiplexing (TDM) circuit traffic over the ATM network. Customers also have increased flexibility, efficiency and cost savings resulting from aggregating voice and data traffic with their ATM traffic. And, ATM CES allows customers to maintain their TDM investment while migrating their dedicated circuits with TDM traffic onto the ATM network. They can introduce ATM technology gradually without isolating or stranding sites with substantial TDM investment.

**Virtual Point Of Presence (VPOP) CES Service:** Allows Internet Service Providers (ISPs) to establish virtual POP locations in any region for LATA-wide transport of dial-up Internet traffic. Traffic from multiple areas can be aggregated onto single ATM connections. Even Frame Relay traffic can be converted to ATM using the FRATM-Service Interworking (FRATM-SI) Enhancement.

**Enterprise VPN:** Enables large and medium business customers to establish a Virtual Private Network (VPN) via the SBC Internet Protocol (IP) network. EVPN is differentiated from traditional Internet access by enhanced security and performance guarantees. Standard features include:

- Dedicated or Dial Access Customers have the option of accessing the service through a Frame Relay, ADSL, or private line connection (56Kbps — 622Mbps) or via dial access using an analog modem or an ISDN connection.
- EVPN Service Backbone provided on a shared wide-area IP routed network backbone with a core that is based on SONET and ATM.
- Performance Level Guarantees are higher than those in the public Internet.
- Enhanced Security accomplished with firewalls, tunneling and encryption, delivering better security than available via today's Internet.
- Options available include network hosted applications, LAN support, and Desktop communications and applications support.

**Online Office:** Targets medium and small businesses with packages of:

- EVPN — The EVPN service as described above for customers with multiple sites.
- Network Hosted Applications — A suite of network hosted applications. Initially, network hosted applications in the package will include web hosting and e-mail. Subsequent applications will include E-commerce, calendar and scheduling, salesforce automation and other business software (e.g., accounting, human resources).
- LAN Support — LAN installation, maintenance and repair in support of an end-to-end service.
- Desktop Support — Support for the communications aspects of the desktop computer and for the Online Office applications.
- Options Available — Desktop applications support.

VTOA involves the scheduled and sequenced replacement of standard circuit-switch tandems with packet-based ATM switches within the core of the network. It's one of the first technologies being planned for wide deployment in order to make convergent voice and data networks practical. SBC intends to begin field trials in 2000 in Houston and Los Angeles. Once the trials prove successful, the ensuing deployment would be one of the largest of its type. The convergence of voice and data backbones will significantly increase network efficiency and scalability by allowing SBC to transport voice traffic the same way as data — via packets — and with the same level of call quality and reliability that SBC provides today.

TRI, the company's research-and-development arm, has been testing VTOA exhaustively under real-life conditions. Their extensive analysis of SBC's Houston network, for example, revealed that the transition to VTOA should reduce the number of tandem switches required from four to one, resulting in a 74-percent reduction in trunk groups.

The company expects to convert 34 of 109 existing tandems to ATM-distributed tandems. Implementing VTOA also would enable SBC to avoid the forecasted deployment of 21 additional tandems in the next seven to 10 years.

Other infrastructure investments are planned to improve network efficiency. One-fourth of the $1.8 billion targeted for network efficiency initiatives will be dedicated to upgrading a significant number of locations currently served via copper-based DS1s to new, lower cost fiber facilities. Another 25 percent will be targeted for moving existing

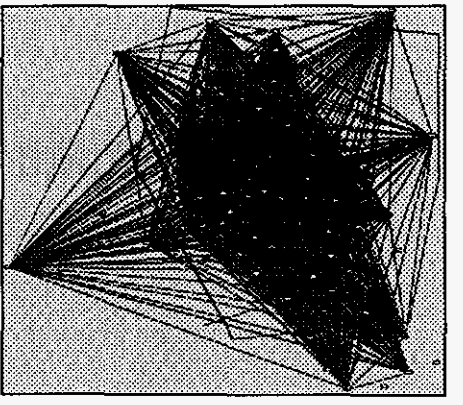
## Houston Network
### Present VTOA

4 tandems

Approximately 500K trunks

76 end offices

2,700 trunk groups



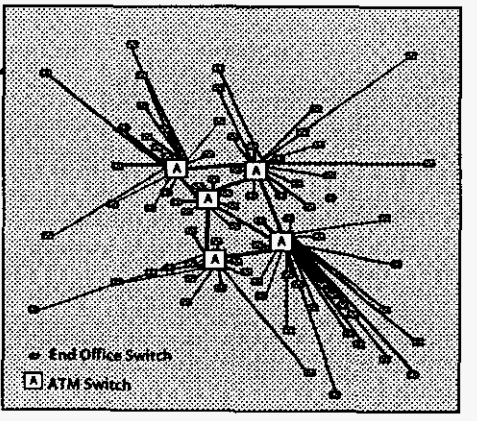
## Houston Network
### Future VTOA
### 2003

1 VTOA tandem

Approximately 464K trunks

76 end offices

700 trunk groups



voice lines to new fiber-fed remotes. The remaining 10 percent will be targeted for upgrading the overall condition of the network.

## Cost Structure of Network

SBC's new network investments will have a profound impact on its cost structure; in fact, the efficiencies SBC expects to gain will pay for the cost of the deployment on an NPV basis. These efficiencies are conservatively targeted to yield annual savings of about $1.5 billion by 2004 ($850 million in cash operating expense and $600 million in capital expenditures).

## Expense Savings

The new loop infrastructure, with the additional dedicated feeder capacity the fiber provides, will substantially reduce the need to rearrange outside plant facilities when installing new or additional services. By avoiding dispatches on many installations, SBC expects to realize efficiencies in its installation and maintenance operations. Other anticipated efficiencies will come from reduced activity required in the remaining copper plant because of improved reliability. A fiber-based distribution network is expected to be less vulnerable to weather conditions, thereby reducing trouble reports.

In some cases SBC is making investments in new technologies to dramatically reduce the cost of supporting future growth. A good example is the company's plan to move most of its copper-based DS1s to fiber at certain locations. With the fiber in place, the cost of providing additional bandwidth via electronics will be significantly less than adding more copper lines. Reducing the number of copper-based DS1s has the added benefit of eliminating a source of interference, which will make more the remaining copper-based facilities available for DSL service. In other cases, such as the plan to replace existing circuit-switched tandems with new fast packet technologies, costs associated with future growth as well as maintenance expenses will be reduced.

## Capital Savings

Savings in capital expenditures for feeder, trunking and provisioning are targeted as a result of the network investments. Reduced spending on feeder facilities represents 70 percent of the targeted capital savings. The broad deployment of fiber and related electronics will substantially eliminate further deployment of copper facilities for feeder reinforcement. The balance of the capital savings comes from the reduced need for trunking capital, from lower provisioning costs for high-growth services, such as DS1s, and from other improvements in the distribution plant.

## Revenue Opportunity

SBC expects its broadband initiative to dramatically improve its ability to deeply penetrate the growing market opportunity for broadband services, especially in the consumer and small and medium business markets. DSL services alone are targeted to add approximately $3 billion to annual revenue within the next five years,

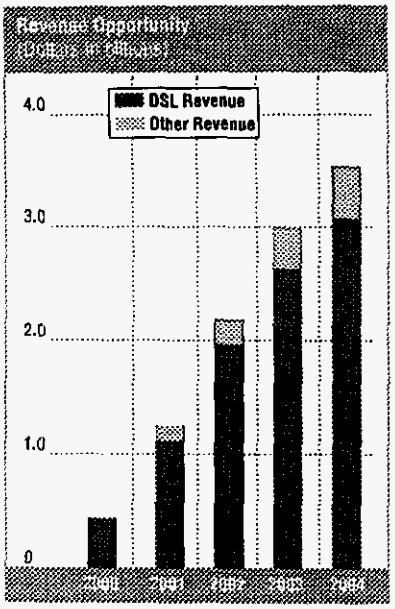
with another $500 million coming from other new or replacement products. This $3.5 billion revenue opportunity represents an additional 100 basis points in top-line growth by 2004.

The investments in fiber feeder and next-generation remote terminals are designed to eliminate loop length and network condition limitations, allowing SBC to meet the ultimate objective of bringing broadband capability to substantially all of its customers. In fact, SBC expects to reach more than 80 percent of its customer locations beginning in 2002. SBC expects to reach 35 million customer locations with broadband service in three years.

The ability to offer and promote broadband services to all customers has significant advantages. Network improvements will eliminate the need to "qualify" a customer for DSL services, making citywide promotions far more effective. Likewise, SBC expects that broadband services will be an integral part of its bundled telecom services. Marketing and promoting bundles that include broadband services will be far more successful in a network environment that is free of concerns regarding customer distance limitations or network disturbers.

SBC's goal is to achieve at least a 50-percent share of the total broadband market penetration. (The broadband market is defined as that portion of SBC customer locations that have the capability to receive landline-based broadband services from one or more providers.) By 2003, SBC expects market penetration to be approximately 30 percent; that is, slightly less that a third of the broadband capable customers will subscribe to some form of broadband access. SBC expects that the broadband market and market penetration will grow to at least half of the customer locations equipped with broadband capability within 10 years.

The size of the broadband market and SBC's objective to




achieve 50 percent of this market penetration implies a DSL subscriber base of more than 6 million by 2004, and more than 10 million before 2009.

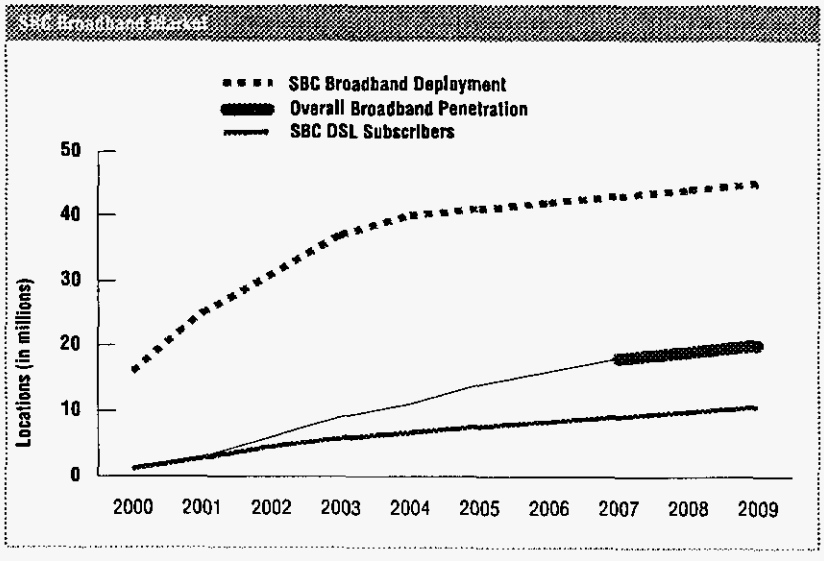
With this new architecture, asymmetrical 6 Mbps service will be initially available to 60 percent of the broadband market. And, HDSL (a 1.5 Mbps symmetrical product) will be available to all customers reached with this new architecture. These two new services are estimated to account for about 10 percent of the total projected DSL demand and 25 percent of the revenue opportunity. Other products such as distance learning, video confer-

encing, remote management, web hosting and server hosting represent additional revenue opportunity.

SBC is also targeting at least an additional $500 million net revenue opportunity by 2004 from other new or replacement products. These products include switched virtual circuit, voice over DSL, and VPOP-DAS (see page 5 for details on these and other products). SBC's new network architecture and its broadband capabilities also position the company to seize additional revenue from new Internet and data-related products that will continue to evolve over the coming months and years.

Several of the products enabled by network improvements may be substitutable for existing products, particularly in the business market. For example, voice over ADSL could reduce demand for business lines and 1.5 Mbps symmetrical service could be a substitute for T1s in certain instances.

Dynamic, data-oriented growth in the business market has fostered a migration toward higher bandwidth services — services that are often aggregated on bigger and bigger "pipes." In the second quarter of 1999, for example, VGEs grew 16.6 percent, driven by strong demand for DS1s and DS3s.




SBC's planning is based on the expectation that business VGEs will continue to grow strongly, fueled by the movement to higher, more efficient broadband capabilities and the integration of voice and data on a single facility. The broadband deployment initiatives will expand the availability of attractive, high-speed services to customers, and improve SBC's competitive position. By having the capability in its network to efficiently offer services such as symmetrical 1.5 Mbps DSL to a much broader market, SBC is positioned to grow business revenues with attractively priced, high bandwidth, competitive products. Additionally, cost structure improvements will give SBC the flexibility to economically respond to continued changes in the marketplace.

## Financial Implications

As previously described, the fixed capital required to implement these initiatives is expected to be $6 billion. SBC plans to deploy

this capital during the next three years, with almost 75 percent targeted for spending in 2000 and 2001. With current operating cash flows in excess of $15 billion, the company has plenty of capacity to fund this investment within its existing capital structure. SBC is evaluating whether the network initiatives will result in a write-down to the carrying value of portions of its copper network, especially the local loop. This evaluation, including quantification of any write-down, will be completed in December 1999.

Given the nature of the network deployment, related cash operating expenses should be modest, and within the parameters for merger synergy investments projected at the time of the original Ameritech acquisition announcement. These expenses include developing or modifying operational support systems; staffing, equipping and training field forces for the project; and, rolling circuits from the old network to the new. They should be about 10 percent of the capital spent per year.

The annual cost structure improvements associated with the new network architecture are targeted to reach $1.5 billion by 2004 ($850 million in cash operating expense and $600 million in capital). With the network improvements paying for themselves on an NPV basis, SBC has an outstanding opportunity to create shareowner value through new revenue opportunities. SBC conservatively targets new annual revenue opportunities to exceed $3.5 billion by 2004, most of which relates to DSL service

**Asynchronous Transfer Mode (ATM)**

Asynchronous Transfer Mode (ATM) is a cell-relay service that provides high-speed information transfer capability and near-real-time multimedia communications among multiple locations. ATM service can be deployed both on a local level, as a private local area network (LAN), and over a wide area, as a backbone network or bridge connecting LANs to wide area networks (WANs). ATM access speeds range from 45 Mbps to 155 Mbps, with plans in the works for speeds up to 622 Mbps. ATM is suitable for many applications, including local transport, wide-area transport, voice, data, video, textual images, CAD/CAM, collaborative computing and distance learning.

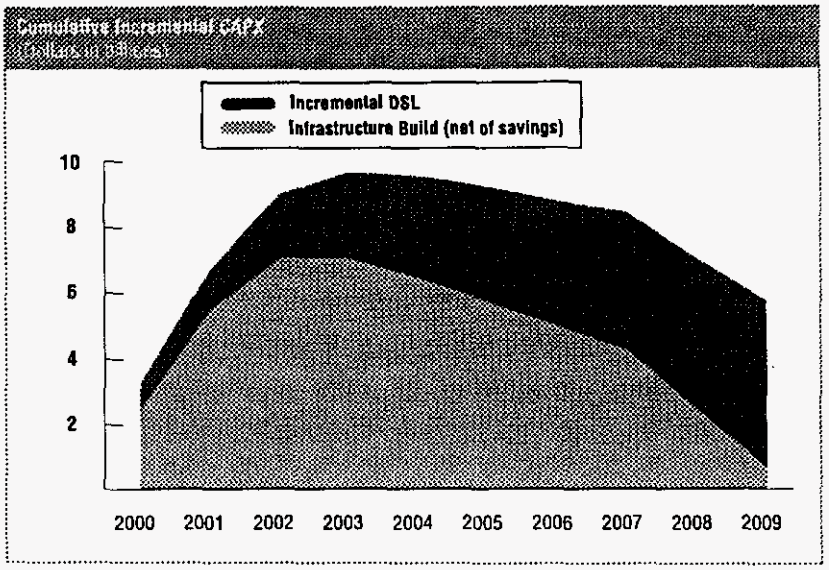
ATM provides users with both scalability and flexibility. It provides scalability by allowing for various rates of access speed, and by allocating bandwidth on an as-needed basis for "bursty" transmissions that require large amounts of bandwidth over short periods of time. ATM provides flexibility because it can support multiple services over a wide area, including frame relay. Considering these attributes, as well as its current availability, ATM is viewed as the logical "next step" as users migrate toward higher-capacity broadband transmission services.

The most significant benefit of ATM is its uniform handling of services, allowing one network to meet the needs of many broadband services. ATM accomplishes this because its cell-switching technology combines the best advantages of both circuit switching (for constant bit-rate services such as voice and image) and packet switching (for variable bit-rate services such as data and full-motion video) technologies. The result is the bandwidth guarantee of circuit switching combined with the high efficiency of packet switching.

offerings. Revenue growth is targeted to improve 100 basis points by 2004 as a result of the expanded broadband opportunity.

SBC's planning guidelines assume a two-year payback period per DSL customer by 2004. On a per-subscriber basis, DSL products are expected to require incremental capital — for the DSLAM and equipment at the customer premise — of just under $500. Customer acquisition costs are targeted at $350 per subscriber. Recurring EBITDA per month is targeted at $35. These per-subscriber metrics assume cost improvements over the next five years, as well as price reductions.

The overall earnings impact associated with DSL and other revenue opportunities from Project Pronto is about 6 to 8 cents dilution in 2000; less than half that amount in 2001; and net-income positive by 2002.




In summary, SBC's new broadband platform and greatly expanded broadband revenue potential give SBC the opportunity to create significant shareowner value — well in excess of $10 billion NPV. The underlying strategic and financial rationale for these initiatives is compelling. These initiatives provide SBC with superior positioning to address exploding customer demand for high bandwidth services from every perspective — time-to-market, products, capability, technology and cost structure.

**Cautionary Language Concerning Forward-Looking Statements**

Information set forth in this *Investor Briefing* contains financial and consumer demand estimates, technology assessments and other forward-looking statements that are subject to risks and uncertainties. A discussion of factors that may affect future results is contained in SBC's filings with the Securities and Exchange Commission. SBC disclaims any obligation to update or revise statements contained in this *Investor Briefing* based on new information or otherwise.

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