BEFORE THE

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

IN THE MATTER OF THE CONTINUED COSTING AND PRICING OF UNBUNDLED NETWORK ELEMENTS	)))))	**DOCKET NO. UT-003013** **Part D**

REPLY TESTIMONY OF

JOHN C. DONOVAN

ON BEHALF OF

COVAD COMMUNICATIONS COMPANY

JANUARY 11, 2002

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I. DENTIFICATION OF WITNESS

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND CURRENT POSITION.

A. My name is John C. Donovan. I am President of Telecom Visions, Inc., a telecommunications consulting company. My business address is 11 Osborne Road, Garden City, NY 11530.

Q. PLEASE DESCRIBE YOUR BACKGROUND.

A. I received a Bachelor of Science degree in Engineering from the United States Military Academy at West Point, NY, and a MBA degree from Purdue University. I have also completed the Penn State Executive Development Program. I have more than 30 years of telecommunications experience. My last employment before forming Telecom Visions, Inc. was with the NYNEX Corporation, also recently known as Bell Atlantic-North, and subsequent to the merger with GTE, as Verizon. I retired as a General Manager under an early retirement offer from NYNEX after 24 years of experience in a variety of line and staff assignments, primarily in outside plant engineering and construction. That experience included everything from personally splicing fiber and copper cables to heading an organization responsible for the procurement, warehousing, and distribution of approximately $1 million per day in telecommunications equipment. I have had detailed hands-on experience in rural, suburban, and high-density urban environments. I spent several years on the corporate staff of

NYNEX responsible for the development of all Methods and Procedures for Engineering and Construction within that company, including methods used to determine material and labor costs associated with building outside plant infrastructure. To summarize, I have planned outside plant, I have designed outside plant, I have purchased telecommunications materials and contract labor, I have personally engineered and constructed outside plant, and I have designed methods for those who do such functions. I have also performed other functions, or have supervised those who do, in installing, connecting, repairing, and maintaining the various parts of the telecommunications network.

I have also taught undergraduate students as an Adjunct Professor of Telecommunications at New York City Technical College, and have attended numerous courses in telecommunications technologies, methods and procedures. For the past five years, I have submitted affidavits, written testimony, and appeared as an expert telecommunications witness in proceedings before state regulatory commissions in Alabama, Arizona, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Missouri, Nevada, New Jersey, New York, Oklahoma, Pennsylvania, Texas, Washington, and before the Federal Communications Commission ("FCC").

Attachment JCD-1 to this testimony provides further detail concerning my qualifications and experience.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?

A. Yes, I previously testified before this Commission in an Unbundled Network Element Workshop[1] on February 14, 1997.

II. PURPOSE

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by Covad Communications, Inc. ("Covad") to review and comment on the direct testimony of Qwest's witnesses and cost studies submitted by Qwest in this proceeding. I intend to offer my assistance to this Commission regarding the reasonableness of Qwest's alleged costs and time estimates, based on my personal hands-on experience in the telecommunications industry over the course of more than 30 years. I will specifically focus on issues and costs associated with cooperative testing during installation of xDSL loops requested by Covad, and on investments and non-recurring costs associated with unbundled packet switching as proposed by Qwest. In addition, although the original scope of my testimony was just these two issues, recent developments have resulted in testimony regarding Qwest's proposed rates for its supposed line sharing over fiber offering that I will address. My testimony also fully supports the testimony of Dr. Richard Cabe.

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[1] Docket Nos. UT-960369, -70 and -71: Re: In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale for US West Communications, Inc.; for GTE Northwest Incorporated; On behalf of AT&T Communications and MCI Telecommunications Corporation.

III. COOPERATIVE TESTING

Q. HOW IS A TYPICAL FORM OF REMOTE LOOP TESTING PERFORMED?

A. An ILEC such as Qwest routinely does testing on its switched services loops using its central office switch-based Mechanized Loop Testing ("MLT") Operating Support System ("OSS"). This OSS has been widely utilized in the telecommunications industry for over 30 years. A remotely located tester can "dial up" the switched circuit from a remote location – even a hand-held Craft Access Terminal – remove dial tone from the circuit, and perform a number of tests on the loop. The ability of a loop to be remotely tested is contingent on that loop being attached to equipment that can be accessed remotely by a technician via a piece of central office equipment.

Q. WHY IS REMOTE TESTING PERFORMED, RATHER THAN ON-SITE TESTING AT THE CENTRAL OFFICE?

A. Remote testing is the most efficient method of testing. It does not require the dispatch of a central office technician to or within a central office to obtain a test set, open up the pair, clip a test cord onto the wire pair, and then later remove the test cord and re-cross connect the pair. Instead, a testing technician at a remote location can efficiently use digital equipment to perform the tests without interdicting the circuit physically at the central office.

Q. CAN QWEST PERFORM REMOTE LOOP TESTING ON A STAND-ALONE XDSL UNE LOOP?

A. No. Since a stand-alone xDSL UNE loop is not attached to Qwest's switching equipment, it cannot remotely test the loop.

Q. SINCE COVAD'S XDSL LOOPS ARE NOT TERMINATED ON A QWEST SWITCH, HOW CAN A QWEST TECHNICIAN TEST A LOOP DURING INSTALLATION ACTIVITIES?

A. The only way for Qwest to internally perform end to end testing on a non-switched loop is to have the Qwest field technician contact the Qwest centralized testing facility. That facility then must dispatch a frame technician to open up the cross connection in the central office and manually attach an MLT test cord to the wire pair in the central office. The Qwest centralized testing facility can then perform a manual MLT test. The Qwest centralized testing facility talks with and works with the technician in the field to perform tests on the loop. Upon completion of the tests, the Qwest frame technician must be dispatched again to remove the test cord and reconnect the cross connection in the central office.

Q. WHAT IS COOPERATIVE TESTING?

A. Cooperative testing occurs when a Qwest-provided local loop has been wired to Covad's Digital Subscriber Loop Access Multiplexer ("DSLAM") equipment in the central office, and Qwest is in the process of, or has completed the installation of, its portion of the loop. In such a case, the DSLAM acts as a central office switch to allow remote testing capabilities via Covad's centralized testing facility (rather than Qwest's centralized testing facility in the case of MLT testing). Cooperative testing occurs when a Qwest technician calls Covad's centralized testing facility where a Covad representative remotely triggers Covad’s

equipment to test the circuit, while the Qwest technician is available to correct any problems with its portion of the circuit.

Q. WHEN IS COOPERATIVE TESTING NORMALLY PERFORMED?

A. Cooperative testing is normally performed on a stand-alone xDSL circuit during the installation phase of Qwest provisioning that loop for Covad's use.

Q. DOES QWEST SEEK TO IMPOSE ADDITIONAL CHARGES AND CONDITIONS ON COVAD FOR COOPERATIVE TESTING?

A. Yes. However, the imposition of such costs is not only burdensome, but also it does not make sense. Covad should actually be accorded a reduction in Non-Recurring costs if it assists Qwest in provisioning a loop without Qwest having to dispatch a frame technician to test the circuit with its own field technician. By performing remote loop testing through its DSLAM equipment, Covad is actually helping Qwest.

Q. WHAT DO YOU RECOMMEND?

A. I recommend that, rather than imposing additional Non-Recurring Charges for Cooperative Testing, that Covad be actually granted a reduction in Non-Recurring Charges – in effect, a negative NRC.

IV. UNBUNDLED PACKET SWITCHING

Q. WHAT IS THE BASIS FOR QWEST'S UNBUNDLED PACKET SWITCHING COSTS?

A. As discussed in Dr. Cabe's testimony, Qwest's cost study for Unbundled Packet Switching ("UPS") is based on Remotely located DSLAMs. That method of

providing for xDSL services in a Digital Loop Carrier ("DLC") Remote Terminal configuration is not forward looking technology and is not cost effective. Additionally, because Qwest also offers a *Remote Collocation* product pursuant to which CLECs can collocate a DSLAM at a Remote Terminal, the testimony set forth below applies equally to that offering.

Q. WHAT IS THE MOST COST EFFECTIVE METHOD FOR SERVING LOOPS LONGER THAN APPROXIMATELY 12,000 FEET?

A. The most effective method for serving many loops, especially loops beyond 12,000 feet, is to serve those loops on DLC equipment. Although such equipment can be fed by copper cable, the clear choice for the past 15 years is to feed those DLC systems with fiber optic cable. Use of DLC equipment is akin to moving a piece of the central office switch out into the field, where state-of-the-art equipment automatically grooms circuits and performs line concentration functions similar to what occurs in the normal central office digital switch. Fiber optic cable is used as the transport umbilical cord to connect the DLC Remote Terminal back to the central office building. Copper distribution cable is used for the "last mile" from the DLC Remote Terminal site to the customer premise. Covad must arrange for xDSL service to be moved to a DSLAM where packetized data can be efficiently aggregated onto an Internet backbone. For all copper loops, that function is performed by Covad's DSLAM in the central office. However, when Qwest installs DLC equipment, data and voice must be packetized separately before being transported between the DLC and the central office.

Q. WHAT METHODS ARE AVAILABLE TODAY FOR TRANSPORTING SERVICES BETWEEN A DLC REMOTE TERMINAL AND THE CENTRAL OFFICE?

A. Both voice and data signals can be transported between the DLC Remote Terminal and the Central Office via T-1 on copper or on high speed fiber cable. Both types of signals must be processed at the remote terminal before transmission to the central office. This processing can be accomplished by using a stand-alone remotely located DSLAM in the Remote Terminal, at the Remote Terminal site, or near the Remote Terminal site, as proposed by Qwest. In such a configuration, once the stand-alone remote DSLAM aggregates the data, it can be transported over a copper T-1 line or over a high speed multiplexed fiber optic line. Copper T-1 lines are not considered forward-looking technology by anyone in the industry. In addition, for high speed xDSL lines, requirements may be at the 1.544 Mbps speed limit of T-1 lines, or even faster. Choking down xDSL service onto a T-1 transport makes no sense. Amazingly, however, Qwest's cost study includes a weighted average that includes copper fed DLC sites. This is especially ironic, considering Qwest's corporate logo:

Notwithstanding the fact that Qwest's trademark is not "*ride the copper*", this technology cannot be seriously considered in a forward looking TELRIC cost

proceeding. Fiber optic transport is the only realistic method, and should be the only one considered in this docket.

Q. WHAT REMOTE TERMINAL DSLAM ALTERNATIVES EXIST?

A. There are two Remote Terminal DSLAM alternatives available. One is a remote stand-alone DSLAM that then requires a separate transport back to the central office. The second is an integrated DLC-DSLAM unit that provides highly efficient integrated functionality. The integrated DLC-DSLAM is based on Next Generation Digital Loop Carrier ("NGDLC"). Such a unit uses a standard NGDLC Remote Terminal channel bank with one or more special common cards. Individual channel unit cards can handle 4 xDSL lines, perform the splitter function in the case of Line Shared loops, and perform the DSLAM function of aggregating packetized data into an efficient high-speed bitstream. The unit also allows the data to be multiplexed and transported over fiber cable. All of these functions are performed in one space-saving well-engineered unit. The integrated DLC-DSLAM is the forward looking cost effective technology, and it should be the only one considered for the purposes of estimating forward-looking costs in this docket.

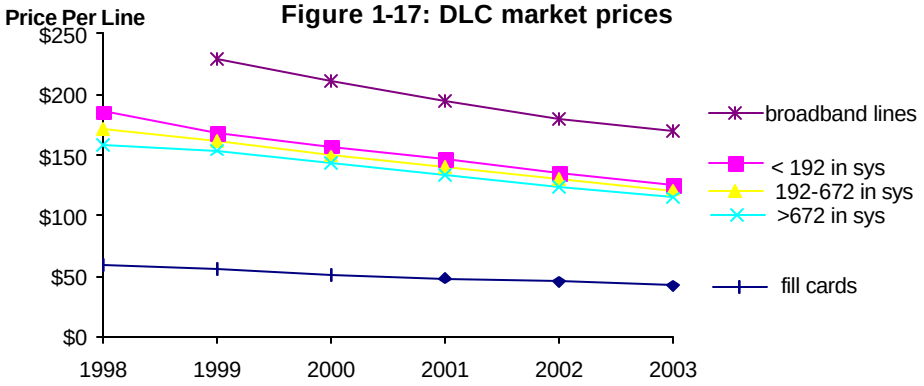
Q. WHAT HAVE BEEN THE COST TRENDS FOR SUCH DLC EQUIPMENT?

A. Costs for Next Generation Digital Loop Carrier ("NGDLC" – a marketing term coined in 1992) have been steadily and rapidly dropping. A recent market research report by RHK, a well-respected firm cited frequently by the Wall Street Journal indicates the following:

Systems prices will continue to fall during the next five years at an expected rate of 7 percent across all system sizes. The 7 percent decline has been consistent in the DLC market throughout the past several years, and RHK expects this trend to continue, as this is a mature market.

Figure 1-17 shows the DLC market prices through 2003, assuming a 35 percent populated system provisioned exclusively with POTS cards. Prices for the largest systems, with more than 672 lines, will decline from $154 per line in 1999 to $115 in 2003. Broadband line ports are more costly than POTS; the average price of a broadband line port in a DLC system was $230 in 1999. RHK expects an annual 10 percent broadband line price decrease to $170 in 2003 as more vendors make this feature available.

Figure 1-17: DLC market prices



	1998	1999	2000	2001	2002	2003
fill cards	$59	$56	$52	$49	$45	$42
< 192 in sys	$185	$169	$157	$146	$136	$126
192-672 in sys	$172	$162	$150	$140	$130	$121
>672 in sys	$159	$154	$143	$133	$124	$115
broadband lines		$230	$210	$195	$180	$170

Source: RHK[1]

Q. WHAT DOES RHK MEAN BY "BROADBAND LINES"?

A. By *broadband lines*, RHK means xDSL lines. RHK recognizes that the currently available state-of-the-art NGLDC systems include the ability to serve xDSL within the channel banks otherwise used for POTS service.

Q. WHAT IS THE STATE OF THE ART TECHNOLOGY WHEN IT COMES TO XDSL OVER FIBER FED DLC SYSTEMS?

A. Several manufacturers provide forward looking NGDLC systems that are able to readily migrate from POTS only into digital based platforms for services. Forward looking systems are digitally based, and will not care whether a particular point to point communication is voice, data, video, music, or any other method of content that can be expressed as digital on or off pulses. This is exactly the corporate image advertised by *Qwest – ride the light*.[2] For several years now, the market leader in NGDLC equipment, Alcatel, has been producing NGDLC systems that can not only provide POTS services over fiber fed DLC systems, but also can allow those systems to easily migrate into a platform that provides all of the functionality of a DSLAM at the Remote Terminal. I am including an article that shows that Alcatel was the market leader in broadband integrate-able DLC equipment as far back as 1999, with over 30% market share and growing, as Attachment JCD-2. The strength of Alcatel's Litespan 2000 system, introduced 10 years ago in 1992, is that it can be enhanced from a POTS only NGDLC system to a POTS plus xDSL platform by simply changing two cards at the Remote Terminal. Evidence for that is included as Attachment JCD-3.

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[2] "This is Qwest: Qwest Communications is a global leader in Broadband Internet-based communications. With one of the largest, most technologically advanced networks in the world, Qwest is powering the exchange of multimedia content – images, data and voice. By strategically aligning with world-class technology leaders, Qwest is helping customers of every type and size benefit from the full potential of the Internet." (See Qwest's corporate website at www.qwest.com).

Q. QWEST CLAIMS THAT ITS STRATEGY FOR DLC SYSTEMS, IN ORDER TO PROVIDE EITHER UPS OR REMOTE COLLOCATION, IS TO ATTACH AN XDSL ADJUNCT DSLAM TO ITS EXISTING DLC REMOTE TERMINAL INSTALLATION. IS THIS APPROPRIATE COSTING FOR THIS COMMISSION'S CONSIDERATION?

A. No. There may be an embedded base of legacy DLC systems. One such popular product line is called SLC-96. These systems were Manufacturer Discontinued ("MD'd") in 1992, but many are still in service. They are generally fully depreciated, but are still functional for limited services. Nothing can be done to refit them to provide integrated xDSL services (hence Qwest's desire to use an adjunct DSLAM attached to a legacy DLC cabinet). I am not suggesting that this Commission dictate that Qwest replace all of these fully depreciated systems (In any case, the subject of costing based on salvage value less cost of removal is thoroughly discussed in Dr. Cabe's testimony). However, my understanding is that costing and pricing should be based on currently available forward looking technology. Using the cost for placing an adjunct DSLAM at an antiquated DLC Remote Terminal site is not proper costing methodology.

Q. IN A FORWARD LOOKING CONSTRUCT, IS IT MORE COST EFFECTIVE TO PLACE AN ADJUNCT DSLAM ALONG WITH A SEPARATE FIBER FED DLC REMOTE TERMINAL, SUCH AS QWEST PROPOSES HERE, OR IS IT MORE EFFECTIVE TO PLACE AN NGDLC SYSTEM THAT CAN BE EQUIPPED FOR BOTH POTS AND XDSL SERVICES?

A. I believe there is no question on this issue. When faced with a situation such as a new housing development, the most cost effective solution is to place an NGDLC Remote Terminal with the capability to add xDSL services.

Q. WHY IS YOUR RECOMMENDATION MORE COST EFFECTIVE?

A. Close to the central office, a large, heavy copper cable may be most cost effective because there are almost no terminating costs at each end, but the cable is expensive on a per-foot basis – perhaps costing $25 or more per foot. On the other hand, fiber optic cable is relatively inexpensive on a per-foot basis – perhaps costing $1 to $3 per foot. However the termination costs for the electronics associated with a fiber cable are very high. The Common Equipment or startup costs can be $50,000 or more. Therefore, there is a distance breakeven point that balances the cost of the cable on a per-foot basis with the termination costs required for the two technologies. Now consider that the Common Equipment startup costs are very high for the fiber termination electronics. That high cost Common Equipment startup cost is very high for the NGDLC Remote Terminal and is also very high for the Remote DSLAM electronic equipment. The ideal solution is to incur a cost effective Common Equipment startup cost that can serve both POTS and xDSL services. Qwest's cost study in this proceeding incurs a high Common Equipment startup cost for POTS services, and a separate and additional high Common Equipment startup cost for xDSL services using a separate DSLAM. The question remains, "Is there equipment that can do both?"

Q. IS THERE CURRENTLY ANY AVAILABLE FORWARD LOOKING EQUIPMENT THAT CAN PROVIDE FOR BOTH POTS AND XDSL SERVICES?

A. Yes. Several manufacturers have developed, and continue to rapidly develop NGDLC platforms that can support both. The market leader in this area is Alcatel, and I have included information about their NGDLC Remote Terminal equipment as Attachment JCD-4. NGDLC was a marketing name created, primarily by DSC Communications, now Alcatel, in 1992. As indicated in Attachment JCD-4, Alcatel has coined a new name for the forward looking, combined platform technology (that it has been selling since 1999), called "New World Digital Loop Carrier" ("NWDLC"). As indicated in Attachment JCD-4, Litespan software release 10.0 added full digital subscriber line access mux (DSLAM) functionality to the platform. "While conventional DSLAMs are usually located in a central office, the Litespan DSLAM functionality can also be integrated into existing Litespan remote terminal locations," in other words into the 10-year old Litespan 2000 Remote Terminal.

Q. WHY WOULD ANYONE PLACE TWO SEPARATE SETS OF COMMON EQUIPMENT AT A REMOTE TERMINAL LOCATION – ONE FOR NGDLC-POTS AND ONE FOR NGDLC-XDSL?

A. No rational person would place separate sets of common equipment at a Remote Terminal location – one for POTS and one for xDSL in a forward looking environment.

Q. REGARDLESS OF WHAT QWEST CHOSES TO DO, WHAT PRICES SHOULD BE CHARGED TO CLECS?

A. My understanding of TELRIC cost and pricing requirements is that the costs and prices charged to CLECs should be based on presently available forward looking technology, regardless of what an ILEC chooses to physically deploy or not deploy. In that case, the only correct solution is an integrated NGDLC platform that can serve both POTS and xDSL services within the same Common Equipment configuration. For any deviation from that efficient, forward looking construct, Qwest should be held responsible for the extra costs.

Q. DO YOU HAVE ANY RESERVATIONS OR CONCERNS ABOUT USE OF AN INTEGRATED POTS/XDSL NGDLC PLATFORM?

A. No. This is what Alcatel, the market leader in NGDLC equipment has coined, NWDLC, and it is clearly the most efficient method currently being used by many other companies, including SBC, Verizon, and others.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.