BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Continued Costing and Pricing of Unbundled Network Elements And Transport and Termination	))))	DOCKET NO. UT-003013

DIRECT TESTIMONY

OF

Robert J. Hubbard

May 19, 2000

TESTIMONY INDEX

I. IDENTIFICATION OF WITNESS

PLEASE STATE YOUR NAME, EMPLOYER AND BUSINESS ADDRESS.

A. My name is Robert J. Hubbard. I am employed by U S WEST Communications, Inc. as a Manager in the Interconnection Planning Department. My business address is 700 West Mineral, Littleton, Colorado 80102.

Q. BRIEFLY OUTLINE YOUR EMPLOYMENT BACKGROUND.

A. I am a Manager in U S WEST's Interconnection Strategies Group, the group responsible for the development of strategies to implement the unbundling of U S WEST's network as required by the Telecommunications Act of 1996 ("the Act"). I provide technical support regarding unbundling issues to the U S WEST Network and Public Policy departments.

I have over 33 years experience with two Regional Bell Operating Companies, U S WEST and Indiana Bell Telephone Co, in their network departments. I worked for over 11 years at Indiana Bell and U S WEST as a cable splicer and as a cable repairman involved in all aspects of splicing and repairing copper cables. At U S WEST, I eventually moved from splicing and repairing into the engineering department as a design engineer for outside plant, designing copper and fiber facilities, and Analog and Digital Carrier Systems. I then went into the planning department as an outside plant planner, in which I planned for future jobs involving fiber cable placement and upgrades to the

existing outside plant network. In 1997, I moved into my present job as a Manager in the Interconnection Planning Department.

I have had substantial involvement in U S WEST's preparation for line sharing. For example, I studied possible network architectures in advance of U S WEST's response to the FCC's First Report and Order and Further Notice of Proposed Rulemaking in Docket No. 98-147 ("Line Sharing Order"). Also, in Minnesota, I participated in the technical trials -- both the Lab and Field Tests -- that were ordered by the Minnesota Commission last year. During both the Lab and Field Tests, I provided technical and engineering input, and evaluated the outcome of the tests.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to describe the network design and engineering issues related to line sharing. In this docket, U S WEST will ask the Commission to set prices for the two types of architecture U S WEST intends to use in the central offices, requested by the CLEC/DLEC for line sharing, in Washington. First, I describe the elements that are required to provide line sharing and identify how those elements relate to the costs that U S WEST will incur to provide line sharing. Second, I explain the benefits and detriments of each of the architectures described above. Third, I address two of the five general categories of costs that ILECs such as U S WEST could incur to deploy line

sharing and, therefore, may recover from CLECs/DLECs. These categories of costs relate to: (1) cross connections; (2) splitters. The other cost categories -- shared line costs and Operational Support Systems costs -- are addressed in the testimony of other U S WEST witnesses.

III. LINE SHARING DESCRIPTION AND BACKGROUND

Q. PLEASE BRIEFLY EXPLAIN WHAT IS MEANT BY LINE SHARING.

A. Line sharing is the joint and simultaneous use by two different telecommunications carriers of distinct frequency ranges of one loop. In a line sharing arrangement, U S WEST provides voice service to the end-user using the voice band frequencies, while the CLEC/DLEC provides data service on the frequency range above the voice band. Through the separation of the voice frequency from the data frequency, one loop can carry both voice and data traffic simultaneously and, potentially, each type of traffic could be carried by a different telecommunications carrier.

At present, however, line sharing only is possible in situations where CLECs/DLECs intend to provide a data service that does not significantly degrade the voice service being provided by ILECs. Given current technology, many types of data services, including SDSL and HDSL, cause unacceptable levels of interference to voice service being carried on shared lines. The FCC recognized this in the Line Sharing Order and determined that only three types of data services, including ADSL, currently are compatible with voice

service in a line sharing environment. Line Sharing Order at ¶ 71.

Q. PLEASE DESCRIBE HOW A TRADITIONAL VOICE CALL IS ROUTED THROUGH THE NETWORK WITHOUT ANY LINE SHARING.

A. A normal voice call comes in to the central office from a home, business, or other outside location on a loop that, depending on the type of frame located in the central office, is connected to a COSMIC[1] frame or Main Distribution Frame ("MDF"). On the frame, the voice call is cross connected to either the Office Equipment ("OE") side of the COSMIC or MDF, or connected through an Intermediate Distribution Frame ("IDF") to the OE. From there, the voice call is routed to the switch, which is connected to the Public Switched Telephone Network ("PSTN"), thereby allowing the call to route to its intended destination.

Q. PLEASE DESCRIBE HOW A TRADITIONAL VOICE CALL IS ROUTED FOR A CLEC/DLEC THAT HAS COLLOCATED WITHIN A CENTRAL OFFICE.

A. When a CLEC/DLEC is collocated, a voice call comes in to the central office from a home, business, or other outside location on a loop to the COSMIC or MDF, just as in the normal course. However, from the COSMIC or MDF, the call is either cross connected to an IDF and then routed to the CLEC/DLEC's collocation area, or it goes directly from the COSMIC or MDF to the CLEC/DLEC's collocation area. The equipment in the

[1] COSMIC is a trademark of LUCENT Technologies

collocation area is then connected to the office equipment of the CLEC/DLEC.

Q. PLEASE DESCRIBE HOW A VOICE AND DATA TRANSMISSION ROUTE THROUGH THE NETWORK IN A LINE SHARING ARRANGEMENT.

A. Line sharing introduces new, unique requirements upon all parties involved in this type of arrangement. New equipment, cross connects, systems, and other complexities are introduced into the network in order to route voice and data traffic separately in a line sharing environment.

Generally, in a line sharing arrangement, the loop comes in to the central office from a home, business, or some other outside location and connects to the COSMIC or MDF. From there, however, things begin to change. The loop then is cross connected and routed to an IDF, which, in turn, is cross connected and then routed to a "POTS splitter." The POTS splitter literally splits the voice and data traffic into two distinct transmissions, thereby allowing the voice and data traffic to be routed to U S WEST and the data traffic to the CLEC/DLEC. The data traffic is then routed to the CLEC/DLEC collocation area. The voice traffic is routed back through the IDF, to the OE side of the COSMIC or MDF, and then to the U S WEST switch.

Q. PLEASE DESCRIBE THE PRIMARY PIECE OF EQUIPMENT THAT "SPLITS"

THE VOICE AND DATA TRAFFIC.

A. As described above, this device is referred to as a POTS splitter; it resides at both the central office and end-user location. The POTS splitter allows the copper loop to be used for simultaneous voice and data transmission by different telecommunications carriers. POTS splitters usually come in two configurations: (1) a single splitter version designed for mounting at the end-user premise; and (2) a multiple splitter version designed for mass termination at the central office.

A POTS splitter is a passive device, meaning it does not require power. POTS splitters have bays, each of which can contain eight shelves or panels. Each shelf typically can accommodate 64 shared lines; however, this will vary depending on the manufacturer of the POTS splitter. As stated, POTS splitters do not require external power to work, yet they still support lifeline services, such as 911, in the event of a power loss.

IV. NETWORK ARCHITECTURE

Q. WHAT IS THE PRINCIPAL DECISION REGARDING NETWORK ARCHITECTURE THAT MUST BE MADE TO IMPLEMENT LINE SHARING?

A. The principal decision regarding line sharing network architecture is where to place the POTS splitter within the central office. There generally are two alternatives: (1) placement of the splitter in a common area, such as at the IDF, so that all parties have ready access to the splitter; and (2) placement of the POTS splitter in the CLEC/DLEC's

collocation area. Each alternative has unique costs, requirements, and benefits.

Q. DESCRIBE THE NETWORK ARCHITECTURE AND EQUIPMENT NEEDED TO PLACE THE POTS SPLITTER IN A COMMON AREA OF THE CENTRAL OFFICE.

A. When the POTS splitter is placed in a common area of the central office, the shared loop comes in to the central office from an end-user premise and connects to the COSMIC or MDF. The shared loop then is cross connected to an IDF which is, in turn, cross connected to a POTS splitter located in a common area. At the POTS splitter, the voice traffic is split from the data traffic, and the data traffic is routed back to an IDF where it is cross connected to a DSLAM located in the collocation area of the CLEC/DLEC. From there, the data traffic is routed to its intended destination over the CLEC/DLEC's network. The voice traffic also is routed from the POTS splitter back to an IDF, but, from there, it is cross connected back to the COSMIC or MDF. At the COSMIC or MDF, the voice traffic is cross connected to a switch for routing to its intended destination over the PSTN.

In this configuration, six cables, therefore, must be placed in the central office: (1) the first between the COSMIC or MDF and the IDF for both voice and data traffic; (2) the second between the IDF and the POTS splitter for both voice and data traffic; (3) the third between the POTS splitter and the IDF for data traffic; (4) the fourth between the IDF and the collocation area of the CLEC/DLEC for data traffic; (5) the fifth between the POTS

splitter and the IDF for voice traffic; and (6) the sixth between the IDF and the COSMIC or MDF for voice traffic. Four cross connects, three termination blocks also are required, and space is required for placement of the POTS splitter. Most of the necessary cabling is not yet in place. Nor are the POTS splitters. Both facilities will require significant effort and cost to install. This architecture for line sharing is graphically depicted in Exhibit RJH-2.

Using the architecture where the POTS splitter is placed in a common area, the CLEC/DLEC can purchase the POTS splitter or ask U S WEST to purchase it subject to reimbursement. In either case, U S WEST is responsible for installing the POTS splitter in the common area. U S WEST also has responsibility for maintenance and repair of the POTS splitter. The CLEC/DLEC must make special arrangements for test access to the POTS splitter.

Q. DESCRIBE THE NETWORK ARCHITECTURE AND EQUIPMENT NEEDED TO PLACE THE POTS SPLITTER IN THE COLLOCATION AREA OF THE CLEC/DLEC.

A. Placement of the POTS splitter in the collocation area of the CLEC/DLEC is much less complicated as compared with placing the splitter in a common area of the central office, because it requires placing significantly less equipment in the central office and, hence, involves substantially less installation time. For this reason, this architecture results in shorter implementation time-frames and significantly less cost.

When the POTS splitter is placed in the collocation area of the CLEC/DLEC, the shared loop comes in to the central office from an end-user premise and connects to the COSMIC or MDF. The loop is then cross connected and routed to an IDF which, in turn, is cross connected and routed to a POTS splitter located in the CLEC/DLEC's collocation area. At the POTS splitter, the voice traffic is split from the data traffic, and the data traffic is routed through a DSLAM to its intended destination over the CLEC/DLEC's network. The voice traffic, on the other hand, is routed back to the COSMIC or MDF via an IDF. From the COSMIC or MDF, the voice traffic is cross connected to a switch for routing to its intended destination over the PSTN.

This architecture, therefore, requires placement of only four cables: (1) the first between the COSMIC or MDF and the ICDF; (2) the second from the ICDF to the POTS splitter for both voice and data traffic; (3) the third between the POTS splitter and the ICDF; and (4) the fourth to the COSMIC or MDF for voice traffic. Four cross connects and termination blocks also are required. Much of the cabling, however, already is in place in many central offices and will not require additional effort or cost to install. This architecture is graphically depicted in Exhibit RJH-3.

Using the architecture in which the POTS splitter is located in the CLEC/DLEC's collocation area, the CLEC/DELC purchases and installs the POTS splitter within the collocation area, and it has responsibility for maintenance and repair of the splitter. With

this architecture, therefore, the CLEC/DLEC has the ability to install its own test access devices and has complete control over acquisition and installation of the POTS splitters. This architecture affords the CLEC/DLEC the ability to control its relationship with its end-users, reducing reliance on U S WEST. The use of this architecture should increase the speed to market of the CLEC/DLEC, thereby facilitating greater competition, and it could improve the end-user experience.

V. CROSS CONNECTS

DOES THE FCC RECOGNIZE THAT U S WEST CAN RECOVER COSTS ASSOCIATED WITH INSTALLING CROSS CONNECTS?

Yes. In the Line Sharing Order, the FCC stated at paragraph 145:

> "We would expect that the costs of installing cross connects for xDSL services in general would be the same as for cross connecting loops to the competitive LECs' collocated facilities, particularly where the splitter is located within the incumbent LEC's MDF. Accordingly, we find it reasonable to establish a presumption that, where the splitter is located within the incumbent LECs' MDF, the cost for a cross connect for entire loops and for the high frequency portion of loops should be the same. We would expect the states to examine carefully any assessment of costs for cross connections for xDSL services that are in excess of the costs of connecting loops to a competitive LECs' collocated facilities where the splitter is located within the MDF.

In making this statement, the FCC assumed that the splitter would be located "within" the ILECs' MDF or, presumably, the COSMIC. However, the placement of POTS splitters within the COSMIC or MDF simply is not practical nor necessary because, in most instances, the CLEC/DLEC has chosen a bay mounted type of splitter that will be located

in close proximity to the ICDF. Thus, the alternative suggested by the FCC in the Line Sharing Order is implicated. With respect to this alternative, the FCC stated at paragraph 145 that:

> "If the splitter is not located within the incumbent LEC's MDF, however, then we would expect the states to allow the incumbent LEC to adjust the charge for cross connecting the competitive LEC's xDSL equipment to the incumbent LECs' facilities to reflect any cost differences arising from the different location of the splitter, compared to the MDF. We would expect that this amount would be only minimally higher than for cross connecting a splitter located within the MDF to the competitive LEC's xDSL equipment."

This is exactly what U S WEST seeks to do here.

Q PLEASE DESCRIBE THE PLACEMENT AND NUMBER OF CROSS CONNECTS NECESSARY TO IMPLEMENT EACH NETWORK ARCHITECTURE (POTS SPLITTER IN COMMON AREA OR COLLOCATION SPACE) DESCRIBED ABOVE.

As described above, when the POTS splitter is placed in a common area, a total of four cross connects, as well as six cables and three termination blocks, are required to implement line sharing. By contrast, when the POTS splitter is placed in the collocation area of the CLEC/DLEC, four cross connects, as well as four cables and two termination blocks, are required. The cost of cross connects and related equipment, therefore, is significantly less when the POTS splitter is placed in the collocation area of the CLEC/DLEC.

VI. SPLITTERS

PLEASE LIST THE TERMS AND CONDITIONS THAT U S WEST AND THE CLEC/DLECs HAVE AGREED UPON FOR POTS SPLITTER COLLOCATION.

A. U S WEST and the CLEC/DLECs spent a substantial amount of time prior to execution of the Line Sharing Stipulation discussing how to best implement line sharing. The following summary constitutes the agreement that was reached in the agreement vis-à-vis placement of the POTS splitter:

1. The CLEC/DLEC has the option to purchase the POTS splitter of its choice or to have U S WEST purchase the splitter on its behalf. If U S WEST purchases the POTS splitter on behalf of the CLEC/DLEC, the CLEC/DLEC must reimburse U S WEST for the cost of the POTS splitter.
2. Regardless whether U S WEST or the CLEC/DLEC purchases the POTS splitter, the POTS splitter selected will meet one of the following criteria:
   the POTS splitter must have been tested during Lab and Field Tests;
   the POTS splitter must meet the requirements for central office equipment collocation set by the FCC in its March 31, 1999 order in CC Docket No. 98-147.

U S WEST will engineer one CLEC per panel minimum. A minimum of one shelf order increment per CLEC is required based on splitter specifications. A bay will house up to eight shelves of splitters. By ordering a shelf at a time, a bay will accommodate more than one CLEC.

U S WEST will install and maintain the POTS splitters.

The CLEC/DLEC will lease the POTS splitter to U S WEST at no cost.

U S WEST will engineer and install the POTS splitter in close proximity to an IDF to allow for shorter cables between the IDF and POTS splitter.

The CLEC/DLEC has the option of purchasing the requisite cabling for itself, provided the cable is given to U S WEST for installation, or it may ask U S WEST to purchase the cabling.

Cables on the U S WEST side of the IDF will be Shielded Category 3 cables to reduce the possibility of spectrum interference.

U S WEST will provide the CLEC/DLEC with Carrier Facility Assignment ("CFA") 15 days prior to the Ready For Service ("RFS") date of the POTS splitter.

U S WEST may co-mingle several CLEC/DLEC POTS splitters in a single bay in order to maximize space availability.

The CLEC/DLEC may choose to utilize existing cables that run from its collocation area to the IDF to support line sharing arrangements. This will reduce the time and cost to implement line sharing.

U S WEST must engineer and install cable from: (1) the POTS splitter to the COSMIC or MDF for voice traffic; (2) the COSMIC or MDF to the POTS splitter for both voice and data traffic; and (3) the POTS splitter to the IDF for data traffic. Some of this cabling may already be in place in many central offices.

To expedite line sharing provisioning, U S WEST has agreed to administer all cross connects.

The CLEC/DLEC will provide U S WEST with cross connect information, CFA, on its side of the IDF to enable U S WEST to perform the cross connects.

The test point access for the CLEC/DLEC will be at the DMARC point on the POTS splitter. The DMARC is the data cable from the POTS splitter back to the IDF.

Q. IF THE POTS SPLITTER IS TO BE PLACED IN A COMMON AREA OF THE CENTRAL OFFICE, HOW DOES A CLEC/DLEC REQUEST POTS SPLITTER PLACEMENT?

A. To initiate POTS splitter placement, the CLEC/DLEC must submit an application form to U S WEST requesting line sharing. The CLEC/DLEC must provide the following standard information to U S WEST on the application form:

The identity of the party that will provide the requisite cable and POTS splitter(s).

The manufacturer name and serial number for the POTS splitter(s).

The number of POTS splitters to be placed in the central office.

The CLEC/DLEC's forecasted line sharing requirements.

The CLEC/DLEC's shelf requirements for the POTS splitter(s).

The CLEC/DLEC's cable requirements, whether they be new or existing cables, to support the POTS splitter placement. If the CLEC/DLEC intends to reuse cables, the CLEC/DLEC must identify the intended cable pairs and their CFA assignments, as well as whether it wants the cable to be shielded.

Any special cable requirements.

If placement of the splitter collocation is feasible in the subject central office, U S WEST prepares a quote showing the charge for the placement. Before U S WEST will begin installation of the POTS splitter, the CLEC/DLEC must pay 100 percent of the quote in advance.

Obviously, the CLEC/DLEC will not need to submit an application for POTS splitter collocation in central offices where the POTS splitter will be placed in its collocation area. If the CLEC/DLEC needs additional collocation space to accommodate placement of a POTS splitter, it will have to submit a standard collocation request.

DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.