Exhibit No:

Issues:	Network
Witness:	John Lube
Type of Exhibit:	Direct Testimony
Sponsoring Party:	Southwestern Bell Telephone Company
Case No:	TO-2000-322

SOUTHWESTERN BELL TELEPHONE COMPANY

CASE NO. TO-2000-322

Direct Testimony

of

John Lube

January 2000

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

FILED[2]

JAN 0 7 2000

Missouri Public Service Commission

In the Matter of the Petition of	)	
DIECA Communications, Inc	)	
D/B/A Covad Communications Company	)	TO-2000-322
for Arbitration of Interconnection	)	
Rates, Terms, Conditions and Related	)	
Arrangements with Southwestern	)	
Bell Telephone Company	)	

AFFIDAVIT OF JOHN P. LUBE

STATE OF TEXAS)
) SS
CITY OF DALLAS)

I, John P. Lube, of lawful age, being duly sworn, depose and state:

1. My name is John P. Lube. I am presently General Manager-Network Services for SBC Operations, Inc.

2. Attached hereto and made a part hereof for all purposes is my direct testimony.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct to the best of my knowledge and belief.

John P. Lube

Subscribed and sworn to before me on this 4th day of January, 2000.

HATTIE C. WYATT
NOTARY PUBLIC
State of Texas
Comm. Exp. 09-17-2000

Notary Public

1. BACKGROUND

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. John P. Lube, One Bell Plaza, Room 2312, Dallas, Texas 75202.

Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A. I am employed by SBC Operations, Inc., a subsidiary of SBC Communications Inc. ("SBC"). My position is General Manager-Network Services.

Q. WHAT ARE YOUR PRESENT RESPONSIBILITIES?

A. I participate in the development, planning, and engineering of telephone networks of the SBC telephone companies, and act as the regulatory and legislative liaison concerning network issues in the states served by those companies. My responsibilities include the presentation, explanation, and justification of the company's network plans before regulatory and legislative authorities. I also provide technical support to the Legal and External Affairs departments.

Q. HAVE YOU PREPARED AN APPENDIX THAT SUMMARIZES YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE?

A. Yes. Schedule 1, which is attached to my testimony, summarizes my educational background and work experience. It also includes a list of the regulatory proceedings where I have filed testimony and/or appeared before the regulatory commissions of the states that are served by the SBC telephone companies.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony, given on behalf of Southwestern Bell Telephone Company ("SWBT"), is to discuss, from a technical perspective, certain issues for arbitration identified by DIECA Communications, Inc. d/b/a Covad Communications Company ("Covad") dealing with Digital Subscriber Line ("DSL") technologies and services.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. My testimony is organized into the following sections:

1) Background
2) Basic Description of DSL Technology
3) Loop Qualification – Covad Issue A(3)
4) Loop Conditioning – Covad Issue A(6)
5) Cross-Connects – Covad Issue A(8)
6) Technical Publications – Covad Issue B

2. BASIC DEFINITION OF DSL TECHNOLOGY

Q. PLEASE DEFINE DSL BRIEFLY.

A. DSL is a technology that allows high-speed data transmission over one or two twisted-pair copper loops. DSL-based services provide dedicated, point-to-point access for data, and therefore, are not carried over the public switched telephone network. These services normally extend from a service provider's central office to

the customer's premises. The different types of DSL technology are collectively referred to as xDSL, where the "x" is replaced with a specific letter to designate a particular type of DSL technology. For instance, HDSL represents High-bit-rate Digital Subscriber Line and ADSL represents Asymmetric Digital Subscriber Line.

3. LOOP QUALIFICATION

Q. WHAT ARE THE ISSUES RELATED TO LOOP QUALIFICATION?

A. The only outstanding issue relating to loop qualification is the appropriate rate for the loop qualification process. Covad alleges SWBT should not charge for loop qualification until such time as it is fully mechanized.

Q. WHAT LOOP QUALIFICATION PROCESS IS OFFERED BY SWBT FOR XDSL?

A. SWBT offers a two-step loop qualification process to CLECs desiring xDSL loops. The first step is called pre-qualification. It is based on the theoretical loop length for a particular group of customer addresses (i.e., a particular distribution area), and can give a CLEC a useful look at what parts of SWBT's loop network can most likely support xDSL services. Covad can directly and electronically access SWBT's pre-qualification data on-line at no charge.

Q. IS COVAD REQUIRED TO USE THE PRE-QUALIFICATION STEP?

A. Not at all. CLECs may choose to use this step to determine likely areas to market their xDSL-based services and/or to obtain a preliminary evaluation of the ability to serve a particular customer. However, this step is completely optional, allowing the CLEC to go directly to the second step.

Q. WHAT IS THE SECOND STEP?

A. The second step is called loop qualification. It provides the CLEC with the actual make-up and spectrum inventory data for a specific loop. This information is obtained by SWBT from its assignment records and manual engineering records.

Q. WHAT INFORMATION DOES SWBT PROVIDE WITH LOOP QUALIFICATION?

A. With loop qualification, SWBT provides loop information to CLECs in accordance with the FCC's SBC/Ameritech Merger Order:

> "SBC/Ameritech will provide requesting telecommunications carriers, including its separate advanced services affiliate, with additional loop make-up information in response to an address-specific request. Depending on the request, SBC/Ameritech will provide, by manual means until it is available electronically, information contained on an individual loop record, which may include: the actual loop length; length by gauge; the presence of bridged taps, load coils, and repeaters, and their approximate location and number; the presence of pair-gain devices, digital loop carriers or digital added main lines; and the presence of disturbers in the same or adjacent binder groups." [1]

[1] FCC 99-279, Memorandum Opinion and Order in CC Docket No. 98-141 ("In re Applications of Ameritech Corp., Transferor, and SBC Communications Inc., Transferee, For Consent to Transfer Control of Corporations Holding Commission Licenses and Lines Pursuant to Section 214 and 310(d) of the Communications Act and Parts 5, 22, 24, 25, 63, 90, 95 and 101 of the Commission's Rules"), released October 8, 1999 ("SBC/Ameritech Merger Order"), paragraph 374.

In addition, spectrum inventory data is provided in accordance with the FCC's Advanced Services Order:

> "The incumbent LEC must also disclose to requesting carriers information with respect to the number of loops using advanced services technology within the binder [group] and type of technology deployed on those loops."[2, 3]

Q. IS SWBT REQUIRED TO MECHANIZE ALL OF ITS LOOP MAKE-UP INFORMATION?

A. No. The FCC's UNE Remand Order states,

> We disagree, however, with Covad's unqualified request that the Commission require incumbent LECs to catalogue, inventory, and make available to competitors loop qualification information through automated OSS even when it has no such information available to itself. If an incumbent LEC has not compiled such information for itself, we do not require the incumbent to conduct a plant inventory and construct a database on behalf of requesting carriers.[4] (emphasis added)

Q. IS SWBT IN THE PROCESS OF MECHANIZING ACCESS TO LOOP QUALIFICATION INFORMATION?

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[2] FCC 99-48, First Report and Order and Further Notice of Proposed Rulemaking in CC Docket No. 98-147 ("In the Matters of Deployment of Wireline Services Offering Advanced Telecommunications Capability"), released March 31, 1999 ("Advanced Services Order"), paragraph 73.

[3] This FCC requirement confirms the CLECs' obligation to advise SWBT of the type of xDSL they are provisioning on each unbundled loops used for xDSL.

[4] FCC 99-238, Third Report and Order and Fourth Further Notice of Proposed Rulemaking in CC Docket No. 96-98 ("In the Matter of Implementation of the Local Competition Provisions of the Telecommunications Act of 1996"), released November 5, 1999 ("UNE Remand Order"), paragraph 429.

A. As just explained above, SWBT is only required to provide CLECs with mechanized access to loop information that SWBT has already mechanized for itself. Therefore, SWBT is in the process of developing mechanized on-line access for CLECs to that portion if its loop information that already exists in SWBT's mechanized databases. As a consequence, mechanized access will not be available for all loop qualification information. The mechanized access being developed by SWBT will allow the CLECs' service representatives to perform pre-order loop qualification while negotiating service with their customers. Access to the same mechanized information will be available equally to CLECs and SBC's retail operations, just as the current manual process is equally available today.

Q. WHEN WILL THIS NEW MECHANIZED ACCESS BE AVAILABLE TO THE CLECS?

A. In response to the FCC's SBC/Ameritech Merger Order,[5] SBC has created a Plan of Record that outlines the mechanization of access to xDSL loop qualification information. As covered in this document, mechanized loop qualification based upon designed loop information will be in place by July 2000. By the end of 2000, mechanized access will be provided to actual loop information, where the mechanized data is available in SWBT's databases.

Q. CAN YOU GIVE SOME EXAMPLES OF INFORMATION THAT IS AVAILABLE IN SWBT'S MECHANIZED DATABASES?

[5] SBC/Ameritech Merger Order, Appendix C, paragraph 15.c.

A. Yes. Some examples of loop information available in SWBT's mechanized databases are designed loop length, designed length by gauge, and spectrum inventory data. Other information such as actual loop length, actual length by gauge, presence and number of load coils, and presence and length of bridged taps is only partially inventoried in SWBT's mechanized databases; consequently, CLECs and SBC's retail operations will not have mechanized access to 100% of these types of information.

Q. CAN YOU PROVIDE SOME EXAMPLES OF INFORMATION THAT IS NOT AVAILABLE AT ALL IN SWBT'S MECHANIZED DATABASES?

A. Yes. The locations of load coils, repeaters, and bridged tap are not available in mechanized databases. Consequently, mechanized access to this information will not be available to CLECs or SBC's retail operations.

Q. WHAT IS SWBT'S POSITION REGARDING CHARGING FOR LOOP QUALIFICATION?

A. SWBT witness Jerrod Latham addresses SWBT's position on charging for loop conditioning.

Q. IS THE LOOP QUALIFICATION PROCESS CONTAINED IN OTHER SWBT-CLEC INTERCONNECTION AGREEMENTS IN MISSOURI?

A. Yes. The loop qualification process for xDSL is a standard feature in all of SWBT's DSL interconnection agreements in Missouri, including the arbitrated agreements with BroadSpan and Sprint.

4. LOOP CONDITIONING

Q. WHAT IS THE ISSUE REGARDING LOOP CONDITIONING?

A. Covad asserts in its petition that SWBT should not be permitted to charge for xDSL loop conditioning.

Q. WHAT IS COVAD'S RATIONALE FOR ITS POSITION?

A. Covad claims that charging for loop conditioning is not consistent with TELRIC[6] principles and forward-looking costing methodologies. Covad further claims that forward-looking loop plant is already conditioned, and therefore, charging for both the forward-looking loop and the loop conditioning results in double-recovery of SWBT's conditioning costs.

Q. WHAT IS SWBT'S POSITION REGARDING THIS ISSUE?

A. SWBT incurs real and legitimate costs when it is required to condition a loop for xDSL. Therefore, SWBT is entitled to recover these costs.

[6] "TELRIC" is an acronym for Total Element Long-Run Incremental Cost, and is the costing principle adopted by the FCC for the pricing interconnection and UNEs.

Q. WHAT IS LOOP CONDITIONING AND WHY IS IT NEEDED FOR XDSL-BASED SERVICES?

A. Even if a copper loop is the proper length to support xDSL operation, there may be devices on that loop that will either prevent the operation of an xDSL service, or, at best, impair its performance. These devices are load coils, digital repeaters, and excessive bridged tap. Therefore, loop conditioning, in the context of xDSL-based services, consists of disconnecting these devices from the copper loop.

Q. IS LOOP CONDITIONING ALWAYS REQUIRED TO PROVIDE XDSL-BASED SERVICES?

A. No. First, most loops simply do not require conditioning for xDSL; in all of those instances, if Covad does not request conditioning, it will not pay for conditioning. Second, when SWBT determines that conditioning is recommended for xDSL, Covad may order the loop with or without the recommended conditioning; however, optimum performance for Covad's customer might be realized only if the conditioning recommended by SWBT is performed. If Covad does not desire the recommended conditioning, however, SWBT will not perform that conditioning, and Covad will not pay for conditioning. Conversely, if Covad agrees to have SWBT perform the conditioning, Covad should reimburse SWBT for performing this work on Covad's behalf. Third, if any loops less than 12,000 feet have load coils or repeaters, SWBT will disconnect those load coils and repeaters at no charge to Covad. However, if Covad requests the disconnection of bridged tap on loops

less than 12,000 feet, then SWBT will charge Covad for this additional conditioning.

Q. TO BETTER UNDERSTAND WHY CONDITIONING IS NECESSARY ON SOME XDSL LOOPS, PLEASE EXPLAIN WHY LOAD COILS ARE FOUND ON COPPER LOOPS?

A. Signals at all frequencies are attenuated (i.e., their strength is reduced) in copper loops because of the capacitance[7] that exists between the two copper wires that make up each loop cable pair. Load coils are devices that are spliced to loop cable pairs to counteract this capacitance-caused signal attenuation at voice frequencies (i.e., up through about four kHz). The current design of copper loops for voice-frequency transmission requires the placement of load coils on loops longer than 18,000 feet. The most common loading scheme used is called "H88," where the "H" designates 6,000-foot spacing between the coils, and the "88" designates an inductance of 88 millihenries (i.e., 44 millihenries for each wire).

[7] In this context, capacitance is an electrical property of the two copper wires that make up a cable pair. Because these two wires are in proximity to each other, electrical signals present in one wire "bleed over" into the other wire. The amount of bleed-over is directly related to the frequency of the signals and the length of the cable pair. As the frequency becomes higher or the length becomes longer, the capacitance effectively begins to act like a short-circuit between the two wires, preventing their use for carrying those signals.

Q. WHY WOULD THE PRESENCE OF LOAD COILS IMPAIR OR PREVENT THE TRANSMISSION OF XDSL SIGNALS?

A. Load coils improve the transmission of voice-grade signals, but significantly attenuate all frequencies above the voice band. Because xDSL technologies operate at signal frequencies much higher than the voice band, load coils will usually prevent the operation of the xDSL service.

Q. WHY DO LOAD COILS EXIST ON SOME COPPER LOOPS LESS THAN 18,000 FEET?

A. There are two primary reasons for load coils to be present on some copper loops being assigned to xDSL-based services where the customers are less than 18,000 feet from the serving central offices. First, earlier design criteria may have called for the loading of those pairs. For instance, loading of loops less than 18,000 feet was necessary for certain PBX services. Second, when that loop plant was initially designed and placed by SWBT, it may have provided voice-grade services to customers who were 18,000 feet or more from the central offices, and therefore would have been loaded. However, because of the evolution of the loop network, some of those pairs may not be needed for those longer distances, due to changes in customer density (i.e., movement from one area to another) or the deployment of fiber optics for longer loops. As a consequence, load coils originally placed for longer loops do exist on loops now shorter than 18,000 feet.

Q. DO THESE LOAD COILS IMPAIR VOICE-GRADE SERVICES ON LOOPS THAT ARE CURRENTLY LESS THAN 18,000 FEET?

A. Not at all. Load coils improve voice-frequency transmission at any loop length. While current outside plant design rules do not require load coils for voice-grade services on loops shorter than 18,000 feet, the presence of such loading certainly causes no impairment to voice-grade services. Therefore, the only reason loading would need to be disconnected from such is the deployment of xDSL-based or other digital-based services.

Q. WHAT ARE DIGITAL REPEATERS AND WHY DO THEY EXIST ON COPPER LOOPS?

A. Digital repeaters are used on non-loaded copper loops to extend the reach of digital services such as DS1 (i.e., 1.544 Mbps) data services or Integrated Services Digital Network ("ISDN") services. DS1 data services might use either T1 or HDSL repeaters. The type of digital repeaters found most often on loops less than 18,000 feet are T1 repeaters. These repeaters are necessary on T1 loops generally longer than 3,000 feet.[8] Multiple repeaters may exist on longer T1 lines, generally spaced

[8] The distance at which a repeater is required varies, depending on the characteristics of the copper loop, such as the gauge(s).

at 3,000-foot intervals. If a T1 repeater is no longer in service on a loop, that non-loaded loop could be assigned to a new xDSL-based service. However, the xDSL-based service will not operate without first disconnecting the digital repeater(s) from the loop.

Q. WHAT IS BRIDGED TAP AND WHY IS IT PRESENT ON LOOPS?

A. Bridged tap is simply a branched or bridged connection of a distribution pair such that the same pair appears at two or more locations within the distribution area. Without the use of bridged tap, sufficient cable capacity would have to be placed for every possible present and future customer location to have dedicated loops that extend all the way back to the serving central office. Because of the uncertainty of where customers will be located (and relocated over time), such dedicated loops would result in larger cable sizes, and more cost to SWBT and customers. Therefore, the presence of bridged tap on loops allows more flexible and efficient use of cable pairs. The amount of bridged tap designed in SWBT's existing network is proper for voice-grade services. In those instances where SWBT's existing network will be used for xDSL-based services, the removal (i.e., disconnection) of bridged tap from loops may be required.

Q. WHAT WORK IS REQUIRED TO DISCONNECT LOAD COILS, DIGITAL REPEATERS, AND BRIDGED TAP FROM A LOOP?

A. When these devices are to be disconnected from a loop, an engineer must first manually locate on cable drawings all load coils, repeaters, and/or bridged taps that

must be removed. An engineering work order must be prepared and a cable splicing crew must be dispatched to each location where work is to be done. Multiple work locations will usually be involved because of load coil spacing and the location(s) of bridged tap. At each location, a safe working environment must be established, the cable located, cable splice opened, the device disconnected from the loop, the cable water-proofed and closed, and the work site vacated. The time required for each of these operations is dependent upon the conditions at the work site. In some cases, the work site will be on aerial cable suspended above a street; in those cases, a work platform must be placed to allow the technician to access the cable. In other cases, it may be necessary to dig a hole to access a buried cable, or clear a manhole on a busy street to access an underground cable. The FCC recognized the complexity of this process when it stated:

> Incomplete documentation on the physical layout of the network and opening and closing cable splices can make the process of locating and removing bridged taps a time consuming and therefore, costly process.[9]

Similar time requirements and costs apply to the removal of load coils and digital repeaters from a loop.

Q. IS COVAD'S CHARACTERIZATION OF LOOP CONDITIONING CORRECT?

[9] FCC 98-188, Memorandum Opinion and Order, and Notice of Proposed Rulemaking in CC Docket No. 98-147 ("Deployment of Wireline Services Offering Advanced Telecommunications Capability"), released August 7, 1998; footnote 316.

A. No. Covad characterizes loop conditioning as a cost already included in a "forward-looking" network. This is incorrect in two ways. First, as explained above, loop conditioning involves disconnecting certain devices from a loop, not the addition of anything. In contrast, the cost of a "forward-looking" network reflects the most-efficient plant available today. Such theoretical construction of new plant in this "forward-looking" network would certainly not intentionally contain devices that would then have to be removed as part of the forward-looking cost. Therefore, it is simply incorrect for Covad to assert that loop conditioning is already included in "forward-looking" network costs. Second, loop conditioning is an activity necessary in SWBT's existing network, not some theoretical "forward-looking" network.

Q. DOES THE FCC AGREE THAT THE SWBT SHOULD BE REIMBURSED FOR LOOP CONDITIONING?

A. Yes. In its Interconnection Order,[10] the FCC stated:

> Our definition of loops will in some instances require the incumbent LEC to take affirmative steps to condition existing loop facilities to enable requesting carriers to provide services not currently provided over such facilities. For example, if a competitor seeks to provide a digital loop functionality, such as ADSL, and the loop is not currently conditioned to carry digital signals, but it is technically feasible to condition the facility, the incumbent LEC must condition the loop to permit the transmission of digital signals. Thus, we reject BellSouth's position that requesting carriers "take the LEC networks as they find them" with respect to unbundled network elements. As discussed above, some modification of incumbent LEC facilities, such as loop conditioning, is encompassed within the duty imposed by section

[10] FCC 96-325, First Report and Order in CC Docket No. 96-98 ("In the Matter of Implementation of the Local Competition Provisions of the Telecommunications Act of 1996"), released August 8, 1996 ("Interconnection Order").

> 251(c)(3). The requesting carrier would, however, bear the cost of compensating the incumbent LEC for such conditioning.[11] (Emphasis added) (FCC footnotes omitted)

The cite above clearly requires Covad (and any other carrier) requesting xDSL-based services to bear the cost of any loop conditioning that SWBT must perform for that xDSL service to operate. However, as explained above, SWBT will charge Covad or any other carrier for such conditioning only on loops longer than 12,000 feet[12], and only when the carrier requests such conditioning.

Q. DOES THE FCC'S INTERCONNECTION ORDER DEFINE ITS USE OF THE TERM "CONDITIONING"?

A. Yes. In a related paragraph in the Interconnection Order, the FCC discusses instances where "it is not technically feasible to condition a loop facility to support a particular functionality."[13] In this discussion, the FCC essentially defines "conditioning," stating,

> Such loop conditioning may involve removing load coils or bridged tap that interfere with the transmission of digital signals.[14]

[11] Id., paragraph 382.
[12] Unless non-required conditioning is requested by the carrier, as explained previously in my testimony.
[13] Id., paragraph 381.
[14] Id., footnote 826.

Q. DID THE FCC CONTINUE TO RECOGNIZE THE NEED FOR INCUMBENT LECS TO BE REIMBURSED FOR LOOP CONDITIONING IN ITS UNE REMAND ORDER?

A. Yes. In this recent order, the FCC states,

> In the *Local Competition First Report and Order*, the [FCC] also stated that requesting carriers would compensate the incumbent LECs for the cost of conditioning the loop. Covad and Rhythms argue that, because loops under 18,000 feet generally should not require devices to enhance voice-transmission, the requesting party should not be required to compensate the incumbent for removing such devices on lines of that length or shorter.[15]
>
> We agree that networks built today normally should not require voice-transmission enhancing devices on loops of 18,000 feet or shorter. Nevertheless, the devices are sometimes present on such loops, and the incumbent LEC may incur costs in removing them. Thus, under our rules, the incumbent should be able to charge for conditioning such loops.[16] (emphasis added)

In other words, the FCC explicitly disagrees with Covad's position regarding loop conditioning, and clearly agrees that Covad should reimburse SWBT for any loop conditioning requested by Covad. It is especially noteworthy that the FCC's position acknowledges that it is SWBT's existing network that is unbundled for Covad's use, not some fictitious network used only for setting the prices of the UNEs themselves.

Q. HAS THIS COMMISSION MADE A DETERMINATION REGARDING LOOP CONDITIONING FOR XDSL?

[15] FCC UNE Remand Order, paragraph 192.
[16] Id., paragraph 193.

A. Yes. This Commission addressed loop conditioning charges in the last two arbitrations related to xDSL. In its Order issued on August 3, 1999, in Case No. TO-99-461, this Commission determined that it "cannot adopt Sprint's suggestion that no charge be made for conditioning."[17] In its Order issued on June 15, 1999, in Case No. TO-99-370, the Commission found that "the fact that BroadSpan must compensate SWBT for the cost of conditioning the loops it requests is not disputed."[18] Thus, this Commission has already recognized that CLECs should reimburse SWBT for requested loop conditioning work, and has established rates it believes are appropriate for such work.

Q. ARE XDSL LOOP CONDITIONING CHARGES INCLUDED IN OTHER SWBT-CLEC INTERCONNECTION AGREEMENTS IN MISSOURI?

A. Yes. Conditioning charges for xDSL loops are included in all SWBT's other DSL interconnection agreements in Missouri, including the arbitrated agreements for BroadSpan and Sprint.

5. CROSS-CONNECTS

Q. WHAT IS THE ISSUE REGARDING CROSS-CONNECTS?

[17] Missouri Public Service Commission's Arbitration Order, Case No. TO-99-461 ("In the Matter of the Petition of Sprint Communications Company, L.P., for Arbitration of Unresolved Interconnection Issues Regarding xDSL with Southwestern Bell Telephone Company"), issued August 3, 1999, page 5.

[18] Missouri Public Service Commission's Arbitration Order, Case No. TO-99-370 ("Petition of BroadSpan Communications, Inc. for Arbitration of Unresolved Interconnection Issues Regarding ADSL with Southwestern Bell Telephone Company"), issued June 15, 1999, page 8.

A. The issue regarding cross-connects is price. SWBT witness Jerrod Latham discusses SWBT's prices for cross-connects, and SWBT witness James Smallwood discusses SWBT's costs that underlie these prices.

Q. WHAT IS A CROSS-CONNECT?

A. A cross-connect is generally a piece of wire that connects one piece of telephone plant to another; inside a central office, this connection is made at a "distributing frame." In the context of SWBT's cross-connect charges for xDSL loops, the cross-connect is the connection between the SWBT's unbundled loop and the central office cabling to the CLEC's collocation space or other point of access to that unbundled loop.

Q. WHAT PHYSICAL COMPONENTS MAKE UP THAT CONNECTION?

A. This overall connection is made up of the following components:

(1) SWBT's main distributing frame ("MDF");

(2) the wire ("jumper") at SWBT's MDF that connects the unbundled loop to a cable ("tie cable") that extends to SWBT's intermediate distributing frame ("IDF");

(3) the tie cable between the MDF and the IDF;

(4) the jumper at the IDF connecting the tie cable from the MDF to a tie cable extending to the CLEC's collocation space or other point of access; and

(5) SWBT's IDF.

Figure 1 below is a diagram that illustrates the typical layout of these five components; each component is numbered in the diagram.

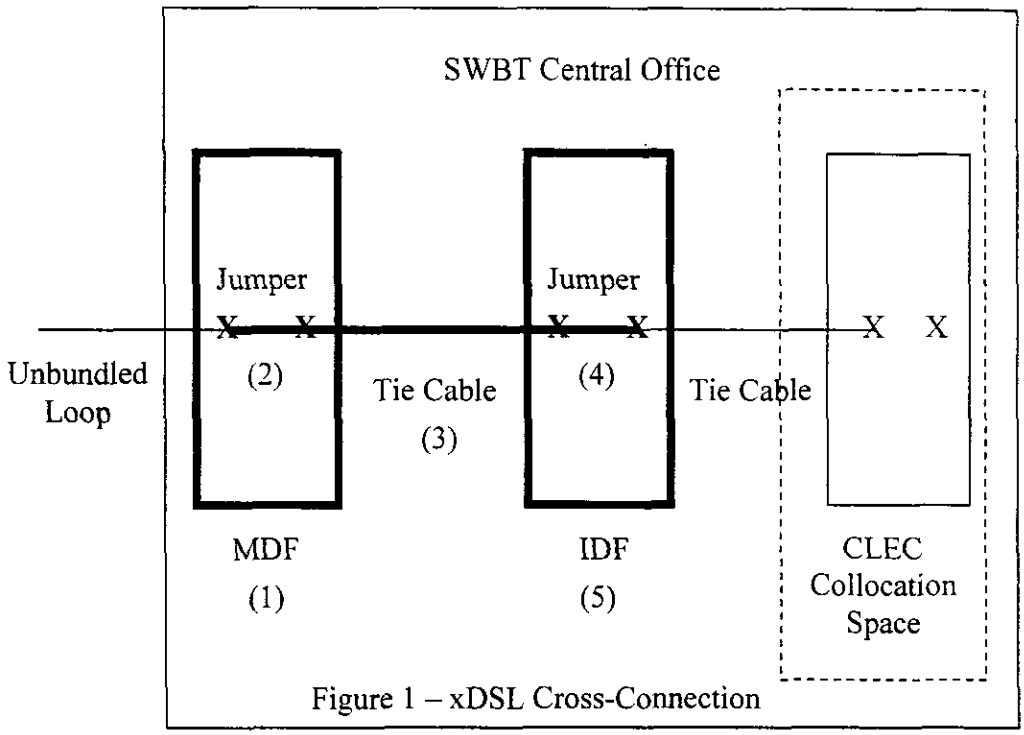

Figure 1 – xDSL Cross-Connection

6. TECHNICAL PUBLICATIONS

Q. WHAT ISSUE DOES COVAD RAISE REGARDING TECHNICAL PUBLICATIONS?

A. In its Petition for Arbitration, Covad contends that modifications to SWBT's Technical Publications ("Tech Pubs"), to which SWBT refers in its proposed interconnection agreement, would have unilateral, substantive effect on the terms and conditions of the interconnection agreement between SWBT and Covad.

However, Covad does not object to "SWBT making procedural modifications to its technical publications."[19] While Covad's petition shows its objection to modifications to these Tech Pubs in the future for "substantive changes," it is my understanding that Covad has refused to define what is meant by "substantive changes."

Q. WHAT ARE TECH PUBS?

A. Tech Pubs are documents prepared within SBC that generally provide technical descriptions and specifications for technologies and equipment used in SWBT's network, as well as services and UNEs which use SWBT's network. These Tech Pubs document the technical requirements necessary for SWBT to internally deploy technology and equipment and offer services and network elements in such a way as to ensure proper network functionality and network reliability for all of SWBT's customers, both wholesale and retail.

Q. DO TECH PUBS COVER TECHNICAL SUBJECTS OTHER THAN XDSL?

A. Yes. Tech Pubs exist for a wide variety of subjects. SWBT's interconnection agreements with CLECs typically reference Tech Pubs that cover subjects such as electrical/optical interfaces, signaling, collocation, and access to UNEs.

Q. WHAT IS SWBT'S POSITION ON THIS MATTER?

[19] Covad Petition, paragraph 45.

A. SWBT is willing to negotiate with Covad on "substantive changes" to Tech Pubs if that term is properly defined. However, SWBT must have the ability to update its Tech Pubs even if Covad does not agree.

Q. WHY IS IT REASONABLE FOR SWBT TO BE ABLE TO UPDATE THESE TECH PUBS?

A. SWBT must have the ability to update its Tech Pubs in order to keep current with new technology and equipment used in its network, especially to the extent it is impacted by evolving national standards. It is likewise necessary for SWBT to update its Tech Pubs in order to keep current with any changes in regulations related to the services and UNEs offered by SWBT. Absent these updates, the deployment, use, and maintenance of SWBT's network may not be appropriate, from either a technical or regulatory perspective. This is particularly true of the requirements for collocation. SWBT's collocation offerings are subject to various statutory and regulatory requirements related to competition, national and local safety codes, and other such matters.

Q. WHAT TYPES OF CHANGES HAS SWBT MADE TO ITS TECH PUBS?

A. Usually, these changes are made to reflect new industry standards or new regulations. For example, recent changes made to SWBT's collocation Tech Pubs were based on new collocation requirements in the FCC's Advanced Services Order.

Q. WHY IS IT NECESSARY FOR SWBT TO RETAIN THE ABILITY TO UPDATE TECH PUBS EVEN IF AGREEMENT IS NOT REACHED WITH COVAD IN NEGOTIATIONS?

A. As just explained, some updates are the result of new regulatory requirements, such as the FCC's Advanced Services Order, while others are necessary to conform with new industry standards. A CLEC cannot be given the ability to prevent SWBT from complying with such changes. SWBT has only one network, and cannot have different sets of Tech Pubs applicable to that network.

Q. IS THERE AN ISSUE REGARDING XDSL TECH PUBS?

A. No. SWBT believes there is no issue related to xDSL Tech Pubs referenced in the DSL appendix to SWBT's proposed interconnection agreement. In fact, SWBT and Covad have agreed to language in this appendix which provides:

> "SWBT shall not impose its own standards for provisioning xDSL services, through Technical Publications or otherwise, until and unless approved by the Commission or the FCC prior to use."[20]

Q. DO REFERENCES TO SWBT'S TECH PUBS APPEAR IN OTHER SWBT-CLEC INTERCONNECTION AGREEMENTS IN MISSOURI?

A. Yes. These references are a standard feature in all interconnection agreements with facilities-based carriers in Missouri today.

[20] Attachment xDSL, Section 4.8.

Q. HAVE ANY CLECS HAD COMPLAINTS REGARDING SPECIFIC CHANGES MADE IN THE PAST IN SWBT'S TECH PUBS?

A. To my knowledge, there have been no such complaints.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

SUMMARY OF EDUCATIONAL AND WORK EXPERIENCE

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I have a Bachelor of Science - Electrical Engineering degree from the University of Houston in Houston, Texas. I am also a Registered Professional Engineer in Texas.

I have also completed company and external training related to network planning and engineering, network technology, accounting, and telecommunications policy and regulation.

Q. PLEASE DESCRIBE YOUR WORK EXPERIENCE WITH SOUTHWESTERN BELL TELEPHONE COMPANY.

A. I was employed by Southwestern Bell Telephone Company ("SWBT") in 1969 as a student engineer (through a cooperative education program with the University of Houston). I worked in central office switching equipment engineering from that time until graduation in June, 1972. After graduation, I held engineering assignments in Houston responsible for transmission equipment engineering, carrier system design, circuit design, and interoffice and intercity facility planning until 1978. At that time, I was transferred to St. Louis, Missouri, and held engineering staff assignments responsible for company-wide facility planning, equipment engineering methods and procedures, and transmission engineering. In 1980, I was transferred to Oklahoma City, Oklahoma, and held positions responsible for facility planning, carrier design, trunk and special services circuit design, plant cost allocation, plant valuation and depreciation, and regulatory accounting. In 1992, I was transferred back to St. Louis where I held staff positions responsible for the evaluation and standardization of all outside plant and transmission equipment products for SWBT, and the life analysis and accounting for the depreciation of all SWBT plant. In 1997, I was transferred to Pleasanton, California, and was responsible for all regulatory matters for Southwestern Bell Communications Services (SWBT's long distance affiliate). I assumed my present title and duties as technical network support for the legal and

external affairs departments for the SBC states in June, 1999.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE A STATE REGULATORY COMMISSION

A. Yes. I have listed cases in which I have filed testimony and/or appeared before state regulatory commissions on the following pages.

ARKANSAS

YEAR	CASE NO.	DESCRIPTION
1995	95-623-U	An Application for Approval of New Depreciation Rates for Various Classes of Property Of Southwestern Bell Telephone Company
1996	96-395-U	AT&T Communications of the Southwest, Inc.'s Petition for Arbitration of Unresolved Issues with Southwestern Bell Telephone Company Pursuant to Section 252(b) of the Telecommunications Act of 1996
1998	98-048-U	Application of Southwestern Bell Telephone Company Seeking Verification That It Has Fully Complied With and Satisfied the Requirements of Section 271(c) of the Telecommunications Act of 1996

KANSAS

YEAR	CASE NO.	DESCRIPTION
1997	97-AT&T-290-ARB	Petition by AT&T Communications of the Southwest, Inc. for compulsory Arbitration of Unresolved Issues with Southwestern Bell Telephone Company Pursuant to Section 252(b) of the Telecommunications Act of 1996
1998	97-SWBT-411-GIT	Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Kansas
1999	99-SCCC-710-ARB	In the Matter of the Petition of Sprint Communications Company L.P. for Arbitration of Unresolved Interconnection Issues Regarding xDSL With SWBT

MISSOURI

YEAR	CASE NO.	DESCRIPTION
1996	TO-97-40	AT&T Communications of the Southwest, Inc.'s Petition for Arbitration pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Interconnection Agreement with Southwestern Bell Telephone Company
1996	TO-97-67	Petition of MCI Telecommunications Corporate and its Affiliates, including MCIMetro Access Transmission Services, Inc. for Arbitration and Mediation Under the Federal Telecommunications Act of 1996 of Unresolved Interconnection Issues with Southwestern Bell Telephone Company
1998	TO-99-227	Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Missouri

OKLAHOMA

YEAR	CASE NO.	DESCRIPTION
1989	PUD 000260	Effect of the 1986 Tax Reform Act on Oklahoma Utilities
1990	PUD 0000692	Application: The 529 Exchange Area Residents Committee and Subscribers of the 529 Exchange Area Relief Sought: Extended Area (EAS) Telephone Service
1990	PUD 0000667	Application: The Town of Elgin and Surrounding Area on 491 Exchange Relief Sought: Extended Area (EAS) Telephone Service
1991	PUD 0000899	Application of Larry A. Schroeder, Acting Director of the Public Utility Division, Oklahoma Corporation Commission, for the Development of a Comprehensive Pricing Plan for the Tulsa Extended Telephone Service Area
1991	PUD 0000974	Application of Larry A. Schroeder, Acting Director of the Public Utility Division, Oklahoma Corporation Commission, for the Development of a Comprehensive Pricing Plan for the Lawton Extended Telephone Service Area
1991	PUD 0000975	Inquiry of the Oklahoma Corporation Concerning the Development of a Comprehensive Wide-Area Calling Plan for the Oklahoma City Extended Telephone Service Area

OKLAHOMA (continued)

YEAR	CASE NO.	DESCRIPTION
1991	PUD 0000606	Application of the Perkins Chamber of Commerce on Behalf of Herein Listed Petitioners Seeking to Have the 547 Telephone Exchange Joined to Other Toll Free Access Stillwater Exchanges
1997	PUD 970000213	Application of Cox Oklahoma Telcom, Inc., for a Determination of the Costs of, and Permanent Rates for, the Unbundled Network Elements of Southwestern Bell Telephone Company
1997	PUD 970000588	Application of Southwestern Bell Communications Services, Inc., for Order Modifying Condition in Certificate of Public Convenience and Necessity and Tariff to Provide Interexchange Services Within the State of Oklahoma
1998	PUD 98000011	Application of Southwestern Bell Communications Services, Inc., Doing Business as Southwestern Bell Long Distance for Expedited Approval of Tariff
1998	PUD 98000012	Application of Southwestern Bell Communications Services, Inc., Doing Business as Southwestern Bell Long Distance to Make Effective Promotion Within Twenty Days

OKLAHOMA (continued)

YEAR	CASE NO.	DESCRIPTION
1998	PUD 970000560	Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Oklahoma
1998	PUD 980000459	Application of Sprint Communications Company, L.P., AT&T Communications of the Southwest, Inc., and MCI Telecommunications Corporation to Determine IXC Interexchange Services Are Subject to Effective Competition and for Modification of OAC 165:55-5-10(j)

TEXAS

YEAR	DOCKET	DESCRIPTION
1996	16189	Petition By MFS Communications Company, Inc. for Arbitration of Pricing of Unbundled Loops
1996	16196	Petition of Teleport Communications Group, Inc. for Arbitration to Establish an Interconnection Agreement
1996	16226	Petition of AT&T Communications of the Southwest, Inc. for Compulsory Arbitration to Establish an Interconnection Agreement Between AT&T and Southwestern Bell Telephone Company
1996	16285	Petition of MCI Telecommunications Corporation and its Affiliate MCIMetro Access Transmission Services, Inc. for Arbitration and Request for Mediation under the Federal Communications Act of 1996
1996	16290	Petition of American Communications Services, Inc. and its Local Exchange Operating Subsidiaries for Arbitration with Southwestern Bell Telephone Company Pursuant to the Telecommunications Act of 1996
1998	16251	Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Texas