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Arizona Corporation Commission
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Re: Docket No. T-00000A-00-0194

To Whom It May Concern:

Enclosed are an original and ten copies of the **DIRECT TESTIMONY OF ROY LATHROP ON BEHALF ON WORLDCOM, INC., AT&T COMMUNICATIONS OF THE MOUNTAIN STATES, INC. AND XO ARIZONA, INC.** for filing with the Arizona Corporation Commission.

For administrative efficiency, Exhibits RL-1 (NRCM Model Description and User's Guide), RL-2 (NRCM Results) and RL-3 (NRCM) of the aforementioned testimony are being filed separately, on a CD-ROM, by AT&T Communications. These exhibits are not included in this filing.

Please be advised that Exhibit RL-5 is proprietary and confidential and has been excluded from the enclosed documents. It is substituted with a page stating it is confidential and this page will, alternately, be directed to the Hearing Officer.

Further, I am also enclosing two additional copies accompanied by a self-addressed, postage-prepaid envelope. Please stamp and return these copies to me in the enclosed envelope.

If you have any questions, please do not hesitate to call me at (303) 390-1197.

Sincerely,

John Connors

Attachments

BEFORE THE

ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE INVESTIGATION INTO QWEST CORPORATION'S COMPLIANCE WITH CERTAIN WHOLESALE PRICING REQUIREMENTS FOR UNBUNDLED NETWORK ELEMENTS AND RESALE DISCOUNTS	))))))	**DOCKET NO. T-00000A-00-0194 Phase II**

Direct Testimony of

ROY LATHROP

On Behalf of

Joint Case of

WORLDCOM, INC.,

AT&T Communications of the Mountain States, Inc.

and

XO Arizona, Inc.

May 16, 2001

EXECUTIVE SUMMARY

ROY LATHROP TESTIMONY

This testimony provides the economic and technological assumptions underlying nonrecurring costs and collocation. Nonrecurring costs are primarily one-time transactional costs that do not include labor or capital costs for activities that recur regularly. Nonrecurring costs are critical to local market entry because they represent sunk costs that create a barrier to entry. The proper cost method to use to develop costs for NRCs is the same as that for recurring costs of unbundled network elements: forward-looking, long run economic costs. Using such a method requires developing costs based on using forward-looking operations supports systems efficiently, forward-looking technologies and efficient labor costs. Forward-looking NRCs exclude equipment costs, which are recovered over time, and treat separately disconnection costs, which may never be incurred. These attributes are consistent with features of the AT&T/WorldCom Nonrecurring Cost Model, which Mr. Lathrop sponsors, and inconsistent with Qwest's nonrecurring cost model, which Mr. Thomas Weiss critiques.

Collocation is a "nuts and bolts" activity by which CLEC equipment is placed in Qwest's premises. A fundamental aspect of collocation deployment is that Qwest controls the placement of collocators' equipment in its central offices. As a result, Qwest exerts almost complete control over the costs its competitors pay for collocation. With no incentive to minimize its competitors' costs, there is no assurance that Qwest will place equipment in the manner it would place its own equipment: so as to minimize the distance to the equipment to which it must connect. Mr. Lathrop describes forward-looking costing as it applies to collocation and identifies a variety of ways in which Qwest's collocation cost model is inconsistent with forward-looking costing principles. Mr. Lathrop evaluates specific cost elements proposed by Qwest and recommends changes to make inputs into Qwest's collocation cost model more consistent with forward-looking costing principles. These inputs, combined with cost factors proposed by Mr. Weiss, were used to generate proposed rates that appear in the testimony of Mr. Michael Hydock.

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SECTION 1 INTRODUCTION

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, EMPLOYER AND PRESENT POSITION.

A. My name is Roy Lathrop and my business address is 1133 19th Street, NW, Washington, DC 20036. I am an Economist in the Regulatory Analysis group of WorldCom Inc.'s ("WorldCom") Law and Public Policy section.

Q. PLEASE DESCRIBE YOUR QUALIFICATIONS AND BACKGROUND.

A. I am responsible for developing and promoting WorldCom public policy positions before state and federal regulators. These policy positions generally involve encouraging competition by ensuring that the ILECs are required to provision unbundled network elements in a non-discriminatory manner at prices based on TELRIC. Over the past four years, I have been involved in a number of collocation costing and pricing cases, working to obtain nondiscriminatory terms and conditions for collocation. I have examined the cost studies and tariffs of several incumbent local exchange companies ("ILECs"), assisted in the development of a forward-looking collocation costing model sponsored by WorldCom and AT&T, and I have filed testimony or comments on various collocation issues in California, Massachusetts, Michigan, Minnesota, New Jersey, New York, Pennsylvania, Virginia, Washington state and at the FCC.

Prior to joining WorldCom, I was employed in the Telecommunications section of the Washington Utilities and Transportation Commission ("WUTC"), where I analyzed economic and policy issues involved in developing an alternative form of regulation for US West, and costing and pricing issues related to network unbundling

proposals. Prior to working at the WUTC, I was employed by the California Public Utilities Commission ("CPUC"). My assignments at the CPUC included three years in the Telecommunications Rate Design Branch of the Division of Ratepayer Advocates where I provided analysis and expert testimony on various rate design, cost and tariffing issues, including cases implementing incentive regulation for California local exchange carriers. Subsequently, I served as an advisor to the Commission responsible for economic and policy analysis for the electricity, natural gas and water industries. Prior to working at the CPUC, I was employed as a Research Economist at the Community and Organization Research Institute where I conducted econometric and policy analysis related to water demand. I have a Bachelor of Arts degree in Economics and Environmental Studies, and a Master of Arts degree in Economics from the University of California at Santa Barbara.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address two issues: nonrecurring costs, and collocation costs.

Nonrecurring costs ("NRCs"). I describe the economic and technological assumptions underlying NRCs and address the application of forward-looking long run economic costing principles to NRC development. I discuss the AT&T/WorldCom Non-Recurring Cost Model ("NRCM") development, general assumptions and methodology. The detailed technical assumptions and the specific inputs to the model are sponsored by Mr. Thomas Weiss, with the exception of the NRCM labor rates. The rates generated by the NRCM appear in a price list attached to the testimony of Mr. Michael Hydock.

Collocation costs. I provide an overview of collocation and the components collocators require. I describe the proper approach to developing forward-looking, long run economic costs for collocation and discuss ways in which Qwest's collocation cost study fails to adhere to forward-looking costing principles. I address a variety of Qwest's specific cost proposals and recommend changes that are consistent with a forward-looking costing approach. These changes were used as inputs to Qwest's collocation cost model and, combined with the cost factors recommended by Mr. Weiss, generated rates that also appear in the price list attached to the testimony of Mr. Michael Hydock.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. My testimony is organized into three sections: section 1 provides an introduction and summary; section 2 addresses nonrecurring costs; and section 3 discusses collocation.

Q. DO YOU HAVE ANY EXHIBITS ATTACHED TO YOUR TESTIMONY?

A. Yes. Exhibit RL-1 is the NRCM 2.2 Model Description and User's Guide; Exhibit RL-2 is the NRCM Results for Qwest – Arizona; Exhibit RL-3 is the NRC Model itself on a floppy disk; Exhibit RL-4 is Qwest's response to discovery request ATT 02-059; and Exhibit RL-5 is Qwest's response (including proprietary attachment A) to discovery request ATT 02-103.

SECTION 2 NON-RECURING COSTS

SECTION 2.1 Economic and Technological Assumptions Underlying Non Recurring Costs

Q. WHAT ARE NON-RECURRING COSTS?

A. Non-recurring costs are primarily one-time transactional costs that do not include either labor or capital costs for activities that recur regularly. Generally, the transactional functions include pre-ordering, ordering and provisioning in response to a request for service by end users. Costs associated with maintenance and repair functions are included in recurring costs for unbundled network elements and are recovered in recurring rates for those elements.

Q. WHAT IS THE SIGNIFICANCE OF NONRECURRING COSTS?

A. Nonrecurring costs must be paid to ILECs before CLECs are able to offer service to end users. The higher the NRCs, the more initial investment must be undertaken by new entrants, and the more difficult entry will be. NRCs should be established consistent with only the amount needed to compensate the incumbent for forward-looking efficient systems and processes. Even then, new entrants cannot escape the fact that NRCs are sunk costs that create an economic barrier to entry.[1]

Q. WHY ARE NRCS SUNK COSTS, AND WHY DO THEY CREATE A BARRIER TO ENTRY?

A. Once a new entrant pays the incumbent NRCs to establish service for a customer, that payment cannot be recovered (hence, "sunk") if the customer changes service providers or if the entrant goes out of business.

[1] A barrier to entry occurs when an entrant faces costs that an incumbent does not face, such as costs to retain existing customers. A barrier to entry also occurs when costs an entrant must incur in order to compete with an incumbent become sunk once those costs are incurred.

Recurring costs, on the other hand, need no longer be paid if a customer changes service providers or if the entrant goes out of business. Sunk costs create a barrier to entry because entrants face greater risks that their up-front costs will not be recovered from sales than costs for tangible assets (for which a firm can recover something if it goes out of business). Thus, NRCs for unbundled network elements create a greater risk that an entrant will fail to recover its costs than do recurring charges.[2]

A new entrant could conceivably impose an NRC on its retail customer that is equal to or greater than the NRC it incurred to serve that customer. As this Commission found in its original Consolidated Cost and Pricing Arbitration, however, this would act as a barrier to entry, since an existing customer need not pay NRCs to maintain service with the incumbent.[3] Indeed, in telecommunications markets, such as interLATA long distance and intraLATA toll service, new entrants and competitors often waive NRCs to entice customers to change service providers. Such promotional offerings of free installation recognize that up-front charges deter customers from trying new (or switching) services. Thus, new entrants are more likely to attempt to recover NRCs through recurring rates. The greater the NRCs, the less likely a new entrant can recover the cost by increasing recurring rates, especially if the average customer life is short.

The fact that the Qwest has virtually 100% market share for the local service market means that almost all NRCs associated with customers changing service providers will be incurred by new entrants.

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[2] Sunk costs also create a barrier to entry because investors recognize that costs will be sunk and thus require a higher expected return before investing to compensate for the risk that the investment will be unprofitable.

[3] Docket No. U-3021-96-448, et al., Opinion and Order (January 30, 1998) at page 29.

Qwest, on the other hand, has every incentive to exaggerate the level of NRCs associated with pre-ordering, ordering and provisioning of unbundled network elements as well as wholesale services, to the extent that an incumbent's goal includes protecting its retail market from any significant amount of competitive intrusion.

Q. BY WHAT MEANS CAN AN INCUMBENT OVERSTATE NONRECURRING COSTS?

A. An incumbent can, for example, establish and maintain out-of-date manual procedures for receiving and processing orders initiated by new entrants. This approach not only raises costs to both incumbent and new entrant, but it also increases the probability of introducing errors, which would expand the amount of time (and increase the cost) to complete such orders. Another example is that costs already included in recurring cost can be incorporated into the cost basis for nonrecurring charges. Also, disconnection costs, some of which may never be incurred, can be included in the development of nonrecurring costs that are imposed when service is initiated. Mr. Weiss discusses such assumptions that appear in Qwest's NRC studies that inflate Qwest's proposed charges.

To ensure cost estimates that form the basis of nonrecurring charges are calculated correctly, it is important to focus only on the costs of the actual transactions of pre-ordering, ordering and provisioning. Even then, the costs must be limited to those costs directly caused by the efficient processing of the service transactions calculated on a forward-looking basis assuming the use of fully mechanized operations support systems ("OSS") and accurate and synchronized databases designed to achieve maximum flow through of each service order.

SECTION 2.2 Transaction Functions

Q. PLEASE DESCRIBE THE PRE-ORDERING, ORDERING AND PROVISIONING TRANSACTION FUNCTIONS.

A. **Pre-ordering** is the collection of information needed to create an accurate end user service order. This includes all information about services subscribed to by the end user, the service address, the facilities available to provide service to the end user, telephone number assignments, etc. While in most markets such pre-order information is obtained directly from the customer, in local exchange markets, virtually all potential customers of new entrants are current customers of the incumbent. This means that new entrants will serve existing incumbent customers who wish to change providers, but may not have changed service location or wish to change features to which they subscribe. Entrants need to obtain this information from the incumbent, and in order for orders to flow through completely, the information must match exactly that information that resides in the incumbent's databases. This means, for example, that "Street" cannot be written as "St." Entrants that have real time access to incumbent databases are able to avoid errors and thereby create service orders the incumbent can process without errors.

Ordering is the placement of a service order for a specific service or services. It should be conducted electronically, with no need for contact between entrant and incumbent personnel. The service order would be created by the entrant using pre-order information obtained directly from the service record information of the incumbent as discussed above. The incumbent responds electronically with a confirmation of order acceptance.

Provisioning is the process by which the incumbent, after receiving a local service request from the entrant, performs the functions necessary to provide the service, interconnection or unbundled network elements requested by the entrant.

SECTION 2.3 Application of Costing Principles to Nonrecurring Costs

Q. WHAT COST METHOD SHOULD BE USED TO DEVELOP COSTS FOR PRE-ORDERING, ORDERING AND PROVISIONING?

A. The cost method that should be used to develop costs for pre-ordering, ordering and provisioning is the same method that should be used for the recurring costs of unbundled network elements – forward-looking, long run economic costs, such as "TELRIC" plus an appropriate share of the efficient common costs of the firm.

Cost estimates for the transaction functions consist of the costs of actually performing the tasks required to provide pre-ordering, ordering and provisioning. Performing these functions requires labor, computers, software and power. Because capital costs for equipment should be recovered through recurring charges (as should power to run computers and the cost of software), only the cost of labor when manual activity is involved is included in developing the costs for preordering, ordering and provisioning. To develop the cost for each function requires a list of steps needed to accomplish each function. The nonrecurring cost is the sum of, for all steps required, the time required to complete each step, multiplied by the frequency with which that step must be taken, multiplied by the labor cost of any manual activity required to complete that step.

Q. HOW SHOULD FORWARD-LOOKING, LONG RUN ECONOMIC COSTS BE SEPARATED INTO THOSE THAT SHOULD BE RECOVERED IN RECURRING RATES AND THOSE THAT SHOULD BE RECOVERED IN NONRECURRING CHARGES?

A. A critical distinguishing feature between the type of costs that should be recovered through recurring rates and those that can, but need not necessarily, be recovered through NRCs is the reusability of facilities or activities to provide service to a subsequent customer with no change. This reusability test requires that no capital costs be included in NRCs, since capital items, once acquired, can be used to provide service to future customers. This holds true for facilities dedicated to a particular customer premise (such as the network interface device), as well as facilities that are used for many customers (such as general purpose computers). The reusability test should also be applied to associated installation labor for the same reason – once the plant is installed, another customer at the same premise can reuse the plant at no additional cost for the plant. The result is that the costs to be recovered in NRCs are simply the costs of actually performing the specified transactions: pre-ordering, ordering and provisioning.

Q. DOES THE "REUSABILITY" TEST MEAN THAT SOME ONE-TIME ACTIVITIES SHOULD NOT BE RECOVERED USING NRCS, EVEN IF ASSOCIATED WITH A SPECIFIC SERVICE ORDER?

A. Yes. Take, for example, a new loop that must be constructed to provide service. Even if constructing a loop were associated with a specific service order, it is correctly treated as a recurring cost. The proper separation between one-time and recurring costs is especially important when various entities (for example, the incumbent and new entrants) will use the facility at various times during the life of the facility. If the forward-

looking, long run economic cost of a one-time activity that benefits multiple users is borne entirely by the first provider to use the facility, then the first user will clearly bear more than its fair share of costs.

A similar example occurs when a cross connection is required to be performed at the feeder-distribution interface to establish service. The cross-connection is correctly treated as a recurring cost because it will remain in place when the customer disconnects service and can be used again (without change) by another customer when new service is established to the same location. Thus, although the cross-connection is performed one time, the activity and facility will be used without change by future customers, and the costs are properly treated as recurring.

Q. ARE THERE OTHER REASONS TO TREAT CAPITAL ITEMS AND INSTALLATION LABOR AS RECURRING COSTS?

A. Yes. This prevents double-counting costs developed in recurring cost studies. For example, loop recurring costs include the entire investment and expense for installing the loop. To include in NRCs the cost of field work when an incumbent establishes service on individual loops would double-count that cost already captured in recurring costs.

Q. WHAT IS REQUIRED TO DEVELOP NONRECURRING COSTS BASED ON A FORWARD-LOOKING, LONG RUN ECONOMIC COST CONSTRUCT?

A. A forward-looking, long run economic cost construct for NRCs would develop costs based on using forward-looking OSS efficiently, forward-looking technologies and efficient labor costs. Using OSS efficiently allows the incumbent to process a very high percentage of valid orders and provision the necessary facilities automatically, without the need for manual intervention. This approach is less costly than the manual

handling of a high percentage of orders that would otherwise "fall out" of the mechanized process because manual processing requires many more provisioning personnel and is hence inconsistent with forward-looking long run economic cost. Furthermore, for consistency, the cost development should rely on the same network as that used in recurring cost studies.

Q. IF QWEST'S OSS HAS CONTAMINATED DATABASES, SHOULD NEW ENTRANTS PAY INCUMBENTS TO CLEAN UP THOSE DATABASES TO ENSURE ORDERS ARE PROCESSED EFFICIENTLY?

A. No. If databases are contaminated, it is a result of past inefficiencies and it would be anticompetitive to impose costs on new entrants to resolve this situation. Cleaning up contaminated databases would permit Qwest to be more competitive in attracting and retaining end users. With a competitive local service market, Qwest would face pressure to have a well managed and maintained OSS because high fallout rates increase the cost of providing service and reduces the quality of the service provided. In a competitive market, companies have incentives to improve customer service and reduce costs, and an efficient OSS (with clean databases) provides such a strategic asset. Making new entrants pay to improve the incumbent's databases would force the entrants to improve the incumbent's ability to compete and should not be permitted.

Q. WHAT IS THE COST DRIVER FOR NRCS BASED ON FORWARD-LOOKING LONG RUN ECONOMIC COSTS?

A. The cost driver for NRCs based on forward looking, long run economic costs is labor cost. A typical NRC study includes the specification of tasks that must be performed manually, the amount of time required to perform the tasks, the frequency with which the tasks must be performed, and the

hourly labor cost of the personnel performing the task. With forward-looking OSS operating in an efficient fashion, manual activities for pre-ordering, ordering and provisioning should be very infrequent.

Q. WHY ARE NO EQUIPMENT OR OTHER COSTS INCLUDED IN FORWARD-LOOKING LONG RUN ECONOMIC NONRECURRING COSTS?

A. Forward-looking long run economic nonrecurring costs exclude equipment and other non-labor costs because these are recurring, not transactional costs. Performing the transactional functions of pre-ordering, ordering and provisioning, other than labor when there is fallout or when truly one-time manual activities are required (such as a central office cross-connect for a loop on copper facilities) is accomplished by ILECs using computers, software and power. These all can be used for other customers with no additional cost, and hence the cost of these items should be accounted for in recurring costs for unbundled network elements. Including such costs in NRCs would increase the barrier to entry that NRCs create, as well as reduce the likelihood that a new entrant would be able to fully recover these costs from its end users.

Q. SHOULD NEW ENTRANTS' COSTS INCLUDE DISCONNECTING SERVICE AT THE SAME TIME AS CONNECTING SERVICE FOR PRE-PREORDERING, ORDERING AND PROVISIONING?

A. No. Requiring a new entrant to pay for disconnection activities when it orders a connection violates the rule of cost causation, since the costs for disconnection are not incurred until and unless a facility is actually disconnected. Also, since the time between connection and

disconnection is unknown, recovering disconnection costs in connection charges raises questions about the time value of money that need not be addressed. Furthermore, it is questionable whether end users should pay any disconnection costs when they order service since the facilities are frequently not physically dismantled. New entrants should not pay for disconnection unless they order the facilities to be disconnected.

Q. WHY HAVE INCUMBENT LECS TRADITIONALLY CHARGED FOR DISCONNECTION AT THE TIME OF SERVICE INITIATION?

A. The reason incumbents have charged end users for disconnection activities at the time of service initiation is that it may be difficult or impossible as a practical matter to collect a disconnection charge from a departing retail customer. Customers would certainly resist paying a fee to stop being charged recurring rates, and for customers leaving the area, it would likely be uneconomic for the incumbent to pursue to collect the final payment.

The practical problems of collecting from retail customers do not exist when the incumbent is dealing with a wholesale customer. Moreover, while connection and disconnection costs have been combined for retail pricing purposes, the activities are separate. For wholesale costing, these costs should be captured and assessed separately, consistent with cost causation principles. Only if and when a new entrant requests the incumbent to perform disconnect activities should the incumbent be permitted to assess a disconnect charge.

Q. WILL DISCONNECTION OCCUR IN ALL CASES WHEN A NEW ENTRANT CEASES TO USE FACILITIES?

A. No. When a new entrant ceases to use the facilities previously used for total service resale or unbundled network elements, facilities will not be disconnected and there should be no disconnection charge. Furthermore, if the end user becomes a customer of the new entrant by migration from the incumbent, the end user would already have paid for disconnection when the end user initially began service with the incumbent. Thus, to assess a disconnection charge would permit the incumbent to recover twice for disconnection costs it may not even incur once!

SECTION 2.4 The ATT/WorldCom NonRecurring Cost Model General Assumptions

Q. WHAT IS THE ATT/WORLDCOM NONRECURRING COST MODEL?

A. The NRCM is a spreadsheet-based costing tool that calculates the forward-looking cost of customer connection, disconnection and change of service. The NRCM develops one time (nonrecurring) cost estimates for the tasks and activities that may be performed by an ILEC when a CLEC requests wholesale services, interconnection and unbundled network elements.

Q. PLEASE DESCRIBE THE PROCESS OF CREATING THE NRCM.

A. WorldCom and AT&T jointly provided technical and economic resources to produce the NRCM model. The companies' subject matter experts collaborated with economists and project managers to develop the model. Subject matter experts worked with economists who explained the economic principles that such studies should reflect and discussed the application of those principles to specific examples of activities that various ILECs had included in nonrecurring cost estimates. A technical

sub-team then identified, for each element, the tasks necessary to perform the work, the probability the tasks would be required, the time required to complete each task and the labor rate for the personnel who would perform each task. The results were codified in an easy to use Excel spreadsheet.

Q. PLEASE IDENTIFY THE MAJOR ASSUMPTIONS EMPLOYED IN THE AT&T/WCOM NON-RECURRING COST MODEL.

A. The NRCM provides bottoms-up, one time cost estimates incurred by an efficient incumbent service provider. The model assumes: (1) an electronic ordering interface between the CLEC and ILEC, (2) an efficient legacy OSS environment with clean databases, (3) forward-looking technologies and efficient processes, and (4) systems costs to be recovered in recurring rates.

Q. PLEASE EXPLAIN WHAT IS MEANT BY AN ELECTRONIC ORDERING INTERFACE AND AN EFFICIENT OSS ENVIRONMENT?

A. The NRCM assumes a forward-looking environment which utilizes as much automation as possible and assumes an electronic interface gateway for CLECs and ILECs when CLECs order service from the ILEC. An efficient legacy OSS environment means using the existing OSS efficiently with clean databases, latest hardware platforms and up-to-date software releases.

Q. WHAT FORWARD-LOOKING TECHNOLOGIES ARE ASSUMED?

A. The model assumes use of forward-looking technologies that are generally available. Specifically, the NRCM is based on the use of technologies such as Local Digital Switches ("LDS"), GR-303 Integrated Digital Loop Carrier ("IDLC") for loops served by a fiber feeder, Digital

Cross-connect Systems ("DCS"), Synchronous Optical Network ("SONET") rings for transport, and a low profile, punch down block main distributing frame ("MDF") for terminating copper loops in the central office. These technologies are important because they can communicate over standard interfaces to the OSS so that little or no human intervention is required for provisioning and maintenance activities.

Q. WHAT IS AN EXAMPLE OF AN EFFICIENT PROCESS THE MODEL USES?

A. In addition to forward-looking technologies, personnel must also employ efficient processes. For example, the NRCM assumes that when a technician has to travel to make a cross connect in a non-staffed central office, the technician will work on an average of four orders while there, and not simply travel back and forth for each order. This assumption reflects efficient practices and ensures an efficient and cost effective use of network resources.

SECTION 2.5 The ATT/WorldCom NonRecurring Cost Model Methodology

Q. PLEASE EXPLAIN THE NRCM METHODOLOGY.

A. The NRCM methodology is simple and straightforward. First, all of the activities required to complete a Local Service Request are identified and listed. Then, for each activity, based on the consensus of the NRCM panel of experts, an estimate is provided of the amount of time (in minutes) required to perform each activity. Once the activity time has been determined, the work group associated with that type of labor is incorporated to determine the labor cost. Then, since some activities may

not have to be performed in all instances (for example, some activities that are required when using an unbundled copper loop are not required when using an unbundled fiber loop), the model also incorporates the probability of an activity happening. A panel of experts, each of whom has decades of relevant telecommunications experience, collectively discussed and reached consensus on the activities, probabilities, and work time estimates included in the model. A labor rate expert, working with all the technical experts to determine the appropriate class of labor associated with each activity, helped construct the default labor rates.

The NRCM calculates the cost of each of the activities comprising a NRC Element using the following formula:

$$\text{Activity Cost} = \frac{\text{Probability (\%) X Time (min) X Rate (\$/hour)}}{60}$$

Finally, the model sums the costs of all the activities for each element and then applies a variable overhead factor to arrive at a final element cost. All of the major model inputs are user-adjustable to reflect a specific state's characteristics and/or Commission specified values. See the NRCM 2.2 Model Description and User's Guide attached as Exhibit RL-1 for more detail.

Q. THE NRCM APPEARS TO RELY HEAVILY ON THE JUDGMENT OF EXPERTS FOR THE ACTIVITIES REQUIRED TO PERFORM EACH FUNCTION, THE PROBABILITY THAT EACH ACTIVITY WOULD BE PERFORMED, AND THE AMOUNT OF TIME REQUIRED TO PERFORM THE ACTIVITY. CAN YOU EXPLAIN HOW EACH JUDGMENT WAS REACHED?

A. As indicated earlier, each of these judgments represent the consensus of a number of experts with vast industry experience. The technical sub-team held many meetings to discuss in extraordinary detail each and every task for each element. It would be impossible to provide in this testimony the thought process behind each judgment, but an explanation of each is provided in the **N**on Recurring **T**echnical **A**ssumptions **B**inder (NTAB) documentation attached to the testimony of Mr. Weiss.

Q. HOW WERE THE DEFAULT LABOR RATES DEVELOPED?

A. The default labor rates were developed primarily by a team labor rate specialist. The labor rates represent a fully assigned rate based on union contracts when they were available, which includes wages and benefits for first-line supervision through third level management. In addition, the labor rate accounts for non-productive time, overtime pay, clerical support and other miscellaneous expenses and are categorized for many different work centers commonly found in an incumbent environment. For more detail, see page 14 of the NRCM Model Description. The model run for Qwest – Arizona uses all available current labor rates specific to Arizona, obtained from Quest in discovery request ATT 02-059.

Q. IS THE NRCM OPEN, FLEXIBLE AND USER-FRIENDLY?

A. Yes. The NRCM is open, flexible, user-friendly and does not require a protective agreement to use.

Q. HOW IS THE NRCM FLEXIBLE?

A. Many of the major inputs to the model, such as travel time,[4] are made user-adjustable. These variables can be set to run sensitivity analyses or to accept a Commission-prescribed value. For example, even though the travel time is initially set to 20 minutes, the user can adjust the value to match the geography and other factors relevant to the specific jurisdiction under study.

Q. CAN THE WORK TIMES BE CHANGED BY THE USER?

A. Yes, although it is not advisable. The default times in the model are the appropriate forward-looking times for the activities listed. Inputting other times would change the nature of the model if, for example, embedded work times were used, changing the model so that it is no longer forward looking. A forward-looking model with embedded work times, in essence, becomes an embedded model producing embedded results.

Q. WHAT IS FALLOUT?

A. Fallout is an error in electronic flow-through for processing pre-ordering, ordering, and provisioning activity. Fallout often requires some form of manual processing. For example, in an electronic ordering process, if an

[4] Travel time is the variable that accounts for the situation in which a technician may need to make a trip to the field to rearrange outside plant, or travel to a non-staffed central office to complete various work activities.

OSS receives incompatible information from another OSS, the order cannot be processed and may "fallout" and require manual intervention. Sometimes fallout is the only cost driver in an otherwise seamless electronic process.

Q. HOW DOES THE MODEL INCORPORATE FALLOUT IN THE COST ESTIMATES?

A. In addition to all of the activities that are required for pre-ordering, ordering and provisioning, the model includes activities that would be necessary if there were fallout. The time and costs associated with these manual activities are included in the cost of completing the related local service request. The proper fallout rate to use in a forward-looking cost model is one associated with the use of efficiently operated and maintained OSS and related databases, rather than the fallout rate an ILEC may actually experience.

Q. WHY DOES THE ATT/WORLDCOM NONRECURRING COST MODEL ASSUME NO TIME FOR AN INCUMBENT'S SERVICE RERPRESENTATIVE TO ENTER A SERVICE ORDER?

A. The NRCM excludes the time required for an incumbent service representative to enter an order because this activity will not occur using a forward-looking OSS system. Unlike the retail situation, processing an unbundled network element order will not require interaction between Qwest's service representative and the customer. The wholesale customers, that is, the new entrants, will interact electronically, not

manually with Qwest. Thus, many nonrecurring costs that exist in a retail environment do not exist in a wholesale environment because wholesale providers (such as WorldCom and AT&T) will transmit orders and information into the incumbent's system electronically through a gateway.

SECTION 2.6 Summary and Results

Q. DO YOU RECOMMEND ANY NRCS TO THIS COMMISSION?

A. Yes. I recommend the results of the AT&T/WCOM Non-Recurring Cost Model, provided as Exhibit RL-2 as prices for the various NRCs identified.[5]

SECTION 3 COLLOCATION

SECTION 3.1 Overview

Q. WHAT IS COLLOCATION?

A. Collocation is the means by which CLECs place telecommunications equipment in a space in order to acquire access to ILEC unbundled network elements and/or interconnect with the ILEC network. "Space" is used generically in this definition and may refer to space within an ILEC central office inside a caged area, within the existing telecommunications equipment line-ups of the ILEC, or even outside the central office altogether. In physical collocation, the CLEC pays the ILEC for the use of CO space and is permitted to enter the CO to install, maintain and repair

[5] The NRCM was run using a copper loop percentage of 29%, the Arizona-specific figure generated by the HAI model. Model defaults were used for all other inputs except the Arizona-specific labor rates described above.

the collocated equipment. Virtual collocation allows a CLEC to place equipment in an area of the CO used by the ILEC for its equipment (that is, it is not in a segregated area). Typically, the CLEC purchases equipment to be dedicated for its use on the ILEC's premises and sells the equipment to the ILEC for a nominal $1.00 sum while maintaining a repurchase option. The equipment is then installed in space beside the ILEC's equipment. In virtual collocation, the ILEC handles day-to-day maintenance activities and is reimbursed by the CLEC. The CLEC is permitted to enter the CO upon request. In both physical and virtual collocation, the same sort of equipment is used and similar tasks are required. The difference lies in ownership, with implications for maintenance responsibility. Cageless collocation is a form of physical collocation in which a CLEC's equipment is placed in an ILEC's equipment lineups (i.e., not in segregated space) and the CLEC retains ownership and has the right to perform maintenance and other activities. Other forms of physical collocation include shared (or common) collocation in which multiple collocators locate equipment in the same cage, and adjacent collocation which can be "on-site," for example outside the central office but on the CO property, and "off-site" which can be in a nearby building. Qwest does not address explicitly the costs of shared, adjacent or remote collocation, other than to state the latter two are priced on an individual case basis ("ICB").

A fundamental aspect of collocation deployment (in contrast to costing) is that the ILEC controls the placement of collocators' equipment in the CO. As a result, ILECs exert almost total control over the costs their competitors pay for collocation. With no incentive to minimize collocators' costs, there is no assurance that ILECs will follow a "best practices" approach to space planning by using "pockets" of space, relocating administrative staff housed in equipment areas, and placing collocators' equipment in the same manner in which ILECs place their own equipment – that is, in "conditioned" space, close to those devices to which they must connect and served by overhead cable racking. In contrast, ILECs typically elect to place all collocators in one area of the CO, even if that area requires demolition and reconstruction to "prepare" the space, and even if that space results in longer cabling (and more cable racking) to connect CLEC equipment than would be the case if the ILEC were installing equipment for itself.

Q. WHAT COMPONENTS ARE REQUIRED FOR COLLOCATION?

A. In general, collocation is a low technology, "nuts and bolts" activity, requiring the placement and connection of CLEC equipment in an ILEC central office. Collocation requires:

- fiber connectivity between the first manhole outside the CO and the CLEC's equipment (entrance facilities);
- copper and fiber connectivity between the collocation area and an appropriate ILEC cross connect;

- DC power connectivity between the CLEC's equipment and a battery distribution fuse bay ("BDFB") or power plant;
- grounding;
- and, in the case of physical collocation, a cage.

Equipment located in central offices typically is placed in metal relay racks or equipment bays. These bays generally are fabricated with pre-drilled iron uprights to permit installation of equipment shelves, and generally are supported directly on the floor slab using anchors appropriately sized for the specific seismic zone in which the equipment is installed. Relay racks are placed adjacent to each other in rows (called "lineups") to simplify cabling arrangements and ongoing maintenance operations. Telecommunications equipment floor layouts typically include both front and rear aisles for maintenance purposes. In addition, floor layouts incorporate BDFBs, located every third or fourth lineup to provide power delivery efficiently. Cables are typically routed within central offices on overhead cable racks supported from the ceiling. The bulk of cabling in a central office is copper, which is typically placed on wider cable racks (15" to 30"), while fiber and power cables are often placed on narrower (12" or 15") cable racks. The vast majority of cabling associated with collocation connectivity is routed on shared cable racks.

Q. DOES QWEST'S COLLOCATION COST STUDY INCLUDE COST ELEMENTS THAT ADDRESS THESE COLLOCATION REQUIREMENTS?

A. Yes, generally. Qwest provides cost elements that address the fundamental requirements for collocation. For certain cost elements, such as cageless and caged "space construction" Qwest lumps together several cost components into one cost element. While this is not inherently wrong, it makes it difficult to establish what is included in the element Qwest is estimating. For example, Qwest's caged space construction cost element includes costs for a cage, engineering, a 60 amp power cable, cable racking and aerial support, lighting, "electrical" and HVAC (heating, ventilating and air conditioning).

Addressing the fundamental requirements for collocation does not mean that Qwest has estimated costs correctly – that is, consistent with a forward-looking, long run economic cost method. I discuss the proper approach to forward-looking costing below. I then evaluate specific cost elements in Qwest's cost study in light of that approach.

Even if Qwest had correctly estimated costs, which it did not, that would not mean that Qwest had correctly developed the proper rate elements from those costs (which it also did not do). An important decision that must be made to turn a cost estimate into a rate element involves whether the costs are properly recovered on a recurring or nonrecurring basis. (Whether a cost is recovered on a recurring or nonrecurring basis determines which cost factors apply, an issue I

address to only a very limited extent. Cost factors are addressed in detail in Mr. Weiss' testimony.) A cost for which the benefits cannot be shared or re-used, such as engineering specific to an individual collocation arrangement, is properly recovered as a nonrecurring charge.[6] I address this issue below in the context of specific cost elements in Qwest's cost studies.

SECTION 3.2 The Development of Forward-looking Collocation Costs

Q. HOW WOULD FORWARD-LOOKING LONG RUN ECONOMIC COSTING PRINCIPLES BE APPLIED TO COLLOCATION?

A. As a practical matter, any cost study should be complete, with no hidden charges, maintain consistent assumptions and be well-documented. A forward-looking, long run economic cost study for collocation would examine collocation components within the context of a forward-looking central office that would be built today, using least-cost, forward-looking technology. It would also develop costs based on the "total demand" for functions – that is, combined CLEC and ILEC use of various shared collocation components, such as central office floor space. This approach is consistent with the FCC's TELRIC costing method that requires consideration of the long run (that is, all inputs are allowed to vary) and

[6] For costs recovered through nonrecurring charges, that is, the situation in which Qwest recovers immediately its complete initial "investment," it is not proper to apply those cost factors that would recover return of and return on capital because Qwest effectively has no "invested" capital, having collected its cost immediately. For costs recovered properly through recurring charges, however, cost factors to recover return on and return of investment are appropriate.

quantities the ILECs provide to requesting carriers as well as use in their own offerings.[7]

A central office that would be built today stands in contrast to Qwest's current embedded base of COs, which were built to accommodate different technological requirements for equipment space and connectivity arrangements. As a result, Qwest's existing central offices (on which most of its costs are based) have characteristics that reflect planning practices that are no longer efficient. For example, in existing COs, new technologies may have been accommodated by adding floors or extending the building horizontally, rather than using forward-looking strategies that minimize the overall, long-term requirement for equipment space. Thus, existing COs tend to be larger than necessary, and the worst cases are often large, urban, multi-floor COs that may have significant amounts of space previously used for equipment but now used to house administrative personnel. This situation is exacerbated by the fact that many COs have congested overhead cable racking or blocked inter-floor cable holes, caused by removing equipment without also removing unused cables (or retiring equipment in place). The result is cable lengths much longer than necessary, since cables must be routed around congested areas or additional cable racking must be installed to alleviate areas of congestion.

Qwest's COs are likely to suffer from excessive cabling distances for the reasons described above. Further, excessive cable lengths may

[7] CFR 51.505

require additional, unnecessary equipment (such as regenerators), which would further drive up costs for collocators beyond what a forward-looking cost study would dictate.

As a matter of internal consistency, CO floor space rental costs developed for a CO that would be built today reflect a fully (air) conditioned CO, prepared to house telecommunication equipment. Thus, such CO floor space costs necessarily exclude any separate "space preparation" or "conditioning" costs as duplicative (as well as controlled by the ILEC, which has no incentive to minimize such costs). [8]

Costs for many collocation components are based on the distance-sensitive relationships assumed in the cost studies. For example, the cost for a voice grade circuit is based in part on the distance that the cable is assumed to travel between the collocator's cage and the incumbent's cross connect device. The forward-looking, least cost standard requires that the distance assumed in the cost study be based on the distance that would obtain in a forward-looking CO. A systematic method for determining such distance-sensitive inputs such as cable lengths ensures that costs are nondiscriminatory and consistent with forward-looking costing principles.

Q. HAS THE FCC PROVIDED A COMPREHENSIVE FORWARD-LOOKING APPROACH TO COLLOCATION COSTING?

A. No. It is worth noting that while the FCC has addressed collocation costs in various orders, it has not specifically and explicitly provided a

[8] Such costs typically include demolition and reconstruction costs to "prepare" space for collocators. This is duplicative because forward looking space rental charges are developed for space that is prepared initially; to impose or include demolition and reconstruction costs would to

comprehensive forward-looking approach to collocation costing. This is important because certain FCC pronouncements might, if considered alone, lead to short run incremental costing that could permit ILECs to assess duplicative charges. For example, in the Advanced Services Order[9] (intended to expand collocation requirements and reduce collocation costs and delays), the FCC discussed recovering "site conditioning" costs on a pro rata basis. While the FCC's discussion addressed a problem of "first in pays" (some ILECs were charging the initial collocator in a central office to "condition" much more space than would be used by that collocator), the FCC did not do this within the larger context of a comprehensive collocation costing method. That is, a forward-looking approach to collocation costing already includes "site conditioning" costs within the per square foot central office floor space costs. The FCC stated:

> ...incumbent LECs must allocate space preparation, security measures, and other collocation charges on a pro-rated basis so the first collocator in a particular incumbent premises will not be responsible for the entire cost of site preparation. For example, if an incumbent LEC implements cageless collocation arrangements in a particular central office that requires air conditioning and power upgrades, the incumbent may not require the first collocating party to pay the entire cost of site preparation. In order to ensure that the first entrant into an incumbent's premises does not bear the entire cost of site preparation, the incumbent must develop a system of partitioning the cost by comparing, for example, the amount of conditioned space actually occupied by the new entrant with the overall space conditioning expenses. We expect that state commissions will determine the proper pricing methodology to

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charge again for space preparation after demolition.

[9] *In the Matters of Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Docket No. 98-147, First Report and Order and Further Notice of Proposed Rulemaking, Released March 31, 1999 ("Advanced Services Order").

ensure the incumbent LECs properly allocate site preparation costs among new entrants.[10]

The proper pricing methodology, one that avoids double counting, includes a forward-looking space rental cost and thus no need to recover "space preparation" or "site conditioning" costs. Another way of stating this is that the pro rata site preparation charges discussed by the FCC are already included in the forward-looking per square foot costs.

SECTION 3.3 General Overview of Qwest's Collocation Cost Study

Q. ARE QWEST'S COLLOCATION COST STUDIES CONSISTENT WITH FORWARD-LOOKING COSTING PRINCIPLES?

A. No. Qwest claims that it conducted its TELRIC studies to "consider a time period over which all inputs are variable" and "identify the total 'replacement' costs of serving all current and anticipated demand, rather than the costs of adding equipment to an existing network to meet a small increment of demand."[11] While Qwest's description of its costing method follows forward-looking principles, its execution is not always consistent with those principles.

First, Qwest's cost studies are not complete and well documented. In particular, certain cost components, such as "engineering" of caged and cageless collocation, which forms a significant percentage of Qwest's "space construction" charges, have insufficient supporting documentation. In addition, Qwest's "Quote Preparation Fee" has little to no support.

[10] Advanced Services Order at paragraph 51.

Furthermore, Qwest proposes an ICB charge for "construction" and other elements.[12] The insidious nature of ICB charges is that they are hidden, potentially duplicative of other charges, subject to manipulation, and are under Qwest's complete control.

Second, Qwest failed to consider the total demand for various cost elements by ignoring its own use of shared facilities such as entrance facilities and cable racking and thereby would impose excessive costs on collocators. Third, Qwest did not develop correctly recurring and nonrecurring charges on a consistent basis. Fourth, Qwest applied cost factors that permit double recovery of power and land and building costs. Lastly, Qwest included costs for "space preparation," which is inconsistent with forward-looking floor space rental cost development.

Insufficient Documentation and ICB Charges

Q. ARE QWEST'S COST STUDIES SUPPORTED BY SUFFICIENT AND ACCURATE DOCUMENTATION?

A. No. Qwest's collocation cost study includes significant costs for which there appears to be little or no support. As discussed in more detail below, Qwest's documentation provides insufficient support for its caged and cageless engineering cost, as well as its power plant costs, and no apparent explanation is provided for its Quote Preparation Fee. In addition, Qwest's cost study is based on 41 cageless collocation jobs, not one of which was located in Arizona. Also, in developing fence costs for

[11] Direct Testimony of Teresa K. Million, March 15, 2001 at 4.

caged collocation, where there are examples from Arizona, Qwest uses a multi-state average, despite the fact that the Arizona-specific costs are significantly less than the average. Furthermore, by basing its study on its actual collocation arrangements, Qwest's approach develops costs that capture existing inefficiencies. For example, Qwest's placement of collocators' equipment further than necessary from the devices to which it must connect, and any need to route cables around congested areas results in longer cables and additional installation labor.

Q. DOES QWEST INTEND TO ASSESS ANY INDIVIDUAL CASE BASIS CHARGES FOR COLLOCATION?

A. Yes. Qwest lists ICB charges for Construction, Adjacent and Remote Collocation and Field Connection Point Construction.[13] In addition, although the charges do not appear in Qwest's proposal in this case, it is my understanding that in the 271 case (Docket No. T-00000B-97-238), Qwest proposes to assess ICB charges for Central Office Security Infrastructure and Space Construction Site Preparation for both caged and cageless collocation. (Qwest also apparently assesses a charge for humidification for leased physical space, which is duplicative of other HVAC costs.) The nature of ICB charges is that they are hidden and do not appear in or as cost studies. Based on my experience in collocation costing, pricing and tariffing cases, ICB charges are assessed for space preparation, as well as for expansion of central office power or HVAC

[12] Direct Testimony of Maureen Arnold, March 15, 2001, Exhibit MA-1 at 15.
[13] Direct Testimony of Maureen Arnold, Exhibit MA-1A, April 6, 2001 at pages 2, 6 and 9,

systems. (These charges sometimes appear as "special construction" charges.)

With respect to security costs, the FCC has precluded ILECs from imposing more stringent security measures on CLECs than the ILECs impose on its own employees and contractors. The FCC stated that "the incumbent LECs may not impose discriminatory security requirements that result in increased collocation costs without the concomitant benefit of providing necessary protection of the incumbent LEC's equipment."[14] Before being permitted to assess any security ICB charge, Qwest should be required to prove it has met the FCC's standard for imposing security costs.

With respect to HVAC, the forward-looking cost for central office space includes investment for HVAC facilities as part of the investment figure used to develop the per square foot charge for space in the CO. With respect to power, collocators pay power charges based on the forward-looking cost of a (shared) power plant. If Qwest were to place equipment (for example, DSLAMs) to serve end users that caused it to expand a power pant, end users of Qwest's DSL service would not be charged for the power plant addition, and it would be discriminatory to assess collocators a charge in a similar situation.[15] To force CLECs to pay ICBs for expanding HVAC or power systems would result in imposing

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respectively.

[14] Advanced Services Order at paragraph 47.

[15] Furthermore, any ICB charges ILECs assess collocators for power and HVAC upgrades are unlikely to capture the economies of scale that ILECs realize in their use and operation of the CO

duplicative costs, would be discriminatory and should not be permitted. Furthermore, rather than list and attempt to assess ICB charges, Qwest should be required to provide cost studies for Adjacent Collocation, Remote Collocation, Remote Adjacent Collocation and Field Connection Point Construction.

Q. IN ADDITION TO BEING POTENTIALLY DUPLICATIVE AND DISCRIMINATORY WHAT ELSE IS WRONG WITH ICB CHARGES?

A. ICBs are also problematic because they are only quantified upon submission of a collocation request, and thus the collocator has no idea what the cost of collocation will be. When a CLEC has a business need for a specific collocation space, it is in a vulnerable negotiating position. Qwest can use this leverage to artificially increase collocators' costs by forcing CLECs to delay their business plans while challenging such ICB charges. Furthermore, charges that simply reimburse Qwest for the time and materials on an ICB basis provide no incentive for Qwest to pursue efficiencies and improve collocation implementation processes.

Q. HAS THE FCC PROVIDED ANY GUIDANCE REGARDING ICB PRICING?

A. Yes. In its *Second Report and Order*, issued June 13, 1997, the FCC found "that LECs' additional, extraordinary, or individually determined cost provisions violate the Commission's requirement that expanded interconnection rate levels be uniform for all interconnectors and that the LECs' tariffs identify the actual rates for expanded interconnection

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HVAC and power systems.

service."[16] The FCC thus prohibited ICB pricing for collocation elements. The FCC explained the reasons for this requirement in paragraph 36 of the same order:

> Tariff provisions permitting LECs to recover unspecified charges for additional, extraordinary, or individually determined costs deny interconnectors advance notice of all the costs associated with physical collocation, creating an uncertainty for the interconnector. This uncertainty, in turn, may serve as a barrier to entering the interstate access market by interfering with the interconnector's ability to implement its business plans and to marker its services. In addition, this uncertainty may increase the risk of the interconnector's business and the price that the interconnector is required to pay to attract debt and equity capital to finance its business. To the extent, therefore, that any of the LECs incur additional, extraordinary or individually determined costs in conjunction with physical collocation service, they must file new tariffs identifying the service they are providing, the price of that service, the costs associated with providing that service, and justification for these costs. This will ensure that interconnectors receive advance notice of all costs associated with physical collocation service and will permit the FCC to judge the reasonableness of the services proposed by the ILECs and the costs of providing those services.[17]

The FCC's concerns regarding ICBs are applicable to all forms of collocation, as well as to the Arizona local exchange market.

Failure to Consider Total Demand

Q. HOW DOES QWEST FAIL TO CONSIDER TOTAL DEMAND?

A. Qwest fails to consider the total demand in developing cost elements by ignoring or understating its use of shared facilities, such as entrance facilities and cable racking, and by understating the number of collocators

[16] *In the Matter of Local Exchange Carriers' Rates, Terms and Conditions for Expanded Interconnection Through Physical Collocation for Special Access and Switched Transport*, CC Docket No. 93-162), issued June 13, 1997, at paragraph 35 (emphasis added).

per central office. These erroneous assumptions are used to support several cost elements, including cable racking, and aerial and bay support.

Collocators per Central Office. Qwest assumed three caged and three cageless collocators per central office,[18] despite an ever-increasing number of collocation applications. Furthermore, Qwest's response to discovery request ATT 02-030 indicates there are already more collocators per central office in Arizona than the figure Qwest used in its cost study. At the very least, Qwest should be required to revise the number of collocators per central office assumed in its cost studies to be consistent with the existing number in ATT 02-030.

Cable Racking. While Qwest and CLECs share virtually all cable racking in a CO, Qwest assumes that 100% of the caged and 50% of the cageless collocation arrangements require "major" (new) cable racking and aerial support. The amount of cable racking dedicated to any one collocator would be very small if Qwest placed CLEC equipment in the manner in which it places its own equipment. Indeed, Qwest completely controls where in the CO to place collocators' equipment and thus directly influences the amount of cable racking and aerial support costs. If Qwest elects to place all collocators in a separate area of the CO and not use pockets of available space, more cable racking is required unnecessarily.

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[17] Ibid, paragraph 36.
[18] Direct Testimony of Teresa K. Million, March 15, 2001 at 92.

It does not appear that Qwest assesses a cable racking cost on virtual collocators. There is no cable racking dedicated to CLECs in virtual collocation because the cable racking (and aerial support) is shared with Qwest's adjacent equipment. The same approach should be used for cageless collocation, since the only difference between virtual collocation and cageless collocation is equipment ownership. It is possible that a caged collocation arrangement could have a small amount of dedicated cable racking, but this would be limited to the amount of cable racking that extends, for example, immediately above the last cage in a line of cages.[19] I recommend no cable racking and aerial support be used to develop costs for cageless collocation. I also recommend the percentage of jobs requiring major cable racking and aerial support be set at 10%, and the percentage of jobs requiring any cable racking and aerial support be set at 20% in developing costs for caged collocation.

Entrance Facility. Qwest fails to consider the total demand for an entrance facility by assuming a new enclosure will be built for CLECs only and used only by caged collocators. A forward-looking approach to collocation recognizes that an entrance enclosure is part of the central office, shared by all occupants. Qwest also fails to consider total demand for cable racking associated with entrance facilities since Qwest assumes an entrance facility is used exclusively by collocators and thus ignores the fact that CLEC cables share cable racking and support with Qwest's

[19] In addition, cable racking costs should be based on cable capacity considering total demand – that is, collocators' and Qwest's cables -- and assessed on a recurring basis.

cables. Qwest's model therefore calculates collocators' costs that are much greater than the appropriate proportionate share of the total cable racking and support capacity cost.

Failure to Develop Correctly Recurring and Nonrecurring Charges

Q. HOW DID QWEST FAIL TO DEVELOP CORRECTLY RECURRING AND NONRECURRING CHARGES ON A CONSISTENT BASIS?

A. Qwest failed to consistently separate those investments that would be shared or reused (and thus recovered through recurring charges) from those investments that would be dedicated to a specific collocator (and thus recovered through nonrecurring charges). This primarily appears in Qwest's caged and cageless construction charges, which are comprised of several different components (including engineering, cable racking, lighting, HVAC, etc.) Qwest developed a nonrecurring charge using investments in shared and reusable assets that should be recovered through recurring charges. (In other instances, Qwest developed recurring charges using investments dedicated to a particular collocator, for which a nonrecurring charge is appropriate.) I address Qwest's construction charges in more detail below.

Q. HOW DOES YOUR "REUSABILITY TEST" DESCRIBED IN THE NRC SECTION DIFFER FROM QUEST'S APPROACH?

A. Qwest appears to develop recurring charges based only on whether Qwest determines that collocation equipment is shared immediately with

Qwest.[20] Qwest misses the point, however, that an asset that is not shared at a point in time, such as a collocation cage, can be shared over time – that is, re-used. If Qwest assesses a nonrecurring charge for such a reusable asset and the initial collocator vacates the collocation arrangement, Qwest will be able to recover its costs multiple times by assessing the same nonrecurring charge to later collocators, despite having completely recovered all its costs from the first collocator.

The theoretically correct approach in this situation is to develop a recurring charge assessed over the life of the asset. Given the possibility that the cage could be vacant for some period of time, it would be appropriate to apply an occupancy (fill) factor. This would increase the cost to CLECs and possibly permit Qwest to "over-recover" its costs and thereby balance the risk of "under-recovery" Qwest faces with potential vacancy. It would also provide Qwest with the incentive to maximize collocation space and availability and lease the unused space in its central offices (as it would do in a competitive market) – something over which it has complete control, and over which CLECs have no control.

Q. QWEST CLAIMS THAT ITS TREATMENT OF RECURRING AND NONRECURRING COSTS IS "CONSISTENT WITH THE FCC'S COLLOCATION PRINCIPLES." IS THAT CORRECT?

A. No, not if by that statement Qwest means consistent with forward-looking costing principles. As discussed above, the FCC has not set forth an explicit and specific TELRIC approach to collocation costing. Indeed, Qwest's citation for support is not to an order in the FCC's Local

[20] Direct Testimony of Teresa K. Million, March 15, 2001 at page 83.

Competition proceeding, but to an FCC Order issued in the FCC's Expanded Interconnection proceeding that preceded TELRIC costing. In fact, Qwest's cite includes the statement that "...physical collocation is a new service..." which clearly is no longer the case. Furthermore, Qwest apparently has not implemented an aspect of the order it cites because Qwest has no written procedures for refunding the unamortized portion of nonrecurring charges to vacating collocators once the vacated facilities are occupied by Qwest or a subsequent collocator.[21]

Applying Cost Factors Resulting in Double Recovery of Costs

Q. HOW DID QWEST APPLY COST FACTORS THAT PERMIT DOUBLE RECOVERY OF POWER AND LAND AND BUILDING COSTS?

A. Qwest applies power and land and building factors to cable racking (and other) investments. Qwest applies these factors generally as a means to spread the costs of its central office power plants and the land and building investments over its various services. Collocation service, however, is different from other services in that collocators pay directly for the (proportion of the shared) power plant as well as space rental that already includes the proportionate share of land and building investment. Thus, Qwest should not apply power or land and building factors to any collocation-related investments. To do otherwise would permit Qwest to "over-recover" its power and land and building costs.

[21] See Qwest's response to discovery request ATT 02-022.

"Space Preparation" Costs

Q. WHERE IN QWEST'S COST STUDY ARE "SPACE PREPARATION" COSTS INCLUDED?

A. Qwest describes the "space construction" rate element for cageless physical collocation as a charge that recovers "the cost of engineering the job, site preparation," and several other components.[22] It is likely, therefore, that this rate element includes space preparation costs that Qwest should not be permitted to recover. Furthermore, the method Qwest used to develop caged collocation costs from its sample of 41 cageless collocation arrangements, makes it likely that space preparation charges also exist in the caged space construction element. Qwest states that its sample:

> "included only cageless collocation jobs. Once the analysis of cageless costs was completed, the assumptions were revised and the missing elements were added to derive a standard cost for a *caged* collocation job. Wherever possible, actual caged collocation data was used in revising the assumptions or estimating the cost for those components of a caged collocation job (e.g., the cost of the cage) which are not found in cageless collocation jobs.[23]

As I discuss below, the data on which Qwest relies for caged and cageless engineering and installation costs is overstated and poorly-documented, and likely includes site preparation costs.

Qwest could also attempt to assess construction or other ICB charges for space preparation activities in a variety of ways as mentioned above. This should be explicitly prohibited.

[22] Direct Testimony of Robert F. Kennedy, March 15, 2001 at 18 (emphasis added).

SECTION 3.4 Analysis of Specific Components of Qwest's Collocation Cost Study

Q. PLEASE COMMENT ON SPECIFIC COLLOCATION COST ELEMENTS?

Installation Times and Input Prices

In response to discovery request 02-024, Qwest noted that it has established contracts that include detailed, fixed, allotted time periods for installation work activities. Given the invoices' lack of detail regarding installation work activities, Qwest has not shown that the installation costs used as inputs to its collocation cost model are efficient or even consistent with its contracted amounts. As Qwest states, "invoices for labor costs did not contain an itemized list of all the functions that were performed by contractors. Virtually all the bills only listed the total hours spent on the job along with the total cost for all functions performed."[24] Since no installation functions are listed, it is not clear whether installation activities were efficiently performed, whether installation included "space preparation" activities or included other activities that benefited Qwest in addition to collocators.

In discovery request 02-095, ATT sought to obtain prices Qwest pays for a variety of collocation components. Qwest objected to the discovery request on the basis that it seeks proprietary information involving a third party. (Qwest also stated that it is seeking vendor permission to provide this information.) It is likely that Qwest is able to

[23] Direct Testimony of Teresa K. Million, March 15, 2001 at 87.

negotiate discounted prices on collocation components, and therefore any pricing recommendation should serve as an upper bound on Qwest's input prices.

Quote Preparation Fee (QPF)

Qwest assesses a nonrefundable QPF as a nonrecurring charge "...for the work required to verify space, power, cable terminations, review design requested, and develop a price quote for the total costs to the CLEC for its cageless [or caged] collocation request."[25] Qwest's proposed QPF is $4763.06 for caged collocation and $4380.68 for cageless or virtual collocation. Qwest's QPF is overstated,[26] unsubstantiated, and appears to be duplicative of Qwest's "engineering" functions.[27] Moreover, Qwest provides no explanation for increasing its QPF by more than three times the $1381.54 for virtual and physical collocation that this Commission reviewed and approved in the prior Consolidated Cost and Pricing Arbitration.

The ability to quickly verify space, power and cable terminations depends on Qwest maintaining accurate records. (updating these records is a function included in Qwest's separate engineering charge, which is discussed below.) Assuming that Qwest maintains accurate records, this

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[24] Direct Testimony of Teresa K. Million, March 15, 2001 at page 89.
[25] Direct Testimony of Robert F. Kennedy, March 15, 2001 at 18. This appears to be the extent of the information provided to support the QPF activities.
[26] Assuming a labor rate of about $50 per hour, Qwest appears to assume the functions identified above require on the order of 50 hours!
[27] Qwest provides a list of functions for "engineering" associated with Line Sharing and CLEC-to-CLEC Interconnection that I have assumed are similar to those engineering functions for caged

process should take no more than ten hours. Reviewing the design requested should take very little time, certainly no more than two hours because of the general similarity of collocation requests. Indeed, Qwest's physical caged and cageless collocation offerings are standardized and include several components in the "space construction" rate element. This standardized approach facilitates Qwest's ability to review the design, as well as to render a price quote, a process that should take no more than two hours. In total then, Qwest's QPF should include no more than fifteen hours.[28]

Qwest does not identify a separate QPF for collocation "augments," that is, collocation requests that simply seek to add power or connectivity cabling to an existing collocation arrangement. These requests do not require the same extent of information verification or design review, and the time required for Qwest to develop a price quote should be reduced. I recommend that the Commission require Qwest to provide a separate QPF for augments that is no more than one-fourth of the QPF established for physical and cageless and virtual collocation in this proceeding.

Engineering – Caged and Cageless Collocation

Qwest assesses engineering charges for collocation. For physical caged and cageless collocation, the charge is subsumed within Qwest's respective "space construction" charge. Qwest's engineering charges are

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and cageless collocation.

[28] For the purposes of modifying Qwest's cost study, I assumed the same labor rate that Qwest

overstated and suffer from poor documentation. For both physical caged and cageless collocation, the engineering investment (before cost factors are applied) exceeds several thousand dollars. Qwest's engineering costs are derived from an average of the 41 cageless collocation jobs, omitting the two most and two least expensive.

In response to discovery requests seeking to substantiate Qwest's engineering costs, Qwest provided redacted invoices, noting that the invoices are "not detailed to specific collocation elements" and "contain only the total engineering amount charged by the vendor."[29] There appears to be no fundamental support for these charges: there is no specification of the tasks performed, there is no confirmation that the costs are explicitly related to specific collocation jobs (and not demolition or space preparation activities), there is no ability to ensure that Qwest did not also benefit from any engineering work conducted simultaneously, and there is no certainty that the tasks performed are not the same as the QPF tasks. (Indeed, this is likely since the QPF functions listed above appear to overlap the functions listed for "engineering" for Line Sharing and CLEC-CLEC Interconnection.) Furthermore, Qwest's approach to engineering collocation is inefficient in that Qwest assumes cage and cageless collocation arrangements will be engineered one-at-a-time. Given the number of collocation arrangements this approach is not only inefficient (and hence more costly), but also ignores Qwest's ability to

used in its Line Sharing and CLEC-to-CLEC Interconnection engineering cost estimates.

[29] Qwest's responses to discovery requests ATT 02-104 and 02-105.

become more efficient at engineering collocation arrangements as it acquires more experience.

As noted above, Qwest is unable to identify what services were performed in exchange for its engineering costs. Based on my experience reviewing collocation costs studies, Qwest's proposed engineering cost is much greater than necessary and should be reduced to one-half of Qwest's proposed value. I note that this is a conservative recommendation, made in concert with my recommendation regarding Qwest's QPF charge. If the Commission were to reject my recommendation regarding the QPF charge, I would recommend the engineering charge be reduced by three-fourths.

Similar to the QPF, Qwest also does not include a separate engineering charge for collocation augments. The engineering required to augment an existing collocation arrangement requires much less work than engineering a new collocation arrangement, and a separate cost should be developed. I recommend the Commission require Qwest to provide a separate engineering charge for augments that is based on one-half of my recommended engineering charge.

In summary, I recommend that the Commission require Qwest to: (1) reduce the engineering cost Qwest uses as an input to its physical caged and cageless "space construction" cost development by one-half; and (2) develop a separate engineering charge for collocation augments that is based on one-half the cost above.

Engineering – Line Sharing and CLEC-CLEC Interconnection

Qwest's engineering charges for Line Sharing ($1274.63) and CLEC-CLEC Interconnection ($1353.22) are overstated. In both cases, the costs are developed based on the same list of functions, grouped into several categories. The "preliminary engineering" category requires that Qwest verify equipment, research jobs and draw configurations. Most of this information should be readily available to Qwest, is standardized and should require no more than one hour. Collocators should not be forced to pay Qwest to verify the accuracy of its drawings that identify where equipment is located in the central office. The "walk through" category consists of assessing standardized functions and taking cable measurements and should take no more than two hours. Qwest states that the walk through serves two important purposes: (1) it is necessary to compare drawings to the actual configuration of the CO; and (2) to ensure space is adequate. Again, collocators should not be forced to pay Qwest to verify the accuracy of its drawings, and determining the adequacy of CO space (floor and ceiling weight bearing capacity) is conducted when an equipment area is planned, not for each placement of a relay rack or a piece of equipment. The "engineering" category appears to consist primarily of providing or modifying engineering diagrams and should take no more than five hours. Qwest's "Forms/follow-up" category appears designed to verify equipment installation is correct and maintain databases and should take no more than two hours. I recommend that

the engineering charges for Line Sharing and CLEC-CLEC Interconnection be based on no more than ten hours.

Floor Space Rental Cost

Qwest proposes to charge $3.96 per square foot for floor space rental. Qwest's approach to developing central office floor space rental cost is generally forward-looking, in that Qwest models the per square foot CO floor space rental cost using land and building investments that would be required to build a central office today. As discussed above, a forward-looking approach to developing space rental costs should preclude Qwest from assessing any space preparation charges.

Qwest relied on the RS Means Construction Cost Data book, a text widely used in the construction industry. RS Means provides the per square foot values for central office construction at the 25th percentile, the median value and the 75th percentile. In developing its floor space cost, Qwest used the median value (which includes costs for contractor overhead and profit) and added costs for architectural fees, land costs, site work and landscaping and Qwest's project management. These added costs account for almost 30% of the total investment Qwest developed.

The RS Means text states that its database includes contractors overhead and profit but does not generally include architectural or land costs. In addition, RS Means states that the median value does not

generally include site work. The conclusion is that Qwest's cost study erroneously assumes that the RS Means median includes no architectural or land costs and no site work, when, in fact, it appears the RS Means median includes these costs to some extent. This necessarily leads to double-counting of architectural, land and site work costs in the Qwest cost study. I recommend that Qwest's per square foot investment be reduced by ten percent to account for this discrepancy. (Interestingly, Qwest fails to provide any explanation for its change from the three-zoned rental rate structure ranging from $2.06 to $2.75 per square foot that it proposed in the prior cost docket to its newly-proposed uniform structure of $3.96 per square foot.)

Standard Space Construction Costs (Physical Caged Collocation)

Qwest does not have a separate collocation cage (i.e., fencing) cost, but instead has a "standard space construction" cost that comprises various cost elements, including engineering, fencing, a 60 amp power feed, overhead cable racking and support structure, electrical distribution and HVAC. The list of the components and the respective percentage each component comprises in the total investment (that is, before any loading factors are applied) for Qwest's 100 square foot cage follows.

"Standard Space Construction" for 100 sf	
engineering	26.9%
fencing	10.2%
60 amp power feed	30.4%
overhead cable racking	16.6%

overhead support structure	1.1%
electrical distribution	11.1%
lighting	1.7%
HVAC	1.8%

Qwest's cost study uses the total of all components to develop a nonrecurring charge as well as a recurring rate. The engineering component was addressed above. There are several additional problems with Qwest's approach.

Treatment of Recurring vs. Nonrecurring Charges. Qwest does not properly separate costs that should be recovered through recurring rates from those that should be recovered through nonrecurring charges. Instead, Qwest developed a nonrecurring charge as well as a recurring rate from the combination of all component investments.

The correct treatment is to develop a nonrecurring charge to recover the investments that cannot be shared or re-used, and to develop a recurring rate to recover the investments that can be shared or reused. For example, the engineering investment should be recovered through a nonrecurring charge, since it is assumed that collocation arrangements are engineered one-at-a-time.[30] By contrast, overhead cable racking and support structure, lighting, HVAC, electrical distribution, and the cage fencing are reusable and these investments (if legitimate) should be recovered through a recurring charge. Indeed, these assets become

[30] As explained above, the efficient, forward-looking method of deploying collocation arrangements in a CO is to "engineer" several arrangements (e.g., cages) at one time, which provides economies in analyzing various equipment systems and real estate needs, producing diagrams, etc.

physically attached to the central office building, and thus become part of the building.[31] (As part of the CO building, these costs theoretically should be recovered over the life of the building.)

Qwest's proposal to assess a nonrecurring charge for space construction would, as described above, result in complete cost recovery each time an entrant began to use a cage. To avoid this multiple cost recovery, it is theoretically appropriate to develop a recurring charge for these reusable assets, and to apply an occupancy factor to recognize the possibility that the cage, etc. may be unused for some portion of the cost recovery period. While this raises costs for the collocators, it provides Qwest with the opportunity to "over-collect" should the actual occupancy exceed the occupancy factor used to develop the recurring charge.

To minimize the dispute over the uncertainty associated with a cage's utilization over time (that is, the specific occupancy factor), I propose instead to use a recurring cost spread over a period of five years. This shorter period of time will balance the risk CLECs face (collectively) for potential cost over-recovery and the risk Qwest faces for potential cost under-recovery.[32]

Double counting. Qwest double counted HVAC and electrical costs. As part of its central office space rental calculation, Qwest reduced the total land and building investment to account for overstated mechanical

[31] Technically, power cables are re-usable, but it is standard practice not to re-use them, so a nonrecurring charge is appropriate.
[32] The recurring charge should be calculated based on quantitative recommendations set forth later in this testimony.

(HVAC) and electrical costs. Qwest indicates that the mechanical and electrical costs from a 1996 study were overstated when compared with the 1998 study it relied on to develop space rental costs. (The 1996 study assumed a larger central office – one that would have required more HVAC ductwork, for example, than the 1998 study. Qwest's solution was to "scale down" the needed HVAC and electrical equipment from the 1996 study to match the equipment size with the CO size assumed in the 1998 study.) The double counting arises because although Qwest's approach retains the "appropriate" amount of HVAC and electrical delivery costs in the per square foot floor space rental cost, Qwest adds HVAC and electrical costs as components in its "standard space construction" cost. (It is interesting to note that the RS Means text on which Qwest relied to develop it per square foot rental cost indicates that the total mechanical and electrical costs, including HVAC, account for on the order of 33% of the total building cost.) Furthermore, in the 271 docket, Qwest apparently proposes to include a "Humidification" charge that is duplicative of HVAC costs since humidification is part of the HVAC system. I recommend that no HVAC, electrical distribution or lighting costs be permitted as part of Qwest's space construction cost (because they duplicate costs Qwest includes), and that a separate Humidification charge not be permitted.

Fencing Cost. Qwest's cost for the fencing component of the standard space construction charge is overstated. In developing its standard space construction cost, Qwest used an average of quotes obtained from 13

vendors to establish costs for 100, 200, 300 and 400 square foot cages. No vendor specifications are identified, and given the single-cage quotes listed, apparently no consideration was incorporated to account for cost reductions resulting from placing multiple adjacent cages, which would permit sharing cage walls and thereby reduce the per-cage costs. In addition, no information was included to ensure that the cage construction estimates, which were based on "actual jobs," did not include space preparation activities such as demolition and reconstruction. Based on my review of cage construction invoices in other (non Qwest) jurisdictions, it is not uncommon for cage construction activities to include labor (and other) costs for demolition and reconstruction.

Qwest provides no explanation for why it did not use the cage quotes that appear in its response to discovery request ATT 02-103, on which it relied to determine floor space rental costs. The cage cost in the response to ATT 02-103 is derived from the RS Means Building Construction Cost Data 1997 book and includes 16% for general overhead and profit, 13% for consulting fees and 5% for real estate project management. Despite the significant costs added to the cage itself, the costs provided from RS Means are roughly one-half the costs Qwest used for its cost study. I recommend that the Commission require Qwest to use the cage costs developed in its response to discovery request ATT 02-103. (It is interesting to note that of the list of 13 cages,

only two are from Arizona and these cage costs range from 66% to 75% of Qwest's average costs.)

Entrance Facility

The entrance facility is the connection between the CLEC cable outside the CO and the CLEC facilities inside the CO. Qwest's costs include the enclosure (manhole) where the CLEC cable enters Qwest's facilities, the conduit between the manhole and the CO, the cable running from the manhole to the CLEC space and the structure, such as cable racking, used to support the cables. The placement costs for cable and equipment is also included. Qwest's cost for an entrance facility is not consistent with forward-looking costing principles. Qwest assumes that it will construct a new enclosure just for CLECs. A forward-looking costing approach would not include constructing a new entrance enclosure just for CLECs. Indeed, as Qwest notes, TELRIC studies are designed to "identify the total 'replacement' costs of serving all current and anticipated demand, rather than the costs of adding equipment to an existing network to meet a small increment of demand."[33]

Qwest includes a significant amount of cost for items such as placing a utility hole, cutting and replacing concrete road covering, and backfilling the hole. By assuming a separate entrance enclosure used only by CLECs, Qwest overstates entrance facility costs by failing to consider that collocators would share the capacity (of the manhole, conduit, riser

rack, cable racking, etc.) with Qwest. The cost overstatement is significant because entrance facility costs should be spread over all users of the facility, and the majority of cables comprising the capacity of the entrance facility are Qwest's.

Qwest should have developed enclosure facility costs based on using shared, rather than separate resources for a manhole and associated costs (such as trenching), since a separate entrance is not consistent with forward-looking costing principles. (Indeed, no other ILEC collocation cost study I have reviewed has included the cost of a new manhole in its collocation cost study.) Since this investment is shared among Qwest and CLECs, the charge should be assessed on a recurring basis. Unfortunately, the structure of Qwest's collocation cost study does not permit a simple input change to resolve this problem. I recommend Qwest's entrance facility costs be reduced by one-third. This is a conservative recommendation since collocators' cables consume a much smaller proportion of the entrance facility capacity.

Power

Per Amp Cost. Qwest states that its DC power usage charge "includes the cost of purchasing power from the electric company and the cost of the power plant" and maintenance to provide power to CLEC equipment.[34] Qwest proposes to charges $11.36 per amp per month for power for the

[33] Direct Testimony of Teresa K. Million, March 15, 2001 at 4.
[34] Direct Testimony of Teresa K. Million, March 15, 2001, Exhibit TRM-06, page A-10.

shared power plant, in addition to a per amp power charge of $3.69 for usage less than 60 amps and $7.37 for usage greater than 60 amps.[35] Thus, if I understand Qwest's proposal correctly, a collocator would pay $15.05 or $18.73 per amp in addition to power cables charges.

On the face of it, Qwest's power charges seem quite high. BY way of contrast, Qwest's FCC power charges range from $8.70 per amp to $12.66 per amp (in Arizona). Power costs are developed based on initial component investments, combined with "engineering and installation" factors (as well as the application of other cost factors). Where I have seen power charges this close to $20 per amp, it has been in the old NYNEX territory and generally as a result of using a (disputed) engineering and installation factor much higher than the (more reasonable) engineering and installation factor upon which Qwest relies. (Other ILECs' power charges are generally less than $10 per amp.) As a consequence, it would appear that Qwest's fundamental investments are too high.

Qwest does not provide any information regarding the source of its power plant investments, which appear to be assembled from a single (unidentified) source. The single source for power plant components is in contrast to Qwest's investments for power and grounding cables and AC feeds, which Qwest appears to have developed from an average of five

[35] Qwest's standard cageless charge includes one 40 amp DC power feed and its standard caged charge includes one 60 amp power feed.

sites, one of which was from Arizona. Qwest did not identify whether it conducts competitive bidding for power plants components.

Qwest does not provide sufficient information to be able to determine whether its power investments are representative of power plants that would be installed in its Arizona central offices. Given the range of central office sizes, it would have been more appropriate for Qwest to develop an average of the investments for different-sized central offices. Furthermore, Qwest did not explain whether the power plant component investments were intended to be used in a single central office (that is, whether the components specified "work with" each other for a particular size plant. This leads to the issue of whether Qwest developed the cost in a consistent manner. For example, Qwest's power plant components include rectifiers, batteries and a BDFB, each with different amperages listed, though it appears Qwest developed costs on a per-amp basis from the total costs, rather than using the respective per-amp amount for each component.

Per Feed Cost. Qwest's development of the per amp power plant equipment costs is inconsistent with its model assumption regarding power feeds and, as a consequence, Qwest overstates the cost of the shared BDFB. Qwest assumes that all power feeds of less than 60 amps are routed through a BDFB, while all feeds in excess of 60 amps are routed directly to the power board. (A 60 amp feed cost is developed by assuming a 65/35 blend of BDFB and direct feed routing.) The cost of the

BDFB, however, is included in the power plant equipment cost that is converted into a monthly recurring charge levied on each amp ordered. Thus, collocators requesting feeds in excess of 60 amps are charged for a BDFB (in the per amp rate) they are assumed not to use. I recommend the cost of the BDFB be removed from the per amp cost developed for power feeds in excess of 60 amps.

Power Cabling Costs. Qwest's material costs for power and grounding cable are overstated. The following two tables provide material cost comparisons for power and grounding cable, respectively, from RS Means and Cobra Wire & Cable. The costs quoted below range from several percent less (for power cable) to ten to fifteen percent less (for grounding cable) than Qwest's (proprietary) figures for similarly sized cable. I recommend that the Commission require an average of the two quotes to be used for Qwest's power and grounding cable costs. (It is likely that Qwest's costs are even lower because of its ability to negotiate discounts.)

Table 1. Material Costs for Power Cable ($ per foot)

Cable Size	RS Means (XHH)	Cobra Wire & Cable (RHW-LS)	Average
#6	0.28	0.644	0.46
#4	0.40	0.834	0.62
#2	0.61	1.060	0.84
1/0	0.94	1.594	1.27
2/0	1.16	1.886	1.52
4/0	1.84	2.665	2.25
350 kcmil	3.00	4.080	3.54
500 kcmil	4.25	6.620	5.44
750 kcmil	6.85	9.319	8.09

- For the larger RHW-LS cable sizes (500 kcmil and 750 kcmil), the more expensive Flex cable is quoted. The non-flex cable costs are $5.54 and $7.71, respectively. Both XHH and RHW-

LS cable meet Qwest's power cable specifications.

Table 2. Material Costs for Grounding Cable ($ per foot)

Cable Size	RS Means (Bare Stranded Copper)	Cobra Wire & Cable (RHW-LS)	Average
#6	0.21	0.644	0.43
#2	0.51	1.060	0.79
1/0	0.855	1.594	1.23
4/0	1.68	2.665	2.17
350 kcmil	2.83	4.08	3.46
500 kcmil	3.95	5.54	4.75
750 kcmil	4.35	7.71	6.03

Both bare stranded copper and RHW-LS meet Qwest's grounding cable specifications.

Terminations

A termination is located between a CLEC's collocation arrangement and an interconnection distribution frame. Qwest develops recurring and nonrecurring charges for cable placement, cable, block placement and blocks. Qwest overstates the cost of DS0 blocks. Qwest assumed a 90-10 blend of 410-type and 89-type DS0 blocks, respectively. The following table provides a material cost comparison for these blocks obtained from two different suppliers. I recommend the Commission require an average of the two quotes to be used for Qwest's block cost. Interestingly, the recommended averages appear to greatly exceed the prices that appear on at least two Qwest invoices (for collocation jobs C9MLC17 and C9MLC20) that were provided in response to discovery, raising the question of whether discounts Qwest obtains for collocation components are reflected in its model input prices.

Table 3. DS0 Block Costs

Block Type	Power & Telephone Supply	Verizon Supply	Average
410 Block	$288.65	327.12	307.89
89 Block	48.55	55.03	51.79
90-10 Mix	264.64	299.91	282.28

Line Sharing

In addition to the engineering charge for line sharing discussed above, other line sharing costs are also overstated. First, Qwest overstates costs by using an intermediate distribution frame ("IDF") in some line sharing configurations. An IDF is not technically necessary to complete a splitter connection for Qwest or for CLECs. Indeed, Qwest states, in explaining how a call is routed through a central office with collocation, that a call can go "directly from the COSMIC or MDF to the CLEC/DLEC's collocation area."[36] Requiring an IDF increases collocation costs unnecessarily by requiring additional cables, connecting blocks, cross connects, installation labor and the IDF itself.

Second, Qwest did not develop cable lengths on an objective, systematic basis to reflect the length of cable that would obtain in a newly-constructed central office, but instead used cable lengths based on "actual jobs." As discussed above, Qwest controls the placement of equipment in the central office and has no incentive to minimize cable lengths for collocators, as it would if it were placing equipment for itself. It

[36] Direct Testimony of James C. Overton, March 15, 2001 at page 20.

is inconsistent for Qwest to develop floor space rental charges based on building a new CO without providing the space planning benefits that would also exist.

Third, Qwest develops recurring charges that appear to include costs associated with cable investment and installation labor. The cable and labor investments are completely recovered by Qwest's nonrecurring charges and there is no need to include these costs in recurring charges for these components.

Central Office Security Infrastructure[37]

Qwest develops a central office space rental charge based generally on forward-looking principles – essentially using the cost of placing a new central office building. Any ICB charge for "Central Office Security Infrastructure" would be based on the preexisting conditions of Qwest's central office configurations, which are irrelevant to forward-looking costing principles. As discussed above, another particularly troubling aspect of any ICB charge is that Qwest has no incentive to minimize such costs and collocators have no control over such costs. Collocators have no input into the conditions which Qwest may claim give rise to such costs; no input into Qwest's measures to alleviate any claimed problems; and Qwest would be the primary beneficiary of such costs.

[37] As explained above, it is my understanding that Qwest has included a Central Office Security Infrastructure cost in the 271 docket, but not in this docket.

If the Commission were to permit Qwest to assess any ICB security costs (in addition to those already included in the per square foot central office rental charge), Qwest must be required to meet the FCC test for imposing security costs,[38] and the amount of any such charge should be borne on a pro rata basis, using square footage as an allocator. While this approach would result in Qwest bearing the majority of the security cost, this is appropriate since Qwest is the primary beneficiary since it has the greatest amount of equipment and floor space that would be protected. Furthermore, it would be Qwest that defines the extent of the security measures and oversees installation. This approach ensures Qwest also has the economic incentive to minimize the costs that arise from the measures it selects.

Channel Regeneration

A regenerator, or repeater, is a type of circuit equipment that amplifies or regenerates electronic digital signals as they travel along cables within the central office. When DS1 and DS3 circuit lengths exceed 650 feet and 450 feet, respectively, a repeater is used to regenerate the signal. There is no disagreement regarding the impact of circuit length on the need for regeneration. Although Qwest identifies this cost as "optional," it is important to emphasize that collocators have no control over where in a central office their equipment is placed. The FCC found that in no event

[38] Qwest "...may not impose discriminatory security requirements that result in increased collocation costs without the concomitant benefit of providing necessary protection of the

should ILECs charge for regeneration because it should not be necessary. This is particularly true in a forward-looking central office. Indeed, if regeneration is needed, it is likely caused by Qwest's placement of collocators' equipment far from the devices to which they must connect, circuitous cable routes made necessary as a consequence of congested cable routes that occur when equipment is retired but cabling is left in place, or a combination of these situations.

The FCC found that:

> "it is unreasonable for LECs...to charge interconnectors for the cost of repeaters in a physical collocation arrangement because the record demonstrates that repeaters should not be needed for the provision of physical collocation service...The record demonstrates that....a repeater is only necessary to maintain the proper voltage level of an electronic signal when the length of the cable between an interconnector's cage and the LEC's digital cross-connect bay exceeds 655 feet for a DS1 and 450 feet for a DS3. A cabling distance of 450 feet is a considerable distance, and no LEC demonstrates that it needs more than 450 feet of cable to obtain interconnection.[39]

Thus, if regeneration costs are subsumed within any existing costs, they should be removed. If a collocator requires regeneration as a consequence of discriminatory equipment placement within a central office, it should be provided at no charge.

Q. **PLEASE SUMMARIZE YOUR TESTIMONY.**

A. Non-recurring costs. For a competitive environment to flourish, new entrants must incur only costs equal to those Qwest would incur using a

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incumbent LEC's equipment." Advanced Services Order at paragraph 47.

[39] *In the Matter of Local Exchange Carriers' Rates, Terms and Conditions for Expanded Interconnection Through Physical Collocation for Special Access and Switched Transport*, CC Docket No. 93-162, Released June 13, 1997 at paragraph 117.

forward-looking network architecture and efficient OSS. Otherwise, the CLEC is burdened with unnecessary and discriminatorily high costs and Qwest has no incentive to become efficient. I described the economic and technological assumptions underlying NRCs and addressed the application of forward-looking long run economic costing principles to NRCs. The NRCM provides the proper tool to generate forward-looking cost estimates to establish prices for NRCs.

Collocation. The proper approach to developing forward-looking, long run economic costs for collocation precludes "space preparation" and ICB charges. Qwest's collocation cost study is flawed in several respects including a lack of documentation and a failure to adhere to forward-looking costing principles. I provided a variety of recommendations to modify inputs to Qwest's cost studies to make them reflect more closely proper costing principles. These inputs, combined with cost factor recommendations made by Mr. Weiss, were used to generate proposed rates that appear in the testimony of Mr. Hydock.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

EXHIBIT RL-1 **NRCM Model Description and User's Guide (the model appears on a CD filed by ATT)**

EXHIBIT RL-2 NRCM Results (the model appears on a CD filed by ATT)

EXHIBIT RL-3 NRCM (the model appears on a CD filed by ATT)

EXHIBIT RL-4 Qwest's Response to discovery request ATT 02-059

Arizona
Docket No. T-00000A-00-0194
AT&T 002-059

INTERVENOR: AT&T Communications of the Mountain States, Inc.

REQUEST NO: 059

RE: Nonrecurring Cost Studies
Witness: Million

Please provide the labor rate for the following job classifications. The rates provided sbould be "fully assigned" (that is, include wages and benefits for first-line supervision through third level management, as well as accounting for non-productive time, overtime pay, clerical support and other miscellaneous expenses).

If available, provide union contract labor rates.

a) Business Dispatch Administration Center (BDAC)
b) Consumer Dispatch Administration Center (CDAC)
c) Circuit Provisioning Center (CPC)
d) Frame Control Center (FCC)
e) Facility Maintenance Administration Center (FMAC)
f) Special Services Installation & Maintenance / Outside Plan (SSI&M /OSP)
g) Loop Assignment Center (LAC)
h) Network Terminal Equipment Center (NTEC)
1) Recent Change Memory Administration Center (RCMAC)
j) Switching Control Center (SCC)
k) Special Service Center (SSC)
1) Splicing
m) InterLata Carrier Service Center (ICSC)

RESPONSE:

Qwest objects to the extent the Data Request seeks to require the production of information or documents not in the possession, custody or control of Qwest Corporation. Notwithstanding and without waiving the objection, Qwest states as follows:

a) Business Dispatch Administration Center (BDAC) = $37.78/hr. (Rate L10)
b) Consumer Dispatch Administration Center (CDAC) = $37.78/hr. (Rate L10)
c) Circuit Provisioning Center (CPC) = $44.31/hr. (Account 6532.3)
d) Frame Control Center (FCC) = $43.81/hr. (Rate L40)
e) Facility Maintenance Administration Center (FMAC) = $42.68/hr (Rate L50)
f) Special Services Installation & Maintenance / Outside Plan (SSI&M /OSP) = $42.68/hr (Rate L50)
g) Loop Assignment Center (LAC) = $37.78/hr (Rate L10)
h) Network Terminal Equipment Center (NTEC) = $43.81/hr (Rate L40)
i) Recent Change Memory Administration Center (RCMAC) = $43.81/hr (Rate

L40)
j) Switching Control Center (SCC) = $43.81/hr (Rate L40)
k) Special Service Center (SSC) = $43.81/hr (Rate L40)
l) Splicing = $46.20/hr (Rate L30)
m) InterLata Carrier Service Center (ICSC) = $40.03/hr (Account 6623.11)

The labor rates use only productive hours as the divisor and include the following components:

Basic Wages & Salaries - including overtime pay
Supervision & Support - Plant rates include direct supervision and office services support. (Plant rates are identified with Lxx.)
SOP(Service Order Processing)/Other rates include direct & indirect supervision and office services support. (SOP/Other rates are identified with Account #'s.)
Benefits
Miscellaneous expenses
Motor Vehicle expenses - Plant rates only, as appropriate.
Other (General Purpose) Tools - Plant rates only, as appropriate.

Respondent: Jennifer Peppers