August 9, 2006

Elizabeth O'Donnell
Kentucky Public Service Commission
211 Sower Boulevard
Frankfort, Kentucky 40602

RE: 2006-00099

Dear Ms. O'Donnell:

Enclosed are an original and five copies each of Rebuttal Testimony of Steven E. Turner and Jim Bellina filed on behalf of Dialog Telecommunications in the above captioned case. Mr. Turner's testimony includes references to BellSouth cost information provided to Dialog pursuant to a Protective Agreement. We are filing a single copy of the testimony which includes this information. The six "PUBLIC" copies are redacted.

Please indicate receipt of this filing by placing your file stamp on the extra copy and returning to me via our runner.

Very truly yours,

STOLL KEENON OGDEN PLLC

Douglas F. Brent

cc: Service List

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

Petition of:	)	
	)	
Dialog Telecommunications for	)	Case No. 2006-00099
Arbitration of Certain Terms and	)	
Conditions of Proposed Agreement with	)	
BellSouth Telecommunications, Inc.	)	Filed March 3, 2006
Concerning Interconnection Under the	)	
Telecommunications Act of 1996	)	

REBUTTAL TESTIMONY OF JIM BELLINA

On Behalf of

DIALOG TELECOMMUNICATIONS INC.

August 9, 2006

1   Q.   **PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS AND**
2   **WHETHER YOU PREVIOUSLY FILED DIRECT TESTIMONY IN THIS**
3   **CASE.**
4
5   A.   My name is Jim Bellina. I am the President and Chief Executive Officer of Dialog

6   Telecommunications, Inc. My business address is 756 Tyvola Road, Suite 100,

7   Charlotte, NC 2821. I previously filed direct testimony in this case.

8
9   Q.   **WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**
10
11   A.   The purpose of my rebuttal testimony is to rebut the testimony of BellSouth's

12   witness Kathy K. Blake.

13
14   Q.   **TO YOUR KNOWLEDGE, HAVE BELLSOUTH'S PROPOSED RATES**
15   **FOR THE BULK OR BATCH HOT CUT PROCESS BEEN APPROVED**
16   **BY THIS COMMISSION AS MS. BLAKE'S TESTIMONY IMPLIES?**
17
18   A.   No. To my knowledge, this Commission has not approved BellSouth's proposed

19   rates for the bulk or batch hot cut process nor has the Commission approved the

20   application of the rate elements – the ordering charge, the two-wire Cross

21   Connect non recurring charge or the unbundled voice loop non-recurring charge –

22   to instances where Dialog is migrating its UNE-P base in bulk to a UNE-Loop

23   configuration.

24
25   Ms. Blake's testimony, however, walks a very fine line.
26
27   Ms. Blake's testimony states that the "Commission's previously established rates

28   for provisioning unbundled network elements *are applicable and should be*

29   *applied when customers migrate from UNE-P to UNE-L*". Ms. Blake's testimony

30   goes on to state that the Commission "reviewed BellSouth's individual hot cut

31   process during BellSouth's 271 proceeding and UNE Cost proceeding and

32   determined that BellSouth met the requirements of Section 271 of the Act by

33   providing 'hot cut conversions at an acceptable level' [and] approved the

34   TELRIC-based nonrecurring rates applicable to hot cuts."

35

1   Q.   **WHY DO YOU SAY MS. BLAKE'S TESTIMONY WALKS A VERY FINE**
2   **LINE?**
3
4   A.   While the Commission may indeed have previously approved TELRIC-based

5   nonrecurring rates for individual hot cuts, this Commission has never determined

6   that those rates *"are applicable and should be applied when customers migrate*

7   *from UNE-P to UNE-L."* This is BellSouth's assertion and position and not a

8   conclusion that has previously been made by this Commission.

9
10   As was discussed in the Direct Testimony of Steve Turner, this Commission

11   began a proceeding (Case No. 2003-00379) to establish a TELRIC-based rate for

12   batch hot cuts based on the criteria set out in the FCC's TRO, but never

13   completed that investigation or established rates for a Bulk or Batch hot cut

14   process nor has this Commission ever determined that the non-recurring charges

15   for an individual hot cut are applicable and should be applied in a bulk migration

16   of customers from UNE-P to UNE-L. "

17
18   Q.   **TO YOUR KNOWLEDGE, HAS BELLSOUTH EVER SOUGHT OR**
19   **OBTAINED COMMISSION APPROVAL OF ITS PROPOSED BATCH**
20   **HOT CUT RATES OR THE APPLICATION OF ITS INDIVIDUAL HOT**
21   **CUT RATES TO A BATCH OR BULK MIGRATION OF CUSTOMERS**
22   **FROM UNE-P TO UNE-L?**
23
24   A.   To my knowledge, BellSouth has never presented a cost study to support rates for

25   a batch or bulk hot cut process. In Case No. 2003-00379, the Commission Staff

26   requested information (which would presumably include a cost study recognizing

27   the efficiencies noted by the FCC) from BellSouth about the appropriate TELRIC

28   rates for batch-cut activities. To my knowledge, BellSouth never provided any

29   cost studies to this Commission to support a batch hot cut rate.

30
31   As Ms. Blake's testimony indicates, BellSouth apparently developed a bulk

32   migration order *process* as a result of the TRO and proposed the application of the

33   individual hot cut non-recurring charges at a 10% discount. But this Commission

1　　　never considered much less approved either the new rates or the application of the

2　　　individual hot cut rates to the batch or bulk migration process.

3

4　　　Therefore, it is apparent that BellSouth has never sought nor obtained approval

5　　　from this Commission for rates applicable to a batch or bulk migration process.

6　　　Nor has BellSouth obtained approval from this Commission for the application of

7　　　the individual hot cut rates to a bulk migration of customers from UNE-P to UNE-

8　　　L.

9

10　**Q.　HAS BELLSOUTH FILED A COST STUDY TO SUPPORT ITS**
11　　　**PROPOSED RATES FOR A BATCH OR BULK MIGRATION IN THIS**
12　　　**CASE?**
13

14　A.　No. Not only have they not filed a cost study, BellSouth has entirely failed to

15　　　even attempt to support its position on this issue Number 1 which was very

16　　　clearly framed as "What is the appropriate TELRIC rate for batch or bulk

17　　　migrations when Dialog requests a conversion from a UNE-P loop and port

18　　　combination to a UNE loop configuration?"

19

20　　　Either BellSouth does not intend to support a bulk migration rate or they are

21　　　"sandbagging" Dialog and intend to support a bulk migration rate in their rebuttal

22　　　testimony – to which Dialog will be unable to respond.

23

24　**Q.　WHAT IS YOUR RECOMMENDATION TO THE COMMISSION?**

25

26　A.　The Commission should conclude that there are not and have never been

27　　　Commission approved TELRIC-based for batch or bulk hot cuts, that Dialog had

28　　　no choice but to submit orders to convert its customers prior to the arbitrary

29　　　deadline set by the FCC, that Dialog should only be required to pay commission-

30　　　ordered TELRIC-based costs for such conversions, and that this Commission will

31　　　establish these rates as recommended by Dialog's witness Steve Turner.

32

33　**Q.　DOES THAT CONCLUDE YOUR REBUTTAL TESTIMONY?**

34

35　A.　Yes.

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

Petition of:)	
Dialog Telecommunications for)	
Arbitration of Certain Terms and)	Case No. 2006-00099
Conditions of Proposed Agreement with)	
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)	

REBUTTAL TESTIMONY OF STEVEN E. TURNER

ON BEHALF OF

DIALOG TELECOMMUNICATIONS

AUGUST 9, 2006

PUBLIC VERSION

PUBLIC VERSION

1 **I.** **INTRODUCTION OF WITNESS**

2 **Q.** **PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Steven E. Turner. My business address is Kaleo Consulting, 2031

4 Gold Leaf Parkway, Canton, Georgia 30114.

5 **Q.** **ARE YOU THE SAME STEVEN E. TURNER THAT FILED DIRECT**
6 **TESTIMONY IN THIS PROCEEDING ON JULY 26, 2006?**

7 A. Yes, I am.

8 **II.** **PURPOSE OF REBUTTAL TESTIMONY**

9 **Q.** **WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

10 A. I have been asked by Dialog Telecommunications ("Dialog") to address Issue No.

11 1 in its arbitration with BellSouth Telecommunications Inc. ("BellSouth"). Issue

12 No. 1 is stated as follows: "What is the appropriate TELRIC rate for batch or

13 bulk migrations when Dialog requests conversion from a UNE-P loop and port

14 combination to a UNE loop configuration?"[1] My rebuttal testimony responds to

15 the Direct Testimony of Kathy K. Blake on behalf of BellSouth as it pertains to

16 this same issue.[2]

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[1] Commonwealth of Kentucky, Before the Public Service Commission, *Petition of: Dialog Telecommunications for Arbitration of Certain Terms and Conditions of Proposed Agreement with BellSouth Telecommunications, Inc. Concerning Interconnection Under The Telecommunications Act of 1996*, Case No. 2006-00099, filed March 3, 2006, Petition of Dialog Telecommunications for Arbitration with BellSouth under the Telecommunications Act of 1996, p. 4.

[2] Commonwealth of Kentucky, Before the Kentucky Public Service Commission, BellSouth Telecommunications, Inc., Direct Testimony of Kathy K. Blake, July 26, 2006. (Hereafter referred to as "Blake Direct Testimony.")

PUBLIC VERSION

1 III. **BELLSOUTH DOES NOT HAVE COMMISSION-APPROVED BATCH**
2   **HOT CUT RATES**

3 Q.   **DOES MS. BLAKE'S TESTIMONY IMPLY THAT THE KENTUCKY**
4   **PUBLIC SERVICE COMMISSION HAS APPROVED BELLSOUTH'S**
5   **BATCH HOT CUT RATES?**

6 A.   Yes. Unfortunately, Ms. Blake attempts to delicately sidestep a straightforward

7   issue in the dispute between BellSouth and Dialog by stringing together several

8   unrelated prior determinations by this Commission related to hot cuts. The issue

9   is whether there is a Commission-approved TELRIC Batch Hot Cut rate in

10   Kentucky. My Direct Testimony has demonstrated that no such rate presently

11   exists in Kentucky and made recommendations to the Commission on how that

12   rate should be developed and what that rate should be. The implication in Ms.

13   Blake's testimony that such an approved TELRIC based Batch Hot Cut rate exists

14   is simply incorrect.

15   Ms. Blake begins by stating the following: "This Commission reviewed

16   BellSouth's individual hot cut process during BellSouth's 271 proceeding and

17   UNE Cost proceeding and determined that BellSouth met the requirements of

18   Section 271 of the Act by providing "hot cut conversions at an acceptable level."[3]

19   It is possible that a casual reading of this statement by Ms. Blake would lead one

20   to believe that the Kentucky Commission was rendering an opinion on the

21   "acceptable level" of the rate for hot cuts in Kentucky. A full review of the

22   paragraph in the Kentucky Commission's Advisory Opinion on this subject,

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[3]   Blake Direct Testimony at p. 3.

3

1   however, demonstrates that Ms. Blake's use of the fragment has nothing to do

2   with the rate for hot cuts:

3   BellSouth asserts that it provides hot cuts in sufficient quantities at
4   levels that generate minimum service disruption.   Thus, when
5   BellSouth converts an existing customer to the network of a
6   competitor by transferring the customer's loop to the CLEC's
7   network, a process referred to as hot cuts, then the process is done
8   accurately enough to meet this checklist item.   BellSouth cites
9   enhanced employee training and the need to maintain accurate
10   customer records in providing hot cuts.   The Commission finds
11   that BellSouth provides hot cut conversions at an acceptable level.[4]

12 Clearly, the context of this determination of an "acceptable level" for hot cuts by

13 BellSouth in Kentucky relates to the provision of "hot cuts in sufficient quantities

14 at levels that generate minimum service disruption." This statement by the

15 Commission did not in any way address whether the rate for hot cuts, much less

16 the rates for Batch Hot Cuts, was at an "acceptable level."

17   Ms. Blake goes on to state the following: "In the UNE Cost proceeding

18 (Case No. 382), the Commission approved the TELRIC-based nonrecurring rates

19 applicable to hot cuts."[5] Ms. Blake provides no citation for this statement from

20 Case No. 382 because no citation would be possible. Based on my review of

21 Case No. 382, the Order in this proceeding was not issued until December 18,

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[4]   Commonwealth of Kentucky, Before the Public Service Commission, *In the Matter of:*
Investigation Concerning the Propriety of Provision of InterLATA Services by BellSouth
Telecommunications, Inc., Pursuant to the Telecommunications Act of 1996, Case No. 2001-
00105, Advisory Opinion, April 26, 2002, p. 32.

[5]   Blake Direct Testimony at pp. 3-4.

PUBLIC VERSION

1   2001.[6] The FCC did not issue its *Triennial Review Order* ("TRO") requiring state

2   Commissions to establish a TELRIC-based rated for Batch Hot Cuts until August

3   21, 2003. It would not be possible for BellSouth to have "approved ... TELRIC-

4   based nonrecurring rates applicable to hot cuts" consistent with the requirements

5   of the FCC's TRO in December 2001 when the FCC did not identify those

6   requirements until August 2003.

7   **Q.   IN YOUR DIRECT TESTIMONY, DID YOU ADDRESS ANY OF THE**
8   **SPECIFIC REQUIREMENTS THAT THE FCC SET FORTH THAT**
9   **SHOULD BE INCORPORATED INTO THE DEVELOPMENT OF A**
10   **TELRIC-BASED BATCH HOT CUT RATE?**

11   A.   Yes. I identified these FCC requirements in my Direct Testimony, but briefly I

12   will review them here. *First*, the FCC concluded that "the loop access barriers

13   contained in the record may be mitigated through the creation of a batch cut

14   process by spreading loop migration costs among a large number of lines,

15   decreasing per-line cut over costs."[7] The FCC clearly anticipated that as a result

16   of performing the hot cut of these "large number of lines" in an efficient manner

17   there would be a decrease in the "per-line cut over costs." This is entirely

18   reasonable since the set-up costs associated with a batch hot cut process, such as

19   deploying personnel to perform the hot cuts, could be efficiently performed once

20   for the entire group of hot cuts required in a central office rather than paid for on a

21   loop by loop basis. In fact, the FCC made this specific finding as follows:

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[6]   Commonwealth of Kentucky, Before the Public Service Commission, *In the Matter of: An Inquiry into the Development of Deaveraged Rates for Unbundled Network Elements,* Administrative Case No. 382, Order, December 18, 2001.

[7]   TRO at ¶ 487.

5

1   Generally, however, we expect these processes to result in
2   efficiencies associated with performing tasks once for multiple
3   lines that would otherwise have been performed on a line-by-line
4   basis. For example, pursuant to the processes in place in at least
5   some states, the incumbent LEC currently will pre-wire circuits on
6   the central office frame, verify the presence of dial tone, and
7   communicate with competitive LECs regarding problems
8   encountered on a line-by-line basis. Under a batch cut process,
9   these activities might be undertaken simultaneously for all lines
10   affected by a given batch order.[8]

11   In short, the FCC concluded that the TELRIC costs for a batch hot cut process

12   would be less than those for the typical provisioning of single unbundled loops.

13   The FCC further anticipated that it would reduce the cost to the CLECs and allow

14   the CLECs "to compete effectively in the mass market" in the absence of access

15   to unbundled local switching or the UNE-P platform.

16 Q. **DID THE KENTUCKY PUBLIC SERVICE COMMISSION PERFORM AN**
17   **EVALUATION OF THE TELRIC-BASED COSTS FOR A BATCH HOT**
18   **CUT PROCESS?**

19 A. As I indicated in my Direct Testimony, the Kentucky Commission began this

20   process in Case No. 2003-00379 on October 2, 2003. However, on March 2,

21   2004, the U.S. Court of Appeals for the District of Columbia issued its decision

22   remanding in part and vacating in part the FCC's *TRO Order*.[9] It is my

23   understanding that this Commission, because of uncertainty as to its role in

24   proceedings required by the TRO, issued an order that effectively ended the

25   proceedings in Case No. 2003-00379. The bottom line is that there is no

26   ambiguity here: the Kentucky Public Service Commission has not previously

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[8]   *Id.*

[9]   *United States Telecom Association v. FCC*, 359 F.3d 554 (2004) ("*USTA II*").

1   determined what the TELRIC-based rates for Batch Hot Cuts are in Kentucky.

2   BellSouth has simply implemented the use of rates for other rate elements to

3   Batch Hot Cuts without the approval of this Commission. These rates, when

4   applied to Batch Hot Cuts, do not comply with the requirements set forth by the

5   FCC as to how TELRIC-based rates for Batch Hot Cuts should be determined.

6   **Q.**   **MS. BLAKE MAKES REFERENCE TO A 10 PERCENT DISCOUNT OFF**
7   **OF THE "NONRECURRING PRICES WHEN CLECS USE THE BATCH**
8   **HOT CUT PROCESS [AS] AN INCENTIVE FOR CLECS TO USE THAT**
9   **PROCESS."[10] ARE YOU AWARE OF WHETHER SUCH A DISCOUNT**
10   **WAS IMPLEMENTED?**

11   **A.**   I am aware that such a discount has been discussed by BellSouth. However, in

12   my review of the history of UNE rate development in Kentucky compared to the

13   rates actually billed to Dialog in Kentucky for BellSouth, it does not appear that

14   any discount has been applied. Specifically, in the Commission's Order in Case

15   No. 382 that I referenced earlier, the Commission determined that the

16   nonrecurring charge for a "2-Wire Analog Voice Grade Loop – Service Level 1"

17   would be $46.66.[11] This rate was set for the provisioning of a new stand-alone

18   unbundled loop prior to any of the dates when the requirements for a Batch Hot

19   cut rate were enunciated by the FCC in the TRO. Moreover, in the Commission's

20   Order describing the setting of these rates, there is certainly no discussion of a 10

21   percent discount as an incentive to use a Batch Hot Cut process. However, as

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[10]   Blake Direct Testimony at p. 4.

[11]   Commonwealth of Kentucky, Before the Public Service Commission, *In the Matter of: An Inquiry into the Development of Deaveraged Rates for Unbundled Network Elements*, Administrative Case No. 382, Order, December 18, 2001, Appendix A, p. 1.

1   documented in my Direct Testimony, Dialog is presently being billed this same

2    $46.66 nonrecurring charge for a 2-Wire Analog Voice Grade Loop – Service

3   Level 1 for the loops that were migrated under the Batch Hot cut process. A 10

4   percent discount has not been applied that I can identify. This nonrecurring

5   charge is the same after the TRO as it was prior to the TRO. That said, even if a

6   10 percent discount would have been applied, this rate development would not be

7   consistent with the requirements set forth by the FCC in the TRO.

8   Q.   **MS. BLAKE INDICATES THAT THIS "COMMISSION'S PREVIOUS**
9   **REVIEW AND APPROVAL OF THE UNE RATES USED WHEN**
10   **BELLSOUTH PERFORMS A HOT CUT CLEARLY INDICATES THAT**
11   **THE RATE CHARGED FOR A SINGLE HOT CUT IS NOT AN**
12   **ECONOMIC BARRIER."[12] DO YOU AGREE WITH THIS**
13   **STATEMENT?**

14   A.   Absolutely not. First of all, as I have already indicated, this Commission has not

15   reviewed BellSouth's cost studies that are specific to the development of a Batch

16   Hot Cut rate as required by the FCC in the TRO and BellSouth did not present

17   such a cost study in its Direct Testimony in this case. Moreover, as I explained in

18   detail in my Direct Testimony, the rate elements that BellSouth is relying on for

19   its Batch Hot Cut rates are for the provision of new individual stand-alone loops.

20   The rate development for new individual stand-alone loops simply does not

21   reflect the process that is relevant when addressing a Batch Hot Cut process.

22   Second, there are aspects of BellSouth's use of its 2-Wire Analog Loop

23   nonrecurring rate development for Batch Hot Cuts that clearly present economic

24   barriers to CLECs such as Dialog.

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[12]   Blake Direct Testimony at p. 4.

PUBLIC VERSION

1   **Q.**   **COULD YOU PLEASE DISCUSS THESE ECONOMIC BARRIERS?**

2   A.   Yes. BellSouth's 2-Wire Analog Loop nonrecurring charge that BellSouth

3   proposes to bill for Batch Hot Cuts is based on the assumption that

4   *****PROPRIETARY** ▉ **END PROPRIETARY***** percent of the loops

5   provisioned by BellSouth are served by DLC.[13] The way that this assumption is

6   used within the cost study is that it directly relates to the probability of when field

7   dispatch work will be required at the DLC unit for the provisioning of an

8   unbundled loop. The cost for such field dispatch work is included in the

9   nonrecurring charge for the 2-Wire Analog Loop. The inclusion of these costs in

10   the nonrecurring charge for a Batch Hot Cut process is not consistent with the

11   forward-looking technology and costing principles required in a TELRIC-based

12   rate and represents a significant economic barrier to Dialog and other CLECs.

13   **Q.**   **WHAT ARE THE FORWARD LOOKING TECHNOLOGY AND**
14   **COSTING PRINCIPLES THAT SHOULD BE INCLUDED IN THE**
15   **DEVELOPMENT OF A TELRIC-BASED BATCH HOT CUT RATE?**

16   A.   The fundamental problem with BellSouth's proposal is that BellSouth's cost study

17   has assumed that the only way to provision a loop served by an integrated DLC

18   ("IDLC") is a field dispatch to move the integrated DLC loop to a non-integrated

19   loop using a physical cross-connect. However, there are multiple other ways,

20   utilizing forward-looking technology as required by TELRIC principles, to

21   provision a loop served by an integrated DLC. One way is to electronically

22   groom the loop terminating at the remote DLC terminal onto a universal channel

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[13] BellSouth-Kentucky Cost Study, "KY-2W__Inputs" Workbook, "INPUTS_MISC" Worksheet, Cell C7.

1   bank connection. It is common for BellSouth to have these universal channel

2   banks in its IDLCs because it is common for there to be various types of loops

3   that cannot be integrated. Therefore, at least one channel bank at a remote IDLC

4   terminal is typically reserved to operate in a universal configuration. This

5   electronic process would not require the dispatch of a technician to the field

6   location at all.

7   Furthermore, the magnitude of not considering forward looking

8   technology alternatives in establishing TELRIC based Batch Hot cut rates is

9   significant. When BellSouth assumes the use of a field dispatch for the migration

10   of an IDLC loop, the built-in cost in BellSouth's cost study for just the 2-Wire

11   Loop NRC for this migration is $98.10.[14] Conversely, if one were to assume that

12   no field work is required in the provisioning of an IDLC loop, the nonrecurring

13   cost for such a migration in BellSouth's cost study for the 2-Wire Analog Loop is

14   $17.96.[15] As a result, it is imperative that forward looking technology alternatives

15   that exist today and are deployed in BellSouth's existing network (and that

16   eliminate the need for this field work) be considered in the development of a

17   TELRIC-based Batch Hot Cut rate in order to ensure that the economic barriers

18   are mitigated.

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[14] This NRC is calculated by setting the field dispatch probabilities in BellSouth's 2-Wire Analog
      Loop NRC study to 100 percent.

[15] This NRC is calculated by setting the field dispatch probabilities in BellSouth's 2-Wire Analog
      Loop NRC study to zero percent.

1 **Q.** **IS THIS THE ONLY ALTERNATIVE TECHNOLOGY FOR PROVIDING**
2 **ACCESS TO UNBUNDLED LOOPS THAT ARE SERVED BY IDLC?**

3 **A.** No. This Commission should also know that IDLC loops can be unbundled.

4 Digital Loop Carrier Remote Terminals ("DLC-RTs"), as indicated above, have

5 two main configurations that can be used to interface loops served by a DLC-RT

6 into the network or a local switch – universal mode (UDLC) and integrated mode

7 (IDLC). Each loop is multiplexed at the DLC-RT into a channel between the

8 DLC-RT and the DLC-COT ("Central Office Terminal") so that it can be

9 transmitted across the fiber. With UDLC, each loop is de-multiplexed back down

10 to an individual loop at the DLC-COT, converted back from a digital to an analog

11 signal (despite the fact that it will need to be reconverted to a digital signal to

12 enter the digital switch) and actually connects into the network or the local switch

13 as a 2-wire analog copper loop – no different from how an all-copper loop coming

14 from the field would interface into the switch.

15 In an integrated mode, the loop is assigned to a time slot (similar to

16 multiplexing but more flexible) between the DLC-RT and DLC-COT. DLC in an

17 integrated mode requires less multiplexing and de-multiplexing and creates an

18 opportunity to gain additional savings by taking advantage of a capability known

19 as concentration – allowing for traffic engineering between the DLC-RT and

20 DLC-COT such that it is possible to assign 96 lines to each equivalent DS-1

21 between the DLC-RT and DLC-COT (described as four-to-one concentration) or

22 144 lines to each equivalent DS-1 between the DLC-RT and DLC-COT

23 (described as six-to-one concentration), further reducing the need for plug-in

PUBLIC VERSION

1   cards at the DLC-COT. In short, the use of integrated DLC-RTs is significantly

2   more efficient than the use of universal DLC-RTs and should be the exclusive

3   DLC network configuration for 2-wire analog loops and others that can be

4   integrated in an efficient, forward-looking TELRIC network.

5   **Q.   IS IT POSSIBLE TO UNBUNDLE LOOPS SERVED VIA IDLC?**

6   A.   Yes. Incumbents such as BellSouth frequently claim that it is impossible to

7   unbundle loops on integrated DLC-RTs, claiming instead that integrated digital

8   loop carrier systems are connected directly into the digital switch. As I have

9   described above, this is not the case. The Central Office Terminal (COT)

10 equipment associated with the integrated use of the RT does not simply stick fiber

11 cable into a digital switch. An integrated Next Generation DLC (NGDLC)

12 system, which is in common use in the industry, has a COT consisting of bay-

13 mounted equipment; the systems are de-multiplexed down to DS1 signals and

14 sent to the digital switch over DS1 cable that is cross connected at the DSX-1

15 frame before being routed to BellSouth's switch. However, and this is a key

16 point, the DS1 connection can also be made available at the COT for delivery to a

17 collocation arrangement within the central office for ultimate delivery to a

18 CLEC's own switch.

19 **Q.   ARE THERE INDUSTRY TECHNICAL DOCUMENTS WHICH**
20 **DESCRIBE THE PROVISIONING OF UNBUNDLED LOOPS ON**
21 **INTEGRATED DLC SYSTEMS?**

22 A.   Yes. Telcordia is a telecommunications research, development, and consulting

23 group that provides engineering information and direction to telecommunications

12

1   firms across the world. Telcordia was formerly known as Bellcore, which had

2   been established at divestiture of the Bell System in 1982 to provide research and

3   development and to set standards for the local Bell Operating Companies.

4   Specifically, Telcordia administers the engineering standards documents that are

5   used by many of the incumbent LECs within the United States. Telcordia is also

6   responsible for writing a book entitled *Notes on the Network.*

7   Telcordia's *Notes on the Network* is an extensive industry source for

8   information on the telecommunications network.[16] In the current version of

9   Telecordia's *Notes on the Network,* there is an extremely important note made on

10   unbundling integrated digital loop carrier found on page 12-53 of this document

11   that is shrouded in technical language and therefore might be missed.

12   Specifically, Telcordia's *Notes on the Network* states: "Also, some RDTs are

13   capable of supporting multiple GR-303 Interface Groups, thereby permitting a

14   single RDT to connect to multiple switches." The acronym RDT stands for

15   "remote digital terminal" and is a reference to what I have been calling an RT

16   throughout this discussion. GR-303 is the specific protocol that defines an

17   integrated connection between the remote terminal into the switch. However, the

18   important part of this statement is the reference to "Interface Groups." Modern

19   NGDLC that BellSouth has deployed has the ability to provision multiple groups

20   of DS1s at the Central Office Terminal (COT) that can be remotely provisioned

21   such that individual loops at the RT can be assigned to a specific group of DS1s at

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[16]   Excerpts of the Telcordia *Notes on the Network* are included as Exhibit SET-4.

PUBLIC VERSION

1   the COT. For example, if a CLEC wanted to access unbundled loops behind an

2   RT, it could procure a DS1 interface at the COT and become an "Interface

3   Group" at that COT. BellSouth could then electronically provision or assign the

4   CLEC loop at the remote terminal back to the particular DS1 assigned to that

5   CLEC instead of the "Interface Group" that BellSouth is using for its own

6   services into its own switch. Please note that Telcordia's *Notes on the Network*

7   provides an illustration of this arrangement for providing unbundling to multiple

8   switch-based CLECs over integrated DLC in Figure 12-35.

9   It is clear from this Telcordia document that unbundling Integrated DLC

10   systems is readily available technology utilizing NGDLC multi-hosting

11   capabilities. As I will discuss below, these capabilities exist today in the DLC

12   systems that BellSouth has deployed throughout its network. The advantage of

13   NGDLC, operating under GR-303, is that traffic can be pre-designated by an

14   incoming line at the DLC Remote Terminal, and directed onto a specific DS-1

15   circuit in the central office. This feature enables CLEC circuits to be groomed

16   onto DS-1s going to the CLEC collocation arrangement. Alcatel NGDLC, for

17   example, can operate with up to four virtual interface groups, meaning that up to

18   four different switches can have a connection to a single Alcatel central office

19   terminal operating in an integrated mode. These four virtual interface groups can

20   then be used to either terminate to multiple BellSouth switches (if, for example,

21   BellSouth had more than one switch within a central office) or can be used to

22   terminate to multiple CLEC switches as I have described previously. The point

1   here is that there should be no dispute that NGDLC in an integrated mode can be

2   used in such a way that unbundled loops can be provisioned off of this technology

3   to CLECs providing their own switching.

4   Q.   **WHAT THEN IS YOUR OVERALL CONCLUSION REGARDING THE**
5   **FIELD DISPATCH COST IN BELLSOUTH'S PROPOSED RATES FOR**
6   **BATCH HOT CUTS?**

7   A.   Quite simply, BellSouth has not even attempted to model an efficient process for

8   provisioning an IDLC loop based on forward-looking technology and TELRIC

9   principles. Such a process would recognize the ability to groom a CLEC loop to a

10   universal channel bank within the remote IDLC terminal or to utilize the ability to

11   unbundle the IDLC configured loop without relying on a field dispatch. As a

12   result, the Commission cannot rely on BellSouth's 2-Wire Analog Loop cost

13   study to establish TELRIC rates for the Batch Hot Cut process because that cost

14   study presents significant unnecessary cost and an economic barrier to Dialog and

15   other CLECs.

16   Q.   **DO YOU HAVE ANY INDICATION THAT BELLSOUTH IS AWARE OF**
17   **THIS GROOMING CAPABILITY WITHIN DLC SYSTEMS EVEN**
18   **THOUGH IT HAS NOT INCORPORATED THIS APPROACH INTO ITS**
19   **BATCH HOT CUT RATES?**

20   A.   Yes. BellSouth entered into a settlement and Joint Stipulation in Florida (Docket

21   No. 041338-TP) with several CLECs on September 30, 2005 related to the issue

22   of addressing the migration of loops served by IDLC. In this stipulation,

23   BellSouth's ability to groom IDLC-served 2-Wire analog loops is specifically

24   addressed as an alternative for the migration of these loops:

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Where the loops are served by Next Generation Digital Loop Carrier ("NGDLC") systems, BellSouth will "groom" the integrated loops to form a virtual Remote Terminal ("RT") arranged for universal service (that is, a terminal which can accommodate both switched and private line (non-switched) circuits). "Grooming" is the process of arranging certain loops (in the input stage of the NGDLC) in such a way that discrete groups of multiplexed loops may be assigned to transmission facilities (in the output stage of the NGDLC). Both of the vendors providing NGDLC systems currently approved for use in BellSouth's network have "grooming" capabilities.[17]

12   Clearly, this stipulated language between BellSouth and the CLECs in Florida

13   indicates that BellSouth has the technology and ability to perform the grooming

14   capabilities described in the Telcordia document and discussed in my testimony

15   above.

16   **Q.   ARE OTHER "ALTERNATIVES" INCLUDED IN THE FLORIDA**
17   **STIPULATION THAT INVOLVE FIELD DISPATCHES?**

18   A.   Yes. BellSouth reserves the right to perform field dispatches such that it may

19   move the working NGDLC-served loop to all-copper facilities or to UDLC

20   facilities. However, the important point here is that from a costing standpoint,

21   TELRIC principles require that the most efficient, forward-looking technology be

22   used in developing the economic cost for an unbundled element. The fact that

23   BellSouth may choose not to use this most efficient alternative by dispatching its

24   technicians into the field does not mean that this cost should be passed onto

---

[17] Before the Public Service Commission, Docket No. 041338-TP *et al.*, *In re: Joint petition by ITC^DeltaCom Communications, Inc. d/b/a ITC^DeltaCom d/b/a Grapevine; Birch Telecom of the South, Inc. d/b/a Birch Telecom and d/b/a Birch; DIECA Communications, Inc. d/b/a Covad Communications Company; Florida Digital Network, Inc.; and Network Telephone Corporation ("Joint CLECs") for generic proceeding to set rates, terms, and conditions for hot cuts and batch hot cuts for UNE-P to UNE-L conversions and for retail to UNE-L conversions in BellSouth Telecommunications, Inc. service area.*, Order No. PSC-05-1131-PAA-TP, November 10, 2005, p. 15 (also identified as Appendix 1, Attachment A, p. 10).

1   CLECs. CLECs are only required to pay the efficient, forward-looking economic

2   cost of performing the migration between BellSouth's network and the CLEC's

3   network for a Batch Hot Cut. Requiring CLECs to bear anything more constitutes

4   an unnecessary economic barrier that this Commission should not allow.

5   Q. **DOES THE RECOMMENDATION THAT YOU OUTLINED IN YOUR**
6   **DIRECT TESTIMONY REFLECT THE REMOVAL OF ANY FIELD**
7   **DISPATCH WORK?**

8   A. Yes. The rate that I proposed for application to the Batch Hot Cut process was

9   the "CLEC to CLEC Conversion without Outside Dispatch" rate element. This

10   rate element has already been approved by this Commission. Moreover, it

11   explicitly excludes any outside dispatch cost for this element. The specific rate is

12      $14.27 for the initial conversion and $7.43 for additional conversions. The

13      $14.27 nonrecurring charge is very close to the $17.96 nonrecurring charge that is

14   derived from BellSouth's own 2-Wire Analog Loop nonrecurring cost study when

15   field dispatch work is eliminated. Either way, BellSouth's current use of $46.66

16   for the 2-Wire Analog Loop NRC (in addition to the $33.67 for the cross-connect

17   element which is discussed in detail in my Direct Testimony) represents a cost

18   level that is entirely unsupportable for a Batch Hot Cut and should be rejected by

19   this Commission.

20 Q. **DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

21 A. Yes it does.

up to 3 Mbs of upstream throughput. Loop lengths up to 3 Kft currently can support these data rates. These advancements enable substantial video and/or data access to subscribers over the traditional loop plant.

This technology now enables LECs to enter the video delivery market without the "last mile" fiber optic cable and hardware costs. While DSL technology does not offer the same bandwidth equivalent of a fiber delivery platform, it can be used to "secure" a video customer base, which could then be migrated to a fiber system based on economics.

12.13 The Unbundled Loop Environment

This section provides an overview of the unbundled loop environment. It first presents background information to identify key regulatory mandates relating to whole loop and sub-loop unbundling. It then describes common configurations and options for unbundling whole loops that are served by all-copper facilities, UDLC systems, and IDLC systems, and addresses various transmission and technical issues associated with unbundled loops. Finally, it assesses the evolving loop unbundling environment in terms of quantity, quality, and types of unbundling.

12.13.1 Regulatory Mandates for Whole Loop and Sub-Loop Unbundling

The Telecommunications Act of 1996 passed by Congress defined seven Unbundled Network Elements (UNEs) that Incumbent LECs (ILECs) must unbundle and offer to Certified/Competitive LECs (CLECs). This law requires these network elements to be offered to competitors in a non-discriminatory manner and have quality equal to the same facilities that the ILEC itself uses.

The seven UNEs defined in the Telecom Act of 1996 are:

1. Local Loops

2. Network Interface Devices (at the customer premises)

3. Local and tandem switches

4. Interoffice transmission facilities

5. Operations Support Systems (OSSs)

6. Call routing signaling databases

7. Operator/directory services.

A local (whole) loop is defined as the transmission facility between the ILEC central office Main Distributing Frame (MDF), or its equivalent, and the Network Interface Device (NID) at the customer premises. Unbundled loops may be provided using a variety of transmission technologies including, but not limited to: copper wire, copper wire-based DLC, and fiber-optic DLC systems. Such technologies can be used singularly or in tandem to provide an unbundled loop.

Subsequent to the passing of the Telecommunications Act of 1996, the ILECs sought judicial relief and won an appeal at the U.S. Eighth Circuit Court to repeal the UNE mandates. Upon appeal by the FCC and CLECs, the U.S. Supreme Court issued its "FCC Remand Order," which required the FCC to re-examine all seven UNEs and justify/explain the rationale for each UNE that the FCC considers necessary.

In November 1999, the FCC released its Docket 99-238, which eliminated the Operator/Directory Services UNE, but retained the other six UNEs. In addition, the FCC added a new UNE called "Sub-Loop". A sub-loop unbundled network element refers to any portion of the ILEC's whole loop which is outside the central office and that a CLEC can access and make interconnection to offer service to a customer.

In December 1999, the FCC released its Docket 99-355, which mandated another UNE, this one relating to the high-frequency portion of the loop. The mandate requires line sharing arrangements between an ILEC and a CLEC for both whole loop and sub-loop unbundling configurations. Line sharing, which is also known as spectrum unbundling, refers to the same twisted copper pair being used by more than one carrier. The ILEC can carry traditional voice-switched telephone service within the 0- to 3-Khz spectrum, and the CLEC can provide DSL services over the spectrum above 3 Khz. All ILECs must begin line sharing implementations by mid-year 2000.

12.13.2 Loop Unbundling

There are two main types of loop unbundling. The first is called "whole loop" unbundling, which is the unbundling of a whole loop from the MDF in the ILEC's central office to the customer premises. The second type is called "sub-loop" unbundling, which refers to a portion of the ILEC's whole loop being offered to a CLEC. This section provides more information about each type of loop unbundling.

12.13.2.1 Whole Loop Unbundling Configurations

Typically, when a customer requests dial tone service from a CLEC, the ILEC removes the wired connection to the ILEC switch in the central office and rewires the customer's loop to a CLEC "meet" point in the central office. Figure 12-32 depicts whole loop transfers in the ILEC central office when the customer is served by copper facilities or by a UDLC system. In most cases, there is an analog handoff to the CLEC. If the CLEC requests a digital handoff, the ILEC may utilize a D4 channel bank to digitize the circuits. Most CLECs transport the unbundled loops back to their central offices (switches) using GR-303 IDLC systems. To do this, the CLECs deploy GR-303 RDTs within their collocation cages in the ILEC's central offices.

The most critical factor associated with unbundling a customer loop is the type of loop facility that the customer is already utilizing for service, such as all-copper, UDLC system, or IDLC system.
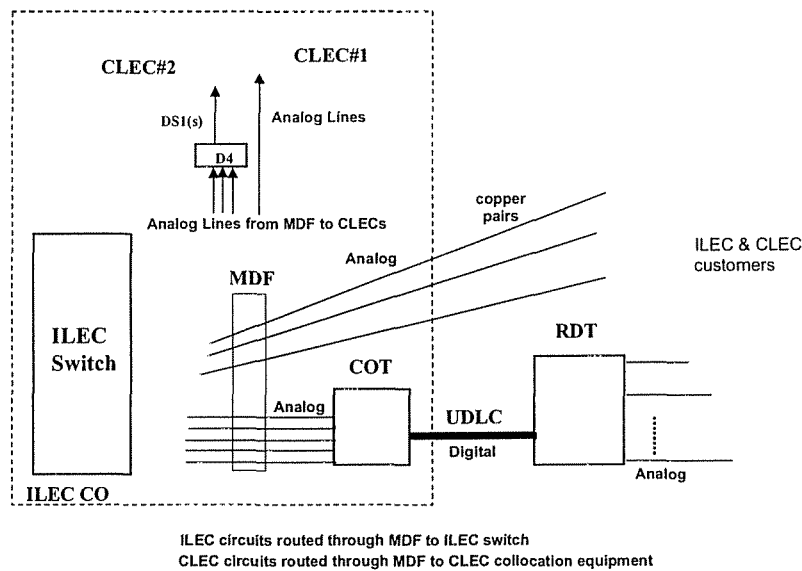
ILEC circuits routed through MDF to ILEC switch
CLEC circuits routed through MDF to CLEC collocation equipment

Figure 12-32. Unbundling Loops Served by Copper or UDLC Systems

- If the customer is receiving service over all-copper facilities, the transfer of the whole loop is straightforward as indicated in Figure 12-32. The ILEC removes the central office connection to its switch and places a jumper from the MDF to the meet point at the CLEC's collocation cage. There is no need to rewire the outside plant or visit the customer premises.

- If the customer is receiving service over a UDLC system, the transfer of the whole loop can be straightforward as shown in Figure 12-32. The ILEC removes the central office connection to its switch and places a jumper from the MDF to the meet point at the CLEC's collocation cage. Again, there is no need to rewire the outside plant or visit the customer premises.

- However, if the customer is served by an IDLC system, the loop is digitally transmitted to the ILEC switch. There are a variety of "technically feasible" options available to the ILEC to unbundle the loop. Each ILEC has established its own set of approved unbundling options along with the corresponding methods, procedures, and practices needed for implementing these options. Numerous unbundling options are possible because many of today's RDTs support multiple kinds of interfaces such as: GR-303, TR-08, UDLC, and D4 DS1. Also, some RDTs are capable of supporting multiple GR-303 Interface Groups, thereby permitting a single RDT to connect to multiple switches.

Some common IDLC unbundling options are:

1. Bypass the IDLC system and transfer the loop to an all-copper pair

   If there are available spare copper facilities serving the customer's neighborhood, transferring the IDLC customer to a spare all-copper circuit may be a viable option for the ILEC, as shown in Figure 12-33. Although this
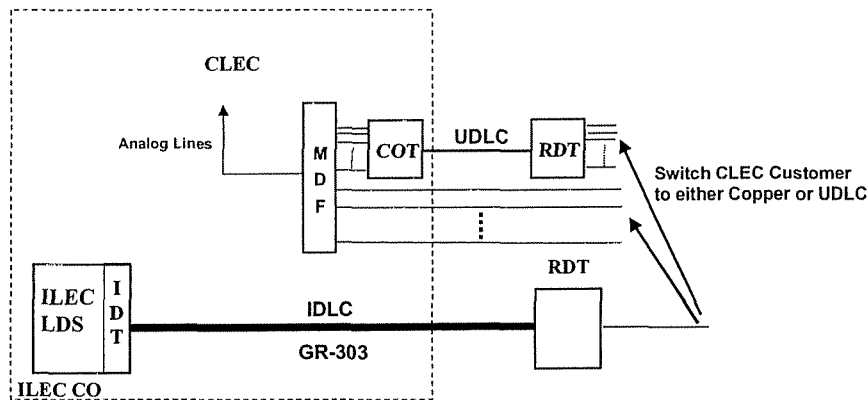
Figure 12-33. IDLC Unbundling - Bypass the IDLC System

procedure is relatively simple, it requires central office and outside plant rewiring to complete the new circuit from the MDF to the customer. The all-copper unbundled loop is the easiest unbundling architecture for the ILEC to perform maintenance and testing.

Some ILECs serve new neighborhoods/housing developments with DLC systems and install a very limited number of copper pairs to support certain services. In these areas, spare copper facilities can be quickly exhausted if used for unbundled loops.

2. Bypass the IDLC system and transfer the loop to a UDLC system

   If there are no spare copper facilities in the customer's neighborhood, the ILEC may transfer the customer's circuit from the IDLC system to a UDLC system (see Figure 12-33). This transfer will also involve both central and outside plant work activity.

   The customer fill rates at IDLC/UDLC CEV sites are typically 50 to 70%. There is a moderate amount of spare capacity on the UDLC systems to support transfers from IDLC systems.

3. Utilize the UDLC capability of the IDLC system

   If the IDLC system is equipped to support UDLC functionality, the ILEC can electronically re-provision the circuit from IDLC to UDLC (see Figure 12-34). No outside plant work activity is needed. Central office work activity is needed to run jumpers from the MDF to the collocation cage and, if necessary, place a UDLC plug-in at the COT.

4. Utilize a separate GR-303 Interface Group for the CLEC customers

   Figure 12-35 shows the use of separate GR-303 Interface Groups to carry ILEC and CLEC traffic. The RDT must support the MIG (Multiple Interface Group) capability defined in the GR-303 specification. This configuration allows a CLEC switch to connect to the ILEC's RDT at the GR-303 interface level.
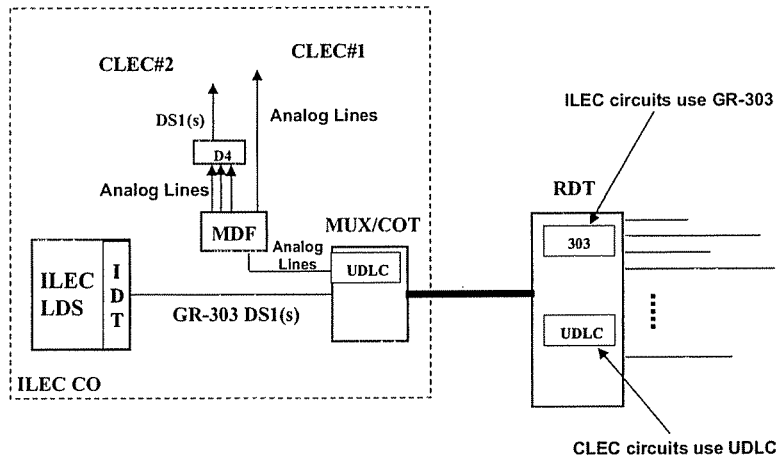
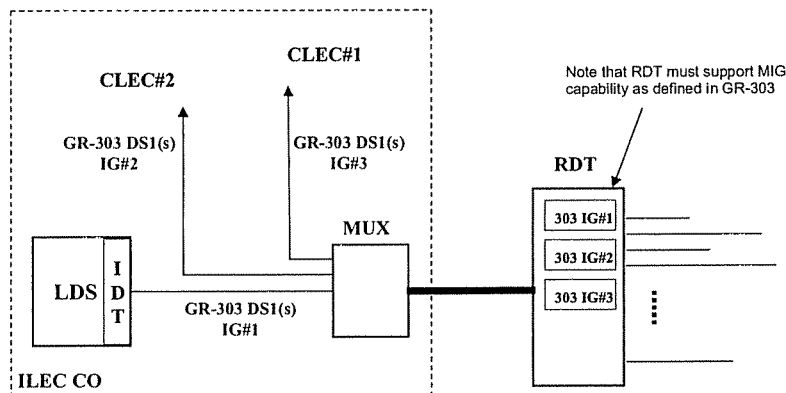**Figure 12-34.** IDLC Unbundling Using the UDLC Capability of RDT

Figure 12-35. IDLC Unbundling Using Separate GR-303 Interface Groups

This arrangement may be cost effective for those CLECs having a "critical mass" of subscribers served by the RDT or group of RDTs in a CEV. Since the GR-303 Interface Group supports operations functionality, there are a variety of issues (provisioning, alarm reporting, sharing of test resources, etc.) that are currently being addressed by the industry.

In response to the Telecommunications Act of 1996, GR-303 requirements were changed in 1997 to permit a single DS1 to be called a 303 Interface Group. A minimum of two DS1s was previously required. This change allows a CLEC to serve a small base of customers at an RDT more economically (but at the risk of lower service availability and reliability).

5. Share a GR-303 Interface Group and use the sidedoor port of the switch to transport CLEC traffic out of the ILEC switch

Figure 12-36 shows the use of a GR-303 Interface Group sharing ILEC and CLEC traffic where all CLEC traffic is routed through sidedoor port DS1s out of the ILEC's switch.
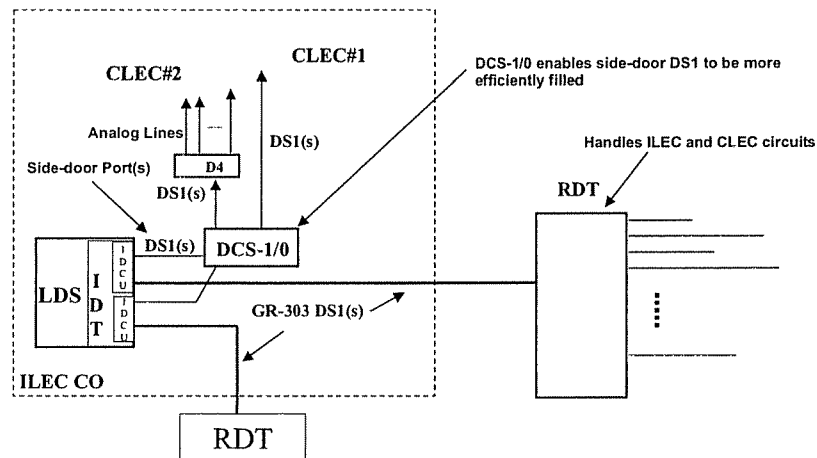

Figure 12-36. IDLC Unbundling Using Sidedoor Port

CLEC circuits are provisioned as non-switched, non-locally switched circuits within the IDLC system. While the DCS-1/0 is shown in the figure, it is not a requirement of this architecture. The advantage of using a DCS-1/0 is realized if the CLEC is not fully utilizing a DS1 from the ILEC LDS to the CLEC, and multiple switch modules with IDCUs are used by the ILEC. If a DCS-1/0 is placed between the LDS DS1 sidedoor port and the CLEC DS1s, it would permit full utilization of the sidedoor LDS/IDCU hardware by enabling CLEC DS0s to be rearranged in the DCS-1/0 and placed on the individual CLEC DS1s.

The ILEC must address the following issues associated with the sidedoor port arrangement:

A. The cost of a DS1 switch termination for a sidedoor port is about ten times the cost for a DS1 line card on a RDT.

B. Since each CLEC circuit requires a nailed up DS0, the ILEC may encounter blocking over the IDLC system as other circuits compete for DS0 channels.

C. The number of sidedoor ports that can be engineered varies depending on the LDS supplier.

D. There is limited support in existing special services design systems and databases to support sidedoor port circuits.

E. The ILEC may need field visits to install special service D4 channel units at the RDT.

6. Utilize separate TR-08 Interface Groups to transport CLEC traffic

Figure 12-37 shows the use of separate TR-08 Interface Groups to carry CLEC traffic while utilizing the GR-303 Interface for ILEC traffic. In the figure, the RDT supports both GR-303 and TR-08 generic interface capabilities. CLEC switches can interconnect with the ILEC's RDT utilizing the DS1 handoff from the TR-08 interface.
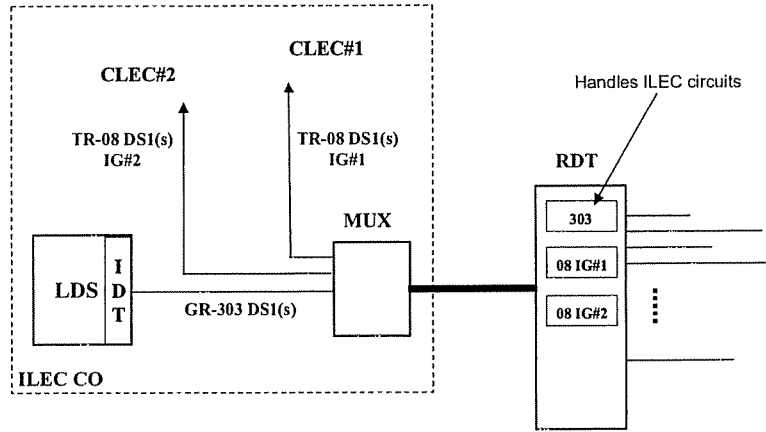

Figure 12-37. IDLC Unbundling Using Separate TR-08 Interface Groups

7. CLEC leases entire RDT

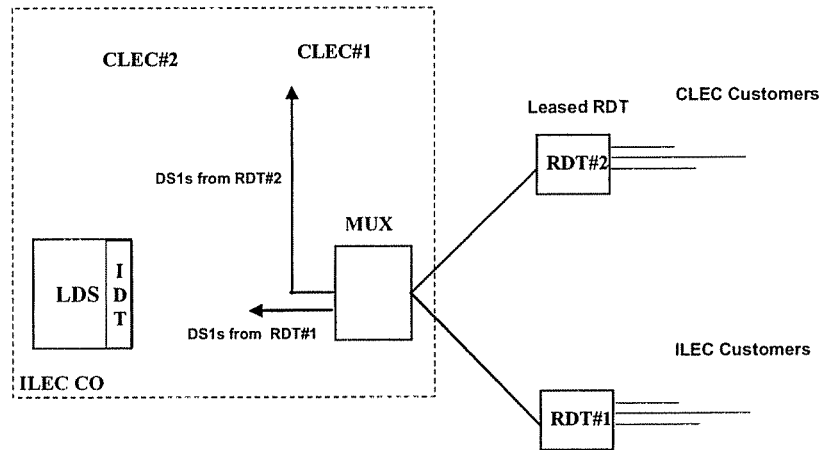Figure 12-38 shows the configuration when a CLEC leases an entire RDT from the ILEC.

Figure 12-38. IDLC Unbundling - CLEC Leases Entire RDT

RDT#1 serves the ILEC customers, and RDT#2 serves the CLEC customers. This unbundling option may be cost-effective for the CLEC if the CLEC has a significant number of residential customers in the neighborhood or is serving a business park or campus.

12.13.2.2 Sub-Loop Unbundling Configurations

Sub-loop unbundling occurs when a CLEC interconnects to a loop facility at a point outside the ILEC's central office. The Sub-Loop UNE is defined by the FCC as portions of the loop that can be accessed at terminals in the ILEC's outside plant. An accessible terminal is a point on the loop where technicians can access the wire or fiber within the cable without removing a splice case to reach the wire or fiber within. Examples of access terminals are: poles, pedestals, the NID, the Minimum Point Of Entry (MPOE) to the customer premises, the MDF, and the Feeder/ Distribution Interface (including CEVs, utility rooms, and DLC Remote Terminals). Figure 12-39 shows sub-loop unbundling at a GR-303 Remote Terminal (RDT) where a CLEC interconnects at the ILEC's RDT using its own GR-303 Interface Group facilities to provide service to its customers. In this configuration, the CLEC leases from the ILEC the RDT equipment and the RDT line facilities to each of its customer premises.
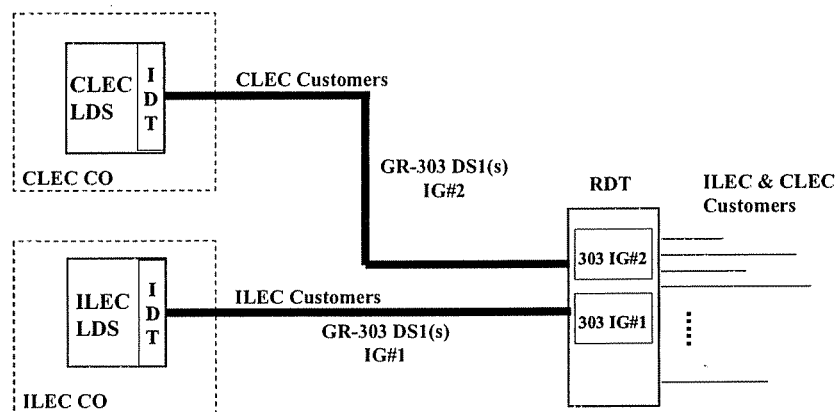

Figure 12-39. Sub-Loop Unbundling at an RDT

The FCC mandate on sub-loop network elements places the burden on each state regulatory commission to determine whether specific interconnection points in the outside plant are "technically feasible". The law directs the state commission to examine the ILEC's specific architecture and the specific technology used over the loop to determine whether it is really technically feasible to unbundle the sub-loop at a potential access point where a competing carrier requests access. Two key factors that are considered in this "technically feasible" determination are whether there is adequate space for collocated CLEC equipment to be installed and if the site has sufficient security safeguards to prevent mischief or sabotage. The FCC has

indicated that its central office collocation rules are also applicable to collocation in outside plant locations.

Since the FCC sub-loop unbundling mandate was announced in 1999, there has been little time for ILECs, CLECs, and state commissions to deal with this UNE. Sub-loop UNEs are an emerging market and, at this time, it is not clear which portions of the ILEC outside plant will be aggressively pursued by CLECs.

Numerous sub-loop unbundling configurations are possible. A CLEC may lease facilities from multiple carriers to create circuits, or it may deploy some of its own facilities and lease other facilities to extend its network to reach a greater customer base. Depending on the CLEC's network architecture, some of the transmission and technical issues associated with IDLC and UDLC configurations (described in Section 12.13.3) may be observed.

12.13.3 Unbundling Issues Associated with UDLC and IDLC Systems

There are various transmission and other technical issues associated with the use of UDLC and IDLC systems in the unbundling environment. In many loop unbundling configurations, the CLEC utilizes an IDLC system to economically transport unbundled loops from the ILEC's central office to the CLEC's central office. Issues arise when the ILEC terminates long length all-copper loops or DLC-transported loops to the CLEC's RDT (meet points at the collocation cage).

When an unbundled all-copper loop greater than 900 ohms or 12 Kft long is terminated at the CLEC's RDT, the customer may encounter degraded voice frequency transmission. To maintain the POTS grade of service, the CLEC may need to install an RDT line unit with a higher DC supervisory range to accommodate the long loop.

When an unbundled UDLC loop is terminated at the CLEC's RDT, the following impacts may be observed:

— Increased dial tone delay

— Degradation of on-hook transmission services, such as caller ID (due to delays)

— Degradation of signal quality (as a result of multiple A/D and D/A conversions)

— Reduction in analog modem operation speed (connection speed depends on loop length, number of A/D conversions, local switch type, and interoffice facility type).

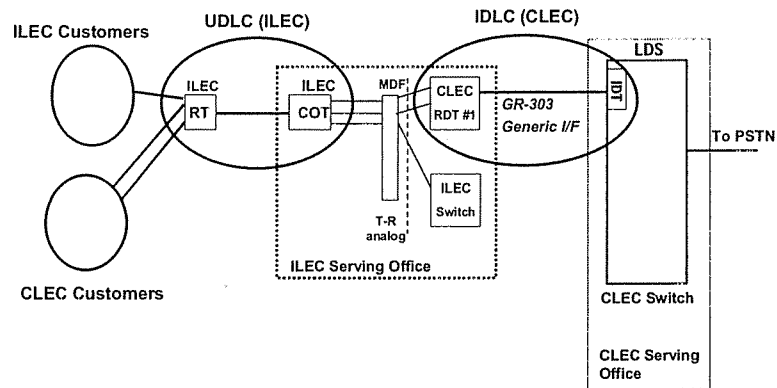Figure 12-40 shows the back-to-back DLC configuration.

Figure 12-40. ILEC/CLEC Back-To-Back DLC Configuration

12.13.4 The Evolving Loop Unbundling Environment

Initially, ILECs offered and provided unbundled circuits to CLECs as analog handoffs to the collocation cages of the CLECs. Many ILECs now offer DS-0 digital connectivity to the CLEC collocation cages. DS-1 interconnection is emerging. Less than 2% of all access lines in the U.S. are currently unbundled, but this may rise to as much as 30% in the next 5 to 10 years. The factors that will significantly impact the potential growth in unbundled loops are: additional FCC regulatory/court changes, rate of implementation of ILEC/CLEC line sharing, and decisions by individual state commissions.

In the current loop unbundling environment, CLECs are largely focusing on unbundling ILEC business customers. The drivers behind this approach are economics and scalability. Provisioning and maintaining multiple unbundled loops from a single business customer lets the CLEC use digital subscriber lines over ILEC facilities. CLECs are requesting copper unbundled pairs and placing DSL equipment on these pairs to provide multiple POTS lines over no more than two unbundled copper pairs. The residence unbundling architecture presents a greater economic challenge to the CLEC because residential customers will generally request a single unbundled loop. CLECs find serving business customers much more profitable than serving residential customers. The FCC mandates on sub-loop unbundling and line sharing are expected to have a significant impact on CLEC expansion into the xDSL marketplace because CLECs will no longer be forced to incur the full cost of a separate copper line to serve customers.

The FCC orders mandating sub-loop unbundling and line sharing will likely be challenged in the courts. While this process evolves, CLECs will press for access to the local loop at the interconnection point nearest to the customer. When DLC systems are used to provide ILEC services, the CLEC will want to interconnect at the RDT. The reasoning for gaining access to the RDT on the analog customer side is to have the ability to provide all of the offered ILEC services without the