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

DIRECT AND REBUTTAL TESTIMONY OF JOSEPH P. RIOLO ON BEHALF OF BLUESTAR NETWORKS INC., COVAD COMMUNICATIONS COMPANY AND RHYTHMS LINKS INC.

PROPRIETARY VERSION

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I. INTRODUCTION AND SUMMARY

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

A. My name is Joseph P. Riolo. I am an independent telecommunications consultant. My business address is 102 Roosevelt Drive, East Norwich, New York 11732.

Q. Please briefly describe your qualifications and experience as they relate to this proceeding.

A. I have been an independent telecommunications consultant since 1992. As a consultant I have submitted expert testimony on matters related to telephone plant engineering in California, Delaware, Hawaii, Illinois, Iowa, Maine, Maryland, Massachusetts, New Jersey, Pennsylvania, Virginia, West Virginia, Wisconsin and the District of Columbia.

I have personally engineered all manner of outside plant including underground, aerial and buried plant in urban, suburban and rural environments. I have engineered copper and fiber plant as well as provisioned analog and digital services. I have participated in the design, development and implementation of methods and procedures relative to engineering planning, maintenance and construction. During the course of my career, I have had opportunities to place cable (both copper and fiber), splice cable (both copper and fiber), install digital loop carrier, test outside plant, and perform various installation and maintenance functions. I have prepared and awarded contracts for the procurement of materials. I have audited and performed operational reviews relative to matters of engineering, construction, assignment, and repair strategy in each company throughout the original 22 company Bell System.

I directed operations responsible for an annual construction budget of $100 million at New York Telephone Company. My responsibilities included but were not limited to engineering, construction, maintenance, assignment and customer services.

Further detail on my education, relevant work experience and qualifications can be found in my curriculum vitae, which is included as Exhibit ______ (JPR-1) to this testimony.

Q. What is the purpose of your 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 address the direct testimony and cost study presentations of all three incumbents, BellSouth Telecommunications, Inc. ("BST"), GTE Florida Incorporated ("GTE") and Sprint – Florida, Incorporated ("Sprint") in this proceeding, and to provide technical support for cost witness Terry L. Murray as well as factual information for the Commission.

Q. Please summarize the conclusions in your testimony.

A. Overall, my testimony introduces sound, engineering-based reason in contrast to the erroneous positions that BST and GTE have introduced into their cost analyses of the unbundled loops that competitors such as BlueStar, Covad and Rhythms require to provide what I will refer to as "xDSL" services, *i.e.*, services based on Digital Subscriber Line technologies. Both BST and GTE substantially inflate the costs and prices that would apply for the elements competitors require to provide xDSL services — primarily by asserting that xDSL services require a "designed" loop and other complex/exceptional support processes.

That is simply not the case. Instead, an xDSL service requires the same "basic" loop as does basic analog or voice grade exchange service — *i.e.*, either a simple all-copper pair or a fiber-fed loop with service-appropriate plug-in electronics. The incumbent local exchange carriers' ("ILECs") convoluted assumptions and cost assertions regarding xDSL-capable loops have no basis in sound engineering practices either now or in the foreseeable future. They can benefit only the ILECs' desire to dominate the emerging broadband market and to stifle competition through outrageous loop rates. Therefore, the Commission should begin by simply dismissing BST's and GTE's wrongly constructed and incorrect analyses of xDSL-related costs. Instead, the Commission should generally adopt costs and set prices for each xDSL-related rate element at the same level as the corresponding price for that element's twin — the parallel unbundled voice-grade loop element. However, as I will also discuss below, both BST and GTE have substantially overstated the cost to provision even basic unbundled voice-grade loops. Therefore, the

Commission should correct the incumbents' estimates of voice-grade loop costs before using those costs to set prices for xDSL-capable loops. I will also discuss the importance of the requirement that ILECs provide competitors with access to the information that competitors need to determine which xDSL services a given set of facilities can support. Access to information, which the ILECs should have been maintaining for years, eliminates many of the nonrecurring costs reported by the ILECs in this proceeding. Specifically, I explain that, with electronic access to the ILEC databases, competitors can qualify their own facilities thereby eliminating the need for the ILEC's to perform any qualification function. I will explain why it is reasonable for the Commission to base costs on the forward-looking presumption that the data needed to qualify loops is available to competitors electronically for the relatively minimal cost of an electronic "dip" into the ILEC databases.

Based on the foundation I have just described, I will provide a methodology for estimating a reasonable cost to provision both xDSL- and ISDN-capable unbundled loops for each of the Florida ILECs in this proceeding.

I will explain the difference between recurring cost of basic and ISDN-capable loops in a current network architecture.

I will explain in detail why nonrecurring "conditioning" charges for xDSL loops are inconsistent with current (let alone forward-looking) engineering practice. In addition I will show that, even if the Commission allows the ILECs to charge competitors nonrecurring rates for "conditioning," the ILECs' proposed costs for that activity are vastly overstated relative to the cost they would actually incur using efficient outside plant management practices.

Finally, I explain that, because splitters are *only* needed in line sharing arrangement, which are not being considered in this proceeding, the Commission should ignore BST's proposed splitter costs and prices in this proceeding.

Q. Please describe in very basic terms how DSL providers in Florida want to use the various elements being priced in this docket.

A. As required by the FCC, DSL providers like Covad, Rhythms and BlueStar will have electronic access to loop makeup information. Given nondiscriminatory access to loop data, a DSL provider can determine which, if any, of its services existing loop facilities can support, with or without "conditioning." If it finds a facility it can use, the DSL provider will reserve that loop. Such loops are identical to basic exchange service/voice grade service loops and have the same cost as those loops. Likewise, ordering such a loop is not more complicated than ordering a voice-grade loop. In some cases the DSL provider may find an older loop that can support its xDSL product once that loop is "conditioned" to comply with current engineering standards. If the DSL provider determines to use such a loop it can first order "conditioning" and then order that loop on an unbundled basis. Again, once the DSL carrier makes the determinations as to whether "conditioning" work is necessary, the underlying loop and the process to order and install it are no different from that of a basic unbundled loop, and the cost is also identical. DSL carriers are ordering the Ford Escort of loop facilities and should not be forced to pay for the Rolls Royce, inflated with unnecessary features and costs that add nothing to the essential functions of the loop.

II. ISSUE 3A: XDSL-CAPABLE LOOPS ARE LOOPS THAT CAN BE USED TO PROVIDE XDSL SERVICES. FROM AN ENGINEERING PERSPECTIVE, XDSL SERVICES USE THE SAME LOOP PLANT FACILITIES AS THE ILECS HAVE USED AND PLAN TO CONTINUE USING FOR VOICE-GRADE SERVICES.

Q. Please define the term "xDSL."

A. "DSL" is the acronym for Digital Subscriber Line. "x" is a variable, meant to encompass the various types of Digital Subscriber Line technologies and is used when referring generally to DSL. Digital Subscriber Line technologies are transmission technologies used on circuits that run between a customer's premises and the central office that provide the end-user "broadband" service capability — essentially, the ability to receive and/or transmit data at substantially higher rates than the modem-based technology on which many customers rely today. To date, most DSL services have been deployed on loops that are copper end-to-end from the central office to the customer premises. However, DSL technologies are now evolving such that DSL services may be deployed on fiber-fed loops. Such loops consist of copper facilities from the customer's premises to a mid-point equipment location, known as a remote terminal ("RT"), where signals are combined and transmitted over fiber optics from the RT to the central office. The ability to deliver xDSL services over both all-copper and fiber-fed facilities now promises to enable carriers to provide xDSL services on a nearly ubiquitous basis, thereby enabling carriers to build service volumes (and economies) in delivery of this exciting new body of services.

Q. Please describe generally the different types of xDSL technologies that are available.

A. There are a variety of DSL technologies available for use by carriers today. Some of the major categories have subsets characterized by different line coding approaches (*i.e.*, data transmission protocol or practice) or amounts of bandwidth. Major categories of xDSL include: Asymmetric Digital Subscriber Line, or ADSL; Rate Adaptive Digital Subscriber Line, or RADSL (a type of ADSL); Symmetric Digital Subscriber Line, or SDSL; High-bit-rate Digital Subscriber Line, or HDSL; Very high speed Digital Subscriber Line, or VDSL; ISDN Digital Subscriber Line, or IDSL, and G.Lite (which is a form of ADSL). Moreover, new forms of xDSL are evolving at a rapid pace.

Q. How do xDSL-capable loops differ from voice-grade loops?

A. In a forward-looking local exchange network, the facilities used to provide xDSL services are identical or nearly identical to those used to provide voice-grade services. In fact, for loops that would be provisioned entirely on copper facilities given current engineering practices, xDSL-capable loops are identical to loops used to provide voice-grade service. BST witness Milner acknowledged as much at page 6 of his direct testimony:

> Significantly, the same copper loops that are used to provide DSL services are also utilized to provide voice service to BellSouth's customers, as well as to other ALECs' customers.

At page 36 of his direct testimony, Sprint witness Dickerson agrees:

> The forward-looking network design used within BCPM to develop the 2-wire voice grade loop is also capable of supporting xDSL for those loops served on copper.

In its response to Rhythms' Interrogatory No. 81, GTE admits the same thing practically (but refuses to so state directly) when it confirms that "GTEFL utilized the ICM-developed cost of an analog loop … for an xDSL loop". (In the same response, GTE claims that its cost analysis makes no assumptions at all regarding what an xDSL-capable loop might actually be: "… no contention is made by GTEFL as to the specific designing, provisioning, maintenance, and repairing of an xDSL loop.")

Q. You stated that the facilities used to provision xDSL loops are the same as those used to provide basic voice grade loops. Does your answer vary between all-copper loops and fiber-fed loops?

A. No. If the incumbents have built their existing loop plant to comply with decades-old design standards, all-copper loops under 18,000 feet in length should be xDSL-capable today. The maximum copper loop facility length included in an analysis based on forward-looking, efficient engineering practices would be 18,000 feet. In practice, the economic crossover point between the use of copper feeder versus fiber feeder and Digital Loop Carrier ("DLC") systems is generally a loop length substantially below 18,000 feet.

At some length at or below 18,000 feet, current economic considerations and engineering practices call for the use of fiber feeder facilities and DLC systems to achieve efficiencies such as allowing concentration in the feeder portion of the loop and to extend the portion of the loop that is provided in a fully digital format closer to the end user. In this arrangement, as with all-copper loops, the copper distribution portion of the loop is identical whether the service provided is basic voice-grade analog service or an xDSL-based service. Likewise, incumbents can provision both basic exchange voice grade services and xDSL-based services using the same DLC systems and the same fiber feeder facilities. In the fiber-fed arrangement for longer loops, however, xDSL capability requires a current technology/upgraded DLC remote terminal and requires the use of a different "channel unit" or plug-in card from the voice-only channel units assumed in the incumbents' recurring cost studies for unbundled analog loops.

Q. Can incumbents physically provision xDSL-capable loops over the same existing facilities that they use to provision voice-grade loops today?

A. Yes. If the Florida ILECs have been building and maintaining their networks in a manner that meets engineering standards that have been in place for decades (and that they say they are following), they can provision xDSL-capable loops over the same facilities used to provision voice-grade loops, in most cases.

For all-copper loops up to 18,000 feet in length, competitors providing xDSL services need nothing more than a basic loop free of impediments such as load coils, excessive bridged tap, repeaters, Digital Added Main Lines ("DAMLs"), noise, or any other condition that has a deleterious effect on xDSL-based services.

I will explain in Section VII.A below why a forward-looking network should not include impairing devices such as load coils and bridged taps longer than 2,500 feet. The other impairing conditions that I just described are equally incompatible with current network design standards. Repeaters and other old local loop devices either render local loops unusable for even Plain Old Telephone Service ("POTS") service or are so obsolete that they should have been removed by ILECs when their use was no longer necessary as a part of ongoing maintenance over the last several decades. Likewise, DAMLs are placed as a temporary expedient on loops to mitigate a lack of outside plant facilities and are replaced with adequate normal outside plant facilities by ILECs as a standard aspect of facility maintenance as soon as is practical.

For loops longer than 18,000 feet, several different possibilities arise. First, if the loop is provisioned over a current fiber feeder and a DLC system, that system can support xDSL-based services with the addition of the correct channel unit, *i.e.*, plug-in card (an older DLC system might also require an upgrade). Second, if the most readily available loop is on older, all-copper facilities, the incumbent may, in limited cases, need to remove load coils that were originally required to provide voice-grade basic exchange service to enable xDSL services. The incumbents should be removing these load coils in any case as they continually upgrade their outside plant to conform with their own engineering guidelines. Third, the incumbent might employ a "pair swap" or "line-and-station transfer" to substitute an available all-copper line for a line provisioned on an older DLC system. Fourth, the competitor might opt to obtain a digital/ISDN-capable unbundled loop and provide an IDSL service. The Commission should remember, however, that the second and third options are incompatible with a network designed to forward-looking, efficient or even current standards.

In other words, these options are workarounds resulting from the fact that the ILEC might not actually have in place a network that parallels the design assumed in an analysis based on the incumbents' own recurring cost studies and current engineering guidelines. As Ms. Murray explains in her testimony, the costs associated with such workaround efforts to squeeze current functionality out of older plant investments should not be considered in addition to the forward-looking recurring cost of constructing facilities. Indeed, such plant maintenance and upgrade issues traditionally have no place in any form of nonrecurring cost analysis with which I am familiar.

In a forward-looking network design, all of the cost associated with extending xDSL capability to even the longest loops results from the investment in DLC systems and the use of the correct channel unit card for the given xDSL service. This network design for costing of xDSL services is no different from the basic costing approach that all ILECs typically use to study the cost of ISDN-capable loops (although the ILECs inflated that cost in other ways). That is the case for good reason. At its core, the ISDN loop is a DSL loop according to ANSI standard 601. Thus, providing xDSL service requires an architecture that is substantially similar to ISDN.

Q. You have just shown that xDSL services are (by design) intended to be provisioned over the same basic loops and network architecture that the ILECs have deployed for years (and continue to deploy). Are

the ILEC cost studies submitted in this proceeding consistent with that fact?

A. No. BST's cost analysis, in particular, greatly distorts the nature and requirements of xDSL service providers. BST initially defines an artificially limited set of loop types and loop transmission standards that it would impose on xDSL loops. To meet these artificial restrictions BST then constructs a plethora of special processing steps that, BST claims, add huge costs to the provision of an xDSL loop. None of these steps are useful or desirable for xDSL providers such as Blue Star, Covad and Rhythms. For example, BST adds costs to dispatch a technician to the end user premise to test the loop relative to its self-imposed standards. To coordinate that test, BST has an engineer "design" the circuit to include wiring BST remote testing access capabilities. That process breaks the normal, inexpensive, flow-through provisioning of the loops and, in turn, leads to additional recurring and nonrecurring costs to wire in that testing facility. These and other related costs are entirely unnecessary and do nothing but harm to the competitive market for xDSL services in Florida.

III. THE ILECS' ESTIMATES OF THE NONRECURRING COST TO CONNECT XDSL UNBUNDLED LOOPS AND BASIC LOOPS ARE GREATLY OVERSTATED.

Q. Should the Commission give any weight to the BST analysis of the nonrecurring cost to provision various types of unbundled loops for use to provide xDSL services?

A. No. I have reviewed the BST nonrecurring cost studies for elements such as the long and short-unbundled copper loops and the ADSL loop and concur with the assessment in Ms. Murray's testimony. BST's analysis is simply irrelevant to the work effort that would reasonably be required to provision the xDSL-capable unbundled loops that data ALECs such as BlueStar, Covad and Rhythms need. Indeed, after having reviewed the BST study and supporting materials, it is still not clear to me what BST thought it was analyzing. As noted above, xDSL loops, particularly those provided over all-copper facilities, are exactly like basic loops. Therefore, as I will explain below, the connection of an xDSL loop should involve no more than the few basic tasks that are required in order to connect a copper loop to a collocation facility in the central office. Instead of studying those activities, BST has presented a maze of irrelevant tasks. Moreover, even if they were somehow relevant, BST's study includes activities that even a moderately efficient ILEC would have mechanized and task times that are entirely unreasonable.

Q. What activities does BST include that are entirely irrelevant to the provision of xDSL-capable loops?

A. Most of the activities presented by BST are simply irrelevant. Ms. Murray's testimony identifies several general areas that BST inappropriately includes in its analysis including loop "conditioning" costs, field work costs and costs to "design" the loop. BST likewise includes inappropriate tasks within the activities reported for individual work groups such as time for coordinating the unbundled loop order with any disconnect of prior BST service, which should have been included as a cost of BST's retail service.

Q. What tasks does the BST analysis include that an efficient ILEC would not require?

A. As an example, the BST ADSL nonrecurring cost study is rife with inefficiency. Consider the reported activities for the "UNEC" work group: BST includes manual work time to "pull" the order, to "assign to work force," to "ensure accuracy of design," to "ensure dispatch." ILECs with forward-looking OSS have automated all of these activities and should not require any standard manual intervention. BST also seems to have mechanized at least some of these tasks but, amazingly, then has built in a 100% manual backup to make sure, for example, that the automated dispatch that should have been scheduled automatically was actually scheduled. I can only assume that BST is deliberately causing fallout (*i.e.*, a need for manual intervention and additional labor costs) for those activities merely because a competitor for xDSL service will use the ordered loop. Likewise, BST includes both time to manually contact customer and to manually "complete order," two tasks that should accomplish the same objective. BST's analysis is replete with such duplicative and unnecessary manual activities, which even a moderately efficient ILEC, and likely BST in its own retail operations, has fully automated.

Q. Please provide examples of unreasonable task times in the BST nonrecurring cost analysis.

A. Again, BST's analysis contains numerous examples of unreasonable task times, including several within the ADSL nonrecurring cost study and the "UNEC" work group. The most extreme is that BST's study appears to assume that this workgroup will spend *27 minutes testing for "continuity" on each of two separate occasions* — a total of 54 minutes to test continuity. A continuity test is one of the most routine, simple and rapid activities in central office operations. If required at all, it is typically done at the same time a connection is made and involves little more than clipping standard test apparatus onto the newly completed connection. This task should take substantially less than one minute and should only be done once at most. BST's reported task time is more than 54 times too high. Indeed, even the BST person responsible for the UNEC group inputs admits that the testing time should not have been duplicated in the study. [See Deposition of James Franklin Ennis, BST, July 20, 2000 at Tr. 56-59.]

Numerous other tasks are likewise substantially overstated. For example, BST reports that the "pull info" task requires 8 minutes. This task should not require any manual time at all, as information required for work on an assigned order is typically either printed or loaded into a queue in a work terminal automatically in a mechanized OSS environment. Even if, for some odd reason, a manual lookup were required, it should not take anything near 8 minutes merely to retrieve the information needed to process an order. Again, these ready-to-hand examples are not exceptions but are instead representative of the reported BST cost study result.

Q. If the Commission agrees with BST's approach of designing each individual xDSL loop, based on its (inappropriate) definitions of those loops, could the Commission rely on the BST reported costs without substantial adjustment?

A. No. As I have noted above, even if the Commission agrees with BST that it must hand design and test each xDSL unbundled loop (using unnecessary manual processes at each step), BST has vastly overstated the cost of each step. Because BST has not identified the basis for many of its study assumptions, I cannot identify each and every instance of where BST's nonrecurring cost study shows unnecessary, unsupported or inflated task times. The examples based on BST's "ADSL Loop" study set forth below clearly illustrate that BST's nonrecurring cost analysis is substantially flawed.

Analysis of BST Reported Tasks and Task Times to Install an "ADSL Loop"

Task Group 1: Service Inquiry

BST assumes that, on 52% of orders, four different groups will do 2.48 hours of "Service Inquiry" work to manually determine if an ADSL-qualified loop is available. A forward-looking analysis should instead assume that the ALEC has access to the data needed to qualify its own loops. Therefore, these tasks are unnecessary. Moreover, as Ms. Murray discusses further, the service inquiry function is also a separate element that can be requested separately by carriers if so desired. Therefore, including that function in the loop installation cost will necessarily result in forcing some carriers to pay to have the same inquiry done twice. For these reasons these costs should be entirely removed.

If for some reason they are not simply eliminated, however, the Commission will need to substantially adjust these costs. BST has not yet supplied sufficient detail concerning the basis for its reported "CRSG" and "LCSC" functions. The process described for these groups is, however, patently absurd.

The CRSG, for which BST reports more than an hour of labor (61.8 minutes) "receives firm order SI from ALEC and screens documents; CRSG prepares/sends transmittals to OSPE for verification of facility availability. Upon completion of job, CRSG informs ALEC facilities are available." This effort appears to consist entirely of reviewing the ALEC request and translating it into a different format that another work group uses and, ultimately, sending notice back to the ALEC when the Service Inquiry is done. Those are functions that a mechanized OSS does automatically. There is no reason whatsoever to have a forward-looking cost analysis assume the equivalent of a room full of monks transcribing the ALEC manuscripts by hand. (Moreover, based on BST's response to Rhythms' Request for Production of Documents 3, Attachment 1, BST appears to have erroneously used a 61.8 minute estimate for an "incremental work effort for order complications" instead of the 45 minute estimate it had developed for basic Service Inquiry processing.)

The next process step is that the LCSC "receives SI from CRSG, validates for accuracy and processes order." BST reports that this requires another 45 minutes. I have been unable to find any workpaper supplied by BST that even basically identifies specifically how the 45-minute estimate was developed. However, the last page of BST's response to Rhythms' Request for Production of Documents 3, Attachment 1, states "Manual worktimes for the LCSC … 1^{st} install … 30 (15 min to screen & 15 min to process order)." Based on that discovery, it appears that BST began by overstating its input by 50%. More importantly, this step appears to be entirely busy-work created by BSTs own manual transcription of the

ALEC's request. In other words, it is for a second room full of monks that do nothing but check the transcriptions of the first group – all before the request gets to a group that is close to the actual work effort.

Fortunately, we have some additional detail regarding the two remaining work groups becausethe subject matter expert, Michael K. Zitzmann, who supplied the task times for the Outside Plant Engineering and "SAC" group portions of the "Service Inquiry" was deposed by parties on July 20, 2000. Mr. Zitzmann revealed that his 180-minute estimated task time for those groups consists of 30 minutes for clerical processing and updating of BST's plant records, plus 150 minutes for a BST engineer to look up the facility records for the requested loop route. At 2.5 hours per loop, this means that Mr. Zitzmann has assumed that a BST engineer, working with plant records for a central office with which he is familiar, with full access to all of BST's mechanized plant records for that office and with the paper records for that office at hand, can trace *three loops per day*. Based on my experience, that estimate is substantially off base. Because he was not able to provide a detailed breakdown of how he arrived at his estimates, it is not possible to analyze exactly how Mr. Zitzmann went wrong. His deposition does, however, provide some clues. For example, Mr. Zitzmann is only marginally familiar with BST's mechanized plant databases such as LFACS because he acknowledges that 13 years ago "… when I was an engineer, LFACS was brand new." [Tr. at 100.] In fact, Mr. Zitzmann seems to have exaggerated the time required for even the most basic uses of mechanized systems. For example, Mr. Zitzmann first asserted that "[i]t takes longer than five minutes ..." just to log into LFACS. [Tr. at 44.] He later seemed to admit that the log-in process involves only two screens and a few key strokes. [Tr. at 101-104.]

Contrary to Mr. Zitzmann's exaggerated estimate, when BST has complete records, a qualified engineer or even an experienced clerical assistant would never need to leave his terminal to qualify loop facilities and might complete the job in the matter of a few minutes. In those cases in which the BST engineer must consult paper records, the process should still take an hour in a worst case scenario. As an overall average, I believe an efficient BST operation could look up the required information and forward it to a ALEC within 30 minutes.

BST's notion that this lookup will need to be done 52% of the time is also a substantial overstatement of the likelihood that an ALEC will require BST to look up a record manually. Such an effort should only be required when mechanized qualification fails, which should be no more than 10 percent of the time.

Task Group 2: Engineering

The second cluster of tasks in the BST analysis is for "engineering." The first engineering task is for the "CPG" work group, which "processes request; designs circuit and generates DLR & WORD document for CLEC and Field." This task appears to consist of two distinct time estimates for correcting fallout in the automated engineering process at two different points, which take 15 and 18 minutes respectively. BST assumes that each type of fallout will occur on 15% of all orders. [*See* BST's response to Rhythms' Request for Production of Documents 3, Attachment No. 2.] The limited supporting documentation provided to support the BST study inputs for this group suggests that the task times came from a time and motion study, which was not provided. BST's workpapers provide no clue as to how the fallout percentages in its study were developed. Hence, because BST failed to provide the source documents for either portion of its cost calculation formula, no detailed analysis is possible.

In addition to the "CPG" work, but also without support, BST assumes that the "AFIG" work group will spend 8 minutes to "assign loop facilities" as needed to correct fallout in the assignment process for an additional 30% of "ADSL loops." Overall, BST is assuming that its automated processes will fail an astounding 60% of the time on a cumulative basis.

As I have shown above, this entire engineering process is unnecessary. If, however, the Commission wishes to include it, an assumed breakdown rate of 60% (in this single, minor portion of the order process) is totally out of line with any reasonable forward-looking OSS process. I recommend that the Commission should allow no more than a few percentage fallout occurrence across the entire "engineering" activity (*e.g.*, 1 percent each for the BST's three types of fallout would be conservative). (In part, I am relying on this adjustment to the occurrence factor for "engineering" tasks to compensate for any overstatement in task times, which BST failed to explain or support.)

Task Group 3: Connect & Turn-up Test

Under the label "Connect & Turn-up Test" in its cost study BST includes work by a number of disparate groups, each of which I will address separately below.

<u>UNE Center Group</u>

BST reports 85.2 minutes for work by the "UNE Center." BST describes this function as "UNEC pulls info, assigns to work forces; verifies & ensures accuracy of design; creates cut sheets to verify reuse of facilities; ensures dispatch, performs frame continuity and due date coordination and testing; performs manual order coordination (RCF, disconnect and UL order) when service is converted on existing facilities, and contacts customer and completes order." Based on the July 20, 2000 deposition of Mr. James Franklin Ennis, the BST expert who provided the UNE Center inputs, it appears that the basic role of the UNE Center is to coordinate and perform remote testing on design loops such as BST "ADSL Loop." [Tr. at 11-14.] As noted above, I do not believe that it is necessary or appropriate for an xDSL-capable loop to be designed and specially wired to allow the ILEC remote test access. (Indeed, neither GTE nor Sprint is proposing to provide such designed loops for xDSL.)

Without such design steps and extra wiring, no remote testing would even be possible, and the UNE Center work would be eliminated.

Even if the Commission were improperly to adopt a designed "ADSL Loop" assumption for BST, the UNE Center cost for testing those loops would be overstated. As an example, the UNE Center time includes functions such as "ensures dispatch" meaning that a UNE Center employee literally checks to make sure that BST's automated systems did not fail to schedule the dispatch of a field technician to coordinate the testing process with the UNE Center. [Tr. at 21.] Such obvious redundancy should be removed from a forward-looking analysis.

The BST reported result also includes basic errors. For example, BST appears to include the time for two distinct 27-minute remote tests. Not ony is it implausible that a remote test would take 27 minutes, Mr. Ennis indicated BST's process actually performs only one test. [Tr. at 56-59.] That single error overstates BST's task times substantially. Given such loose coordination between the cost study group and the experts who supposedly validated the study inputs, there is no telling how many other such errors may have entered into BST's analysis.

The inputs that BST did accurately capture also appear to be generally overstated. For example, Mr. Ennis attempted to justify the task times that BST relied on for the "first install" of a loop by explaining that those times consider that BST may actually have to process multiple loops on the same order. [Tr. at 68-69.] Mr. Ennis seemed unaware that the

BST study is not stated on a per order basis, but adds additional time and cost for any additional loops on an order. Therefore, if the initial loop time does included bundled time for multiple loops as BST's expert asserted, the BST study times are generally and significantly overstated.

Fundamentally, a far more efficient approach would be for BST to simply have the technician test the loop manually at the time it is installed. That effort would require considerably less than the 27 minutes the UNE Center allegedly requires for each individual test. Being conservative, I would therefore allocate an additional five minutes work activity for an efficient equivalent of the UNE Center testing process.

It is not surprising that BST's estimates are so far off. Although Mr. Ennis was the subject matter expert on which BST relied to support the UNE Center cost estimates, he did not actually develop those estimates. Instead, he merely agreed to accept the cost estimates provided to him by the cost group. He had no idea from where the estimates used actually came or how they were developed. [Tr. at 50-52.]

<u>"WMC" Work Group</u>

BST reports 15 minutes for the "WMC" group to "coordinate dispatched technicians." BST failed to provide a word of explanation regarding how this time was developed or what exactly is supposed to take place for the reported 15 minutes. [*See* BST's Response to Rhythms' Request for Production of Documents 3, Attachment 3. The supporting work papers provided therein for the "WMC" show that someone signed off on the input estimates but nothing more.) BST's alleged need for yet another layer of manual coordination is contrary to efficient engineering practices using forward-looking OSS. The Commission should not allow any recovery for this group and activity until BST provides compelling justification concerning why it is necessary.

<u>CO I&M</u>

BST includes 20 minutes for 85% of loops for the CO I&M group to "wire circuit at collocation site." Based on the July 20, 2000 deposition of Mr. Daniel Eric Stinson, it appears that this is based on an assumed ten minutes to review the order and walk to the frame location, and five minutes to run each of two frame jumpers one on the main distribution frame and another to connect a BST remote test head (thereby making the loop "designed"). [Tr. at 29-30.] Other than the assumption that a second jumper is required to include a designed test point, I agree that the basic functions for this work group are required. I do not agree with the BST time estimates and present my own recommended alternative times for those functions later in this section of my testimony. If and only if the Commission approves BST's recommendation to design in a test point, I recommend that this task should take a total of 11 minutes.

The 85% assumption appears to be based on a BST note that the study "... assume[s] 15% of total are carried in other transport elements." This is not explained and does not make any obvious sense. Indeed, Mr. Stinson seemed unclear at to where or how the remaining 15% of the CO

I&M costs might be captured. [Tr. 24.] Therefore, I recommend increasing the occurrence of this work from 85% to 100% when applying the occurrence to my more reasonable time estimates.

Outside Plant or Field Work

Finally, BST assumes 115.2 minutes of outside plant or field work plus 20 minutes of travel time for *every* ADSL loop order. Ms. Murray's testimony explains that this work should not be included in a forward-looking analysis of nonrecurring costs because it is already captured in the recurring cost analysis.

Not only is this cost entirely double counted, BST's analysis again overstates task times. xDSL loops will not require a dispatch in 100% of cases under any reasonable set of assumptions. As a forward-looking assumption, the Commission should not assume that an xDSL loop will require a dispatch of outside plant technicians any more often than is required for a basic loop, which BST assumes will be required for only 20% of basic unbundled loops.

BST also appears to have substantially inflated the times for a dispatch. To begin, BST appears to have double-counted travel time by including it both in the aggregate 115.2 total minutes and again as a separate line item in the study. Therefore, I recommend that the Commission eliminate the additional separate time for travel.

BST's remaining task time estimates include:

***** BST PROPRIETARY**

1) 16 minutes for "Actual placement and/or removal of cross connection jumpers, performance of line and station transfer work, or bearing of connect through."
2) 15 minutes to "Check loop pair(s) for continuity, and/or dial tone before leaving cross connect box, LST, PXJ, RXJ, BCT location."
3) 20 minutes for "Time spent 'hooking up' test equipment and performing operational test from the network interface."
4) 19 minutes for "Technician closes out service order on CAT and/or on phone with the ICM."
5) 45 minutes for an "Attempt to resolve problems with continuity of the loop or lack of dial tone" on 30% of all lines.
6) 56 minutes of "Time spent in trouble resolution following failure test performed at the network interface" on 21% of all loops.

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All of the preceding detail comes from BST's Response to Rhythms' Request for Production of Documents 3, Attachment 9.

Each of these estimates greatly exaggerates the time required, on average, for a qualified technician to perform the required task. Some of the individual tasks, in the sequence from items 1 through 4 above, such as item 1, can be accomplished in a minute or less. Considering the entire series of tasks in sequence (including setup time), I estimate that it might take an average of 25 minutes in total.

Likewise, the cumulative *** **BST PROPRIETARY** 51% **END PROPRIETARY** *** presumed error rate reflected in items 5 and 6 is completely inconsistent with the performance level I would expect. Even being extremely conservative and retaining BST's task times, I recommend allowing BST to include only a maximum of a 5% occurrence for each type of error.

Q. Please summarize the findings you have just presented.

A. The following table compares the BST reported times by function with the times I believe are appropriate for either a forward-looking cost study of a basic loop, including an xDSL loop, or a realistic study of a designed loop process.

Group / Function	**BST Reported Time**	**Realistic Time Assuming a Forward-Looking Process with No Design**	**Realistic Time Assuming BST's Engineered/ Designed Loop Process**

Group 1: Service Inquiry	286.8 minutes on 52% of orders	0 minutes (Should be mechanized and is part of another element.)	30 minutes on 10% of orders.
Group 2: Engineering	15 minutes on 15% of orders 18 minutes on 15% of orders 8 minutes on 30% of orders	0 (ADSL loops should not be designed)	15 minutes on 1% of orders 18 minutes on 1% of orders 8 minutes on 1% of orders.
Group 3: UNEC	85.2 minutes for multiple tasks at various occurrences	0 (remote testing is not required or possible on a non designed loop)	5 minutes additional time for a test at the frame in central office at installation.

Group 3: WMC	15 minutes per loop	0 (not required for a basic loop)	0 (BST has not provide even a basic explanation of what this element is for)
Group 3: CO I&M	20 minutes on 85% of loops	8 minutes for 100% of loops	11 minutes for 100% of loops
Group 3: SSI&M (Outside plant)	90 minutes for multiple tasks at various occurrences	0 (this activity is a recurring cost in a forward-looking analysis)	50 minutes total time for 20% of loops (including 5% additional error correction time)
Total Cost	$ 281.61	$ 4.67	$ 20.52

Q. Are the tasks you just discussed and your comments about those tasks relevent to other BST proposed nonrecurring costs?

A. Yes. The problems with BST's nonrecurring analysis for installing an "ADSL loop" generally apply to all of the varieties of xDSL-related unbundled loop that BST reports and to the disconnect times associated with those elements as well.

Also, my criticism of the "Service Inquiry" functions should be applied to BST's costs for a manual Service Inquiry as a standalone element because BST uses the same work groups and tasks for that analysis. Therefore, a reasonable estimate of the time required for a manual service inquiry (*i.e.*, a request for loop makeup information) would be ***** BST PROPRIETARY** $ 16.31 (30 minutes multiplied by the $32.62 "SAC" group labor rate) if ordered as a distinct element or $1.63 if bundled into the "ADSL Loop" provisioning nonrecurring cost with a 10 percent occurrence following BST's methodology. **END PROPRIETARY ***** DECLASSIFIED

Q. If the Commission rejects BST's unnecessary "designed loop" assumptions for xDSL, what activities and task times should be included in a nonrecurring cost analysis?

A. Costs for access to loop makeup information and/or "conditioning," which may or may not be required for any given loop, if determined to be appropriate at all by the Commission, should be recovered as part of a charge specific to those activities. Therefore, the only activities relevant to processing an order to connect an individual loop are: 1) processing and reviewing the ALEC service order; 2) placing the required jumper to connect the loop appearance in the central office to the (prewired) collocation cross-connection; and 3) reporting back to the OSS that the work is completed. These are the same steps required for a basic unbundled loop; there is no reason whatsoever that the nonrecurring work times or costs for all-copper xDSL loops should be different than for a basic, non-designed loop. However, the Commission should not apply the work times that BST has reported for a basic loop, at least not without making significant adjustments to these times, because BST has also overstated the work efforts and times required to connect basic unbundled loops.

Q. Typically how long should it take to process and review the ALEC service order?

A. Jumper work is typically done in batches at specific times of the day. Normally, a technician does not go to a terminal to pull each individual order. Instead, a printout of all of the assigned orders for the day is generated automatically for the technician and is waiting at the designated time. In the worst case, an efficient technician will go to a terminal and pull records for a number of orders at once. The analysis required for each order is likewise negligible. An order that requires running a jumper is the most common task for a central office frame technician. Moreover, a technician who has been assigned to a given office for more than a few weeks knows with significant precision where the "from" and "to" points for an order are located on the frame with little more than a glance at the order. Therefore, on average, I estimate that it would take no more than 2.5 minutes to pull and analyze a work order to connect an xDSL-capable loop.

Q. How long should it take to actually place the jumper connection?

A. Placing a jumper to connect the loop appearance to the appearance of a cross connection to collocation should take no more than a few minutes, even allowing for walking time. Again, a technician will know the frame well and the process of attaching a jumper to the frame is so routine as to be almost automatic. In some percentage of cases, however, the technician will need to travel to an office location that is normally "unstaffed" to perform the specific jumper work. Therefore, some travel time may also be required in order to complete this task. If the ILEC is operating efficiently, however, even that travel time will be minimal on a per-line basis. Travel time as a function of lines should be small, both because most lines will be located in staffed offices and because, when work in a non-staffed office is required, it can typically be coordinated to occur in batches. Based on the assumption that 80% of loops are in staffed locations and four loops are grouped into a batch (on average) before a technician is dispatched, travel time would only be assigned to each loop with a 5% occurrence. Based on the further assumption that a non-staffed office is typically 20 minutes from a dispatch location, then each loop would only be assigned one minute of travel time. Based on my personal experiences, I believe these are reasonable assumptions.

Q. How long should it take to close an order?

A. Closing an order should take less time than it took to originally "pull" and analyze because no analysis is required. Instead, the technician is merely checking off into the automated system that the requested work has been completed. Again, an efficient technician will do this activity in a batch mode once numerous assigned jumpers have been placed. I estimate that, on average, it should take about 1.5 minutes to report work complete for each line on an order.

Q. Wouldn't processing the order itself also involve some additional cost?

A. Only in very limited cases. Typically, ILECs' OSS are fully capable of managing the flow of a basic order, which should include the cross connection of a loop regardless of the intended use for that loop, in a fully automated mode. Therefore, the only manual task time required to process an order for an unbundled loop would be to manually sort out problems for the small percentage of cases in which the automated OSS cannot identify facilities and assign the work correctly. Given that the ILEC in question should have decent up-front order edits in place and have maintained reasonably accurate database records, the percentage of such fallout should be very low. I estimate that it should be around 2% in an analysis of efficient, forward-looking costs. It might take about 15 minutes, on average, to review, analyze and resolve such problems. Given this assumption the correction of errors in the ordering process would legitimately take an additional 0.3 minutes on a per-line basis.

Q. Is the activity required to eventually disconnect an xDSL-capable (or other basic) loop roughly the same as the time you just reviewed for connecting the loop?

A. Yes. The only difference is that the actual jumper or connection work would take somewhat less time because it is faster to pull a jumper off of a frame connection than to make a new connection.

Q. Please summarize the steps and times that should be included in the nonrecurring cost to connect an ordered basic or xDSL-capable loop.

A. The following tables provide a sound estimate of the tasks and work times required to provision a basic copper loop (for use to provide basic exchange analog service or an xDSL service).

Tasks, Times and Costs Required to Efficiently Connect an Unbundled Loop			
Task	Minutes	Occurrence	Minutes per Line
Obtain and Review Order	2.5	100%	2.5
Travel to Remote Office	20	5%	1
Place Jumper	3	100%	3
Report Work Complete	1.5	100%	1.5
Total Minutes Per Line			8
Estimated (Proxy) Labor Rate			$ 40.00
Total Cost			$ 5.33

As the preceding table indicates, if one assumes for the sake of illustration that the Commission adopts a forward-looking average labor rate of about $40 for the related work groups for any given ILEC, then the total cost to connect an unbundled xDSL loop should be about $5.33. The price should be about $5.33 plus any adopted common cost markup. As shown in the following table, the costs and rates for a disconnect would be very similar.

Tasks, Times and Costs Required to Efficiently Disconnect an Unbundled Loop			
Task	Minutes	Occurrence	Minutes per Line
Obtain and Review Order	2.5	100%	2.5
Travel to Remote Office	20	5%	1
Remove Jumper	2	100%	2
Report Work Complete	1.5	100%	1.5
Total Minutes Per Line			7
Estimated (Proxy) Labor Rate			$ 40.00
Total Cost			$ 4.67

Significantly, the process of connecting jumpers in a frame within a central office is a highly consistent task across ILECs. Therefore, aside from minor variations caused by differences in labor rates, I would not expect the result presented in the preceding tables to vary across ILECs.

Q. Is BST's analysis of the time and tasks required to install an unbundled ISDN loop more reliable?

A. No. Again, BST seems to have studied the wrong element. For all-copper loops, an ISDN loop is identical to any other copper loop and BST merely needs to place the jumper from the cable appearance on the central office Main Distribution Frame (from the end user) to the hardwired cable appearance to the ALEC's collocation space (that is located on a terminal block on the Main Distribution Frame).

For loops provisioned on fiber-fed DLC systems, an ISDN loop must be connected to an appropriate line card in the DLC. For the first line in a RT, this process would entail placing an ISDN line card at the RT that would establish the feeder portion of the circuit and subsequently, placing a cross-connect jumper at the adjacent FDI from the appearance of this feeder pair to the distribution copper cable pair that serves the end user. Because the ISDN line card can accommodate 4 ISDN lines, the subsequent 3 lines of ISDN service would merely require the placement of a cross-connect jumper at the FDI for subsequent orders.

Using the estimated $40 labor rate and GTE's 45.5% of fiber-fed loops the following tables provide a reasonable estimate of the cost to install an unbundled ISDN-capable loop. The first table develops the cost for installing those ISDN-capable loops that are provisioned over all copper facilities.

Tasks, Times and Costs Required to Efficiently Connect an All-

Copper Unbundled ISDN-Capable Loop			
Task	Minutes	Occurrence	Minutes per Line
Obtain and Review Order	2.5	100%	2.5
Travel to Remote Office	20.0	5%	1.0
Place Jumper	3.0	100%	3.0
Report Work Complete	1.5	100%	1.5
Total Minutes Per Line			8.0
Estimated Labor Rate			$40.00
Subtotal			$5.33
% All Copper Loops			54.5%
Weighted Cost of All-Copper Loops			$ 2.90

The second table provides the costs for provisioning a fiber-fed ISDN-capable unbundled loop.

Tasks, Times and Costs Required to Efficiently Connect a Fiber-Fed ISDN-Capable Unbundled Loop			
Tasks	Minutes	Occurrence	Minutes Per Line
Obtain and Review Order	2.5	100%	2.50
Travel to RT/FDI	20.0	100%	20.00

Set Up Work Area	5.0	50%	2.50
Place Line Card @ RT	3.0	25%	.75
Place Jumper @ FDI	3.0	100%	3.00
Tear Down Setup	5.0	50%	2.50
Report Work Complete	1.5	100%	1.50
Total Minutes Per Line			32.75
Estimated Labor Rate			$40.00
Subtotal			$21.83
% Fiber-Fed Loops			45.5%
Weighted Cost of All-Copper Loops			$ 9.93

The total cost is $12.83 ($2.90 + $9.93). To develop ILEC-specific costs for any ILEC one can modify the tables to include the ILEC-specific labor rate, the ILEC-specific forward-looking percentage of fiber-fed loops and any Commission-approved common cost markup.

Q. Is the cost to disconnect the same?

A. No. Because the ILEC will not need to remove the line card each time an unbundled ISDN-capable loop is disconnected, the cost to disconnect is less. The following table provides the costs to disconnect a ISDN-capable unbundled loop.

Tasks, Times and Costs Required to Efficiently Disconnect an All-Copper Unbundled ISDN-Capable Loop

Task	Minutes	Occurrence	Minutes per Line
Obtain and Review Order	2.5	100%	2.5
Travel to Remote Office	20.0	5%	1.0
Remove Jumper	2.0	100%	2.0
Report Work Complete	1.5	100%	1.5
Total Minutes Per Line			7.0
Estimated Labor Rate			$40.00
Subtotal			$ 4.67
% All Copper Loops			54.5%
Weighted Cost of All-Copper Loops			$ 2.55

The second table provides the costs for disconnecting a fiber-fed ISDN-capable unbundled loop.

Tasks, Times and Costs Required to Efficiently Disconnect a Fiber-Fed ISDN-Capable Unbundled Loop			
Tasks	Minutes	Occurrence	Minutes Per Line
Obtain and Review Order	2.5	100%	2.50
Travel to RT/FDI	20.0	12.5%	2.50
Remove Line Card	3.0	25%	.75

Report Work Complete	1.5	100%	1.50
Total Minutes Per Line			7.25
Estimated Labor Rate			$40.00
Subtotal			$4.83
% Fiber-Fed Loops			45.5%
Weighted Cost of All-Copper Loops			$ 2.20

The travel time for disconnection considers that the card will only need to be removed when all ISDN lines at the RT have been disconnected, roughly 25% of the time. It further assumes that the ILEC will only trigger the dispatch to remove the card when at least one other job is planned at the RT. Hence, the overall occurrence of the cost is 12.5% or 25% of 50%. The total cost to disconnect an unbundled ISDN-capable loop is approximately $4.75 ($2.55 + $2.20). Again, to develop ILEC-specific costs for any ILEC one can modify the tables to include the ILEC-specific labor rate, the ILEC-specific forward-looking percentage of fiber-fed loops and any Commission-approved common cost markup.

IV. THE COMMISSION SHOULD REQUIRE THE ILECS TO PROVIDE COMPETITORS WITH ACCESS TO LOOP MAKEUP INFORMATION AT A PRICE THAT REFLECTS THE COST THE ILECS WOULD INCUR IF THAT INFORMATION WERE AVAILABLE, IN ALL CASES, THROUGH THE ILECS' MECHANIZED SYSTEMS.

Q. In the previous section of your testimony, you provided a restated estimate of the cost for an ILEC to manually provide information to a ALEC regarding the loop makeup, so that ALECs can qualify loops for their xDSL services. Did you intend to suggest that ILECs should be authorized to charge ALECs for that manual activity?

A. No. In the preceding section I restated the cost of BST's manual "Service Inquiry" assuming reasonable processes and task times. As I hope was clear, however, I did not intend to endorse BST's approach. This section of my testimony will address the proper approach to developing costs for loop data in a forward-looking analysis.

Q. What information does a competitor require to determine the suitability of a loop for provisioning xDSL-based services?

A. To determine the qualification of a loop for xDSL-based services, it is necessary to determine the type of facility (*i.e.*, copper end-to-end or an amalgam of fiber/copper/electronics). Additionally, the ALEC must know the characteristics of the facility, including the length, gauge and capacitance and the presence or absence of any impediments (*e.g.*, load coils, amount of bridged tap, repeaters) and interferers (*e.g.*, AMI T-1). The determination of suitability of a loop for provisioning DSL-based services based on this "loop makeup" information is very specific to the DSL technology and equipment that a particular carrier deploys.

Q. Where do the ILECs keep an inventory of this loop characteristic information?

A. The ILECs keep the inventory of the aforementioned loop makeup information in mechanized database systems. For example, BST keeps such information in the Loop Facilities Assignment and Control System ("LFACS") database, as well as the MapViewer system, which provides a mechanized version of older paper plant record, and possibly other databases. [BST's Response to Rhythms' Interrogatory 34.] GTE apparently stores loop information in several databases, including the Integrated Computer Graphics System ("ICGS") and the Assignment Activation Information System ("AAIS"). [GTE's Response to Rhythms Interrogatories 8-10.]

Q. How should competitors obtain the necessary loop makeup information from the ILECs?

A. The most straightforward solution would be direct limited electronic access to these databases.

Q. Should the information that competitors require be ubiquitously available in the ILECs' mechanized systems?

A. Yes, with rare exceptions. It should be possible to access data regarding the majority of loops from existing legacy systems such as LFACS; there should be no need to develop new loop makeup databases or update existing databases. In some cases, a subset of the data required to enable a ALEC to do its own loop qualification may not be present.

The ILECs installed loop inventory management databases such as LFACS, in different forms, over 20 years ago. Since these databases are used by the ILECs for loop assignment purposes, they contain some loop makeup information on each and every loop. Although the ILECs did not fully populate these databases with all the categories of loop makeup data at their inception, it has long been standard within the industry that all plant changes should be input to the databases on a going forward basis. The loop makeup of all existing plant was to be entered into the database any time the plant was altered. Given the frequency of plant additions, changes, rearrangements, and removals over the past 20+ years, I would have expected that the necessary loop makeup data for virtually all of the ILECs' plant would now reside in the relevant databases. Of course, this would have required the ILECs to consistently follow their own guidelines that require these databases to be updated with each plant addition, change, rearrangement or removal.

To the extent that information needed for loop qualification resides only in an ILEC's "plats" (which are paper plant records), rather than in electronic databases, it reflects the ILEC's internal failure to populate its databases as it should have given the upgrades that Florida ratepayers have been funding for years. Moreover, many, if not all, incumbents have been developing electronic access to the formerly paper-only plat records such as BST's MapViewer system, which BST has already deployed in Florida. [*See* Deposition of Michael K. Zitzmann, July 20, 2000 Tr. at 26.] GTE, too, states that "[n]o data used for loop qualification is regularly stored on paper records." [GTE's Response to Rhythms' Interrogatory 8.]

Q. Does the loop makeup information missing from these mechanized systems exist elsewhere?

A. Yes. The information required for loop qualification also resides in the outside plant location records and work prints. BST, for example, proposes to charge competitors for manual loop qualification whenever BST must resort to these outside plant location records and work prints to obtain the loop makeup information that would otherwise be available through databases such as LFACS.

Q. What are your recommendations concerning access to loop makeup information?

A. I urge the Commission to find that ALECs should have electronic access to the relevant databases for the purpose of qualifying loops for xDSL-based services. Ms. Murray explains that such a ruling would be consistent with FCC requirements that ALECs have access to back office operation support systems ("OSS") that ILECs have. Direct access to the databases is the efficient means to allow competitors to qualify loops and it is also the only means to ensure that competitors and the ILEC have parity in terms of their ability to assess which advanced services they can offer to end user customers. Moreover, the ILEC should provide any loop makeup data not found in those databases based on research of its outside plant location records. In those cases where the cable plant found in the OSP location records was installed/rearranged after the inception of LFACS or other relevant databases, the ILECs should provide the loop makeup information to the ALEC at the same price as that provided via the mechanized system. To do otherwise would penalize ALECs and reward the ILECs for failing to follow their own established record-keeping guidelines.

Q. Is it practical for the ILECs to provide access to their databases with loop makeup information?

A. Yes. It is entirely feasible for the ILECs to provide a direct read-only access to LFACS and similar databases. ILEC field operations personnel have been able to obtain such access for years. Moreover, while I am not a lawyer, providing competitors with such access would appear to fall within the FCC's non-discrimination requirements because the ILECs' own technicians have such access. Thus, a forward-looking cost study for ALEC access to loop makeup information should assume that the competitor has such nondiscriminatory access to databases providing information relevant to loop makeup. Given that access, there is no activity associated with loop qualification that a competitor's own personnel could not perform on its own behalf to qualify loops for xDSL services. An analysis that assumes BST will impose additional costs on competitors to "qualify" loops on the competitors' behalf therefore assumes that the ILEC will not comply with FCC requirements and will not provide nondiscriminatory access to its OSS and related databases. [47 C.F.R. § 51.313(c).]

Moreover, I understand that GTE already provides some type of electronic access to loop makeup information and that BST is currently developing an interface to provide such access. (In her testimony, Ms. Murray discusses the appropriateness of the charges that BST proposes to collect for this service.)

Q. Does the mechanized access to loop make-up information provided by GTE and proposed by BST allow competitors sufficient access to relevant information?

A. Possibly. For example, if BST's representations regarding its long-awaited system for electronic access to loop makeup information are accurate, then it appears likely that it will provide sufficient information.

[*See*, *e.g.*, BST's Response to GPSC Workshop Requests 10; this Response is attached hereto as Exhibit ____ (JPR-2).] To the extent, however, that the incumbents' interfaces interpret, exclude or restrict access to available data, they will not constitute acceptable access to the appropriate access to loop qualification data. Competitors' engineers need to have access to the detailed information available in LFACs and other relevant databases.

Q. In case electronic access to existing data in the ILEC's database is not sufficient, how should a forward-looking analysis cost out the effort for the ILEC to manually look up the missing information?

A. Even if a manual lookup is needed, the cost should be based on a forward-looking charge for an electronic "dip" into the ILEC's database. An incumbent's failure to keep its databases up-to-date or automate other records is not the fault of a competitor ordering a DSL-capable loop. Nor should the competitor be held responsible for an incumbent's cost to update its databases. More important, Florida consumers should not be charged twice for the system: once over the years in basic rates for telephone service and now, again, when those Florida consumers seek advanced services relying on the data embedded in those legacy systems. Therefore, to the extent that a competitor requires loop makeup information that would normally reside within a database such as LFACS, but that an incumbent has failed to enter into that database, the Commission should require the incumbent to provide the information through whatever means necessary including review of the company's and paper loop plant records ("plats"). The efficient means of providing the same information would be a database "dip" into the relevant database. Therefore, the price to the competitor for this function should not exceed the incremental cost of the processor time associated with such a dip.

V. THE ILECS HAVE INCORRECTLY MODELED ISDN LOOP COSTS.

Q. What is Integrated Services Digital Network ("ISDN")?

A. The standard ISDN – Basic Rate Interface provides up to 144 Kb/s of throughput in each direction for two "B" channels of 64 Kb/s each and one "D" channel of 16 Kb/s. The "B" channels contain the message information (voice and data).

Q. What are the copper cable characteristics that support ISDN service?

A. ISDN can be provisioned on "clean" copper loops up to 18,000 feet without enhancing equipment. This technology is not tolerant of load coils, but may operate with some bridged tap dependent upon amount and location. The loss limit is generally 42DB @ 40 KHz. Thus, from a loop perspective, ISDN uses a basic two-wire non-loaded analog loop. In other words, an "ISDN loop" is, for all-copper loops under 18,000 feet, entirely indistinguishable from a "basic" loop and should have the identical cost.

Q. Can ISDN technology operate on fiber-fed digital loop carrier systems?

A. Yes. ISDN has been available over DLC systems for many years. In a forward-looking cost analysis, therefore, all ISDN loops longer than 18,000 are modeled with fiber feeder and DLC electronics. For these longer loops the cost to provide ISDN is not identical to the cost of a "basic" or voice grade loop. On DLC systems, ISDN loops must be equipped with a suitable plug-in channel card (either a BRIU or BRIU2) at the remote terminal. Because the plug-in required for ISDN is more expensive than the plug-in required to support basic voice grade service, longer ISDN loops cost somewhat more than comparable basic voice service loops.

Q. When provisioned over longer loops on current DLC systems, does ISDN cause any other incremental cost relative to basic voice grade service other than the differential in the cost of the respective line cards?

A. No. ISDN does not use a fatter light pulse than POTS service and, therefore, does not require bigger (or more) fiber cable, take up more conduit space, *etc.* Moreover, ISDN channels may be concentrated similar to POTS lines. Given the array of DLC sizes and types assumed in the ILECs' studies, they would not incur any additional cost for electronics in the remote terminal or at the central office, other than for the incremental cost difference between the ISDN and POTS plug in cards at the remote terminal. This is true over any reasonable projection of average demand for ISDN service. To the extent that ILECs further inflate ISDN costs based on the presumption that they will somehow incur additional central office costs (such as line cards at the central office) to provide ISDN/IDSL-capable loops, that presumption has no basis in fact.

Q. Do BST's loop directives support your statement that the only cost differential between ISDN/IDSL and POTS lines is the cost of the channel cards when provisioned over fiber/DLC?

A. Yes. BST "Loop Technology Deployment Directives" [RL: 98-09-019BT, December 8, 1998] clearly indicate that ISDN is not so different from POTS:

***** BST PROPRIETARY**

> ISDN can be treated in a POTS-like manner when served via NGDLC systems using the large TR-303 interface. [Exec. Sum. Pg. 1.]
>
> 3.02 TR-303 has been approved for the RELTEC NGDLC/FITL systems with both the 5ESS and DMS-100. TR-303 has also been approved for the Alcatel/DSC NGDLC systems with the 5ESS and approval is pending with the DMS-100. The deployment of large platform TR-303 interfaces supporting widely deployed NGDLC systems will allow ISDN to be provisioned in a more POTS-like manner and will eliminate virtually all unique

> facilities required to serve ISDN for new system placements. ... [Page I1.]
>
> Once the TR-303 system is established, the economics of providing ISDN over digital loop carrier or metallic based facilities is much the same as that for POTS. [Page I2.]

END PROPRIETARY **

Q. How should the ILECs calculate recurring charges for ISDN/IDSL loops?

A. I agree with Ms. Murray that recurring charges for ISDN/IDSL loops should be set at the recurring charge for basic loops, plus an increment to account for the higher cost of an ISDN card at the RT as compared to a POTS card, weighted by the percentage of fiber feeder in the forward-looking network.

Q. Is it necessary for an ISDN-capable loop to be "designed" or engineered?

A. No. As I explained above, ISDN can be provided over standard loop facilities. ILECs have provisioned ISDN as a standard, non-designed and non-engineered service for years.

<u>VI. ISSUE 3B: THERE IS NO VALID ENGINEERING BASIS FOR A COST STUDY FOR XDSL-CAPABLE LOOPS TO MAKE</u>

<u>DISTINCTIONS BASED ON LOOP LENGTH AND/OR THE PARTICULAR DSL TECHNOLOGY TO BE DEPLOYED.</u>

Q. Have the incumbents in this proceeding proposed any limitations on loops used to provide xDSL services?

A. Yes. All three incumbents have indicated that they will provide an xDSL-capable loop over a "clean copper loop" (that is, an all-copper loop that is free of load coils, excessive bridged tap and other potential DSL inhibitors). In addition, BST has proposed a number of distinctions based on service type and loop length.

Q. Must xDSL-based services be provided over all-copper loops?

A. No. The predominant method for provisioning DSL-based services today is to use a "clean copper loop." However, as I explained above, forward-looking DLC equipment allows carriers to provide DSL-based services over fiber/DLC loops in the same manner as ISDN is provided over those facilities. With a suitable array of line cards, these DLCs can accommodate voice, ISDN, and a wide variety of DSL-based services such as ADSL, HDSL and SDSL. Such DLCs are currently being deployed across the country. Indeed, at least one major ILEC, SBC, has determined that it can actually reduce its costs by substantially accelerating the actual deployment of forward-looking DLC specifically in a manner that supports xDSL-based services. SBC has announced that its "Project Pronto" initiative, which is designed to extend the reach of xDSL services and other broadband services to the substantial majority of SBC end users using currently available DLC technology, will produce that benefit by delivering "annual cost structure improvements ... targeted to reach $1.5 billion by 2004 ... with network improvements paying for themselves on an NPV basis." [*See* SBC Investor Briefing No. 211, SBC Announces Sweeping Broadband Initiative, October 18, 1999, at 10, attached as Exhibit ______ (TLM-3) to Ms. Murray's testimony.]

Q. Do the Florida ILECs intend to provide their own broadband services and unbundled loops over fiber/DLC systems?

A. Yes. Sprint witness Mr. McMahon, for example, notes at page 17 of his direct testimony, when discussing xDSL, that "[i]n the near future, this technology will also be available via NGDLCs in Sprint's local networks." BST admits that it is currently testing DLC systems for this purpose and that they will be available in the near future. [BST's Response to Rhythms' Interrogatories 78-81.] BST's "Loop Technology Deployment Directives" [RL: 98-09-019BT, December 8, 1998] provide a great deal of evidence that BST has in fact steadily been moving in this direction since at least 1998, if not longer. Indeed, in its loop directives, BellSouth stated:

> ***BEGIN BST PROPRIETARY** Recent approvals of projects to replace existing feeder and distribution facilities in Atlanta and South Florida with a fiber distribution network to deliver integrated voice and

> broadband services (known as IFITL) have accentuated the importance of the fiber distribution deployment strategy.

[Loop Technology Deployment Directives, Introduction, Page 2.]

The Loop Technology Deployment Directives also state that all BST feeder placement should use fiber facilities [Executive Summary, Page 1] and that BST has limited all new DLC deployment to systems known to be ready to support broadband service and to be GR-303 compliant. [Page 2 and Major Issues, Page 2.] BST anticipates that this requirement will produce "significant savings in both the switch and loop portions of the network." [Major Issues, Page 2.] According to BST:

> Next Generation Digital Loop Carrier (NGDLC) is the first choice vehicle for all new narrowband facility placements. These systems support both metallic and fiber distribution systems and are an integral part of the emerging broadband/narrowband strategies.

[Loop Technology Deployment Directives, Executive Summary, Page 1.]

This key BST directive further states as follows:

> Minimize investments in metallic cable, conventional DLC systems, and associated equipment; maximize investments in NGDLC/FITL in anticipation of integrated broadband/narrowband systems.

[*Id.*, Executive Summary, Page 2] and

> Dedicated special service capacity should be established in each NGDLC node to allow grooming of special services *and unbundled loops* at the RT via electronic cross-connects.

[*Id.*, Executive Summary, Page 3, emphasis added.]

BST's ADSL Planning Directives [BST's Response to AT&T's Request for Propduction of Documents 62, ADSL Planning Directives, RL:00-01-021BT, September 14, 2000 "ADSL Planning Directives"] further demonstrate that BST has been and is continuing to advance its DSL deployment plans over loops that traverse fiber-fed loops.

> ADSL capabilities will need to be deployed in the near term at thousands of digital loop carrier sites. The rapid ADSL deployment that will be required over the next few years to meet high speed data demand *and competition* is a very important step for our [BellSouth's] company. The use of these directives will permit you to optimize the design of our high-speed network.

[ADSL Planning Directives, transmittal letter (emphasis added).]

These directives go on to state that BST will "[u]se new ADSL capabilities in both Alcatel and Marconi NGDLC systems beginning in the third quarter of 2001." [Id., at 2.]

NGDLC ADSL Capabilities

> Both Alcatel Litespan® and Marconi DISC*S® NGDLC systems will have ADSL channel units in the future. It is expected that

these alternatives will be tested, approved, and fully documented by mid year 2001. This should include all operations systems interfaces required for service activation and service assurance. Therefore, Remote DSLAMs or Mini-RAMs should not be needed for sites serviced by NGDLC after mid 2001. Furthermore, for NGDLC sites to be equipped for ADSL between now and mid 2001, ADSL remotes should be limited to mini-RAMs if the ADSL demand through mid 2001 can be met by 16-32 lines of Mini-RAM capacity. This will permit us [BellSouth] to move the ADSL lines to the NGDLC platform in 2001 and avoid large startup costs for remote DSLAM cabinets now.

[Id., at13.]

Thus, it is apparent that even BST agrees that it will be implementing xDSL over fiber-fed loops within one year. In establishing loop rates in this proceeding based on forward-looking design principles, it is essential that the Commission establish rates based on the ILECs' forward-looking NGDLC, DSL-over-fiber-capable networks and capture the increased efficiency that can be expected as a result of the related plant improvements. This is needed to insure that competitors will have an equal ability to use the ILECs' available capability in the same manner and timeframe as the incumbents. **END PROPRIETARY*** ** Any other determination will inevitably harm the competitive market for xDSL services.

Q. Using two-wire loop options as an illustration, please describe the distinctions that BST's cost study makes among xDSL-capable loops based on loop length and/or the particular DSL technology to be deployed.

A. BST has proposed separate prices for the following DSL elements (in addition to ISDN), all of which it asserts will be provisioned only over "dry" copper:

- ADSL Compatible Loop (Element A.6.1) – up to 18,000 feet (inclusive of bridged tap);
- 2-wire HDSL Compatible Loop (Element A.7.1) – up to 12,000 feet;
- 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.

Q. Are the distinctions that BST is attempting to impose on loops used for xDSL-based services appropriate?

A. No. As Ms. Murray will discuss from an economic perspective, the first problem with BST's approach is that it misleads BST into modeling different networks for different services. For example, BST apparently seeks to convince this Commission that it should set rates for voice-grade loops based on an entirely separate network architecture than it uses to set rates for DSL-capable loops. Such a presumption cannot be true in any rational analysis — be it the existing, historical network or a forward-looking cost analysis. That approach simply fails to reflect realistic, efficient engineering practices and, as I have discussed above, is entirely unnecessary.

Moreover, if there was ever a legitimate reason for segregating xDSL loop costs into the many categories that BST proposes, it would have been the minor process differences in the manner in which BST qualified each loop. Those differences were, however, merely an artifact of BST's monopoly control of the data needed to qualify loops. As soon as BST makes loop makeup data available directly to ALECs, any such distinction is irrelevant because ALECs can determine if they wish to take a given facility as is or to order "conditioning" (discussed below) and then take the "conditioned" loop as is. The array of BST definitions thereby becomes nothing other than a means by which BST can control who can market what types of advanced services over its unbundled loops. For example, BST's proposed ADSL- and HDSL-specific loop elements effectively impose artificial limits on the services that carriers can provide over specific facilities to specific customers. These artificial limits appear likely to constrain other carriers from offering advanced service options that BST is itself not yet prepared to market. Yet, an all-copper loop is the same whether it is used for ADSL, HDSL or any other (2-wire) xDSL-type, or a voice service for that matter.

Q. Does the all-copper network BST models for xDSL-capable loops make sense?

A. No. It does not represent BST's actual network, in which 42.4% of the loops are provisioned with fiber/DLC. [BST's Response to Rhythms' Interrogatory 83.] Nor would anyone build such a network today, a fact that not even BST would dispute. [*See* Loop Technology Deployment Directives; ADSL Planning Directives.] Therefore, it does not resemble any network BST plans to build in the future. The most economic network design available for some time involves the use of fiber/DLC for fiber-based loops. For example, Mr. Milner explains that BST's cost study used fiber feeder facilities rather than copper for loops longer than 12,000, because it is "the most economic architecture." [BST, Milner Direct, at 22.] He goes on to explain that:

> in actual network design, voice grade services are mixed with demand for other types of service such as DS-1 and higher bandwidth services. In selecting the infrastructure design for a network to meet all of these demands, new copper cable is rarely the facility of choice for the feeder network. Instead, fiber cable with fiber optic multiplexers and NGDLC are used to meet the combined demand on the cable route.

[BST, Milner Direct, at 23.] Further, as I showed above, BST's own internal loop deployment guidelines require the use of fiber NGDLC in current and future network design. [*See* Loop Technology Deployment Directives; ADSL Planning Directives.]

BST has no plans to deploy an all-copper network today. Rather, BST has created an imaginary, hypothetical, network scenario that would not be useful for the very broadband services that it is attempting to study and does not reflect its own practices.

Q. BST also develops DSL-capable (and ISDN-capable) loop costs as if those services requires a "designed" loop. Should an xDSL-capable loop be treated as a designed service?

A. No. BST should have modeled xDSL- and ISDN-capable loops in the same manner that it modeled basic analog loops (*i.e.*, Service Level or "SL" 1). xDSL- and ISDN-capable loops do not need to be designed and do not require special test points, *etc*. Any claim to the contrary is merely an excuse to overbuild and/or inflate costs. Each unnecessary step in the provisioning process, such as bringing an engineer into the process to "design" the circuit in some manner, disrupts the automated, practically $0 cost flow-through capability of mechanized OSS and inserts rapidly mounting labor costs. As shown above and in Ms. Murray's testimony, the difference in costs between voice-grade and xDSL-capable loops that BST achieves by artificially breaking the flow-through OSS process in this manner is astounding.

Q. Why is it unnecessary for xDSL- or ISDN-capable loops to be "designed"?

A. First, DSL providers want, and the FCC has given them the right, to access loop makeup information that allows them to pick loops that will support their services. Where all-copper loops are deployed in a forward-looking network, they extend from the ILEC central office to the customer network interface device ("NID") and should not be treated any differently based on the service provisioned over those loops. Both analog and digital service providers can use the same copper loop. Any additional steps that BST takes to "design" a loop for xDSL-based services would do nothing other than unnecessarily drive up the cost to xDSL or ISDN competitors. Regardless of how the loop will be used once it gets to a collocator's space, the physical work that the ILEC should do remains the same, *i.e.*, connect the cable pair in the central office to the appropriate appearance at the ALEC collocation arrangement. Ordering and provisioning processes should also be similar for analog and xDSL-capable loops when loops are provisioned via fiber feeder and DLC systems. Indeed, if the cost of installing the appropriate plug-in card is included in the recurring cost calculation, where DLC systems are deployed, the cost to provision analog and digital unbundled service loops would not differ substantially. When the ILECs allow xDSL provisioning over DLC facilities, the maximum nonrecurring cost differential would be the relatively minimal cost of a dispatch to the remote terminal (by either the ILEC or ALEC). In either case, unbundled digital loops required for the provisioning of xDSL services have no need to be "designed" circuits as the forward-looking network topology is already designed to provide ubiquitous basic or advanced services. In other words, basic service and, for example, xDSL services can be provisioned using the same basic flow-through processes that support mass service volumes without the need for expensive one-of-a-kind or one-at-a time design costs.

Q. Why is important that the Florida Commission exclude unnecessary and artificial "design" tasks from the cost studies?

A. It is clear that the demand for DSL services in Florida is huge. Even if all competitors including the ILECs somehow absorbed these costs equally, the more unnecessary tasks (and the resulting costs) that ILECs squeeze into the provisioning process, the harder it will be for Florida consumers to obtain competitively priced DSL services.

VII. ISSUE 11: XDSL "CONDITIONING" IS UNNECESSARY IN A FORWARD-LOOKING TELECOMMUNICATIONS NETWORK; MOREOVER, THE INCUMBENTS' "CONDITIONING" COST STUDIES REFLECT EXCESSIVE WORK TIMES AND UNNECESSARY TASKS, EVEN FOR THE "CONDITIONING" OF OUTDATED, EMBEDDED PLANT.

A. The Commission Should Prohibit the ILECs from Charging Competitors for Loop "Conditioning."

Q. What is loop "conditioning"?

A. As I mentioned above, older plant designs (or transitional expedients to increase capacity, such as a DAML) can include elements that impede broadband services. In the context of this proceeding, "conditioning" refers to modifications to embedded loop plant facilities needed to remove equipment or plant arrangements that would impede the transmission of DSL-based services. The notion that ILECs must "condition" lines for DSL-based services is therefore potentially misleading. The term conditioning has traditionally been used in telecommunications to refer to situations in which equipment must be *added* to a circuit to enable that circuit to perform to tighter engineering parameters. In contrast, to make certain loops in its embedded plant DSL-capable, an ILEC must *remove* unnecessary equipment from the circuit, such as load coils or excessive bridged taps. In other words, the ILEC must *decondition* these loops by eliminating equipment that may have been required in 20- to 30-year-old plant designs to support analog/voice services but that is no longer required under current network standards. Thus, the "conditioning" that the ILECs seek to include as a cost of xDSL loops in this proceeding, removing obsolete loop attachments and transitioning older plant to a more current design standard, is traditionally a part of ongoing plant maintenance and rearrangement. As a standard business practice, the cost for such activities would typically be captured as a recurring and on going business expense.

The ILECs in this proceeding have primarily used the term "conditioning" to refer specifically to the removal of load coils and excessive bridged tap.

Q. What are load coils?

A. Load coils were used on copper POTS lines longer than 18,000 feet to counteract the effect of capacitance that builds up as the length of the loop increases. Although load coils mitigate the effect of capacitance, they severely attenuate frequencies above 3000 Hz, which is detrimental to both DSL loops and analog data modems. Load coils are completely unnecessary on any loop less than 18,000 feet in length.

Q. What is bridged tap?

A. Bridged tap exists where one single dial tone can appear at more than one cable pair location. Bridged tap occurs when a cable pair has a three-way splice (from the central office to location #1 to location #2), such that dial tone can appear in two or more different cable pair locations. Visually, you can think of bridged tap occurring at a fork in the loop. One fork continues necessarily to the customer premise to complete the circuit. The second fork extends some distance into the field, but never terminates at a customer premises.

This approach to outside plant design became obsolete when party-line service became largely obsolete. [*See Bellcore Notes on the Networks*, December 1997, p. 12-3: "Multiple plant design [use of bridged tapped pairs] was largely replaced by dedicated plant design because of the labor intensity of adding to or changing existing plant and customer demands to convert from multiple-party line to single-party line service."] Common in the days of party line service, bridged taps should have been engineered out of the network since 1972. The high frequency, digital nature of DSL services (like ISDN services) prevent them from operating with more than 2,500 feet of bridged tap.

Q. Have the ILECs proposed loop "conditioning" charges in this proceeding?

A. Yes. To varying degrees and in various permutations, each of the ILECs has developed costs and proposed charges for removal of these xDSL interferers.

Q. Would "conditioning" be necessary given the networks that the ILECs have modeled for their voice-grade services?

A. No. Indeed, it is my understanding that none of the three ILECs have included load coils or bridged tap in its recurring cost analysis. For example, GTE witness Ms. Casey notes: "GTE's MRC [monthly recurring charge] study is based on a forward-looking network that does not include devices such as bridged taps or load coils." [GTE, Casey Direct, at 7.] Furthermore, existing ILEC networks that are correctly designed and engineered to reasonably current standards would already be free of load coils and excessive bridged taps and therefore should not require loop "conditioning."

Q. Why should existing ILEC networks not require loop "conditioning"?

A. As noted in Exhibit ___ (JPR-3), A Brief History of Outside Plant Design, decades-old industry engineering standards have called for the removal of the very types of impediments that the ILECs' proposed xDSL loop "conditioning" costs address. As Exhibit ______ (JPR-3) explains in more detail, with current loop standards such as the Carrier Service Area ("CSA") guidelines that carriers began to implement in the early 1980s, outside plant engineering evolved in a manner that makes bridged tap and load coils obsolete and undesirable. At Bell Atlantic, now part of the same corporate entity as GTE, where I worked at that time, this standard was followed in building all new facilities.

In particular, the CSA concept was initiated in the early 1980s across the local exchange industry to migrate the outside plant cable network to arrangements over which incumbents could better support a wide range of services. This concept, based in part on the even earlier Serving Area Concept ("SAC"), outlined a strategy that divided the central office geography into discrete service areas for plant deployment. Under CSA design, the incumbent places a remote terminal RT containing electronics in each entity. The RT location is chosen to ensure that the incumbent can serve any customer in that entity via a non-loaded copper cable having minimal bridged tap.

All new plant placed since the early 1980s should meet these engineering guidelines. Furthermore, the ILECs should have begun "conditioning" their existing plant as a part of ongoing maintenance since that time.

Q. Why should "conditioning" have been performed as a part of routine maintenance?

A. Local exchange carriers have performed, and continue to perform, "conditioning" activities such as deloading loops routinely as part of maintaining their loop plant. For example, the ILECs are reinforcing routes and doing other work in the outside plant on a daily basis. Whenever a technician had to work on any plant, that technician should have also been assigned to bring that plant into compliance with engineering current standards to the extent possible. ILECs typically reengineer older plant to eliminate DSL inhibitors such as load coils and bridged tap when growth requires an upgrade to the existing plant in any specific area.

Furthermore, the ILECs have had to perform "conditioning" for their own services. For example, loops that incumbents use to provide ISDN service typically require the same type of "conditioning" as DSL-capable loops, and even loops that incumbents use to provide basic POTS service cannot operate with T-1 repeaters on them. As Sprint itself points out: "Sprint and other LECs are implementing plans to proactively make their networks capable of supporting xDSL services.... An efficient forward-looking network service provider will implement such binder group management plans in a proactive manner, and not on a service order-by service order basis." [Sprint, McMahon Direct, at 18.] Therefore, the ILECs' cost to "condition" their networks would already been included in the ongoing expenses that the incumbents have incurred and charged to ratepayers for maintaining/improving the network for many years.

Moreover, both BST and GTE have indicated that the expenses in the recurring costs they presented in this proceeding include the costs of ongoing plant rearrangement and grooming as a recurring cost:

> BellSouth follows the general principle that all rearrangements and changes of existing Outside Plant Facilities not retired are charged to the appropriate expense

> accounts for the type plant involved. This would include the rearrangement of pairs to facilitate repairs, freeing up pairs required to accommodate service order activity, and general routine maintenance and grooming of existing cable facilities. Rearrangement activities of an expense nature would also include work to completely rehabilitate a cable in connection with placement of new metallic or fiber cable.

[BST's Response to Rhythms' Interrogatory 53.]

Likewise, GTE admits:

> Operating expenses associated with rearrangement activities (if any) are reflected in GTEFL's financial statements in accordance with the FCC's Part 32 chart of accounts... Any operating expenses associated with rearrangement activities would be recorded to its respective plant account. For example, any rearrangement costs related to Buried Cable are recorded in the Buried Cable Expenses Account 6423.

[GTE's Response to Rhythms' Interrogatory 30.]

Therefore, as should be reflected in the ILEC's standard practice, conditioning appears already to be included in the recurring unbundled loop costs reported by these two ILECs.

Q. Are any of the ILECs providing conditioning as part of their federally tariffed DSL offerings without charging their customers for such conditioning?

A. Yes. BellSouth performs conditioning as part of its offering and appears not to charge for the conditioning.

> *** **BEGIN BST PROPRIETARY** [For BellSouth's Industrial Class DSL offering, t]he customer gets the ADSL performance that the existing loop conditions will support up to the maximum rates. If ADSL cannot be serviced on the existing loop a reasonable effort shall be made to provide the service. Briefly, that effort to serve the customer can consist of one or more of the following:
>
> A. Move the working line to another facility, including making a line and station transfer (LST).
>
> B. Remove detrimental loading.
>
> C. Remove service inhibiting bridge tap.
>
> . . .
>
> The Business Class service is guaranteed to provide the minimum data rate. If the ADSL line does not sync-up the loop make-up shall be examined to determine what loop conditioning can be done to provide the service. . . .

END PROPRIETARY*** [Outside Plant Engineering Methods and Procedures for BellSouth® ADSL Service, 915-800-019PR, at 7, Sept. 30, 1999, BST's Response to AT&T Request to for Production of Documents 62.]

While BellSouth clearly performs loop conditioning for its federally tariffed DSL offering, my review of BST's tariffed offering failed to locate any charges for, or even mention of, loop conditioning.

Q. Have the ILECs agreed that load coils should not exist on copper loops that are less than 18,000 feet in length?

A. Both Sprint and BST admit that load coils are not required for such loops. For example:

> Copper pairs that are less than 18,000 feet long do not have to be loaded in order to provide voice grade services.

[Sprint, McMahon Direct, at 21.]

> Loops of this length [18,000 feet or less] do not normally need the load coils to provide voice support and once they are unloaded, the loops can support some forms of advanced services.

[BST's Response to Rhythms' Interrogatory 44.]

> [F]or loops less than 18,000 feet the impact of this procedure [removing load coils] on voice grade service will be minimal since load coils neither enhance nor impair the quality of voice transmission for loops of that length."

[BST, Caldwell Direct, at 58.]

As I discuss below, although BST is certainly correct that the removal of load coils will not impair service, its carefully worded statement that coils do not harm "voice transmission" is not true for basic exchange service quality as a whole. For example, load coils can impede modem speeds.

Q. Do the ILECs in this proceeding seek to recover the cost for load coil removal on loops of less than 18,000 feet?

A. Yes. Each of the ILECs has proposed charges for removing load coils from loops less than 18,000 feet, although at vastly different cost levels.

Q. Would it be appropriate for the ILECs to recover the cost for load coil removal on loops of less than 18,000 feet?

A. No. That would be like having to pay extra to get a new car without a cracked windshield. A new car should come equipped with a new windshield and you should not have to pay more to get a windshield without a crack on your new car. Similarly, competitors should not have to pay more to get an xDSL-capable loop under 18,000 feet that is free of load coils. "Conditioning" is part and parcel of delivering a loop built to current standards that is under 18,000 feet.

Q. Have other ILECS agreed not to charge for load coil removal on loops of less than 18,000 feet?

A. Yes. For instance, GTE's merger partner, Bell Atlantic, does not intend to charge for load coil removal from loops of less than 18,000 feet, because copper loops of that length should not have load coils. It would instead remove such obsolete equipment at its own expense. For example, Bell Atlantic – New York ("BA-NY") states:

> BA-NY will not impose the Load Coil Removal charge if load coils must be removed from loops less than 18,000 feet long, since load coils are generally not required for such loops under the current or past design criteria applied by BA-NY.

[Panel Testimony of Bell Atlantic - New York on Costs and Rates for Loop Conditioning and Line Sharing for DSL-Compatible Loops in New York Case 98-C-1357, February 22, 2000, at 11.]

This is appropriate treatment for such loops.

Q. Has it been long enough to expect that ILEC outside plant should conform to CSA guidelines that you mentioned above, which eliminate a need for load coils?

A. Yes. It has been 20 years since the industry adopted those guidelines for non-loaded outside plant. Twenty years exceeds the service lives established by most commissions for outside plant categories of aerial, buried, and underground copper cables. Load coils on copper pairs should therefore be treated as a problem condition, and the ILECs should remove those load coils without charging ALECs.

Q. Do ILECs such as BST actually use the CSA guidelines?

A. Yes. According to discovery responses, BST is currently using CSA and has been since 1982:

> New outside plant loop facilities placed today are based primarily on digital loop carrier platforms and associated fiber and/or copper distribution facilities using Fiber/Carrier Serving Area (FSA/CSA) design concepts to provide both voice grade and digital services.

[BST's Response to Rhythms' Interrogatory 62.] BST has also stated that:

> Since the introduction of CSA design in 1982, BellSouth (formerly Southern Bell/South Central Bell) has used CSA design guidelines for new cable facilities where digital loop carrier is used for feeder facilities, although BellSouth does not employ these guidelines in every instance.

[BST's Response to Rhythms Interrogatory 67.]

BST has also assumed CSA design in its recurring unbundled loop cost study. [*See* BST, Milner Direct at 23, and BST's Response to Rhythms First Set of Interrogatory No. 84.]

Q. Other than adopting the CSA guidelines 18 years ago, has BST given any indication of its plans to modernize its network in such a way as to eliminate load coils?

A. Yes. As I discussed in Section VI. above, *** **BEGIN BST PROPRIETARY** BST's "Loop Technology Deployment Directives" give repeated indications that BST has begun to systematically replace its copper feeder with fiber/NGDLC systems. **END PROPRIETARY ***** Such systems are free of load coils.

Q. What type of outside plant design does GTE use?

A. According to discovery responses, GTEFL has used its Electronic Serving Area ("ESA") and Customer Access Facilities ("CAF") guidelines in the design of outside plant for approximately 10 years. (I do not know what GTE used before that time.) [GTE's Response to Rhythms' Interrogatory 44.]

Q. What load coil guidelines are dictated under GTE's guidelines?

A. GTE's guidelines appear to be *** **GTE PROPRIETARY** similar to CSA guidelines. Specifically, GTE's guidelines restrict the usage of load coils and bridged tap in a similar manner in all but the most rural applications. [*See, e.g.*, GTE cost study at Tab 30 34-35.] GTE's guidelines are largely market-based but call for migration to substantially CSA-like design that GTE refers to as an "Electronic Serving Area" or "ESA" in even "Moderately Competitive Markets." [*See, e.g.*, GTE cost study at Tab 30 47-51.] In areas that are more than "Moderately Competitive," GTE's guidelines call for even stricter/more xDSL-friendly designs. Therefore, assuming that competition exists and is increasing in GTE's Florida service areas, CSA-based cost analysis might be conservative for GTE. **END PROPRIETARY ***** Moreover, GTE's merger partner, Bell Atlantic, has been using CSA standards for as long as BST.

Q. Why is it undesirable to have bridged tap even in a POTS loop?

A. There are several reasons why bridged tap is undesirable in a POTS loop. First, bridged tap results in dial tone appearing on a pair in two different locations. Whereas normally, any cable damage in the second location should have no effect on an end user's line at the first location, the mere existence of bridged tap puts the line at risk of service outage should damage occur at location number two.

Second, having a bridged pair condition adds detrimental capacitance to the line, which adversely impacts high frequencies, makes one cable pair appear to be longer than it needs to be, and adversely affects analog dial-up modems.

Third, having a bridged tap hangs an antenna-like device on a pair, which may allow increased hum and noise on the line.

Fourth, bridged tap causes additional circuit loss so it reduces the strength of the voice signal which may erode the quality of service.

Q. Should bridged tap ever appear in copper feeder plant?

A. No. Bridged tap should not appear in copper feeder plant. The Serving Area Concept ("SAC") guidelines, introduced in 1972, designated that wire center areas were to be divided into discrete geographic serving areas. The SAC specified that the distribution network contained in a serving area should be connected to the feeder network at a *single* interconnection point, (known as the Serving Area Interface). Bridged tap in copper feeder plant would exist only if the same cable pair appeared as a feeder resource in *two different* Serving Area Interfaces, making it inconsistent with SAC guidelines. [See Exhibit ______ (JPR-3) for a more detailed explanation of the SAC guidelines.]

Q. Should bridged tap be used in distribution plant?

A. Although a distribution cable may contain many cable pairs, once distribution spans out into smaller side legs (*e.g.,* the cable assigned to run down a specific block), the same cable pair should never appear in two different side legs. You can think of side legs as forks in the road. With bridged tap, one leg leads to the an customer premises and the other dead ends at some other location. Distribution cable should always be engineered in 25-pair binder groups, such that no pairs in a particular 25-pair binder group should ever appear in more than one side leg. This ensures no bridged tap conditions between separate distribution side legs.

Q. What bridged tap guidelines are dictated under the CSA guidelines?

A. CSA guidelines state that "[t]he maximum allowable bridged-tap is 2.5 kft, with no single bridged-tap longer than 2.0 kft." [Bellcore, *Bellcore Notes on the Networks*, December 1997, at 12-5.] Both BST and GTE agree that, with the CSA design concept, bridged tap would be limited to these levels. [*See* BST, Milner Direct, at 3 and 23, BST's Response to

Rhythms' Interrogatory 69, and GTE's Response to Rhythms' Interrogatory 46.]

Q. When is bridged tap removal required to provide xDSL-based services for loops designed under reasonably current engineering guidelines?

A. CSA guidelines permit bridged tap use, but only up to a level that generally does not interfere with xDSL (*i.e.,* the 2,500 feet per total and 2,000 feet per individual bridged tap limits). As I have explained, the ILECs would not need to remove bridged tap from plant designed to meet CSA guidelines because the CSA design limits bridged tap to a level that would not interfere with xDSL. Therefore, bridged tap removal is not required for loops that comply with the CSA standards regarding bridged tap. As I explained earlier, BST has followed the CSA guidelines since 1982 and GTE has followed similar standards for at least 10 years. All of the ILECs' plant should now conform with these twenty-year-old industry standards for outside plant construction and maintenance. Excessive bridged tap exists on a loop only if ILECs in Florida ignored industry standards and neglected outside plant maintenance. In those instances, ILECs should bear the entire cost of removing such bridged tap. Nonetheless, each of the three ILECs proposes to charge for bridged tap removal in all instances.

B. The ILECs Substantially Inflate Loop "Conditioning" Costs by Failing to Incorporate Efficient Engineering Practices in Their Cost Studies.

Q. Do the ILECs' "conditioning" studies reflect efficient current practices?

A. No. As I have already explained in detail, current engineering practices dictate that ILECs should have been removing load coils and excessive bridged tap from their systems over the last 20-30 years. In addition, the ILECs inflate "conditioning" costs by substantially overstating work times and, even more significantly, by understating the number of loops that they should "condition" whenever a technician is dispatched to do that type of work.

Q. Should the ILECs "condition" more than one pair at a time?

A. Yes. If the Commission allows any recognition of "conditioning" as a nonrecurring cost, it is most important to the issue of determining a reliable unit cost to recognize that "conditioning" old plant should always be done for multiple lines at once. Even if one assumes that costs should be based on backward-looking, outdated plant designs, it is always efficient to "condition" multiple loops at the same time. Therefore, the cost for such refurbishing of older plant should be spread across all of the loops that benefit from that work. Indeed, in the ILEC's typical operation, such maintenance, upgrade and/or rearrangement work was booked into a general expense account and not treated as a nonrecurring event.

In the cost studies presented in this proceeding each of the ILECs has proposed a discriminatory separate treatment of "conditioning" costs as nonrecurring when a competitor initiates the request. Sprint and BST are, however, partially on the right track, at least as regards to load coil removal, in recognizing that it is efficient to condition multiple loops at once. But, they are still nowhere near a performance level that would win even a bronze for efficiency. GTE, in contending that each load coil or bridged tap removal would have to be performed pursuant to a specific request, is not even in the stadium. It is a standard efficient engineering practice to deload and unbridge more than one loop at a time. Indeed, the standard practice in the industry is to prevent multiple re-entries into outside plant splices because multiple re-entries can cause serious deterioration in the wire insulation that will cause telephone wires to short out. Consequently, engineers have been instructed to engineer copper plant in terms of binder groups of either 25 pairs or groups of 50 pairs. (A "binder group" is designated as such because, inside a copper cable sheath, groups of pairs are segregated into manageable groups of pairs by binding such a group of either 25 pairs or 50 pairs with a thin color-coded ribbon wound around that group of pairs.) Standard engineering practice is to attempt to maintain "binder group integrity," that is, to splice and otherwise treat all of the pair in a given binder group as a unit. (For example, Sprint indicates that efficient providers "will implement binder group management plans in a proactive manner." [Sprint, McMahon Direct, at 18.] Single pair splicing, *i.e.*, splicing only one or a few of the pair in a given binder group for some purpose, has been avoided for decades.

Moreover, it is simply more efficient to work with facilities a group at a time. If pairs are not "conditioned" in multiples of 25 or 50 pairs, or more, at a time, then a splice will soon degrade. Loading cases are designed to readily "condition" an entire binder group. Attempting to isolate individual line results in a tangled "bunch of grapes" look that is more difficult to work with. Therefore, to simplify both current and future operations, it is more efficient to treat the entire group rather than to create and have to deal with a tangled mass of individual splices.

Q. What would be a reasonable number of pairs to "condition" at one time?

A. For numerous reasons, I recommend that the Commission recognize that "conditioning" will, on average, be done 50 pairs at a time. In addition to the practical reasons that I provided above, such as that "conditioning" entire binder groups will limit maintenance problems associated with multiple splice reentry, "conditioning" an average of 50 lines at a time is a practical actual average.

Considering load coils first, for loops under 18,000 feet in length, it makes no sense whatever from an engineering perspective to dispatch a technician to remove load coils and to remove anything less than all of the coils currently deployed. Load coils are not useful and are harmful to loops under 18,000 feet. They should be removed at the first opportunity. The total number of loops under 18,000 to be deloaded at once would therefore range from a minimum of the 25 pairs on the binder group with the target xDSL loop to potentially *hundreds* of pairs that happen to be loaded in multiple binder groups at the same location (as loading is done at regular intervals, the load coils for various binder groups would be collocated). For loops over 18,000 feet, it still makes no sense from an engineering perspective to "condition" one line at a time — particularly given the substantial predicted demand for xDSL services over the next few years. An efficiently managed outside plant operation will always maintain some level of available spare. An ILEC should "pre-condition" a reasonable projection of total spare plant to meet anticipated demand for xDSL-based services every time it dispatches a technician and splices are being opened. Therefore, on average, a 25-pair binder group should be unloaded even for loops longer than 18,000 feet. Combining the over- and under-18,000 feet estimates, 50 pairs per load coil removal dispatch across all loop lengths is a reasonable average.

Q. Are there times when only one pair can be "conditioned"?

A. Occasionally. However, as I just explained, there are also cases where many hundreds of pairs at a time can be "conditioned" at once. I propose an approach that will be reasonable for the vast majority of cases. For example, if a load coil must be removed from a 25-pair splice with other working lines that are longer than 18,000 feet of copper, then it would not be proper to deload the entire 25-pair group of pairs. However, there are other cases involving a 2,400-pair cable working at 75% utilization (1,800 working pairs, and 600 spare pairs). With 600 spare pairs, it may make sense to deload several hundred pairs in anticipation of rapid growth for DSL services.

The number of pairs that an ILEC should "condition" will vary based on local conditions, but assuming that the ILEC will "condition" 50 pairs at a time is a reasonable middle ground.

Q. Does it make sense to remove bridged tap for one loop at a time?

A. No. As with load coils, "conditioning" 50-pairs at a time is a reasonable average. Loops under 18,000 feet that contain bridged tap are, by definition, relatively short. As a result, the cables over which these loops are provisioned would generally be larger-size cables. It is therefore reasonable to unbridge a *minimum* of 50 "working" loops in each cable at a branch splice, in each direction.

The benefits of unbridging multiple working pairs that have unnecessary bridged tap are manifold.

First, the requested "conditioning" for the service order is accomplished.

Second, 100 pairs at this branch splice location are unbridged (a procedure that improves the existing service without disrupting it), and transitions the network towards present-day engineering standards. (The ILECs should have been unbridging their pairs since the introduction of the Serving Area Concept in 1972.)

Third, transmission of voice-grade service on these working circuits is improved because the insertion loss, caused by the bridged tap, is removed.

Fourth, the unbridged working circuits provide a base of preconditioned pairs that could be utilized for future services that are incompatible with excessive bridged tap; the ILECs could provision loops for those services via a line and station transfer to one of the unbridged working circuits in lieu of opening cable splices to unbridge an individual pair at the time of the future service request. The ILECs should provide these line and station transfers at no cost, should the ILECs decide not to unbridge spare pairs. Indeed, as I showed above, *** **BEGIN BST PROPRIETARY** BST performs line and station transfers at no charge in the provision of its federally tariffed DSL offering. **END PROPRIETARY** *** [*See* ADSL Deployment Directives at 7.]

Fifth, the unbridged working services now have less exposure to maintenance problems, which will result in reduced customer trouble reports.

Sixth, "conditioning" working service precludes the need to re-enter a working splice on numerous occasions to "condition" one pair at a time, which potentially causes customer outages.

Seventh, unbridging working service does not require the amount of engineering study that would be involved if every spare pair were studied, grouped, and allocated to a specific branch cable (this is an expedited method that I have used in the past to effectuate the unbridging of pairs as called for in SAC design). Because the actual "wire work" is a relatively minor portion of the cost of the job, this methodology is cost efficient.

Moreover, unbridging multiple pairs at a time substantially reduces the "conditioning" cost on a "per unit" basis. The benefit to the ILECs is that the ALEC order would trigger an unbridging opportunity to clean up its outside plant — something that it should have been doing proactively since SAC design in 1972, but perhaps had no opportunity to do so because the particular bridged tap splice involved had no activity in the last 28 years.

For longer, bridge tapped loops, a cost analysis based on older plant design must recognize that, as cable sheaths traverse the route from the central office, the cable size tends to diminish. Because engineering guidelines do not permit bridged tap between load coil sections, bridged taps should only be located in the customer end section of cable plant, *i.e.*, within 3 to 12 Kft of the customer location. Even for these longer, loaded loops, the ILECs could still achieve benefits similar to those described for non-loaded loops by unbridging multiple pairs; however, the number of working lines to be unbridged at a branch splice location would likely be smaller, *e.g.*, 25 working pairs per cable (a total of 50 pairs), to account for the diminished size of the cables.

Q. Do the ILEC studies reflect the guidelines you suggest?

A. No. As noted above, BST and Sprint have both (correctly) assumed that they will remove load coils from multiple pairs at a time, for loops less than 18,000 feet in length. Unfortunately, they both still understate the number of pairs that would be efficient to condition at once. BST proposes removing load coils from ten pairs at a time for these shorter loops. Sprint presents the more reasonable position, proposing to remove load coils from 25 pairs at a time, but still does not capture the costs of an efficient practice. GTE has absurdly maintained that it will remove load coils from only one pair at a time.

For loops of greater than 18,000 feet in length, all three ILECs have proposed removing load coils on one pair at a time.

Q. Do the ILECs' proposals regarding removal of load coils make sense?

A. No. Even Sprint's proposal for loops under 18,000 feet in length is not the most efficient approach. For copper facilities under 18,000 feet in length, load coils are not needed to provide basic voice or any other common service. The presence of load coils on such facilities generally indicates either that the plant in question was once used to serve customers further from the central office and has been rearranged or that the facilities in question are very old and were designed to engineering standards that have not been used in decades. Because the continued presence of load coils does nothing other than inhibit data services on those facilities, the load coils in question should have been removed as a part of regular maintenance. If the incumbent did not take advantage of related dispatches to remove those coils in the past it makes no sense at all not to remove *all* of the load coils present once a technician is dispatched to remove any coils. Removing all the coils present makes sense because it requires almost no incremental effort to remove multiple coils. Indeed, it is often efficient to remove all of the coils on a cable than to attempt to remove some small subset thereof.

Given that it is efficient to remove all of the coils in a route for facilities under 18,000 feet, it is probable that the total number of loops that an efficient carrier would deload at one time would include multiple 25-pair binder groups and, therefore, would be substantially more than 50 per dispatch.

And, as I have already explained, for copper facilities over 18,000 feet in length it makes sense to "condition" a portion of the available spare that corresponds to the demand for advanced services that is likely to evolve over the long run on that route.

As Sprint witness McMahon explains:

> The actual work time involved in making the connection is not more than a minute or two, but set-up time can be significant, particularly when working in

> manholes. This is why an efficient ILEC will unload multiple pairs at one time when working on loops under 18,000 feet in length, instead of unloading only the pair required for the current order.

[Sprint, McMahon Direct, at 22.] But Sprint fails to provide any explanation as to why the same consideration does not apply for removal of load coils on loops of over 18,000 feet (or removal of excessive bridged tap). This is especially surprising in light of Mr. McMahon's earlier statement that Sprint and others are "proactively" conditioning their networks for advanced services. [*See* Sprint, McMahon Direct, at 18.]

Q. What are the ILECs' positions regarding the appropriate number of pairs from which bridged tap should be removed at one time?

A. None of the three ILECs has proposed removing bridged tap from multiple lines at once. As I explained in detail above, it makes no sense not to remove bridged tap from multiple loops once a technician has been dispatched.

Q. How should "conditioning" 50 pairs at once affect a cost calculation for "conditioning"?

A. Because the ILECs should condition an average of 50 pairs per "conditioning" dispatch, the cost per pair would be $1/50^{th}$ of the cost per "conditioning" dispatch.

C. If the Commission, Inappropriately, Adopts Any Nonrecurring Cost for "Conditioning," Such Charges Should Reflect Efficient Methods, Procedures and Tools.

Q. If the Commission were to award the ILECs the right to charge for "conditioning," could it rely on the ILEC proposals?

A. No. For all the reasons I have detailed in the foregoing sections, the ILEC "conditioning" studies are too flawed to rely upon. The range of proposals by the ILECs makes that apparent. For example, the ILEC proposals for removing load coils range form a low of $5.74 for Sprint to remove an aerial coil to a high of $ 1,448.22 for GTE to remove any coils generically.

Q. If the Commission were to award ILECs the right to charge for load coil removal , what tasks and task time assumptions would be appropriate?

A. If the Commission elects to permit the ILECs to impose such charges — which it should not — then such charges should be based on engineering practices generally employed in the telecommunications industry and on reasonably efficient task time estimates.

Load coils were deployed, starting only when a copper loop reaches 18,000 feet in length, at 6,000-foot intervals, starting with three locations (at 3,000 feet, 9,000 feet, and at 15,000 feet). Also, because feeder cable is normally placed in conduit when close to the central office, I assume that the first two load coil locations involve underground cable at manhole locations. The third location is most likely in aerial or buried locations. Therefore, I have assumed that 50 percent of the time for deloading of the third load coil location will be at an aerial location, and 50 percent of the time, deloading of the third load coil location will be at a buried location. Instead of the wide array of divergent proposals by the ILECs, the Commission can use the following work steps and conservative time estimates to estimate the costs involved in removing load coils from these three locations:

Underground Cable Load Coil Removal in a Manhole

Step	Description	Task (min.)
1	Travel time to underground splice location.	20
2	Set up work area protection and underground work site.	5
3	Pump and ventilate manhole.	15
4	Buffer cable / Rerack cable / set up splice.	5
5	Open splice case.	5
6	Identify pairs to be deloaded for 1st 25-pair binder group.	5
7	Bridge 25-pair binder group for service continuity (if necessary).	5
8	Remove / sever connection from main cable to load 'in' & 'out taps.	3
9	Rejoin / splice 25-pair binder group through main cable.	5
10	Remove bridging modules from Step 7.	2
11	Identify pairs to be deloaded for 2nd 25-pair binder group.	5
12	Bridge 25-pair binder group for service continuity (if necessary).	5
13	Remove / sever connection from main cable to load 'in' & 'out' taps.	3
14	Rejoin / splice 25-pair binder group through main cable.	5
15	Remove bridging modules from Step 12.	2
16	Clean, reseal, and close splice case.	10
17	Rack cables, pressure test cables in manhole.	10
18	Close down manhole, stow tools, break down work area protection.	10
	Total Minutes	120
	Total Hours	2.00
	No. Technicians	2
	Total Timesheet Hours	4.00
	No. Locations	2
	Total Hours	8
	Pairs deloaded	50
	Minutes per pair	9.6 min.

Aerial Cable Load Coil Removal at a Pole (50% occurrence)		
Step	Description	Task (min.)
1	Travel time to aerial splice location from underground splice location.	10
2	Set up work area protection.	5
3	Set up ladder or bucket truck.	10
4	Open splice case.	5
5	Identify PIC pairs to be deloaded for 1st 25-pair binder group.	2
6	Bridge 25-pair binder group for service continuity (if necessary).	5
7	Remove / sever connection from main cable to load 'in' & 'out taps.	3
8	Rejoin / splice 25-pair binder group through main cable.	5
9	Remove bridging modules from Step 6.	2
10	Identify pairs to be deloaded for 2nd 25-pair binder group.	2
11	Bridge 25-pair binder group for service continuity (if necessary).	5
12	Remove / sever connection from main cable to load 'in' & 'out taps.	3
13	Rejoin / splice 25-pair binder group through main cable.	5
14	Remove bridging modules from Step 11.	2
15	Clean, reseal, and close splice case.	10
16	Secure splice case to strand and clean up work area.	10
17	Close down aerial site, stow tools, break down work area protection.	10
	Total Minutes	94
	Total Hours	1.57
	No. Technicians	1
	Total Timesheet Hours	1.57
	No. Locations	0.5
	Total Hours	0.78
	Pairs deloaded	50
	Minutes per pair	0.94 min.

Buried Cable Load Coil Removal at a Pedestal (50% occurrence)		
Step	Description	Task (min.)
1	Travel time to buried splice location from underground splice location.	10
2	Set up traffic cone at rear bumper of truck.	1
3	Walk to site & open splice pedestal.	2
5	Identify PIC pairs to be deloaded for 1st 25-pair binder group.	2
6	Bridge 25-pair binder group for service continuity (if necessary).	5
7	Remove / sever connection from main cable to load 'in' & 'out taps.	3
8	Rejoin / splice 25-pair binder group through main cable.	5
9	Remove bridging modules from Step 6.	2
10	Identify pairs to be deloaded for 2nd 25-pair binder group.	2
11	Bridge 25-pair binder group for service continuity (if necessary).	5
12	Remove / sever connection from main cable to load 'in' & 'out taps.	3
13	Rejoin / splice 25-pair binder group through main cable.	5
14	Remove bridging modules from Step 11.	2
16	Secure splice within buried pedestal and clean up work area.	3
17	Close down buried site, stow tools and traffic cone.	5
	Total Minutes	55
	Total Hours	0.92
	No. Technicians	1
	Total Timesheet Hours	0.92
	No. Locations	0.5
	Total Hours	0.46
	Pairs deloaded	50
	Minutes per pair	0.55 min.

Q. If the Commission were to award ILECs the right to charge for load coil removal, what charges would be appropriate?

A. The Commission should use work steps and time estimates I have listed, along with the labor rates it adopts for each ILEC, to estimate the costs involved in removing load coils. I have estimated that the total average time for removing all load coils from a loop is just over 11 minutes per pair. For example, at a labor rate of $45, a load coil removal charge of $8.32 per pair would apply.

Q. If the Commission were to award ILECs the right to charge for bridged tap removal, what tasks and task time assumptions would be appropriate?

A. Again, if the Commission elects to permit the ILECs to impose such charges — which it should not — then such charges should be based on reasonably efficient practices generally employed in the telecommunications industry.

As I explained previously, the ILECs should have eliminated bridged taps almost 30 years ago, except for limited end-section bridged taps that could be removed in the service terminal at time of an installation visit. In addition, bridged tap should not exist in underground feeder cable close to the central office. Therefore, I would assume that a single case of bridged tap, if it occurs, would occur 50 percent of the time at an aerial location, and 50 percent of the time at a buried location. Accordingly, the Commission can use the following work steps and conservative time estimates to estimate the costs involved:

Aerial Cable Bridged Tap Removal at a Pole (50% occurrence)		
Step	Description	Task (min.)
1	Travel time to aerial splice location.	20
2	Set up work area protection.	5
3	Set up ladder or bucket truck.	10
4	Open splice case.	5
5	Identify PIC pairs for bridged tap removal for 1st 25-pair binder group.	2
6	Remove bridging modules or cut & clear pairs for 1st 25-pair group.	2
7	Identify PIC pairs for bridged tap removal for 2nd 25-pair binder group.	2
8	Remove bridging modules or cut & clear pairs for 2nd 25-pair group.	2
9	Clean, reseal, and close splice case.	10
10	Secure splice case to strand and clean up work area.	10
11	Close down aerial site, stow tools, break down work area protection.	10
	Total Minutes	78
	Total Hours	1.30
	No. Technicians	1
	Total Timesheet Hours	1.30
	No. Locations	0.5
	Total Hours	0.65
	Pairs Unbridged	50
	Minutes per pair	0.78 min

Buried Cable Bridged Tap Removal at a Pedestal (50% occurrence)		
Step	Description	Task (min.)
1	Travel time to buried splice location	20
2	Set up traffic cone at rear bumper of truck	1
3	Walk to site & open splice pedestal	2
4	Identify PIC pairs for bridged tap removal for 1st 25-pair binder group	2
5	Remove bridging modules or cut & clear pairs for 1st 25-pair group	2
6	Identify PIC pairs for bridged tap removal for 2nd 25-pair binder group	2
7	Remove bridging modules or cut & clear pairs for 2nd 25-pair group	2
8	Secure splice within buried pedestal and clean up work area	3
9	Close down buried site, stow tools and traffic cone	5
	Total Minutes	39
	Total Hours	0.65
	No. Technicians	1
	Total Timesheet Hours	0.65
	No. Locations	0.5
	Total Hours	0.33
	Pairs Unbridged	50
	Minutes per pair	0.40 min.

Q. If the Commission were to award ILECs the right to charge for bridged tap removal, what charges would be appropriate?

A. Again, the Commission should use work steps and time estimates I have listed, along with the labor rates it adopts for each ILEC, to estimate the costs involved in removing bridged tap. I have estimated that the total average time for removing a bridged tap from a loop is under two minutes per pair. For example, at a labor rate of $45, a load coil removal charge of $0.89 would apply.

VIII. THE COMMISSION SHOULD DISREGARD BST'S COST STUDY FOR SPLITTERS.

Q. Do you have any further comment regarding BST's cost studies?

A. Yes. BST has presented proposed prices for line-sharing splitters (element J.4). Because all parties to this proceeding had previously stipulated that line-sharing issues would not be considered in this proceeding [Joint Stipulation of Certain Issues and Schedule of Events, FPSC Docket No. 990649-TP, filed December 7, 1999, at ¶ 5.], I have not scrutinized BST's proposal.

Q. Should the Commission consider BST's proposed rates for line-sharing splitters in this proceeding?

A. No, not at this time. The sole function of "splitters" is to "split" the loop into high- and low-frequency bandwidths. This function has no relevance outside the context of line sharing.

Q. Does this conclude your testimony?

A. Yes, it does.

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PROFESSIONAL EXPERIENCE

TELECOMMUNICATIONS CONSULTANT 1992-Present

- Expert witness before the FCC and State Public Utilities Commissions.
- Engineering witness on behalf of AT&T, MCI Worldcom, Covad Communications, Rhythms Links Inc., and Mid-Maine Telephone Company.
- Testified in 14 jurisdictions on behalf of clients.
- Provided consulting services for the design, project management and implementation of national DSL company.
- Provided consulting services to equipment staging, assembly and installation company.

NYNEX 1987-1992

- Between 1987 and 1992, I was the NYNEX Engineering Director-Long Island. In that position, I was responsible for budgeting, planning, engineering, provisioning, assignment and maintenance of telecommunications services for all customers on Long Island, N.Y.

NYNEX 1985-1987

- Between 1985 and 1987, I was NYNEX District Manager-Midtown Manhattan. I was responsible for budgeting, planning, engineering, provisioning, assignment and maintenance of telecommunications services for all customers in Midtown Manhattan.

NYNEX 1980-1985

- Between 1980 and 1985, I was NYNEX District Manager-Engineering Methods. In that capacity, I was responsible for the design, development, implementation and review of all outside plant methods and procedures for New York Telephone Company. Additionally, I was responsible for the procurement of all outside plant cable and apparatus for the New York Telephone Company.

AT & T 1978-1980

- Between 1978 and 1980, I was an AT&T District Manager, responsible for the design, development and documentation of various Bell System plans, and for audits and operational reviews of selected operating companies in matters of Outside Plant engineering, construction, assignment and repair strategy. I also served as the Project Team Leader at Bell Telephone

Laboratories for the design and development of functional specifications for mechanized repair strategy systems.

NEW YORK TELEPHONE 1976-1978

- Between 1976 and 1978, I was District Manager-Outside Plant Analysis Center for New York Telephone Company. I was responsible for the analysis of all outside plant maintenance reports and the design, development and implementation of related mechanized reporting, analytical and dispatching systems. I was also responsible for the procurement of all outside plant cable and apparatus for the New York Telephone Company.

VARIOUS

- Between 1962 and 1978, I held a variety of technical and engineering positions of increasing responsibility at New York Telephone and Bell Telephone Laboratories. During 1967 and 1969, I was on military leave of absence from New York Telephone while serving in the U.S. Navy.

EDUCATION

I hold a B.S. in Electrical Engineering from City College of New York, and have taken a variety of specialized courses in telecommunications since college.

RECENT TESTIMONY

State of Maryland	Docket No. 8731, Phase I
Commonwealth of Virginia	Case No. PUC 970005
State of New Jersey	Docket No. TX95120631 TX98010010
State of Pennsylvania	Docket No. A310203F0002 et al, MFSIII
State of West Virginia	Case Nos. 96-1516-T-PC 96-1561-T-PC 96-1009-T-PC 96-1533-T-T
State of California	Case Nos. R.93-04-003 I. 93-04-002
State of Wisconsin	Docket Nos. 6720-MA-104 3258-MA-101
District of Columbia	Formal Case No. 962
State of Delaware	PSC Docket No. 96-324
State of Iowa	Docket No. RPU 96-9
State of Hawaii	PUC Docket No. 7702
FCC	File No. E98-05
State of Illinois	Docket No. 99-0593 98-0396
State of New York	Case No. 98-C-1357

BellSouth Telecommunications, Inc.
Georgia Public Service Commission
Docket No. 11900-U
GPSC Workshop Requests
April 19, 2000
Item No. 6
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REQUEST: What is BellSouth's response to the letter of March 30th written by Rhythms representing the CLECs attending the March 21, 2000 CLEC xDSL UNE meeting regarding loop make-up data elements? The letter provided a list of 33 loop make-up data elements that the CLECs collectively request BellSouth provide electronically through its GUIs and application-to-application interfaces.

RESPONSE: Following is the list of 33 loop makeup elements requested by the CLECs and a response for each. Requirements marked in the NOTES column with an asterisk (*) will be provided in July 2000 either directly or may be calculated by the CLEC based on the data provided; information will be obtained from the LFACS database via existing electronic interfaces (LENS, RoboTAG™, and TAG). This functionality is targeted for July 2000 unless otherwise noted:

	REQUIREMENT	NOTES
1.	Loop Length	*
2.	Loop Length by Segment	*
3.	Length by Gauge	*
4.	26 gauge equivalent loop length	*
5.	Quantity of load coils	*
6.	Location of load coils	*
7.	Quantity of bridge taps	*
8.	Location of bridged tap by occurrence	*
9.	Length of bridge taps by occurrence	*
10.	Quantity of pair gain/DLCs	* (provided by PG system type)
11.	Location of pair gain/DLC	* (this will be the terminal ID)
12.	Type of DLC	* (by System Type)
13.	Qualification status of loop based on specific PSD	Not provided. The CLEC will provide this information to BellSouth on Line Sharing requests and it will be stored in the LFACS database in the 4Q00 timeframe (with mechanization of Line Sharing Electronic Ordering functionality). If desired by the CLECs, this information could be made available in future releases.
14.	Source of data - actual or designed	* (All loop makeup information stored in LFACS will be actual)
15.	Presence of DAML	*
16.	Presence of disturbers in the same or adjacent binder groups	Not available. The information does not exist in a mechanized system(s) region-wide.
17.	Loop medium (copper or fiber)	*

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RESPONSE: (continued)

	REQUIREMENT	NOTES
18.	Length that is copper or fiber	*
19.	Whether a loop originates at a remote switching unit (RSU)	Not provided. BellSouth will provide the terminal address but it is unknown from the data available if this is an RSU. The loop makeup beyond the RSU will be provided and it is not necessary to know that the pairs originate at an RSU versus a Remote Terminal to determine loop qualification.
20.	Location of RSU (Remote Switching Unit)	Not provided. BellSouth will provide the terminal address but it is unknown from the data available if this is an RSU. The loop makeup beyond the RSU will be provided and it is not necessary to know that the pairs originate at an RSU versus a Remote Terminal to determine loop qualification.
21.	Type of RSU (Remote Switching Unit)	Not provided. BellSouth will provide the terminal address but it is unknown from the data available if this is an RSU. The loop makeup beyond the RSU will be provided and it is not necessary to know that the pairs originate at an RSU versus a Remote Terminal to determine loop qualification.
22.	Type of Plant (aerial or buried)	*
23.	Location of repeaters	Not available at this time.
24.	Type of repeaters	Not available at this time.
25.	Quantity of repeaters	Not available at this time.
26.	Availability of spare facilities	*
27.	Quantity of Low pass filters	Not available at this time. BellSouth is investigating the possibility of providing this information with the mechanization of Line Sharing, targeted for production in 4Q00.
28.	Location of Low pass filters	Not available at this time. BellSouth is investigating the possibility of providing this information with the mechanization of Line Sharing, targeted for production in 4Q00.
29.	Quantity of Range extenders	Not available at this time.
30.	Location of Range extenders	Not available at this time.
31.	Number of gauge changes	*
32.	Resistance Zone	Not available at this time, but being evaluated for inclusion in the next release, targeted for production in 4Q00.
33.	Presence of DC voltage	Not available in mechanized systems.

A Brief History of Outside Plant Design

1. The term "outside plant" refers to all physical telecommunications facilities located outside of central office buildings, normally consisting of poles, conduit, fiber optic cable, copper cable, and ancillary equipment. Issues surrounding outside plant form the basis for the majority of unresolved concerns in this case.

2. Engineering design must take into account transmission characteristics of copper cable. Customers are lumped into geographical groupings, and then a fail-safe transmission design is created for all customers in that grouping, using the worst case loop. This simplifies distribution network design. (*See* Bellcore, *Telecommunications Transmission Engineering*, 1990, p. 91.) Such a grouping of customers is normally referred to as a *Distribution Area*. All cables within a Distribution Area should have a uniform cable gauge makeup and loading characteristics. (Load coils are inductors placed on copper cable wires to counteract the effects of increasing capacitance as pair lengths become longer.) This traditional simplified engineering planning and design method, also known as "prescription design," has been used for decades to preclude the engineer from having to do a manual loop qualification for each individual loop within the Distribution Area.

3. Over many years, several distribution network designs have evolved. The major distribution network designs that evolved are *Multiple Plant*, *Dedicated*

Plant, *Interfaced Plant*, the *Serving Area Concept* ("*SAC Design*"), and the *Carrier Serving Area Concept* ("*CSA design*"). Network design has evolved such that CLECs can provide either advanced or analog services over the vast majority of existing outside plant.

4. *Multiple Plant* (pre-1960s): *Multiple Plant* design dates back to the days of party line service. While there are still some customer lines on party line service, the industry has long recognized that party line service should have been eliminated years ago in order to provide equivalent service levels to all end users of POTS common carrier service. This very old design created many cases of "bridged tap."

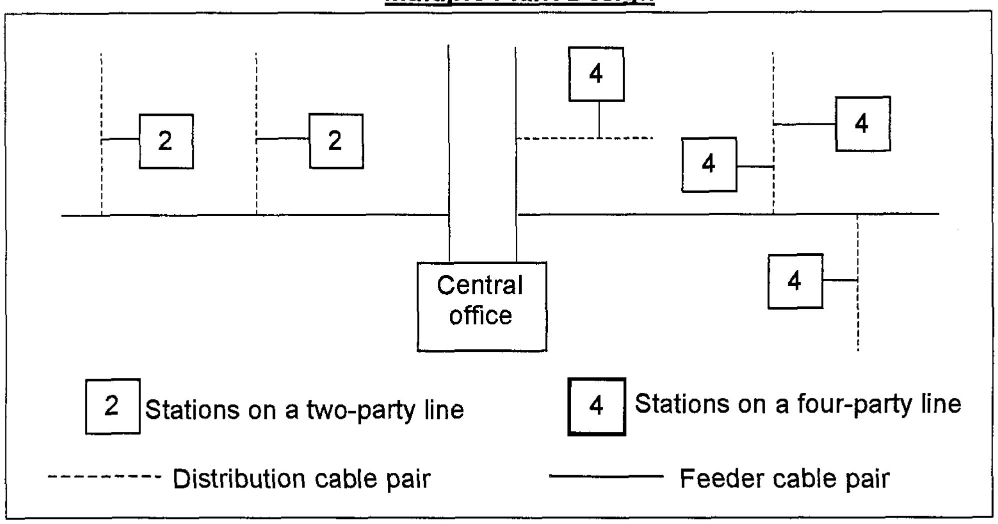
5. *Bridged tap* is defined as follows:

> Bridged tap [occurs when] an extra pair of wires [is] connected in shunt [parallel] to a main cable pair. The extra pair is normally open circuited but may be used at a future time to connect the main pair to a new customer. Short bridged taps do not effect voice frequency signals but can be extremely detrimental to high frequency digital signals. (Gilbert Held, *Dictionary of Communications Technology*, John Wiley & Sons 1995, p. 56.)

6. *Bridged tap* was initially used so that telephone companies could provide facilities less expensively in a market where not all customers would want telephone service. Since an exact customer requesting dial tone, among several, could not be predicted, use of bridged tap allowed the company to draw dial tone on one pair of wires at several locations. That outdated environment produced a design concept called "multiple plant." *Multiple plant* is defined as follows:

> Multiple plant design involves splicing two or more distribution pairs to a single feeder pair, as illustrated [below]. That is, feeder and distribution plant are combined with no interface between them. This procedure provides flexibility to accommodate future assignments by providing multiple appearances of the same loop pair at several distribution points. In times when multiparty service was common, it accommodated field-bridging of party-line stations, saving feeder pairs at the cost of added field work for rearrangements. However, adding new feeder pairs forced line and station transfers to relieve the distribution cables. Because changing existing plant or adding new facilities is labor intensive and because party-line service continues to shrink, multipled plant design has been largely replaced by other designs. (Bellcore, *Telecommunications Transmission Engineering*, 1990, p. 92.)

Multiple Plant Design



7. *Dedicated Plant* (late 1960s): *Dedicated plant* was a short-lived attempt to provide a permanently assigned cable pair from the central office main distributing frame ("MDF") to each customer's Network Interface, without a Feeder Distribution Interface. This resulted in little network flexibility, and created maintenance problems. "… [D]edicated plant has been superseded by

interfaced plant." (Bellcore, *Telecommunications Transmission Engineering*, 1990, p. 92.)

8. *Interfaced Plant* (1960 - 1972): *Interfaced plant* design guidelines mandated the use of a Feeder Distribution Interface ("FDI"),

> a manual cross-connection and demarcation point between feeder and distribution plant.
>
> Compared to multipled and dedicated plant, interfaced plant provides greater flexibility in the network. The serving area concept, discussed below, uses the interfaced plant design. (Bellcore, *Telecommunications Transmission Engineering*, 1990, pp. 92-93.)

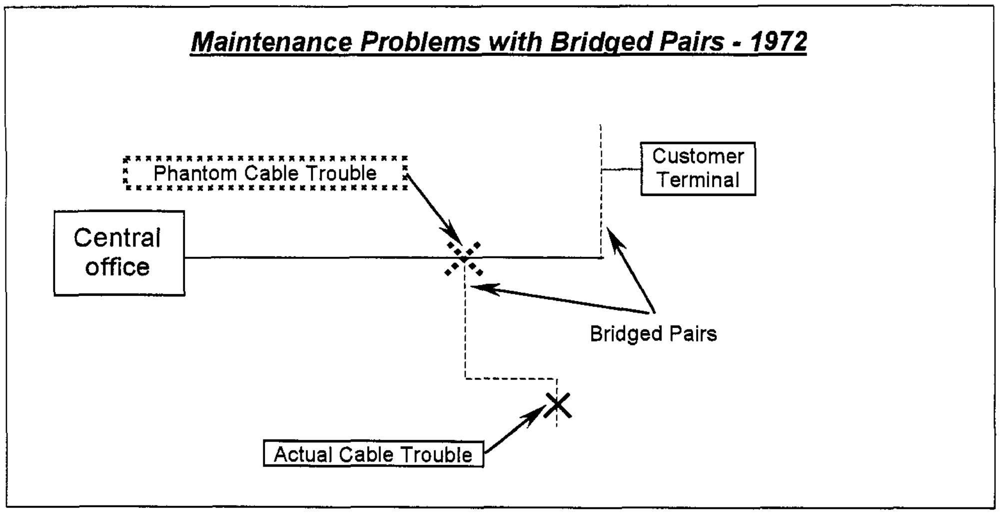
9. *Serving Area Concept* (1972 - 1980+): The *Serving Area Concept* ("*SAC*") design was introduced in the early 1970s as a prescription simplified engineering planning and design method, and was the first major attempt to modernize the network to care for growing and ubiquitous service to an ever shifting customer base. Many concepts carried over into the *Carrier Serving Area* ("*CSA*") design guidelines that have been used since approximately 1980. The following are important aspects of *SAC* design that form the basis for the modern day concept of outside plant planning and design that have been in place for over 27 years:

> Portions of the geographic area of a wire center are divided into discrete serving areas...
>
> The outside plant within the serving area is the distribution network. It is connected to the feeder network at a single interconnection point, the serving area interface [or feeder distribution interface].

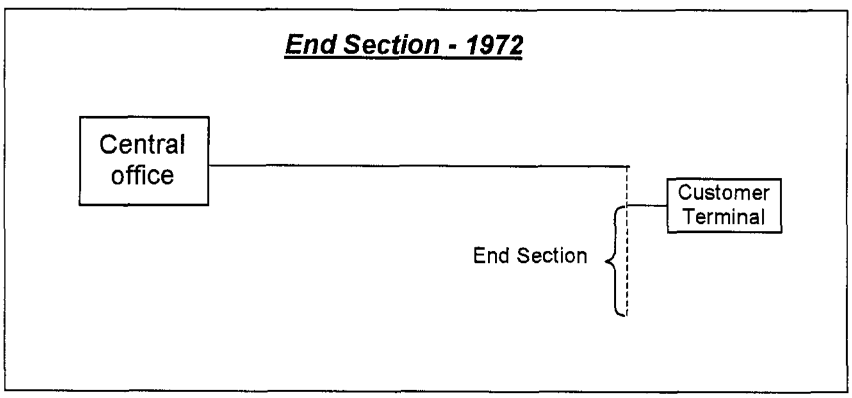
> ... it simplifies and reduces engineering and plant records necessary to design, construct, administer, and maintain outside plant...
>
> **It aids transmission by minimizing bridged taps**, a distinct advantage in providing services of bandwidth greater than voice. (Bellcore, *Telecommunications Transmission Engineering*, 1990, pp. 92-93, emphasis added.)

The *SAC* concept also stated that there should be no multipled copper feeder cable (i.e., no bridged tap at all in copper feeder plant), no multipled copper cable binder groups between distribution cable side legs (i.e., no bridged tap at all in copper distribution plant), and that a primary and secondary copper distribution pair would be dedicated to a customer's block terminal, with those pairs cut dead beyond the serving terminal (i.e., no bridged tap in the form of "end section" for at least 2 pairs per living unit).

Another reason for eliminating all *bridged taps* from distribution side legs involved the ability to locate cable troubles. Where a single cable pair appeared in two different side legs, if there was a cable trouble off of the direct route back to the central office, in the side leg nearer to the central office, test measurements using a Wheatstone Bridge would indicate that the trouble was at the bridged tap splice, not at the actual trouble location. The following diagram illustrates the problem with *bridged taps* on distribution side legs:



Whereas the previous diagram illustrates the maintenance reasons for eliminating bridged tap between a customer and the central office, the following diagram shows the existence of end section, which is electrically similar, but is bridged in parallel with the working line, going away from the customer's location, rather than between the customer and the central office.



An end section should not be longer than 2,000 feet, thereby meeting the 1980 CSA design criteria that the industry has generally adopted. This end section should occur only for the rare occasion when the xDSL line is the third line to this customer, since the primary and secondary pairs should have been cut off at the serving terminal.

Carrier Serving Area (1980+): The next guideline for modernizing the network was the introduction of the "*Carrier Serving Area Concept*" to care for customers' demand for increasing transmission bandwidth. This new *CSA* prescription simplified engineering planning and design guideline initially used a simple 900 ohm rule that could be equated to loop lengths depending on wire gauge. The following Bellcore description indicates precisely the loops desired by service providers in provisioning xDSL loops of any kind currently in the marketplace:

> The maximum allowable bridged-tap is 2.5 kft, with no single bridged-tap longer than 2.0 kft. All CSA loops must be unloaded and should not consist of more than two gauges of cable. (Bellcore, *Bellcore Notes on the Networks - Issue 3*, December 1997, p. 12-5.)

10. Summary: What we have is a history clearly stating that all loops since 1980 should have been designed to the *CSA* concept that would support sought-after digital services. All loops since 1972 should have at least been designed under the *Serving Area Concept*, in which all distribution cable, within an entire *Distribution Area*, has the same transmission characteristics (all loaded or all non-loaded), all of the same copper gauge cable, and with no bridged tap. Therefore, correctly designed outside plant for the past 27 years should

present little problem to CLECs applying for xDSL service loops. Loops older than 27 years are far beyond their useful service lives and depreciation lives.

11. It should be noted that xDSL technologies were created under the vision that most existing copper circuits would support much higher bandwidth using sophisticated electronics. The legacy of that position goes back to the promulgation of CSA guidelines in 1980. Thus, most loops in an ILEC's outside plant inventory can support DSL and voice service because network design has evolved such that CLECs can provide either advanced or analog services over the majority of existing outside plant. CLECs just want a normal, well-designed copper loop. CLECs are not requesting a host of "unusual loops" or "unique loops" that justify the imposition of "unusual" and "unique" special charges.