

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

**BELLSOUTH TELECOMMUNICATIONS, INC.**  
**DIRECT TESTIMONY OF D. DAONNE CALDWELL**  
**BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**  
**DOCKET NO. 960916-TP**  
**SEPTEMBER 9, 1996**

Q. PLEASE STATE YOUR NAME, ADDRESS AND OCCUPATION.

A. My name is D. Daonne Caldwell. My business address is 675 W. Peachtree St., N.E., Atlanta, Georgia. I am a manager in the Finance Department of BellSouth Telecommunications, Inc. (hereinafter referred to as "BellSouth" or "the Company"). My area of responsibility relates to economic service costs.

Q. PLEASE GIVE A BRIEF DESCRIPTION OF YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A. I attended the University of Mississippi, graduating with a Master of Science Degree in mathematics. I have attended numerous Bell Communications Research, Inc. (Bellcore) courses and outside seminars relating to service cost studies and economic principles.

My initial employment was with South Central Bell in 1976 in the Tupelo, Mississippi, Engineering Department where I was responsible for Outside Plant Planning. In 1983, I transferred to BellSouth Services, Inc. in Birmingham,

1 Alabama, and was responsible for the Centralized Results System Database. I  
2 moved to the Pricing and Economics Department in 1984 where I developed  
3 methodology for service cost studies until 1986 when I accepted a rotational  
4 assignment with Bell Communications Research, Inc. While at Bellcore, I was  
5 responsible for development and instruction of the Service Cost Studies  
6 Curriculum including courses such as "Concepts of Service Cost Studies",  
7 "Network Service Costs", "Nonrecurring Costs", and "Cost Studies for New  
8 Technologies". In 1990, I returned to BellSouth and was appointed to a position in  
9 the cost organization, which is now a part of the Finance Department, with the  
10 responsibility of managing the development of cost studies for transport facilities,  
11 both loop and interoffice.

12

13 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

14

15 A. The purpose of my testimony is to describe the cost methodology used in the Long  
16 Run Incremental Cost (LRIC) and Total Service Long Run Incremental Cost  
17 (TSLRIC) studies for the following unbundled network elements that BellSouth  
18 will provide to the Alternative Local Exchange Companies (ALECs) in Florida:

- 19
- 20 • Unbundled Loops (2-Wire Analog, 4-Wire Analog and 2-Wire ISDN  
Digital)
  - 21 • Unbundled Loop Channelization Systems and Central Office Channel  
22 Interfaces (located in the BellSouth central office buildings)

23 The cost studies include all the volume sensitive and volume insensitive long run  
24 incremental costs associated with the provisioning of these unbundled elements.

25

1 The cost studies, have been previously furnished to ACSI in response to ACSI's  
2 First Request for Documents Items 3a-c and 5. This document request was filed  
3 with the Florida Public Service Commission ("FPSC" or "Commission") and  
4 served on ACSI on September 3, 1996. The cost studies were filed with the FPSC  
5 as Exhibits (DDC-7 and DDC-8) to my Direct Testimony filed on August 12,  
6 1996.

7

8 Q. ARE YOU PROVIDING COST SUPPORT FOR THE LOOP CROSS-  
9 CONNECT, THE 2-WIRE ASYMMETRICAL DIGITAL SUBSCRIBER LINE  
10 (ADSL), THE 2-WIRE HIGH-BIT-RATE DIGITAL SUBSCRIBER LINE  
11 (HDSL) AND THE 4-WIRE HDSL LOOPS?

12

13 A. Not at this time. The LRIC/TSLRIC cost study for the loop cross-connect is  
14 nearing completion and will be filed at a later date. The technical specifications  
15 for the ADSL and HDSL loops are not finalized. When those specifications are  
16 determined, cost studies will be developed and provided.

17

18 Q. WHAT COST METHODOLOGY IS USED IN THE COST STUDIES FOR  
19 UNBUNDLED ELEMENTS?

20

21 A. Incremental costing techniques are used to identify the incremental costs  
22 associated with providing these elements. Incremental costs are based on cost  
23 causation and include all of the costs directly caused by expanding production, or  
24 alternatively, costs that would be saved if the production levels were reduced. The  
25 production unit could be an entire service or a unit of a service. Costs may be

1 volume sensitive and/or volume insensitive. Long run incremental cost studies  
2 assume that production capacity is adjusted to meet demand; hence, only forward  
3 looking costs affected by the business decision being studied are included.

4

5 Q. DO THE LRIC AND TSLRIC STUDIES FOR THE UNBUNDLED ELEMENTS  
6 INCLUDE SHARED OR COMMON COSTS?

7

8 A. No. The LRIC and TSLRIC studies do not include shared or common costs  
9 because, by definition, shared and common costs are not causally related to  
10 specific elements. The LRIC studies for the unbundled elements include only the  
11 volume sensitive long run incremental costs associated with providing these  
12 elements. The TSLRIC studies include volume insensitive long run incremental  
13 costs in addition to the LRIC.

14

15 Q. HOW DO THE COST STUDIES FILED WITH YOUR TESTIMONY RELATE  
16 TO THE FCC'S FIRST REPORT AND ORDER IN CC DOCKET 96-98 (FCC  
17 ORDER) RELEASED AUGUST 8, 1996?

18

19 A. BellSouth uses a forward looking long run economic cost methodology.  
20 BellSouth's cost studies identify both the Long Run Incremental Costs and the  
21 Total Service Long Run Incremental Costs as appropriate. These studies include  
22 only the direct costs caused by providing the particular network element being  
23 studied.

24

25

1 The purpose of the cost methodology established by the FCC Order, Total Element  
2 Long Run Incremental Cost (TELRIC), is to set the rates for interconnection and  
3 unbundled network elements. The basis for a TELRIC study is also a forward  
4 looking long run economic cost methodology. However, TELRIC methodology  
5 anticipates pricing of elements in a wholesale network company; hence, many  
6 costs regarded as common or shared and, therefore, excluded from BellSouth's  
7 LRIC and TSLRIC methodology would be included as directly attributable in a  
8 TELRIC study. The FCC pricing methodology also specifies that, over and above  
9 TELRIC, the additional portion of forward looking common costs that cannot be  
10 directly attributed to any particular network element will be allocated among the  
11 cost elements.

12

13 Q. IS BELLSOUTH DEVELOPING ANY TELRIC STUDIES FOR UNBUNDLED  
14 NETWORK ELEMENTS?

15

16 A. Yes. BellSouth is currently developing the methodology to support TELRIC  
17 studies. As soon as TELRIC studies are completed, they will be provided.

18

19 Q. WHEN TELRIC STUDIES ARE PROVIDED, WILL THEY PRODUCE  
20 GEOGRAPHICALLY DEAVERAGED COSTS?

21

22 A. The initial TELRIC studies that BellSouth will provide will be representative of a  
23 statewide average. BellSouth is currently looking at several alternatives that will  
24 enable the development of a reasonable approach to geographic deaveraging of the

25

1 costs. Once the methodology is determined, geographically deaveraged TELRIC  
2 studies will be produced and provided.

3  
4 Q. DO YOU EXPECT TELRIC RESULTS TO PRODUCE HIGHER OR LOWER  
5 COSTS THAN THE LRIC/TSLRIC RESULTS FILED WITH YOUR  
6 TESTIMONY?

7  
8 A. By definition, TELRIC results should be higher than the LRIC/TSLRIC results.

9 For example:

10 - BellSouth's LRIC/TSLRIC studies do not include any shared or common costs  
11 that would be considered directly attributable using the TELRIC methodology  
12 specified in the FCC Order and

13 - BellSouth's LRIC/TSLRIC studies do not include an allocation of forward  
14 looking common costs that cannot be directly attributed to any particular network  
15 element.

16  
17 Q. IN THE ABSENCE OF TELRIC STUDIES, WHAT CONCLUSIONS CAN BE  
18 DRAWN BASED UPON THE LRIC/TSLRIC STUDIES FILED WITH YOUR  
19 TESTIMONY?

20  
21 A. Since, by definition, TELRIC results should be higher than LRIC/TSLRIC results,  
22 it would be inappropriate to set rates below the costs identified by these  
23 LRIC/TSLRIC studies. Until TELRIC studies are available, the Commission  
24 should use BellSouth's LRIC/TSLRIC results as the price floor for establishing  
25 rates for unbundled network elements.

1

2 Q. WHAT NETWORK COMPONENTS ARE INCLUDED IN EACH OF THE  
3 THREE TYPES OF UNBUNDLED LOOPS (2-WIRE ANALOG VOICE  
4 GRADE, 4-WIRE ANALOG VOICE GRADE AND 2-WIRE ISDN DIGITAL  
5 GRADE)?

6

7 A. The unbundled loop is the facility used to connect an ALEC's customer premises  
8 with the BellSouth central office. The voice grade and ISDN unbundled loops  
9 begin at a connection on the Main Distributing Frame in the BellSouth central  
10 office. At the ALEC's customer premises, the loop includes the cabling up to and  
11 including the network interface. All outside plant components of the network  
12 utilized between the central office and the ALEC's customer premises are  
13 included. The network components include copper cables, poles, conduit, fiber  
14 optic cables, and multiplexing equipment. Exhibit DDC-1 attached to my  
15 testimony depicts the basic architecture for each of the three unbundled loops.

16

17 Q. WHAT TECHNOLOGIES ARE INCLUDED IN THE UNBUNDLED LOOP  
18 COST STUDIES?

19

20 A. The technologies differ depending on the type of loop being provisioned. The  
21 voice grade and ISDN unbundled loop studies analyze two technologies: copper  
22 and digital loop carrier on fiber. Copper and digital loop carrier on fiber represent  
23 forward looking technologies and the most efficient method of deploying voice  
24 grade (2-wire and 4-wire) and 2-wire ISDN unbundled loops now and in the  
25 future.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

Q. WHAT IS THE RECURRING COST STUDY PROCESS FOR UNBUNDLED LOOPS?

A. The generic steps involved in developing recurring costs for unbundled loops are listed below. Each of the three unbundled loops is studied separately and the unique characteristics of each, such as transmission level and loop length, are taken into consideration. Exhibit DDC-2 attached to my testimony provides a flowchart depicting the specific steps for developing the recurring costs for the unbundled 2-wire analog voice grade loop.

Step 1: Determine the network designs (architectures) which will be used to deploy the loop. (Loop sample data is gathered for the voice grade and ISDN loops).

Step 2: Determine material prices and/or investments for the items of plant used in each design and/or each loop sample. Material prices are obtained from BellSouth contracts with various vendors.

Step 3: Apply in-plant factors and telephone plant indices as appropriate to determine base year investments. In-plant factors are applied to material prices in order to convert the material price to an installed investment which includes the cost of material, engineering labor and installation labor. Telephone plant indices estimate the changes in material price and/or installed investment over time.

Step 4: Adjust the investments for utilization to account for spare capacity. Spare capacity is required for maintenance and growth.



1        **Step 5:** Apply investment inflation factors to the investments to convert the  
2        utilized base year investments to investments representative of a three year  
3        planning period.

4        **Step 6:** Apply loading factors to the investments to determine investments for  
5        miscellaneous common equipment and power, land, buildings, poles and  
6        conduit as appropriate.

7        **Step 7:** Weight the investments to determine an average investment for a  
8        typical loop and add the results to determine an investment by plant account  
9        for the service. The investment for each loop in the loop sample is calculated  
10       and then an average loop investment is determined for the voice grade and  
11       ISDN unbundled loops.

12       **Step 8:** Convert the investments by plant account to annual costs by applying  
13       account specific annual cost factors to the various investments. Add the annual  
14       costs for the various accounts and then divide by 12 to determine a total  
15       monthly cost for the service.

16

17    **Q. WHAT IS INCLUDED IN THE NONRECURRING COSTS FOR EACH TYPE**  
18    **OF UNBUNDLED LOOP?**

19

20    **A. Nonrecurring costs for the unbundled loops are the one time costs associated with**  
21    **provisioning, installing, and disconnecting the unbundled loops. These costs**  
22    **include four major categories of activity: service order processing, engineering,**  
23    **connect and test, and technician travel time. Examples of the work activities in**  
24    **each of these categories are as follows:**

25            • Service order processing -

- 1                                    Prepare and issue service order
- 2                                    • Engineering -
- 3                                    Assign cable and pair; Design circuit; Order plug-in
- 4                                    • Connect and Test -
- 5                                    Install circuit; Test circuit
- 6                                    • Technician Travel Time -
- 7                                    Travel to the ALEC's customer premises
- 8

9 Q. WHAT IS THE NONRECURRING COST STUDY PROCESS FOR ALL  
10 THREE TYPES OF UNBUNDLED LOOPS?

11

12 A. The generic process for developing the nonrecurring costs for unbundled loops is  
13 as follows:

14                    Step 1: Determine the cost elements to be developed.

15                    Step 2: Define the work functions.

16                    Step 3: Establish work flows.

17                    Step 4: Determine work times for each work function.

18                    Step 5: Develop directly assigned labor costs for each work function (labor  
19 rate x work time).

20                    Step 6: Accumulate work function costs to determine the total nonrecurring  
21 costs for each cost element.

22 Exhibit DDC-3 attached to my testimony provides a flowchart depicting the  
23 nonrecurring cost development.

24

25

1 Q. WHAT NETWORK COMPONENTS ARE INCLUDED IN THE UNBUNDLED  
2 LOOP CHANNELIZATION SYSTEM AND THE CENTRAL OFFICE  
3 CHANNEL INTERFACE?  
4

5 A. The unbundled loop channelization system and central office channel interface is  
6 an arrangement offered to the ALEC for the purpose of channelizing multiple  
7 digital loop carrier 1.544 mbps channels on a non-concentrated or concentrated  
8 basis up to a maximum of 96 channels per system. These channels are available  
9 for connection to unbundled voice grade loops. The system includes the DSX-1  
10 cross connect panel terminations for the DS1s and the digital loop carrier system  
11 hardwired equipment and common plug-ins. The central office channel interface  
12 includes the working voice grade plug-in. Exhibit DDC-4 attached to my  
13 testimony depicts the items of plant included in these elements.  
14

15 Q. WHAT IS THE RECURRING COST STUDY PROCESS FOR THE  
16 UNBUNDLED LOOP CHANNELIZATION SYSTEM AND CENTRAL OFFICE  
17 CHANNEL INTERFACE?  
18

19 A. The recurring cost study process for the unbundled loop channelization system and  
20 central office channel interface includes the same generic cost study steps as those  
21 listed for the unbundled loops. Of course, the network design determined in Step 1  
22 is for the unbundled loop channelization system and central office channel  
23 interface.  
24  
25

1 Q. WHAT IS INCLUDED IN THE NONRECURRING COSTS FOR THE  
2 UNBUNDLED LOOP CHANNELIZATION SYSTEM AND CENTRAL OFFICE  
3 CHANNEL INTERFACE?  
4

5 A. The nonrecurring costs for the unbundled loop channelization system and central  
6 office channel interface include three major categories of cost: (1) service order  
7 processing, (2) engineering, and (3) connect and test. The activities associated  
8 with these costs are similar to the activities listed for the unbundled loops. These  
9 unbundled elements are located in the BellSouth central office building; therefore,  
10 technician travel time is not required.  
11

12 Q. WHAT IS THE NONRECURRING COST STUDY PROCESS FOR THE  
13 UNBUNDLED LOOP CHANNELIZATION SYSTEM AND THE CENTRAL  
14 OFFICE CHANNEL INTERFACE?  
15

16 A. The nonrecurring cost study process for the unbundled loop channelization system  
17 and central office channel interface is identical to the nonrecurring cost study  
18 process for the unbundled loops.  
19

20 Q. PLEASE SUMMARIZE YOUR TESTIMONY.  
21

22 A. The Long Run Incremental Cost and Total Service Long Run Incremental Cost  
23 studies filed with my testimony in this proceeding determine the volume sensitive  
24 and volume insensitive costs that are incurred specific to Florida for providing  
25 unbundled loops, unbundled loop channelization systems and central office

1 channel interfaces. The cost studies include only the costs directly incurred in  
2 provisioning these elements and do not include any allocation of shared and  
3 common costs. Until TELRIC studies are available, the Commission should use  
4 BellSouth's LRIC/TSLRIC results as the price floor for establishing rates for  
5 unbundled network elements.

6

7 Q. DOES THIS CONCLUDE YOUR TESTIMONY?

8

9 A. Yes.

10

11

12

13

14

15

16

17

18

19

20

21

22

23

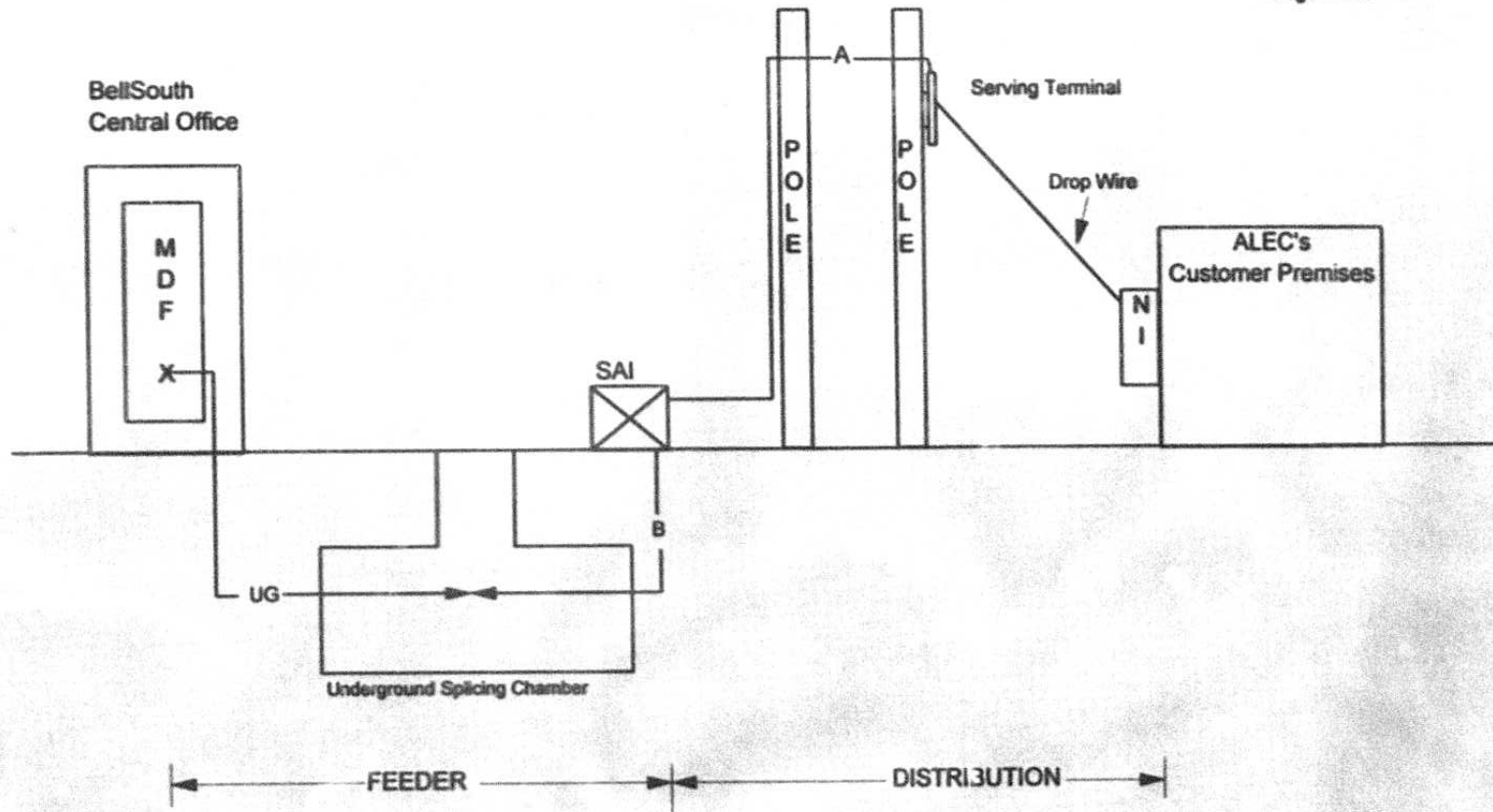
24

25

### ILLUSTRATIVE EXAMPLE

Unbundled Voice Grade and 2-Wire ISDN Loop Components for Loops with Loop Length  $\leq 12$  KFT.

BellSouth Telecommunications, Inc.  
 Docket No. 960916-TP  
 Exhibit No. DDC-1  
 Page 1 of 2



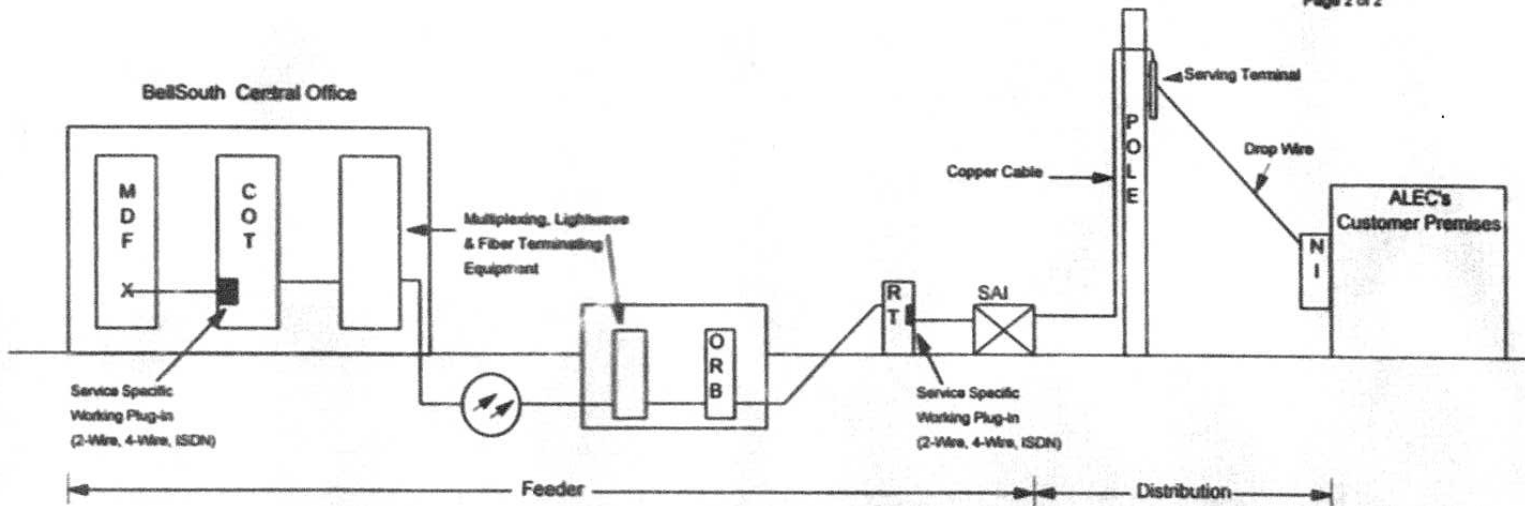
- MDF Main Distributing Frame
- UG Underground Cable
- B Buried Cable
- SAI Serving Area Interface
- A Aerial Cable
- NI Network Interface

**NOTE:**


- 2-Wire Voice Grade Uses 1 Copper Pair
- 4-Wire Voice Grade Uses 2 Copper Pairs
- 2-Wire ISDN Uses 1 Copper Pair

**ILLUSTRATIVE EXAMPLE**

Unbundled Voice Grade and 2-Wire ISDN Loop Components for Loops with Loop Length > 12 KFT.

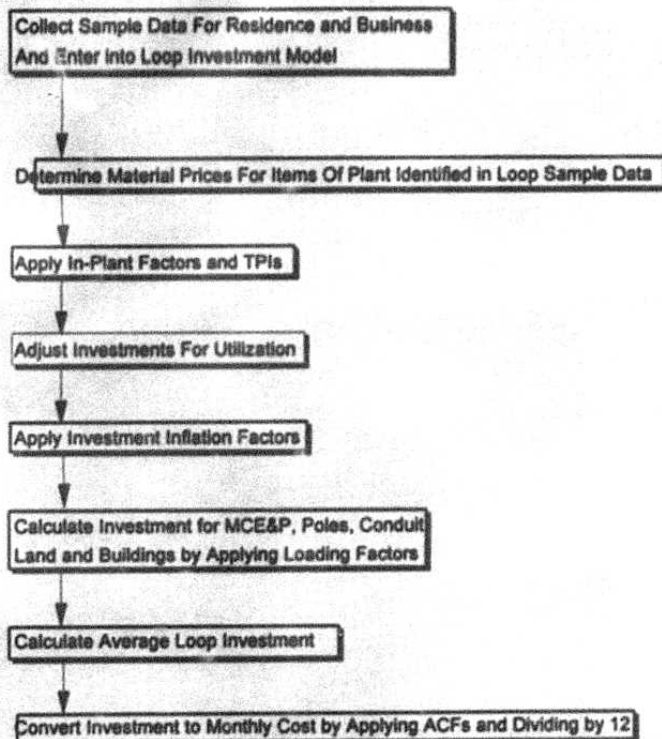


- MDF Main Distributing Frame
- COT Digital Loop Carrier Central Office Terminal
- RT Digital Loop Carrier Remote Terminal

 Fiber Optic Cable

- ORB Office Repeater Bay
- SAI Serving Area Interface

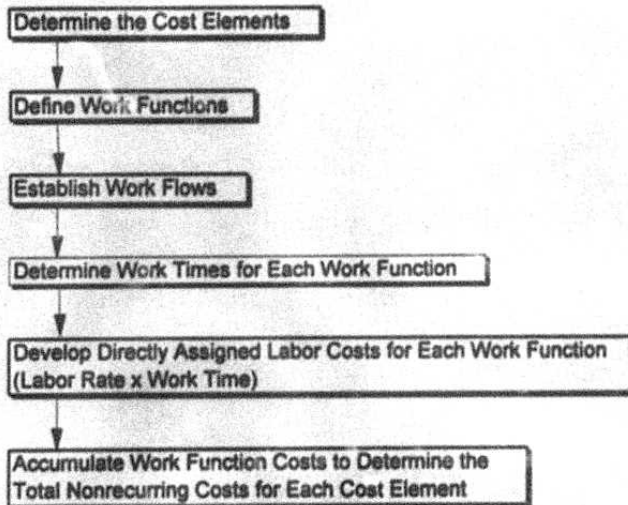
## UNBUNDLED 2-WIRE ANALOG VOICE GRADE LOOP COST DEVELOPMENT PROCEDURES



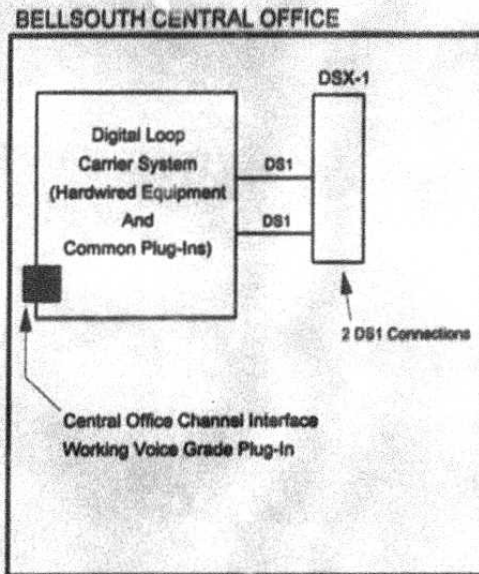
TPis Telephone Plant Indices  
MCE&P Miscellaneous Common Equipment and Power  
ACFs Annual Cost Factors



**General Flow Diagram for Developing Nonrecurring Costs**



### LOOP CHANNELIZATION SYSTEM AND CENTRAL OFFICE CHANNEL INTERFACE



DSX-1 DS1 Digital Cross Connect Panel