New England Telephone and Telegraph Company

d/b/a Bell Atlantic

xDSL CONDITIONING

&

LINE SHARING

DIRECT TESTIMONY

OF

BRUCE F. MEACHAM

June 14, 2000

I. INTRODUCTION

Q. Please state your name, business address and current position.

A. My name is Bruce F. Meacham and my office is located at 125 High Street, Boston, Massachusetts. I am a Senior Specialist – Service Costs in Bell Atlantic's Finance Department with responsibility for serving as a witness on nonrecurring cost studies.

Q. Have you previously provided testimony on nonrecurring costs?

A. Yes. I testified for Bell Atlantic on the UNE Nonrecurring Cost Study submitted in Rhode Island for Docket No. 2681.

Q. Please describe your professional background and in particular those aspects that qualify you to assume this responsibility.

A. I was first employed by the Company in 1972 in the Outside Plant Engineering Department. In 1975, I was assigned to the General

Engineering Department where I held several positions performing and supervising jurisdictional separations studies of Company investments and expenses used for division of revenue settlements, cost of service studies and tariff filings.

In 1986, I transferred to the Marketing Department where I was responsible for developing embedded and incremental costs to support regulatory proceedings and rate cases, new product or service offerings, and special contracts for facilities-based pricing options. From 1989 to 1992 I had responsibility for developing methods and controls for tracking the costs of enhanced products and services to meet state and federal requirements for nonregulated business activities. In 1992, I joined the Finance Department where I analyzed expense and force budgets for the Marketing and Engineering Departments. Since 1993, I have been working in Service Costs where I first held responsibilities for producing business unit financial reports. Following the enactment of the Telecommunications Act of 1996 (the Act), I became responsible for performing and testifying to cost studies to support our requirements under the Act, particularly for wholesale services, and unbundled network elements.

I am a graduate of the University of Massachusetts where I received a Bachelor of Science degree in Industrial Engineering and a Masters degree in Business Administration. In addition, I received a Master of Science degree in Accounting from Suffolk University, in May 1999.

II. purpose

Q. What is the purpose of this testimony?

A. The purpose of this testimony is to introduce and support the cost studies that were performed to determine the appropriate recurring and non-recurring rates for Bell Atlantic – Massachusetts' ("BA-MA" or "the Company") xDSL and line sharing tariff offerings, which were filed for Department approval in Docket 98-57. Topics covered in the testimony include:

I. Description of the xDSL Technologies
II. XDSL Conditioning Services
III. Line Sharing Services
IV. Non-Recurring Cost Methodology

In addition, the following exhibits are attached:

I. ADSL Conditioning Study
II. Line Sharing Cost Summary
III. DSL Work Activities, Times and Costs

IV. Survey Letter and Instructions
V. Aerial/Underground Cable Weightings

The testimony herein describes the costs submitted in BA-MA's DSL Compliance Tariff Filing (see Exhibit I) and Line Sharing Tariff Filing (see Exhibit II) on May 5, 2000.

I. DESCRIPTION OF THE xDSL TECHNOLOGIES

Q. What are xDSL technologies?

A. The term "xDSL" describes a family of transmission technologies that use specialized electronics at the customer's premises and at a telephone company's central office (or other company facility) to transmit high-speed data signals over copper cables. Thus, xDSL does not refer to any particular *service*, but to a family of *technologies* that can be used to provision a wide variety of services.

The xDSL technologies at issue in this proceeding are, by definition, copper-based; that is, they can only be utilized over copper cables. The fact that these technologies utilize copper loops enables telephone companies to extend the economic life of their embedded copper loop plant by using that plant to provision high-speed digital services. xDSL is, therefore, an interim technology — one that will eventually be displaced by fiber-based transmission technologies. It is, moreover, a technology that is based on and largely justified by the use of embedded plant. BA-MA is *not* deploying copper loops on a forward-looking basis in order to support xDSL transmission technologies or the advanced digital services that those technologies can support. However, there may be significant implications for BA-MA's forward-looking costs in that BA-MA may have to rehabilitate and maintain its embedded copper loop plant far longer than it would have absent xDSL technologies.

A. xDSL Services

Q. What xDSL transmission technologies underlie the services introduced in the DSL tariff?

A. The two xDSL technologies that are relevant to the DSL Tariff filing are Asymmetrical Digital Subscriber Line ("ADSL") and High Bit-Rate Digital Subscriber Line ("HDSL"). ADSL utilizes a twisted-pair copper loop. The technology is "asymmetrical" in the sense that it can support a signal of up to 640 Kbps from the customer to the telephone company, but a signal of much higher bandwidth — 6 Mbps or more — from the telephone company to the customer. The higher bandwidth in the telephone-company-to-customer direction permits rapid downloading of information from Internet Web servers or other databases.

Moreover, using ADSL technology, data signals can be combined with a conventional voice-grade POTS signal and transmitted over a single facility.

Q. What services can be provisioned using ADSL technology?

A. Bell Atlantic currently uses ADSL technology to provision a retail voice-and-data service known as Infospeed DSL, designed primarily to offer customers high-speed Internet access together with voice-grade POTS service. Various CLECs offer their own, competitive services based on ADSL technology.

Q. What is HDSL?

A. HDSL (for "High-Bit Rate Digital Subscriber Line") technology comes in two varieties, one of which utilizes a two-wire copper loop and the other of which utilizes a four-wire copper loop. The two-wire version supports symmetrical transmission at speeds of up to 784 Kbps; the four-wire version supports speeds of up to 1.5 Mbps. Four-wire HDSL technology can thus be used to provision DS-1 circuits.

Q. What services were introduced in the DSL Tariff?

A. The principal purpose of the May 5 tariff filing was to offer unbundled loops qualified for ADSL and HDSL transmission. CLECs wish to use such loops to provision their own data transport services. More specifically, the tariff offers the following new offerings:

- Digital two-wire link (ADSL Qualified)
- Digital two-wire link (HDSL Qualified)
- Digital four-wire link (HDSL Qualified).

These links are simply two- or four-wire copper loops that will support the transmission of ADSL or HDSL signals. They extend from the customer's premises to an interconnection point between BA-MA and the CLEC, located at a collocation arrangement in BA-MA's central office. BA-MA does not provide the xDSL terminating electronics at either end of the transmission path. Those are provided by the CLEC, its customer, or a third party.

A. **Digital Designed Loops**

Q. What are "Digital Designed Loops"?

A. As will be described in greater detail below, certain technical difficulties arise when ADSL or HDSL signals are transmitted over loops that exceed a certain length or that are otherwise configured in ways that impair xDSL transmission. For example, in accordance with standard industry practice, copper cables greater than 18,000 feet in length are generally fitted with "load coils" to improve their voice transmission characteristics. The presence of such coils, however, results in rapid deterioration of high-frequency signals used in xDSL transmission. As a result, loops greater than 18,000 feet in length, unless they are specially "conditioned" by the removal of load coils, are generally unsuitable for ADSL transmission. Accordingly, BA-MA's offering of wholesale ADSL-qualified links is generally limited to links of less than 18,000 feet. These lengths include any bridged taps that are present.

Nevertheless, BA-MA recognizes that some CLECs may wish to offer ADSL-based services over "long" loops (or other types of loops that impair xDSL transmission), and the DSL Tariff attempts to accommodate those wishes. If a CLEC desires ADSL transmission over loops exceeding the threshold length of 18,000 feet, or loops that are otherwise incompatible with ADSL transmission, BA-MA offers loop conditioning options. Loops that require special conditioning for DSL transmission are offered separately as "Digital Designed Links" ("DDLs"). Rates and regulations applicable to DDLs are also included in the DSL Tariff.

B. DSL Conditioning Charges

Q. What charges are proposed for for ADSL, HDSL and DDLs in BA-MA's DSL Tariff?

A. The charges for these services, as well as the charges proposed for Line Sharing, are described in Ms. Amy Stern's testimony.

Q. What recurring charges does BA-MA propose for ADSL- and HDSL-qualified links and DDLs?

A. The recurring charges for the underlying loops are based on existing, Department-approved recurring rates for two- and four-wire analog loops. Those recurring charges are not at issue here, and will therefore not be discussed further in this testimony. As discussed below, BA-MA proposes two recurring charges associated with prequalifying and maintaining xDSL loops and line shared loops.

Q. What non-recurring charges has BA-MA proposed with respect to ADSL-compatible loops, HDSL-compatible loops, and DDLs?

A. BA-MA has prepared a number of costs supporting the proposed "conditioning" charges related to these loops. These charges are listed below. All of the DSL Conditioning charges are non-recurring charges ("NRCs"), with the exception of the Mechanized Loop Qualification Charge and the Wideband Test

Access Charge, which are monthly recurring charges. Below is a list of the proposed charges for which costs were developed.

DSL CONDITIONING CHARGES	TYPE OF COST
Mechanized Loop Qualification	Recurring
Manual Loop Qualification / Inquiry	Non-recurring
Engineering Query	Non-recurring
Engineering Work Order	Non-recurring
Removal of Bridged Taps (One Occurrence)	Non-recurring
Removal of Bridged Taps (0 to 18,000 feet)	Non-recurring
Removal of Load Coils (21,000 feet)	Non-recurring
Removal of Load Coils (27,000 feet)	Non-recurring
Cooperative Testing	Non-recurring
Add Electronics (Repeater)	Non-recurring
Wideband Test Access	Recurring

Q. Are the rates proposed by the Company identical to those set forth in the D.T.E. Tariff No. 17 Compliance Filing delivered May 5, 2000?

A. Yes.

I. xDSL CONDITIONING SERVICES

Q. What types of functions are associated with BA-MA's proposed xDSL Conditioning charges?

A. The xDSL Conditioning charges basically fall into two categories:

- Charges related to loop qualification — *i.e.*, to determining whether a particular loop is qualified for ADSL or HDSL transmission. These include the Mechanized Loop Qualification Charge, the Manual Loop Qualification Charge, and the Engineering Query Charge.

- Charges related to loop conditioning. Charges in this category include the Engineering Work Order Charge, the Removal of Bridged Taps Charge, the Removal of Load Coils Charge, and the Add Electronics Charge.

In general, a CLEC would order services in the first category for all or most loops on which it wishes to offer xDSL-based services, in order to determine whether those loops are appropriately qualified. Services in the second category would only be ordered where the CLEC wishes to offer xDSL-based services over a loop that is not initially qualified for the services that the CLEC wishes to offer.

Q. Does BA-MA incur qualification and conditioning costs with respect to the loops that it uses to offer Infospeed DSL service?

A. BA-MA, like CLECs, incurs qualification costs to determine whether a particular customer's line qualifies for its ADSL-based Infospeed DSL service. The extent to which CLECs will incur conditioning costs depends upon the terminating electronics that they choose to use and the extent to which they are willing to limit their offerings to customers whose loops meet certain requirements. BA-MA has chosen, at least for the present, to limit its own retail offering to loops of 15,000 feet or less that do not require any conditioning, and accordingly does not incur any conditioning costs. Other carriers may choose to offer their DSL-based services to a wider range of customers, and if they do, they may incur conditioning costs that BA-MA does not incur.

A. The Loop Qualification Process

Q. Please provide an overview of the loop qualification process.

A. The primary means by which CLECs can obtain loop qualification information is by submitting queries to BA-MA's automated loop qualification database (the "Database"). This Database supports both BA-MA's retail service and the provision of unbundled ADSL/HDSL-compatible links to CLECs.

Since the Database is still in the process of being built on a central-office-by-central-office basis, in some cases a loop on which a CLEC wishes to offer an xDSL-based service may not yet be included in the Database. Alternatively, if the Database shows that the loop does not qualify, the CLEC may wish to determine *why* it is not qualified (*e.g.*, the presence of load coils, the presence of Digital Loop Carrier ["DLC"] equipment, or excessive loop length). (The particular information that a CLEC may need to qualify a loop for its own services depends on the nature of those services, and in particular on the technical characteristics of the terminating electronics that the CLEC chooses to use.) In such case, additional information can be provided through a Manual Loop Qualification process. Further information that may be of interest to CLECs offering specialized services, such as cable gauges and the location of load coils, is available through the Engineering Query process.

A CLEC that is offering services comparable to BA-MA's retail services should be able to get all of the qualification information it needs from the Database (provided that the Database has been created for the central office in question). The Manual Loop Qualification and Engineering Query processes recognize the fact that CLECs may wish to offer services with more stringent technical requirements than Infospeed DSL.

Q. What charges are proposed for the qualification function?

A. A recurring Mechanized Loop Qualification charge, applicable to all loops used to offer xDSL-based services, is proposed to recover a pro rata share of the costs incurred in the creation and maintenance of the Database. Non-recurring charges imposed on the requesting carrier are proposed to recover the costs of Manual Loop Qualification and Engineering Query.

1. **Mechanized Loop Qualification**

   Q. What information can a CLEC obtain from the Database and how is it obtained?

   A. A CLEC can submit a query to the Database through BA-MA's standard Operations Support System wholesale interfaces, including both EDI and the Web GUI. The query may identify the loop in question by telephone number or address. The principal loop qualification information that is available from the Database and that would be of interest to CLECs is the total metallic loop length (including bridged taps), as determined by an MLT test. The Database will also indicate, however, whether or not the loop is qualified for the offering of Infospeed DSL service. (A loop is deemed qualified for Infospeed DSL if the total loop length, including bridged tap, is less than 15,000 feet, if the loop is *not* served by DLC, and if T1 is absent from the loop's binder group.)

   It should be noted that although the Database is accessed by entering a particular telephone number or address, the loop qualification information is generated and stored on a terminal-by-terminal basis. The information returned from the Database indicates whether qualified loops are available within the terminal serving the specific location in question.

Q. How is the Database being created?

A. The creation of the Database for a particular terminal involves MLT testing of a sample of the loops in that terminal. The testing is carried out on an automated, bulk-testing basis that greatly reduces the time and cost per test. The loop-length information obtained from the MLT test is then associated in the database with the telephone number and address of each of the loops served by that terminal.

On an ongoing basis, the Database will be updated to reflect any changes in loop qualification information resulting from modifications or rearrangements to loop facilities (*e.g.*, the upgrading of a particular loop from copper to DLC).

Q. How many offices are currently included in the Database?

A. As of the end of March 2000, 93 percent of offices with an existing or pending CLEC collocation presence were included in the Database. Priority is being given to offices based on BA-MA's proposed roll-out of retail Infospeed service, the presence of CLEC collocation, and specific CLEC forecasts for the offering of their own xDSL-based services.

Q. Is BA-MA considering the inclusion of additional loop qualification information in the Database?

A. Yes. As originally configured, the Database did not indicate why a particular loop was unqualified for Infospeed (*i.e.*, whether the lack of qualification is due to excessive length, or the fact that the loop contains a DLC system, or the fact that the loop is in a binder group with a cable being used for T1 transmission). Beginning early this year, the Company began adding additional fields to the Database to include this information. These fields will be populated for newly qualified offices on an ongoing basis. For offices already in the Database, the fields will be populated for terminals tested pursuant to the Manual Loop Qualification process, as such manual testing is completed.

Q. Why doesn’t the Database include *all* information that might be of interest to CLECs intending to offer ADSL/HDSL-based services, and that currently must be obtained through the Manual Loop Qualification or Engineering Query processes?

A. Obtaining information on cable gauges, load coil locations, etc., for *all* of BA-MA’s loops — and using it to populate a greatly expanded database — would require a massive and highly expensive effort. Paper records ("cable plats") would have to be reviewed for literally millions of loops. This would greatly expand the cost of the Database for all carriers, including those whose chosen technologies do not require such detailed information. In contrast, under BA-MA’s less extravagant approach, unnecessary costs are not incurred to review cable plats for loops that may never be used to offer xDSL-based services. Moreover, under BA-MA’s approach, the costs of paper-record-review would be imposed in a cost-causative manner only on those CLECs whose services require the additional information.

Q. What charges are associated with the Database?

A. BA-MA has proposed a Mechanized Loop Qualification Charge. This is a recurring charge, imposed on all ADSL-capable loops ordered by CLECs. (The associated cost is also identified as a cost of all loops used to provide Infospeed DSL service, and is covered by the retail rate for such service.)

The Mechanized Loop Qualification Charge would not be imposed on loops served by central offices that are not included in the Database at the time of the CLEC request. It also would not be imposed on CLECs that choose not to consult the Database prior to ordering an ADSL/HDSL-compatible loop or DDL.

Q. What activities are involved in Database maintenance?

A. The activities involved in Database maintenance are related to program changes, loading and extracting data, and the updating of the records in the database performed by engineers in the Facilities Management Center ("FMC"). In general, these activities will be conducted on an ongoing basis as a consequence of changes in facilities, growth in loop plant, and CLEC requests for additional information not originally included in the Database.

This expense is in no way related to the computer-operations, software-development, and database management type expenses assigned for recovery through Annual Cost Factors ("ACFs") under such USOA Accounts as 6724 (Information Management).

2. Manual Loop Qualification

Q. What information is available through the Manual Loop Qualification process?

A. Information available through the Manual Loop Qualification process includes: (a) total metallic loop length (inclusive of bridged tap), (b) presence of load coils (yes/no), (c) presence of Digital Loop Carrier equipment (yes/no), and (d) qualification per BA-MA's standards.

Q. How is the Manual Loop Qualification Process carried out?

A. The first step in Manual Loop Qualification is a check of the Loop Facilities Assignment and Control System ("LFACS") database for the loop in question. (LFACS is a Bellcore-designed system that inventories and assigns all loop facilities from the serving terminal to the main distribution frame in the central office. It is not a circuit design tool.) LFACS provides certain information necessary to carry out MLT tests. LFACS may also include, for some loops, information regarding the presence or absence of load coils, bridged taps, the length and gauges of the associated copper cables, and whether the loop is on DLC.

The next step is the performance of the MLT test. BA-MA estimates that it will be possible to complete the test in about 80% of the cases. (Factors that might interfere with the test in the remaining 20% of the cases include the absence of available test trunks, the absence of working POTS lines at the terminal, a line busy condition, loop fed-by electronics, and trouble on the line.) Where an MLT test cannot be completed, the Manual Loop Qualification request is referred to the engineering staff at the FMC in order to locate and review the relevant cable plats. This review will determine the presence or absence of load coils and the presence or absence of DLC.

Where the test is carried out and fails (*i.e.*, indicates that the loop is not qualified) — a situation which will occur for about half of the loops for which the test is completed — the request will be referred to the FMC for a determination of the reasons for the failure, and the results will be reported to the CLECs. Where the test is carried out and passes, no further information is required, so the qualification result is simply reported.

A more detailed description of the steps involved in the Manual Loop Qualification process is set forth below, broken down by the personnel category responsible for each step.

MANUAL LOOP QUALIFICATION

Maintenance Administrator ("MA")

Receives and reviews request from Telecommunications Industry Services Operations Center ("TISOC") via Local Service Request ("LSR") with a loop qualification form. The request is transmitted via Lotus Notes.

Checks LFACS database for valid address and telephone number, and for existence of spare facilities

Sets up the telephone number; performs the MLT test on a working pair at the requested service location; and obtains the loop length

Evaluates and examines the test results

The test results are divided into the following categories:

- MLT test cannot be completed
- MLT test indicates that the circuit does not qualify
- MLT test indicates that the circuit qualifies

If the MLT test cannot be completed, documents that fact and refers the loop qualification form to Facilities Management Center ("FMC") for an engineer and engineering clerk to check the paper records

If the line does not qualify, annotates the loop qualification form with loop length and forwards the loop qualification form to the FMC for an engineer and engineering clerk to check the paper records

If the line qualifies, returns the loop qualification form so annotated to the TISOC to notify the CLEC

Engineer

Receives and reviews loop qualification form from the MA for (a) those circuits that could not be tested and (b) those lines that did not qualify for the requested service and need required information on the presence or absence of load coils and DLC Assigns task to Engineering Clerk to check paper records

Engineering Clerk

Receives and reviews Notice for Manual Inquiry

Researches LFACS database for terminal location, cable count, and telephone number

Reviews cross-reference dictionary for plat number(s)

Pulls cable plat(s) for aerial and underground routes

Determines from the cable plat(s) the loop length by calculating distance from the central office to the serving terminal for those requests which could not be tested

Determines from the cable plat(s) the presence or absence of load coils, or whether facilities are on DLC for all requests

Enters cable length and the presence or absence of load coils and DLC into the LFACS database

Posts information to the loop qualification form

Forwards loop qualification form to the Engineer for review

Engineer

Reviews and analyzes data supplied by the Engineering Clerk and posted to the loop qualification form

Returns completed loop qualification form to the TISOC

Q. Why can't the CLEC conduct the MLT test and access the LFACS database itself?

A. Conducting an MLT test requires access to the switch port for the loop being tested. Since the CLEC does not provide the switching function, the CLEC in general would not have — and should not have — access to switch ports assigned to customers that it does not serve. Accordingly, in most cases, a CLEC will not have MLT-test access to the loops that need to be tested in a particular terminal.

Direct CLEC access to LFACS is problematic for several reasons, and is also unnecessary.

First, LFACS is primarily a loop inventory system, designed for use by BA-MA's engineering staff in planning the need for facilities expansion in particular service areas. Although it may contain, for a number of loops, certain information relevant to loop qualification, that information is not present for many loops, and in any event it is not updated on a consistent basis, since it is not needed to support LFACS’ primary function.

Second, the only LFACS information that would be relevant to loop qualification — *i.e.*, the presence or absence of DLC and of T1 in the binder group — is now or will in the near future be available from the Database on a more reliable basis.

Third, providing CLECs with unrestricted direct access to LFACS, even on a read-only basis, would give CLECs access to proprietary information concerning the services being provided on particular loops, and the addresses to which they are being provided. Such information would comprise customer information to which carriers not serving the customer should not have access.

Finally, it should be noted that BA-MA’s retail representatives do not have direct LFACS access. The system is utilized by BA-MA’s network planning and engineering organizations. BA-MA’s Infospeed sales forces, like CLECs, obtain their qualification information from the Database.

Q. Why does BA-MA need to consult paper records in order to determine loop make-up information? Why isn’t such information available — for all loops — from a mechanized database such as LFACS?

A. BA-MA has almost 100,000 pages of cable and other outside plant plats, each of which contains highly detailed information on outside plant location and configurations. "Mechanizing" these records for effective use could not be accomplished simply by scanning the documents and storing the images electronically. Rather, the *information* encoded in the plats would itself have to be entered — primarily manually — into a system sophisticated enough to store all of this information efficiently, to retrieve relevant information in response to a wide range of possible queries, and to update the information as needed. The costs of such a process would be enormous — certainly in excess of $100 million — and would take over five years to implement. To date, the Company has not judged it cost effective to undertake this effort. Certainly, it cannot be justified for the purpose of marginally reducing the costs of providing one particular service.

Q. Should information derived from the Manual Loop Qualification process be stored in the Database, as many CLECs have suggested?

A. BA-MA began to introduce this feature in the first quarter of this year.

It should be noted that even following this Database upgrade BA-MA still will not be able to store in the Database the results of Manual Loop Qualifications for loops served by central offices that have not yet been qualified. Until the central office is "created" in the Database, there will be no records to populate with the Manual Loop Qualification information. (However, since virtually all collocated offices will have been qualified by the end of 1999, this should be a relatively insignificant issue.)

1. Engineering Query

Q. When would the Engineering Query process be utilized by a CLEC?

A. In some cases, in order to design and implement its services, a CLEC may desire additional information even beyond that provided by the Mechanized and Manual Loop Qualification processes. Such information might include the number and location of bridged taps, the number and location of load coils, the location of Digital Loop Carrier equipment, or the cable gauge at specific locations. To the extent that such information is available from BA-MA's cable plats, the Company will search for it and provide it to CLECs upon request. The Engineering Query Charge recovers the costs associated with processing and responding to such requests.

It should be emphasized that there is no "standard" Engineering Query response. The information provided depends upon the specific information requested by the CLEC and on the availability of such information.

Q. Why can't this information be obtained from the Manual Loop Qualification process, which may also entail review of cable plats?

A. First, not all Manual Loop Qualification requests result in the review of paper records. Indeed, the proposed Manual Loop Qualification rate assumes that such review will only be required in about 60% of the cases. Moreover, even when cable plats are consulted, the Manual Loop Qualification process only involves a cursory review of those records to determine the presence or absence of DLC and load coils. Engineering Query entails a more detailed — and hence more time-consuming and costly — review. Keeping the two processes separate imposes the costs of the more detailed review in a cost-causative manner only upon those carriers that need the additional information.

Q. What functions are required to respond to an Engineering Query request, and who carries them out?

A. The functions required for Engineering Query are listed below:

ENGINEERING QUERY

Maintenance Administrator ("MA")

Receives and reviews request from TISOC via Local Service Request ("LSR") with a loop qualification form. Request is transmitted via Lotus Notes.

Checks LFACS for database for valid address and telephone number, and for existence of spare facilities

Sets up and performs the MLT test using telephone number retrieved from LFACS for the requested service location and obtains the loop length

Evaluates and examines the test results

The test results are divided into the following categories:

- MLT test cannot be completed
- MLT test indicates that the circuit does not qualify
- MLT test indicates that the circuit qualifies

If the MLT test cannot be completed (short circuit, line busy, metallic trouble, open on frame, etc.), documents that fact and refers loop qualification form to Facilities Management Center ("FMC") for an engineer to check the paper records

If the line does not qualify, annotates the loop qualification form with loop length and forwards the loop qualification form to the FMC for an engineer and engineering clerk to check the paper records. If the line qualifies, returns the loop qualification form so annotated to the TISOC to notify the CLEC.

Engineer

Receives and reviews loop qualification form from the MA

Researches the LFACS database for terminal location, cable count, and telephone number

Reviews cross-reference dictionary for plat numbers

Pulls cable plat(s) for aerial and underground route

Determines from the cable plat(s) the location of load coils, bridged taps, and DLC remote terminal

Creates worksheet indicating the length of the run, the gauge of the wire and location of any bridge tap(s), load coils or DLC

Completes loop make-up form from the worksheet

Updates LFACS database with length, gauge, bridge tap(s), load coils and DLC information

Forwards information to the TISOC

Q. Since an Engineering Query request will in many cases follow a Manual Loop Qualification request, why does the MLT test need to be performed a second time?

A. The various qualification alternatives were not designed to be sequential, but as stand-alone options that could be ordered individually or in combination. A CLEC is perfectly free to order an Engineering Query without first ordering a Manual Loop Qualification. Accordingly, the separate alternatives were each costed on a stand-alone basis. In any event, performing the MLT test in all cases will save the costs associated with reviewing the Database when an Engineering Query is requested — and with then doing the MLT test in any event where no previous test was conducted.

A. The Conditioning Process

Q. What conditioning alternatives does BA-MA offer to CLECs wishing to offer ADSL- or HDSL-based services?

A. BA-MA offers the options of removing bridged taps and removing load coils. Both of these conditioning activities must be preceded by an Engineering Work Order request. The costs of these conditioning activities would be recovered through NRCs imposed on the carrier requesting the conditioning.

1. Engineering Work Order

Q. What is the Engineering Work Order process?

A. The Engineering Work Order process includes certain general preliminary functions associated with loop conditioning activities. These include verifying facilities availability, writing the work order, preparing the special bill generated as a result of construction, and updating records. The Engineering Work Order captures work performed exclusively by personnel in the Facilities Management Center (FMC). None of the loop *qualification* activities included in the Manual Loop Qualification or Engineering Query processes duplicate the loop *conditioning* activities included in the Engineering Work Order.

The specific functions included in the Engineering Work Order process are as follows:

ENGINEERING WORK ORDER

Engineer

Upon request for an Engineering Work Order, acquires work order number

Prepares field notes and contact telephone numbers

Designs work requirement (e.g., remove bridge tap(s), remove loads) after research of cable plat(s)

Draws schematic of work required including outside plant locations

Checks for and obtains any necessary permits

Orders equipment (if required) and updates TIRKS (if appropriate)

Sends schematic to Engineering Clerk for drafting of the work print and pre-posting of cable plat(s)

Engineering Clerk

Receives schematic from engineer for drafting

Completes the work print

Pre-posts cable plat(s)

Updates LFACS

Forwards completed work product to Engineer

Engineer

Reviews final design from drafting

Acquires necessary and appropriate approval

Schedules work with Construction

Engineering Clerk

Sends copies of engineering work order to Construction and Accounting

Engineer

Receives completion notice from Construction

Completes and forwards billing information to Special Billing Unit

Engineering Clerk

Receives completion notice from Construction and final posts the work order on the cable plat(s)

Sends final completion notice to Accounting (Assets).

Q. Why must the FMC perform these functions?

A. This work is necessary because:

- The Company must verify that facilities are *still* available when the CLEC places the final order.
- Tasks associated with writing the final work order are not completed until notification from the CLEC that it will move ahead with the conditioning charges and this effort is clearly not contained in any other rate element.
- Work associated with preparing a bill is only included when a firm order is issued for the conditioning work and is not contained in any other rate element.
- Updating records to reflect the removal of load coils or bridged taps on plats will not occur until after a firm commitment is received from the CLEC ordering loop conditioning.

Q. Why should the cost of the Engineering Work order include the cost of updating databases and cable plats?

A. Updating the LFACS and LIVEWIRE databases reflects the changed condition of the facilities. Also, updating the plats ensures that they will convey up-to-date information the next time that they are utilized for the purpose of providing loop qualification information to CLECs. Moreover, updating relevant records is an integral part of the process of modifying BA-MA’s outside plant. It is appropriate that the cost causer — *i.e.*, the carrier that requested that the work be done — be billed for this cost.

1. **Removal of Load Coil**

   Q. What is a load coil?

   A. A load coil is an inductor that is connected into a loop in order to improve its voice transmission characteristics. Such coils are generally utilized on longer copper loops, specifically those longer than 18,000 feet. At such lengths, an unloaded copper loop may distort a voice signal by attenuating higher frequencies within the audible range. The load coil "flattens" the frequency/response curve in the audible range, ensuring that significant voice frequencies are not excessively attenuated.

Q. What is the significance of load coils for the offering of ADSL- or HDSL-based services?

A. Despite the benefits they provide for voice transmission, load coils cause severe signal attenuation in the frequencies above the voice band (*i.e.*, above 3,000 Hz). Accordingly, "loaded" loops are generally unsuitable for xDSL transmission.

Q. What functions are associated with load coil removal?

A. The functions required for Load Coil Removal are as follows:

LOAD COIL REMOVAL

General Clerk

Builds work operations in ECRIS

Splicing Technician(s)

Receives work assignment from foreman and travels to job site

Upon arrival at job site, sets up work area protection

If underground, opens manhole and begins purging the manhole to dissipate any stagnant gas, ensures against oxygen deficiency, and provides a complete air change in the manhole pump manhole if required

If underground, tests the manhole environment to ensure there is no combustible gas prior to entering

If underground, sets up the inside of the manhole for work to be done

If aerial, sets up bucket truck and/or ladder and platform

Identifies and opens the splice case

Sends tone from central office on the pairs to be unloaded

After identification of the pairs, monitors to ensure there is no traffic

Cuts off pairs at both ends (one pair from the splice case to the load coil and one pair from the load coil back to the splice case)

Splices pairs through

Closes splice

Tears down site set-up and remove work area protection

Travels to next site and repeats above process as necessary.

General Clerk

Completes the work operations in ECRIS

Closes out the order and sends completion notice to Engineering

Q. How much work is involved in removing load coils?

A. The removal of load coils is a relatively complex and difficult process. With the advent of DLC equipment and its initial deployment in the local loop to serve long-loop customers approximately twenty years ago, and with the introduction of the Service Area Concept as a standard design principle, the construction of new or additional loaded telephone plant virtually ceased with minor exceptions. As a result, the vast majority of any loaded plant in service today in Massachusetts is at least twenty years old. Plant of this vintage was constructed before the availability of lightweight, quick access splice enclosures, or in many cases, before the use of PIC-insulated filled cable in either the aerial or underground environments.

Q. How do these facts impact the amount of effort involved in deloading a cable pair?

A. Cutting off the individual loaded pair is not the major determinant of the work time involved in the load coil removal process. Rather, it is time required to obtain *access* to the coil that is paramount. Some of BA-MA’s underground cable has lead sheath and sweated lead splice cases. Other cable may be older vintage plastic sheath cable with cast iron splice cases assembled with a dozen or more bolts and sealed at its seams with gaskets. Depending on the congestion in the manhole the splice case in question may be located behind other splice cases or cables, which may have to be temporarily rearranged to get access. Cables of any vintage located in an underground environment are pressurized to prevent water from entering the cable or splice cases, necessitating additional preparation to insure the pressure is maintained in the cable during the process of opening the splice to deload the pairs.

Even before any of this work occurs, work site protection must be set up in accordance with state/municipal highway safety rules, and the manhole, which in many cases may contain water or other material, may requires pumping or cleaning. Occupational safety standards require that the manhole be ventilated both before and during the work activities to insure the atmosphere is not harmful to the technicians. (For safety reasons, manhole work always requires a minimum of two technicians.) Then, and only then, can the technicians proceed with looking for the pair that is to be deloaded and cut off. On closing up, the technicians must also reassemble the entire case with new seals and gaskets to insure the watertight integrity of the splice case.

While less labor intensive, aerial deloading is also an involved process. In the vast majority of situations, the technician is still dealing with a unique setup and possible traffic control. In addition, the technician is working alone, so the setup, while less complex than at an underground site, may take just as long. As explained above, the cable and splice cases are on average 20 years old or more and the wires contained within the splice case may be brittle or may have lost some of their initial flexibility, so extreme care must be taken when rummaging though the hundreds of cable pairs for the correct one designated to be deloaded to avoid introducing troubles in other customers’ lines. Re-assembly of the closure requires replacement of all deteriorated components of the splice case to ensure weather-tight integrity.

Loads found in the small amount of the plant in BA-MA that is buried introduces another factor not normally encountered in the other two situations, that of hiring a contractor to dig to expose the buried load coil and splice. As with manhole work, this may require paid police traffic details. While working conditions are not as difficult as in the underground, any buried splice must be restored to ensure that the whole assembly is watertight. The case and load must ultimately be reburied and the area restored.

The fact that deloading is done at multiple locations has little, if any, impact on the time expended at any one location, as each site is unique and are generally spaced over a mile apart.

Q. What charges is BA-MA proposing to recover load coil removal costs?

A. A non-recurring Removal of Load Coil Charge recovers the costs associated with such removal. It should be noted that this charge does *not* recover any costs associated with load coil reconnection if the loop is subsequently surrendered by the CLEC and is used by BA-MA as a POTS loop.

BA-MA 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 design criteria applied by BA-MA. Since the number of load coils on a loop depends, under BA-MA's design criteria, upon its length, the charge is loop-length-sensitive. Longer loops have more load coils, and thus generate greater load coil removal costs.

Q. How much of BA-MA's cable plant is underground vs. aerial?

A. BA-MA's ARMIS data for 1998 indicate that of metallic cable, 68.5 percent is aerial, 21.8% is underground, and 9.7% is buried. However, these figures are irrelevant for purposes of these cost studies, since they reflect percentages of sheath miles, and not percentages of total loops in service. Moreover, they do not distinguish exchange cable from interoffice cable.

Q. Does BA-MA's weighting correct disparities based on loop length (since load coil removal should only be required on loops longer than 18,000 feet)?

A. Yes. BA-MA computed the weightings using information from the Company's Loop Analysis And Reporting (LART) system in combination with Outside Plant Planning Engineering inputs. The development of the aerial/underground weighting factors is explained in more detail in Section VI.E.2.a, Load Coil Removal and Bridged Tap Removal. The weighting factors are shown in Exhibit I, Workpaper Page 1, Lines 20 and 21, to this testimony.

Q. Would it be possible to achieve economies of scale by deloading more than one loop at a time.

A. Only in the rare case where load coils on two different loops being conditioned for ADSL or HDSL transmission are located at the same splice point and where conditioning for those two loops was ordered at the same time. (Obviously, deloading a pair not being used for xDSL transmission, and for which conditioning has not been requested, would simply cause BA-MA to incur uncompensated costs and would impair the voice transmission characteristics of that pair.)

Q. Does BA-MA's assumption of a constant work time per coil removed properly reflect any travel-time efficiencies that may exist where multiple coils are removed in a single job?

A. Yes. Because of the spacing of load coils along the loop, travel will be required not only to the initial removal site, but also between removal sites. The work times used in the studies implicitly incorporate the average travel time required for each removal.

2. Removal of Bridged Tap

Q. What is the significance of bridged taps for xDSL transmission?

A. As explained previously, the presence of bridged taps can impair the xDSL transmission characteristics of a loop through signal reflection and, to a lesser extent, by increasing the effective length of the loop. However, the impact is almost always modest, and certainly far less severe than that caused by load coils. Indeed, only services with unusually stringent technical requirements — certainly, far more stringent than those associated with Infospeed — would be significantly impaired by the presence of normal quantities of bridged taps. In any event, BA-MA will removed bridged taps from a DDL upon request.

Q. How would the costs of such removal be recovered?

A. BA-MA proposes to impose a non-recurring charge, the Removal of Bridged Taps Charge, on CLECs that request bridged-tapped removal. Separate charges are proposed for: (a) removal of a single bridged tap, and (b) removal of multiple taps. When the removal of multiple bridged taps is required, the Company determined that half of the time two taps must be removed and half of the time three taps must be removed, for an average of two-and-a-half taps.

The charge does not apply when bridged tap above 6,000 feet is removed from loops of less than 18,000 feet, since BA-MA's loop design criteria (which are consistent in this respect with industry standards) recommend such loops not have bridged tap in excess of that length.

Q. Is the presence of bridged tap in BA-MA's network inconsistent with industry standards?

A. No. BA-MA has constructed its plant according to established accepted standard design practices that were in effect at the time the plant was constructed or modernized. The bridged tap present in BA-MA is typical of what would be encountered in the networks of other operating telephone companies in plant of the same vintage and constructed in areas having a similar demographics to BA-MA. The guidelines governing how the local loop network was designed and built have evolved over time. This evolution has been driven by changes in the demand for services, in the types of services offered, in the relationship between the costs of material and labor, and in other factors. Such changing guidelines did not mandate wholesale redesign and replacement of network components. This situation is well understood by both standards-setting organizations and the developers and manufacturers of telecommunications equipment. As a result, telecommunications equipment is built to compensate for a reasonable variety of conditions encountered in the real world.

The fundamental intent underlying the publication of new guidelines (such as the migration to Carrier Serving Areas in the early 1980's) is to establish a framework to which the network can migrate, not to dictate an immediate replacement of the network. The bridged-tap limitations published in the early 1980s, for example, applied to plant constructed or reconstructed under CSA principles, and also provided a template that allowed local operating companies to lay out their network to conform to that concept and to identify nonconforming areas for targeting when other work triggers — such as relief or rehabilitation of plant in those areas — occurred. The new guidelines were never intended to drive a mandated program to build to the new standard absent other drivers.

Q. What tasks are included in the Bridged Tap Removal process?

A. The functions required for Bridged Tap Removal are as follows:

BRIDGED TAP REMOVAL

General Clerk

Builds work operations in ECRIS

Splicing Technician

Receives work assignment from foreman and travels to job site

Upon arrival at job site, sets up work area protection

If underground, opens manhole and begins purging the manhole to dissipate any stagnant gas, ensures against oxygen deficiency, and provides a complete air change in the manhole.

Pump manhole if required

If underground, tests the manhole environment to ensure there is no combustible gas prior to entering

If underground, sets up the inside of the manhole for work to be done

If aerial, sets up bucket truck and/or ladder and platform

Identifies and opens the splice case

Sends tone from the central office on the pairs from which bridged tap(s) are to be removed

After identification of the pairs, monitors to ensure there is no traffic

Cuts off bridged tap(s)

Splices pairs through

Closes splice

Tears down site set-up and removes work area protection

Travels to next site and repeats above steps as necessary

General Clerk

Completes the work operations in ECRIS

Closes out the order and sends completion notice to Engineering

Q. Is bridged tap removal then a process of simply finding and cutting off the correct pair?

A. The overwhelming majority of our residential customers is served from a mixture of aerial strand or pole mounted terminals, rear wall terminals, and interior building terminals that entail site set-up or access efforts. Working in and looking for the correct pair in an aerial splice closure even after site set up is not as straight forward as one might assume. As mentioned in the above discussion of load coil removal, there are varying vintages of plant and closures. If the bridged splice happens to be in the underground, the same issues that must be faced in deloading would be present here as well.

Q. Would situations in which multiple numbers of drop wires attached at intermediate terminals where service has been disconnected impose significant bridged tap removal costs on CLECs?

A. Disconnected drops attached at intermediate terminals should have little or no impact. Drops are connected to a specific pair at a terminal. According to current standards, a specific pair in the distribution will only have multiple appearances within an area limited to a block or two (or approximately 1000 feet) and, realistically, may appear in only a couple of terminals in that stretch. A drop is installed only when service is ordered, and while it may only be disconnected at the customer end, if the customer disconnects the pair itself is generally reused elsewhere only if it was installed as a second line. (Otherwise it would be dedicated to the original premises for use by the next customer.) Additionally, drops are typically only 100 feet in length or less, and even if there may be multiple drops connected to the same pair in a few intermediate terminals, the aggregate length of the bridged tap involved should be well within the tolerances of most DSL electronics, and would not have an impact on the level of service delivered.

Q. Can efficiencies be realized by removing bridged taps and load coils at the same time?

A. Bridged taps and load coils are not located within the same splice, so no savings would result from performing the two tasks at the same time.

A. **Add ISDN Electronics (Repeater)**

Q. Please explain the purpose of the Add ISDN Electronics (Repeater) process.

A. BA-MA’s existing tariff for two-wire digital (ISDN-BRI-compatible) loops is limited to loops 18,000 feet or less in length. When a CLEC orders a two-wire digital link and the metallic loop length is greater than 18,000 feet, additional ISDN Loop Extension electronics must be added to the link.

BA-MA has proposed an NRC to recover the cost of the necessary electronics, plus the labor costs associated with its installation. The cost of the electronics is BA-MA's actual, current purchase price, inclusive of all applicable discounts, and with all appropriate loadings. The cost of this extension electronics was *not* included in the rate development for the two-wire digital loop.

Q. What work functions are associated with the Add Electronics process?

A. The functions performed for ISDN Extension Electronics are as follows:

ADD ELECTRONICS (ISDN Extension)

Maintenance Administrator

Receives service order/engineering work order

Calls for a frame attendant to pretest circuit

Assists service technician as required in testing

Coordinates both the frame attendant and service technician in placing equipment at both the central office frame and the remote terminal

Re-tests circuit from central office to customer location to ensure connectivity

Central Office Switchman

Receives service order/engineering work order

Identifies the location of equipment (relay rack/frame)

After identification of the equipment, monitors to ensure there is no traffic

Adds ADTRAN repeater circuit card to equipment

Re-tests the new circuit for connectivity in conjunction with the MA and the Service Technician

Service Technician

Receives work assignment from foreman and travels to job sit

Gains access to remote terminal

Identifies the location of equipment

After identification of the equipment, monitors circuit to ensure there is no traffic

Adds ADTRAN repeater circuit card to equipment

Re-tests the new circuit for connectivity in conjunction with MA and CO Technician

Removes work area protection

Closes out work order

B. Testing

1. **Wideband Test Access**

   Q. Is BA-MA implementing a testing capability for shared lines?

   A. Yes. BA-MA is implementing a Wideband Test System that will allow the Company to minimize its forward-looking costs for trouble shooting on shared loops. Without this enhanced capability, BA-MA (and CLECs) will incur increased costs and dispatches as the volume of this type of service arrangement increases. In addition, BA-MA will develop enhancements to RETAS that will provide CLECs with test results of MLT tests on the baseband of the circuit.

   Q. Has a cost been developed for the Wideband Test System?

   A. An ADSL Test Access recurring cost per DSL line, representing the costs associated with the Metallic Test Access Units ("MTAUs") and its associated common equipment and operational support costs, was presented in the May 5 Compliance filing. The cost can be found in Exhibit I, Workpaper Page 7, Line 4. The Wideband Test Access monthly costs will apply on all Line Sharing arrangements.

2. XDSL Cooperative Testing

Q. What is Cooperative Testing?

A. Cooperative Testing is required to be performed on the due date for the installation of an ADSL compatible link by the BA-MA Installation and Maintenance ("I&M") technician and the Data Local Exchange Carrier ("DLEC").

Q. What are the work activities associated with Cooperative Testing?

A. First, the BA-MA technician will call the DLEC, using the DLEC provided toll free telephone number. This telephone call is originated from the end user's premises. Upon reaching the DLEC, the BA-MA technician notifies the DLEC with the circuit identification and the location of the demarcation point.

At the DLEC's direction, the BA technician will first provide a "short" across the pair. Second, the BA-MA technician will remove the short across the pair in order that the DLEC can perform its diagnostic test. In addition, the BA-MA technician will receive "tone" on the loop transmitted by the DLEC in order to complete the test. If the cooperative test passes, the DLEC will approve the loop.

Q. What if the loop does not pass the cooperative test?

A. If the test does not pass, the DLEC will give BA-MA the specific trouble data to assist the field technician in correcting an identified problem in the loop. The BA-MA I&M technician will bridge on the RCCC and the Central Office technician to help isolate the trouble. The CO Frame technician will assist in the determination of whether the trouble is in the BA-MA facilities or proven toward the DLEC's network. In addition, the CO Frame technician will ensure wiring is correct and will perform the appropriate tests (*e.g.*, short, open, etc.) under the direction of the I&M technician.

Q. What is the next step in the Cooperative Testing process?

A. If the trouble is found to be in BA-MA's facilities, the BA-MA I&M technician and/or CO Frame technician will perform the necessary repairs and resume the testing procedure with the DLEC. If the trouble proves to be towards the DLEC's network, it is the DLEC's responsibility to resolve the problem.

Q. What is the final step in the Cooperative Testing process?

A. When the loop is accepted by the DLEC, the BA-MA I&M technician will provide the completion information to the RCCC and update the job status information residing in the Computer Access Terminal ("CAT"). In addition, the Central Office Frame technician is responsible for closing out the order in the Switch/Frame Operations Management System ("FOMS").

I. Line Sharing Services

A. Background: Description of Line Sharing and Proposed Serving Arrangements

Q. What is line sharing?

A. Line sharing generally describes the ability of a competitive LEC to provide xDSL based service over the same physical loop facility as is used by the incumbent LEC for the provision of a retail voice grade service. As part of this arrangement, voice traffic is transported in the 0-4 kHz frequency range; data traffic is transported in the available spectrum above 4 kHz. This frequency separation is accomplished through the use of central office based "splitters" with low-pass and high-pass filters to combine the separate voice and data services onto a single loop facility. Splitters or filters are also required at the customer location to separate these services for delivery to the appropriate CPE (*i.e.*, telephone set for voice services and personal computer for data services). The FCC has addressed line sharing requirements in some detail in a recent order (the "FCC Order"). The FCC Order only requires an incumbent LEC to provide a requesting carrier with access to the high frequency portion of the loop if the incumbent LEC provides voice services on the loop over which the CLEC seeks to provide data services.

Q. Is BA-MA able to determine at this point what precise serving arrangements will be used for line sharing following the FCC mandated implementation date?

A No. A number of different arrangements are being considered and discussed during these preliminary stages.

However, no actual lines have been brought into service as yet and it would be premature to say that either BA-MA or the CLECs have settled on a final preferred arrangement.

At the conclusion of the first phase of the line sharing implementation, BA-MA will assess the merits of each configuration and develop a deployment plan to implement the most effective mix.

At this time, BA-MA has a preferred approach that makes good business sense and that is fair and equitable for the CLECs. The costs of that alternative are discussed and identified below. There is an ongoing collaborative process, at which participants from the Company, CLECs and Staff are involved in an attempt to resolve the sundry issues surrounding the provisioning and maintenance of xDSL wholesale offerings. That process, as well as continuing review within the business, may lead to alternative serving arrangements. In order to have a cost study available to meet the May 5 filing date, BA-MA analyzed what in our view is the most likely scenario that is currently being discussed. If this scenario changes and/or additional schemes are required, the Company will address any modifications in its responsive or rebuttal testimony.

Q. What will BA-MA do if the serving arrangements ultimately implemented for line sharing differ from those utilized in these cost studies?

A. Should alternative serving arrangement(s) be developed, the Company is prepared to provide relevant cost studies with its subsequent testimony. Further, any costs that are too unclear for the identification of reasonable cost estimates (for example, OSS associated with Line Sharing) will also be addressed at that time.

B. Costs of Line Sharing

Q. What costs did the FCC conclude that the incumbent LEC could potentially incur in providing access to Line Sharing?

A. The FCC Order addresses five types of direct costs that an incumbent LEC could potentially incur to provide access to line sharing: (1) local loops; (2) Operations Support Systems (OSS); (3) splitters; (4) cross-connects; and (5) line conditioning.

1. Loop Costs

Q. What costs for the local loop does the FCC Order address?

A. The FCC Order concludes that the states may require LECs to charge no more to CLECs for access to shared local loops than the amount of loop costs allocated by the LEC to its interstate rates for retail ADSL-based service.

Q. Does BA-MA propose to allocate any loop costs to the rates that it will charge for line sharing?

A. No, not at this time. Nevertheless, the Company reserves the right to do so in the future.

1. OSS Costs

Q. What costs for Operational Support Systems ("OSS") does the FCC Order address?

A. The FCC Order concludes that the incumbent LECs should recover in their line sharing charges reasonable incremental costs of OSS modifications that are caused by the obligation to provide line sharing.

Q. What OSS costs have been identified?

A. There are two major OSS efforts required in order to meet requirements of the FCC Order. The first involves updating the inventory and provisioning systems to recognize Line Sharing. The second involves BA-NY's pre-order, order, and billing systems.

Q. What provisioning and inventory systems must be updated?

A. The following operational support systems for Telcordia must be updated by Telcordia; SOAC, SWITCH, LFACS, WFA/DI, WFA/DO, WFA/C, NSDB, PAWS, and LEIS/LEADS.

Q. What costs are projected to be required for the Company's internal pre-ordering, ordering, and billing systems?

A. There will be significant programming effort required to enable the Company's wholesale pre-ordering, ordering, and billing systems to become compatible with Line Sharing. Since it is still very early in the definition stage of this project, the Company is unable to offer an estimate of the programming costs associated with this effort. It would propose that these costs, which will be incurred over the upcoming twelve months, should be tracked and rates set subject to true-up upon the project completion.

1. Splitter Costs

Q. What costs associated with the splitter does the FCC Order address?

A. The FCC Order concludes that if the incumbent LEC purchases for CLEC use the same splitter that it uses itself for its own xDSL service, states may require that the incumbent assess the CLEC the same "amount that it itself pays for a delivered splitter." It further concludes that the CLEC can purchase its own splitter and transfer it to the incumbent LEC. In addition, the state may allow the LEC to charge to recover the cost of installing the splitters.

Q. What line sharing splitter costs were studied by the Company?

A. BA-MA developed cost studies based on the placement of the splitter on a Relay Rack located in the Company's own space within the central office or installed within a CLEC collocation cage.

Q. Please describe the cost components that would apply to a Relay Rack Mounted splitter located either in BA-MA's space or in a CLEC collocation cage?

A. There are five required splitter cost components. They include (1) the non-recurring installation costs if BA-MA installs the splitter on behalf of the CLEC, (2) the recurring administrative and support costs for the splitter, (3) collocation charges including application fee, engineering fee, the cabling and frame terminations and relay rack support, and (5) non-recurring ordering, wiring, provisioning and field installation charges (as appropriate).

a. Splitter Recurring and Non-Recurring Costs

Q. How were the splitter costs developed?

A. The splitter costs were developed based on the deployment of a SIECOR Relay Rack Mounted Splitter and utilized the vendor contract prices. The splitter is comprised of the costs for the common equipment (*i.e.*, a getting started material cost that is required before line cards are added) and the costs of the splitter circuit cards. Each circuit card contains four splitters and the splitter shelf has a capacity for twenty-four cards (96-splitter capacity).

Q. What is meant by Option A or Option C as used in this testimony and in the Company's description of the line sharing offering?

A. The options refer to the location of the splitter. The participants of the

industry collaborative proceedings that have taken place have adopted this terminology. The participants have included representatives of Bell Atlantic, the CLECs, and regulators from the NY PSC. Option A assumes the splitter is placed in a CLEC collocation cage:

Option A – CLEC-Provided POTS Splitter in Collocation Cage

Option C assumes that the splitter is placed in the common space of a BA-MA central office:

Option C – CLEC-Provided POTS Splitter in BA Space

Q. What were the three cost scenarios for which splitter costs were developed?

A. Three different scenarios were developed for the splitter installation costs in order to capture the different manner in which the splitter could be purchased, installed, and maintained.

- CLEC purchased, BA-MA installed, BA-MA maintained and supported (Option C)
- CLEC purchased, CLEC installed, BA-MA maintained and supported (Option C).
- CLEC purchased, CLEC installed in collocation cage, BA-MA supported (Option A).

Q. Please describe the first scenario (CLEC purchased, BA-MA installed, BA-MA maintained and supported).

A. In this scenario, Option C, the CLEC is responsible for the purchase of the splitter and transferring the asset to BA-MA for a nominal amount. BA-MA is responsible for installing the splitter and for the network maintenance and administration and other support of the splitter once installed. The cost study calculates the installation cost for the splitter common shelf and the full complement of twenty-four cards containing four splitter circuits (*i.e.*, 96-line capacity) by multiplying the material cost by the Engineered, Furnished and Installed ("EF&I) factor. This installation cost will be recovered up-front in a non-recurring rate element.

In addition to the installation costs, a recurring cost element was identified that captures the operating expenses for network maintenance and administration and other support. This cost element is developed by first identifying the total installed investment for the splitter as if BA-MA actually purchased and installed the splitter. The operating expense Annual Cost Factors (*i.e.*, maintenance, directly attributable joint, and common) are applied to the calculated total installed investment (material cost plus the costs of engineering, furnishing and installation) in order to estimate the network maintenance and administration and other support recurring cost. These costs appropriately do not include any capital-related costs.

Q. Please describe the second scenario (CLEC purchased, CLEC installed, BA maintained and supported).

A. In this scenario, the CLEC is responsible for the purchase and installation of the splitter. BA-MA is only responsible for maintaining and supporting the splitter once it is installed by the CLEC. Based on these assumptions, there are no non-recurring installation costs. It is important to note that if the CLEC elects to purchase and install the splitter itself, the Virtual Collocation terms and conditions require that the equipment installation may only be performed by Bell Atlantic approved equipment installation vendors.

However, costs will be incurred by BA-MA for network administration and other support of this splitter equipment that is now a part of the BA-MA network. This recurring cost is developed in the same manner as described for Option C above. That cost study calculates the total investment as if BA-MA were to purchase and install the splitter and applies the operating expense Annual Cost Factors (*i.e.*, maintenance, directly attributable joint, and common) in order to estimate the administrative and support recurring cost. As in the prior scenario, the costs have been developed for the total splitter complement (common equipment and splitter cards to support ninety-six-circuit capacity). Exhibit II provides the non-recurring costs for installation and the network maintenance and administration and other support recurring costs for the splitter.

Q Please describe the third scenario, Option A (CLEC purchased, CLEC installed in collocation cage, BA-MA network administration and other support).

A In this scenario, Option A, the CLEC purchases and installs the splitter in its collocation cage. BA-MA is only responsible for the network administration and other support of the line sharing equipment and its integration into the Company's network. The cost of the network administration and other support is detailed in the cost study included in Exhibit II.

a. Collocation Cost Elements

i. Splitter Equipment Support Cost

Q. How are the costs associated with the Splitter Equipment Support recovered?

A. The cost of the Splitter Equipment Support will be recovered by applying a new monthly rate. This new rate element consists of two cost components. The first component, the virtual collocation Relay Rack per full shelf cost has already been adjudicated and tariffed in the 7/3/97 Physical Collocation SAC Study. The approved cost element has been converted to a cost per shelf cost by dividing by 14 splitter shelves per rack. The new element takes this calculated relay rack cost per shelf and adds the new cost of the equipment bay on a monthly per splitter shelf basis. The development of the monthly Splitter Equipment Support cost is shown in Exhibit II.

ii. Other Collocation Cost Elements

Q. What other collocation cost elements are applicable to line sharing?

A. The following cost elements are applicable to line sharing (1) virtual collocation application fee, (2) virtual collocation engineering fee, and (3) the physical collocation voice grade connection costs. All of these costs have been fully litigated, approved and tariffed in Massachusetts.

Q. How many Physical Collocation Voice Grade Cross-connect cost elements are required to connect the splitter?

A. Two Physical Collocation Voice Grade Cross-connect cost elements are needed. As shown in the diagrams above, the first Physical Collocation Voice Grade Cross Connect connects the Splitter Voice/Data port to the ADSL end-user customer outside plant cable and pair. The second Physical Collocation Voice Grade Cross-connect connects the Splitter's Voice port to the office equipment (OE) or central office switch line port. These costs have already been litigated, approved and filed in the 7/3/97 Physical Collocation SAC Study.

1. Cross-Connects (Service Access Charges)

Q. What costs associated with cross-connects does the FCC Order address?

A. The FCC Order finds that where the splitter is located "within the incumbent LEC's MDF," the cost for installing cross-connects for xDSL services would, in general, be the same as the costs incurred for cross-connecting loops to the CLEC's collocation facilities.

BA-MA will incur two non-recurring costs for cross-connecting the splitter to the loop. One for connecting the splitter SAC cable to the end-user customer's cable and pair on the MDF, and one for connecting the splitter to the office Equipment (OE). These cross-connects complete the terminations of the SAC cables described below.

Q. How was the cost for the cross-connection developed?

A. The cost for the cross-connection is simply the cost for Central Office Wiring for a two-wire digital link, as filed on February 9, 2000.

Q. How are the costs of disconnecting BA-MA's service, prior to cross-connecting to the splitter, recovered?

A. Those costs are recovered in the initial BA-MA retail access line installation, in compliance with long standing cost recovery policy by this Department. They are not imposed on the CLEC.

Q. Please describe the Service Access Connection ("SAC") cabling charges.

A. The SAC charges are physical collocation rate elements that recover investment in the frame and/or POT Bay termination as well as the cabling between distribution frames

Q. How are the costs associated with the Relay Rack in which the Splitter shelf resides recovered?

A. The cost of the relay rack and the associated floor space will be recovered by applying the virtual collocation rate for Relay Rack and Floor Space per ½ rack. This rate is converted from a per ½ rack basis to a per splitter shelf basis. The development of the per-splitter shelf cost is shown in Exhibit II.

Q. What SAC cabling costs will be incurred for the Relay Rack Mounted Splitter residing in BA-MA space?

A. Two SAC cabling costs will be incurred. As shown on the above diagrams, the first SAC connects the Voice/Data line (which under Option C would have a splitter in the middle) to the ADSL end user customer outside plant cable and pair on the MDF. The second SAC connects the Splitter Voice port to the office equipment (OE) or central office switch line port.

1. Loop Conditioning

Q. What costs associated with conditioning does the FCC Order address?

A. The FCC Order concludes that the states may require that the conditioning charges for shared lines not exceed the charges the LECs are permitted to recover for similar conditioning of stand-alone loops for xDSL-based services.

I. NON-RECURRING COST METHODOLOGY

A. Use of Forward-Looking Costing Principles

Q. Are the costs determined by BA-MA's cost studies forward-looking?

A. Yes. The costs determined in BA-MA's cost studies are forward-looking, in the sense that they reflect the efficient provisioning practices to be used in the foreseeable future. The costs are forward-looking despite the fact that they assume the use of copper feeder cable, in contrast to the DLC-based, fiber-feeder technology that underlies BA-MA's studies of other types of loops. ADSL and HDSL transmission technology, as noted above, is inherently copper-based, and inherently based on the use of existing facilities. What CLECs have clearly requested from BA-MA, and what BA-MA is proposing to provide, are simple copper transmission paths to which the CLECs can attach their own xDSL electronics, provided by their own vendors and adapted to the services that they intend to offer. These electronics would not function properly over DLC systems. Thus, the use of copper reflects the most efficient technology currently available for provisioning the particular unbundled service that has been requested and that is being provided. The proposed rates for DSL Conditioning services properly reflect the most efficient ways of carrying out certain functions that are *required* for copper-based loops to be used for ADSL/HDSL transmission. In this respect, it is irrelevant that, for example, load coils would not be used on fiber feeder cable or on "new" copper loops specifically deployed for xDSL applications rather than for voice transmission. They *are* utilized, for good and sufficient reasons, on existing copper loops.

Q. Is BA-MA utilizing inconsistent models for its recurring and non-recurring costs?

A. No. The non-recurring charges that BA-MA proposes for its ADSL/HDSL-compatible loops are consistent with the copper-based, forward-looking technology proposed for those loops. The non-recurring charges that BA-MA proposes for "POTS" loops are consistent with the fiber-based, forward-looking DLC technology proposed for those loops.

The long-run costs of a DLC-based loop plant are *less* than the costs of an all-copper plant. Indeed, this was the very basis of the Commission's decision adopting an all-DLC model for the purpose of determining recurring costs. Although DLC systems utilize more electronics than non-DLC loops require, they also result in significant reductions in maintenance costs, structure costs, and other costs associated with copper cable.

Q. Is BA-MA making its competitors pay for network modernization that its ratepayers have already funded through retail rates, since ratepayers have already paid for "network modernization" through reduced depreciation lives for copper facilities?

A. No, it is not. First, the costs that BA-MA is seeking to recover here are not "network modernization" costs. The presence of load coils, for example, in BA-MA's copper loop network already reflects modern design principles for copper cables above a certain length. Nor is BA-MA seeking rates here to fund the conversion of those loops to DLC technology. Rather, the proposed conditioning charges essentially seek to recover the costs of converting copper loops properly designed for voice transmission to copper loops properly designed for ADSL/HDSL transmission.

Second, depreciation is a means of recovering investment cost. It does not compensate the Company for expenses such as those associated with loop conditioning.

B. Determination of Non-Recurring Costs

Q. How did BA-MA calculate the non-recurring costs included in its study?

A. Non-recurring costs are the one-time expenses incurred by the Company to initially establish service, and then later disconnect it. Non-recurring costs are essentially determined by the product of an estimated work time and a relevant labor rate.

1. Work Time Estimation

Q. How were estimated work times determined?

A. The first step was to determine the types of work activities required to provide the function in question. Various provisioning process subject matter experts ("SMEs") were consulted in order to make these determinations. The organizations contacted were Installation & Maintenance Staff, Technology Deployment/Facility Management Staff, Facilities Analysis/Facility Management Staff, Product Development, and the Operations Assurance Administration Group. The experts have either performed the relevant function themselves, have been responsible for the service technician / engineering personnel performing the activities and tasks, have monitored the function as a manager, or have written the methods and procedures to perform the required procedure.

Second, the specific work activities required and the functional organizations involved were identified. Within each functional organization and for each work activity, the relevant Job Function Code (JFC) was identified in order to determine the relevant labor rate.

Third, instructions were provided on how to develop the work time estimates. The SMEs were directed to:

- Consider all functional organizations that might be involve to ensure that all work, and only that work, performed to complete the job associated with each rate element was captured.
- Ensure that work being evaluated was not already captured in an existing rate element or in one of the other rate elements being studied in this proceeding.

- Reflect the effects of any forward-looking efficiencies.
- Determine what work activities and tasks were required to accomplish the work associated with the rate elements to be studied.
- Recognize only the work times required to complete these particular activities and tasks.
- Estimate only the time required to perform the activities and tasks in question, not overall cycle time.
- Include only the personnel required, by title and job function code, to complete the particular activities and tasks.
- Provide how often (occurrence) were these activities and tasks required to be performed, by rate element; i.e., frequency of multiple occurrences of the same activities on a single job.

Fourth, based on the above directions, estimates of the average length of time required to perform these individual functions (testing, framework, splicing, etc.) was determined. In some instances, work times were determined separately for alternative provisioning scenarios; these work times were then combined into a weighted average based on the percentage of times in which each particular scenario would occur; the percentages were also based on SME judgment.

SMEs were instructed to estimate work times assuming efficient processes, and any uncertainties were resolved in favor of shorter work times.

Q. What was done in order to validate the work time estimates?

A. Work time estimates for the conditioning activities of the Service Technician were reviewed with other personnel in the outside plant ("OSP") community and against data in the Company's Engineering & Construction Records Information System ("ECRIS") and results from ISDN conditioning work done in 1999.

All other OSP personnel with whom the work time estimates were discussed considered the times to be low and likely the result of best case scenarios. A comparison to ECRIS data, for "Estimated" and "Actual" work times to perform conditioning- and pair swap-related activities, shows that the estimates developed by the SMEs to identify forward-looking work times understate the Company's present experience.

For example, to remove load coils, the Company used a forward-looking estimate of 12 to 16 hours, depending on whether three or four load coils needed to be removed. The average work time to actually perform similar work activities to those required to remove load coils is 20.7 and 55.71 hours for aerial and underground, respectively.

In the case of the removal of bridged taps, the Company used a forward-looking estimate of four hours per bridged tap removed. The Company presented two studies for the removal of bridged taps. One, for the removal of a single bridged tap, was based on a work time of 4.0 hours. The other, for the removal of multiple bridged taps, was based on average of 10 hours. The average work times actually experienced by the Company to perform similar work activities to those required to remove a bridged tap are 6.45 and 16.99 hours for aerial and underground, respectively.

Part E of the Exhibit to this testimony provides additional detail on the ECRIS data used to validate the SMEs estimates.

1. Labor Rates

Q. How were labor rates determined?

A. The labor rates used in these studies are based on BA-MA's directly assigned labor costs for specific JFCs for Massachusetts. To maintain consistency with the January 5, 1998 UNE Non-Recurring Cost filing, the labor rates used are average 1995 rates trended to 1/1/97 at a trend rate of 1.02 for three semi-annual periods. Directly assigned labor rates include basic wage and salary costs for the relevant JFC and for clerical support and management supervisory personnel with direct reporting responsibilities (*i.e.*, those to whom the job functions in question directly report). It also includes cost-causative loadings assigned to those wages and salaries, such as payroll taxes and benefits. These rates do not include wages, salaries, and loadings associated with additional administrative and support personnel assigned to higher-level management.

A. Methodology for Mechanized Loop Qualification Costs

Q. What was the basis for setting the Mechanized Loop Qualification charge?

A. The Mechanized Loop Qualification Charge was based on the costs of creating and maintaining the Database.

Q. How was that cost determined?

A. The Database creation costs are essentially the costs of the performing MLT tests for a sample of loops in each terminal in the offices included in the database. Testing costs are determined by multiplying the average testing time per loop by the relevant labor rate. This generates a per-loop cost. The total testing cost is then determined for the five-year period that will be required to qualify all of BA-MA's loops, and is reduced to a net present value ("NPV") basis. This total cost is then divided by the forecasted number of wholesale and retail ADSL links that BA-MA will be providing or using, also computed over a five year period and reduced to an

NPV basis. The result is an average testing cost per loop utilized for ADSL/HDSL transmission. This cost was amortized over a thirty-month period (representing an average "service life" for a customer’s use of a retail ADSL-based service) to arrive at a monthly recurring cost.

Another component of the Mechanized Loop Testing Charge is the Database maintenance cost. The cost was developed by identifying the cost (labor rate times activity time duration), of program development and refinements, loading and extracting data, and other ongoing maintenance activities. Next, the cumulative number of lines qualified over the planning period, by year, were multiplied by the cost previously developed. Again, the forecasted number of subscribers requesting ADSL over the five-year planning period were also brought back, on a NPV basis, to the current year to match these expenses. The total Database maintenance expense was then divided by the total forecasted number of ADSL subscribers and converted to a monthly expense.

Q. Should recovery of Database creation costs be cut off after the end of the thirty-month amortization period to avoid over-recovery of costs?

A. No. Cutting of the charge after a thirty-month period for each loop to which it might apply would create a significant administrative burden and would make proper billing virtually impossible. In any event, in some cases customers will abandon their DSL services after a period shorter than thirty months (resulting in under-recovery); in other cases they will hold on to the service for more than 30 months (resulting in over-recovery). On average, the recovery period should match the Database creation costs.

Q. Does double recovery result from the recovery of Database costs in both retail and wholesale rates?

A. No. Total creation and maintenance costs were allocated to both wholesale and retail loops forecasted to provide ADSL-based services. This ensures that in total, the Database creation and maintenance costs will not be over-recovered.

Q. If the Database was originally created to support a retail service offering, why is there an incremental cost associated with making its capabilities available to CLECs?

A. To forgo the cost associated with making the Mechanized Loop Qualification Database available to CLECs would be inconsistent with the theory of TELRIC pricing as applied by this Commission. BA-MA incurred a cost to create the Database, and if CLECs share in the use of the Database with BA-MA, they as co-cost-causers must also bear a proportionate share of those costs. Similarly, the Commission has rejected Teleport's contention that spare facilities should be provided to CLECs for free under TELRIC principles and AT&T's contention that switch memory should be free because BA-MA was not required to purchase additional memory to meet CLEC demands for Office Dialing Plans.

B. **Annual Cost Factors**

Q. How were the annual cost factors determined for use in the cost studies?

A. All of the factors used in these studies are the same as those used in recurring cost studies filed in D.P.U. 96-73/74, 96-75, 96-80/81, 96-83, 96-94 – Phase 4. A table showing these factors can be found in Exhibit I, Workpaper Page 11 of this testimony.

C. Costing Approach

1. **General Issues**

Q. Are the non-recurring cost studies supporting DSL and Line Sharing different than those filed on January 5, 1998 and modified February 9, 2000 as part of the Consolidated Arbitrations on UNE costing?

A. In some instances BA-MA could not make use of the existing studies to satisfy the need for xDSL cost support. Since the filing of the original UNE non-recurring cost studies, BA-MA has made several improvements to its non-recurring cost study methodology to address issues raised by regulators and intervenors in Massachusetts and other jurisdictions. One of those issues concerned the statistical reliability of BA-MA's early work time estimates. To counter this concern, BA has more recently conducted footprint-wide, formal surveys in order to calculate new average work time estimates as input to the Manual Loop Qualification and Engineering Query non-recurring costs studies. The data collected in these surveys have been reviewed by National Economic Research Associates, Inc. (NERA) as part of their overall review of all of the Non-Recurring Cost Model surveys. These improvements are discussed in further detail in this Section.

Q. What general costing approach was used for loop conditioning costs?

A. The general approach for loop conditioning was somewhat different from that used for non-recurring charges ("NRCs") in BA-MA's January 5, 1998 UNE filing. In both cost studies, estimated work times were determined through a survey approach, and were then converted to costs by applying the appropriate labor rates for the employees performing the work functions involved. In BA-MA's more recent approach, new work time estimates have been broken down into individual work activities that can be selectively applied to each cost element depending on the probability of occurrence. The results of these work time studies are provided in Exhibit III. These detailed work steps also addressed the differences in the work steps required for splicing activities in aerial versus underground plant.

Q. What are "occurrence factors" and how were they used in the studies of conditioning costs for DSL-compatible loops?

A. Occurrence factors represent the frequency with which a particular work activity is performed. For example, if an activity is performed each and every time a customer request is processed, the occurrence factor is 100%. If an activity is only performed half of the time, the occurrence factor is 50%.

Q. How were occurrence factors determined by BA-MA for these studies?

A. The personnel participating in the survey process provided the current occurrence factor for each activity. Later, a panel of SMEs, who reviewed the survey results to make them forward-looking, made any adjustments to the occurrence factors that were necessary for that purpose. For example, if a particular work activity were performed 100% of the time today, the survey respondent would have provided an occurrence factor of 100%. However, should the SME determine that in a forward-looking environment the work activity would not be done at all, the SME would provide an occurrence factor of 0%. Thus, the final work time would be zero.

Q. How did BA-MA ensure that the specified work steps represented a forward-looking approach to loop conditioning?

A. After the completion of the surveys, subject matter experts reviewed the work steps in order to assess whether or not the current work activities and times would either be eliminated or potentially reduced in a forward looking environment. This review determined that none of the current activities (and associated time estimates) would be eliminated (or would need adjustment) in a forward-looking environment.

Q. What steps were taken to assure that survey questionnaires were administered to BA-MA staff most well informed about the work activities being studied?

A. The selection of participants involved in the data collection process was limited to employees most familiar with the specific work functions being performed. A letter was sent to the department heads of the Outside Plant Splicing organization involved in the survey explaining the nature of what the Company wanted to accomplish and its commitment to accurately identify its costs. A copy of that letter, dated December 7, 1999, is included in Exhibit IV.

Q. What steps were taken to assure that those selected to respond to the survey questionnaires understood their task and completed the questionnaires?

A. In addition to management oversight of the process, instruction forms were given to each survey participant. A copy of those instructions is also included in Exhibit IV.

The Service Costs staff monitored the survey results and made repeated efforts to obtain completed surveys from respondents in all work groups. As a result, additional responses were obtained. Every possible effort was made to assure that the importance of the process was understood and that the number of surveys returned would be adequate.

Q. What steps were taken to ensure that the identified work processes did not include functions whose costs are recovered through other rates?

A. The non-recurring cost study approach and the structure of the non-recurring cost model preclude the identification of the same work in multiple rates. As explained above, the non-recurring cost study methodology identified costs based on the functional groups involved and the work activities performed. NRCs are developed on the basis of discrete work activities performed either within a single functional organization (*e.g.,* the Engineering Work Order, which captures *only* activities performed within the Facilities Management Center) or within a number of successive functional organizations by personnel who do work unique to the request being process (*e.g.,* Link Provisioning costs, which reflects work done in the RCCC and the MLAC). Duplicate identification would only occur if individuals in different functional organizations were identified as doing exactly the same work or if the same work were identified as being done more than once by the same person. There are no instances of such a phenomenon in the Company's studies. Finally, the Service Costs cost analysts and supervisors conducting the study effort are familiar with the costs underlying the NRC charges and ensured that any possible duplication of work times or costs where avoided.

Q. What steps has the Company taken to obtain reasonable work time estimates?

A. To assure adequate sample size, the Company obtained survey responses from respondents throughout the entire Bell Atlantic region. Moreover, the Company committed to and executed a vigorous effort to obtain survey responses. As previously described, Service Costs staff monitored survey returns and vigorously pursued each work group for participation.

To measure statistical precision, BA-MA asked National Economic Research Associates ("NERA") to review the results of the DSL non-recurring time surveys and estimate the precision of the average work times and non-recurring rates.

Q. How were the data collected in the survey used by NERA?

A. NERA reviewed the results of the DSL surveys, and calculated the average time that respondents indicated were required to complete each work activity. All independent survey responses were used to calculate the estimates of average times and the sampling variance of those estimates.

NERA then calculated a 95% confidence interval for the NRCs. Based on the average work times developed from BA-MA's non-recurring survey, NERA calculated the 95% confidence interval precision level for both normal and expedited non-recurring rates.

2. Specific Conditioning Costs

a. ***Load Coil Removal and Bridged Tap Removal***

Q. What costs must BA-MA recover for removing load coils?

A. A non-recurring cost is incurred for the removal of load coils. There would also be a cost associated with load coil reconnection if the loop is subsequently surrendered by the CLEC and is used by BA-MA or another CLEC as a POTS loop.

BA-MA 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-MA. Since the number of load coils on a loop depends, under BA-MA's design criteria, upon its length, the charge is loop-length-sensitive. Longer loops have more load coils, and thus generate greater load coil removal costs.

Q. How would the costs of bridged tap removal be recovered?

A. BA-MA proposes to impose a non-recurring Removal of Bridged Taps Charge. Separate charges are proposed for: (a) removal of a single bridged tap, and (b) removal of multiple taps. When the removal of multiple bridged taps is required, the Company determined, based on SME input, that half of the time two taps must be removed and half of the time three taps must be removed, for an average of two-and-a-half taps.

The charge does not apply when a bridged tap above 6,000 feet is removed from loops of less than 18,000 feet, since BA-MA's current loop design criteria (which are consistent with industry standards) recommend such loops not have bridged taps in excess of that length.

Q. What assumptions were made concerning the percentage of load coil removal jobs that would take place in an aerial and underground environment (*i.e.*, concerning the occurrence factors for aerial v. underground load coil removal)?

A. We assumed that 45.74% of load coil removals would occur in an underground environment, while 54.26% would occur in an aerial environment. These weightings were derived by applying the distribution of loop plant by density cell (Metropolitan, Urban, Suburban and Rural) to the average total loop length (feeder + distribution) split between aerial and underground. The distribution of loop plant by density cell was obtained from Loop Analysis And Reporting (LART) system data. The average total loop length by density cell and the portions of aerial vs. underground cable by density cell were obtained from Outside Plant Planning Engineers. It was assumed that the cost to remove load coils from buried facilities approximates the cost to remove them from aerial facilities.

The development of the Facility Occurrence Factors can be found in Exhibit V.

Q. How were Facilities Occurrence Factors determined for the bridged tap removal studies?

A. The development of the number of aerial bridged taps and underground bridged taps — 76.19% aerial and 23.81% underground — was similar to that for the removal of load coils. The primary difference was that instead of using total average loop lengths, only the distribution cable portion was used. This was done because there is much less likelihood of bridged tap in feeder cables than in distribution cables. As with load coil removal, removal of bridged tap from buried facilities were assumed to cost the same as aerial.

Q. Can multiple pairs be unbridged or deloaded at the same time to reduce the per pair cost of performing the process?

A. As a practical matter, no. It would be a rare situation in which conditioning work had been requested for multiple loops at the same splice point at the same time. (In cases where this might occur, for example where a CLEC plans to embark on a marketing campaign targeted towards a single building or other cluster of customers, then BA-MA would be willing to negotiate a rate that reflects the efficiencies that would be achieved. There is no reason, however, to assume that such efficiencies will be achievable on a routine basis.)

Thus, the claim that BA-MA should condition multiple loops on a single dispatch must be based on the premise that such work should be done even where not requested for all of the loops. (For example, some CLECs have claimed that BA-MA should remove bridged taps from *all* of the pairs in a particular binder group if conditioning has been requested for even one such pair.) But random removal of load coils can result in degradation of voice service, and random removal of bridged taps can result in service disconnection and reduced utilization of loop plant. Only if one were to assume that at the relevant location there were (a) multiple pairs bridged at the same location that were not in use, or (b) multiple pairs loaded that were not needed for voice service, or (c) some combination of the above, would some economies be realizable. Such a scenario, however, would be the rare exception, not the rule, and where it does exist conditioning of the additional loops would not necessarily be simple or inexpensive.

To simplistically assume that large groups of pairs (*e.g.*, 25 pair complements) of significant length are routinely bridged and then left spare is without merit. Instances where bridged tap does exceed a total length of 6,000 feet or even the individual 2,000 foot limit, are extremely rare. Where a "long" bridged tap is present, it is because the plant was constructed prior to the implementation of revised resistance and CSA design. In such cases, the binder group integrity rule would not apply, and the binder group would often be split among terminals, side legs, and addresses, so that it would not be possible to cut off a complete 25 pair complement of bridged tap at a single location without major rearrangement or relief work.

Even if service degradation or disconnection problems could be avoided, routinely performing unrequested bridged tap removal or load coil removal work on additional loops would increase the cost of each individual conditioning job based on the somewhat speculative assumption that the additional loops may be used for DSL-based services at some point in the future, thus possibly resulting in some long term cost savings. The increase in current costs would be certain and immediate, while the long-term cost savings would be speculative and undeterminable. It would thus be inappropriate to adopt such a practice, or to build such a "multiple loop" assumption into the cost study process for loop conditioning.

b. ISDN Extension Electronics

Q. How were the non-recurring costs developed for adding ISDN Extension Electronics?

A. The ISDN Extension Electronics are essentially investments, the costs of which the Company proposes to recover through a one-time NRC. Thus, the central office electronics material costs are converted to in-place or installed costs through the application of the appropriate investment loadings (EF&I, Power, and L&B). The outside plant electronics material costs are converted to in-place or installed costs by determining the time required to install the remote terminal electronics (estimated to be a half hour), and multiplying this time by the directly assigned labor rate for the outside plant technician.

Q. Why should these investment costs be recovered through a non-recurring as opposed to a recurring charge?

A. The proposal to introduce a non-recurring charge for ISDN Loop Electronics stems from the BA-MA's current recovery of similar retail costs through non-recurring special construction charges. In addition, the imposition of a non-recurring charge for costs that are incurred as one time capital investments addresses the fact that there is likely to be considerable customer churn in the market for ADSL-based services. In such circumstances, the recovery period built into the development of recurring cost studies may lead to significant under-recovery of these costs.

Q. Is this proposed charge based on forward-looking costs in view of fact that extension equipment would not be required for two-wire digital loops provisioned using DLC technology?

A. Yes. ISDN loop extension is frequently requested for loops that are, in fact, provisioned on copper rather than DLC. This is also consistent with the FCC's conclusion that conditioning costs should be recoverable even where conditioning would not be needed on "forward-looking" plant.

* * *

Q. Does this conclude your testimony?

A. Yes.