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GTE FLORIDA INCORPORATED
DIRECT TESTIMONY OF DR. GREGORY M. DUNCAN
DOCKET NO. 950984-TP

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Q. Please state your name, address, employer and title.

A. My name is Dr. Gregory M. Duncan, my address is 40 Sylvan Road, Waltham, MA 02254. My employer is GTE Laboratories Inc., where I am Staff Scientist for the Telecommunications Research Laboratory, attached to the Department of Economics and Statistics.

Q. Please state your qualifications and training.

A. Certainly. I have a B.A. in Economics and English which I received from the University of Washington in 1970. I attended the University of California at Berkeley and was awarded an M.A. in Mathematical Statistics in 1974, and a Ph.D. in Economics with concentrations in Economic Theory and Econometric Theory in 1976. I did additional work in Industrial Organization, Organizational Behavior, Money and Banking, and Labor Economics. In 1974, before finishing my dissertation, I joined the faculty in the Economics Department at Northwestern University in Evanston, Illinois, where I began my research into theoretical econometrics, theory of the firm, and market structure, particularly studying the transportation industry. While there I was asked to join the faculty of the Statistics Department and become part of the Transportation Center, both of which I did. In 1978, I joined the faculty of the Economics Department at Washington State University, where I became a tenured Full Professor in the Department of Economics, and eventually in the Departments of Statistics, and of Mathematics. My research there continued in econometric theory, market structure and labor. My teaching included graduate microeconomic theory, graduate econometrics, industrial economics and transportation. During that period, I helped found and was one of the first associate editors of the academic journal, 'Econometric Theory'; during that period, too, I was publishing regularly in such journals as

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1 **Econometrica, the International Economic Review, The Journal of**
2 **Econometrics, among others. I also refereed for the major journals, and made**
3 **many invited presentations. I performed professional service activities such as**
4 **being a member of the organizing committee for the North American Econometric**
5 **Association Meetings in 1984 with responsibility for organizing the Econometric**
6 **Theory sessions.**

7 My Ph.D. students primarily worked on problems in empirical industrial
8 organization. During that period I visited Duke University as Professor of Business
9 in the Fuqua School of Business, The California Institute of Technology as an
10 Institute Associate, and the University of California San Diego as a Visiting Scholar.
11 In the Fall 1987 I joined GTE Laboratories as Principal Member of the Technical
12 Staff in Economics, Statistics and Operations Research, where my role was to
13 guide, direct, and develop research of academic quality in economics, particularly,
14 econometrics, game theory and industrial organization for GTE Corporation. My
15 research there has been primarily empirical and policy oriented industrial
16 organization. During this period, I also taught graduate econometrics and Statistics
17 at Boston University.

18

19 **Q. What is the purpose of your testimony?**

20 **A. To present the economically valid approach to pricing of inputs such as unbundled**
21 **loops sold to competitors, and to address some methodological errors in MFS'**
22 **petition and associated Direct Testimony of MFS witness Timothy Devine.**

23

24 **Q. Have you testified before?**

25 **A. Yes. I have testified twice before the California Public Utilities Commission. In**
26 **addition I have written testimony filed before the FCC.**

27

1 **Q.** **You indicate that there is an economically valid approach to pricing inputs**
2 **sold to competitors. Would you describe this approach and put it in the**
3 **context of overall regulation and deregulation of utility companies?**

4 **A.** Yes. Let me start with a general overview of regulation as seen by most
5 economists. Then I will explicitly address pricing of intermediate products, that is,
6 inputs sold to competitors. Unsurprisingly, whenever the market is viable,
7 economists believe it should be relied on to do the job in preference to government
8 intervention. When it is not, the government intervention should be minimal and
9 strive to emulate competition as closely as possible.

10

11 **Q.** **In the context of pricing, what form should this emulation of competition**
12 **take?**

13 **A.** In competitive markets, the threat of entry by other firms protects consumers from
14 incumbent prices that exceed the "Total Service Long-Run Incremental Cost"
15 (TSLRIC), which I will define below, by more than a contribution sufficient to repay
16 the stockholders of the firm for their investment. Similarly, competitors are
17 protected from predatory pricing; that is, the pricing of some services below cost
18 in order to drive competitors from the market. In single product firms, such
19 predation is near impossible for any length of time since the company would be
20 earning revenues below costs. In multiproduct firms where there is a monopoly in
21 one or more of the product lines, such pricing is possible through a cross-subsidy.
22 When this happens, a product in a market immune from competition is priced so
23 that revenues exceed its "Stand Alone Cost" (SAC) and the proceeds used to
24 fund a product priced below its TSLRIC. In a well regulated market, regulators can
25 eliminate such cross-subsidies by setting price floors at TSLRIC and price ceilings
26 so that revenues from a product line or set of product lines do not exceed stand
27 alone cost. This last statement must be tempered when public policy goals (e.g.,
28 universal service) may be supported by such pricing. Nonetheless, the regulator
29 must be cognizant of these situations when engaging in ongoing regulatory policy.

1 **Q.** **You've used the terms TSLRIC and stand alone cost. Would you explain**
2 **them?**

3 **A.** **Certainly. TSLRIC is defined in different ways depending on the context, but here**
4 **I mean the average incremental cost of providing a service as opposed to not**
5 **providing it at all. (This definition is equivalent to what Mr. Devine calls LRIC (at 22-**
6 **23 of his Direct Testimony). LRIC actually has a different definition; thus I assume**
7 **Mr. Devine intended to say TSLRIC.) Specifically, if a firm produces products**
8 **A,B,C,... at levels a,b,c,..., then the TSLRIC of product A is the difference in cost**
9 **between producing (a,b,c,...) and producing (0,b,c,...) divided by a, the total**
10 **amount of A produced. If $TC(a,b,c,\dots)$ represents the total cost to the firm of**
11 **producing its products at levels (a,b,c,...), and $TC(0,b,c,\dots)$ represents the total**
12 **cost of producing all products but A, at these same levels, except dropping the**
13 **production of A altogether, then**

$$14 \qquad \qquad \qquad TSLRIC_{\text{for } A} = (TC(a,b,c,\dots) - TC(0,b,c,\dots)) / a.$$

15 **Economic theory states that in a competitive market, the price of a service will be**
16 **no lower than TSLRIC.**

17
18 **Q.** **Should one expect prices in competitive markets to be at TSLRIC?**

19 **A.** **No. And to assert otherwise is a common error arising from incorrectly applying**
20 **examples in microeconomic theory textbooks where firms price at marginal cost.**
21 **In fact, TSLRIC is the lowest price a firm would accept before shutting down.**
22 **Indeed, if a firm did not price higher than TSLRIC it could never pay back its**
23 **investors for their investment. The firm could not cover the costs of common**
24 **and/or shared facilities and equipment, and it would eventually go bankrupt.**

25
26 **Q.** **What are stand alone costs?**

27 **A.** **Stand alone costs(SAC) are the costs incurred by a firm entering the market**
28 **producing a single product or group of products Using the definition of costs**
29 **above, the stand alone cost of A would be, $TC(a,0,0,0,\dots)$, while the stand-alone**

1 costs of producing A and C, would be $TC(a,0,c,0,0\dots)$. In a competitive market,
2 the price would be set so that the revenue generated by the product would be no
3 higher than the stand alone cost (it could be lower). Otherwise, it would incent
4 entry by new firms. This entry would persist until the price fell to the point where
5 revenue was at competitive levels.

6

7 **Q. Would competition result in prices such that revenues equal average stand**
8 **alone costs?**

9 **A.** Not necessarily. If cost reductions and economic profits could be had by
10 producing more than one product, then entry would continue until the prospect of
11 profits by either repricing or by expanding or contracting the product line vanished.
12 Stand alone costs serve as an upper bound on the revenues prices could be
13 expected to generate in a competitive market.

14 **Q. How would regulators use these cost concepts to encourage or even compel**
15 **competitive-market like behavior for regulated or partially regulated firms?**

16 **A.** In competitive markets, the TSLRICs and the average SACs form bounds between
17 which we would expect to find prices. Consequently, regulation that seeks to
18 emulate the workings of a competitive market should impose average SACs as an
19 upper pricing bound and TSLRICs as a lower pricing bound.

20

21 **Q. But doesn't this leave a lot of leeway for the firm to set prices? Wouldn't the**
22 **firm still be able to exercise market power by pricing so that revenues fall at**
23 **or just below SAC?**

24 **A.** Yes, and economic theory has a solution--one which because of its difficulty in
25 administration, we will not endorse, but which nevertheless serves as a benchmark
26 with which to compare other methods. That method is Ramsey-Pricing.

27 **Q. Isn't Ramsey pricing the inverse elasticity rule--the method that would stick**
28 **senior citizens with obscenely high rates because they have nowhere else to**
29 **turn for service?**

1 **A.** No. This is a very special case, one we give as an example to undergraduates
2 because the arithmetic can be worked out by hand, for homework. Generally,
3 Ramsey pricing will not follow an inverse elasticity rule. The story about its effect
4 on various socioeconomic groups is an invidious misapplication of the theory.
5 Specifically, there is no service specific to the elderly. There may be pricing plans,
6 but no services. A line is a line, a minute of use is a minute of use. The relevant
7 elasticity is not the elasticity of the most inelastic person/unit in the market for the
8 service, but that of the most elastic, e.g., the marginal unit or the one most likely
9 to leave. Full fledged Ramsey pricing requires computation of all the firm elasticities
10 and cross elasticities for all possible services, combinations of services,
11 combinations of firms, etc.. Because this information is often unavailable, or
12 available only at great effort, Ramsey pricing is generally regarded as extremely
13 impractical to implement properly.

14

15 **Q.** Should Ramsey pricing be adopted by this Commission?

16 **A.** The Commission should adopt efficient and fair pricing. Ramsey pricing is
17 theoretically useful, but probably not practical at this time. However, it does
18 present one finding of use to us, that is, that the price of a service should equal its
19 TSLRIC plus an additional amount, a "Contribution To Margin"(CTM). The sum of
20 these TSLRICs plus their contributions to margin should yield the firm an adequate
21 return on the investments in the firm while paying all operating costs. The size of
22 the contribution coming from each service is calculated so as to be independent
23 of production costs, and is specifically designed to be economically efficient, cover
24 the firm's costs, and earn a fair rate of return. Unfortunately, Ramsey pricing is
25 often seen as being potentially inequitable. Consequently, for the reasons of
26 impracticality and potential inequitable treatment of customers, economists have
27 searched for another criterion for determining the appropriate levels of the
28 contribution to be derived from the multitude of products produced by the firm.

29

1 **Q. Have they succeeded?**

2 **A. To a great extent yes. Understanding that economists are loath to ever give up**
3 **efficiency even when unattainable or inequitable, and would generally prefer**
4 **Ramsey pricing, the proposal which GTEFL makes for pricing inputs to competitors**
5 **satisfies the fairness (under a Pareto superiority criterion, whereby a policy is**
6 **Pareto-superior if it improves the well-being of some without harming the well-being**
7 **of any), the competitor protection and the end user protections mentioned above.**
8 **In addition, it induces entry of only the efficient competitors and discourages the**
9 **incumbent from making an inefficient use of its own input when a competitor could**
10 **use it better.**

11 **Q. How does this work?**

12 **A. By means of the simple expedient of pricing the input sold to a competitor so that**
13 **the incumbent is indifferent to using the input itself or selling it. In the case where**
14 **end user rates have been rebalanced to be efficient, this amounts to pricing the**
15 **input to the competitor by subtracting any avoidable retail costs from the end user**
16 **price and adding back in any additional wholesaling costs, both on a per unit basis**
17 **and adding in any additional CTM lost because of selling the input to a competitor.**
18 **Where there is no end user price (as in the case of a new product, like an**
19 **unbundled loop) the price should be equal to TSLRIC+wholesale costs/unit+ the**
20 **opportunity cost of selling the input to the competitor rather than the incumbent**
21 **using it itself.**

22

23 **Q. Can you give an example?**

24 **A. Certainly. The easiest example is one that can be found in Baumol and Sidak's**
25 **book Transmission Pricing and Stranded Costs in the Electric Power Industry.**
26 **(Baumol, William J. and J. Gregory Sidak (1995) 'Transmission Pricing and**
27 **Stranded Costs in the Electric Power Industry' AEI Press Washington DC at 118.)**
28 **Referring to the attached Exhibit GMD-1, Railroad Company X is one of many**
29 **providers of service on line AB. Y does not operate on AB. All railroads, including**

1 X and Y carry traffic from B to C. X carrying by way of its track (BXC), Y by way
2 of its (BYC). Suppose the competitive price to shippers of moving from A to C is
3 \$10. Suppose, too, the incremental costs along AB is \$3 for all railroads who
4 operate along AB, while for X its incremental costs for operating along BXC is also
5 \$3. X then earns $\$10 - \$3 - \$3 = \4 as contribution towards its fixed and common
6 costs for every ton of freight it carries from A to C. In a competitive market, what
7 will be the competitive price charged by X, or any of its competitors, for Y to carry
8 a ton from A to B? Assuming one ton carried by Y means one less carried by X,
9 the answer is \$3 for the cost of using the track plus \$4 for the lost opportunity to
10 complete the deal itself. That is no firm will sell to Y at less than \$7, even though
11 the incremental cost of moving from A to B is \$3.

12

13 **Q. Is this efficient?**

14 **A.** Yes. Because of the multitude of other providers, the prices have been driven to the
15 point where the marginal firm is just making zero economic profits; that is, they are
16 covering their joint and common costs and making a fair rate of return.

17

18 **Q. But there are not a multitude of other supplying local exchange service.
19 Doesn't this make your example irrelevant?**

20 **A.** No. We are trying to determine what would happen in a competitive market and
21 then, by regulation, emulate the same behavior. Hence, examination of a
22 competitive example is just what is called for.

23

24 **Q. Doesn't this method of pricing inhibit entry?**

25 **A.** No. Assume that Y has costs of \$2 per ton for shipping from B to C, because of
26 a better engineered roadbed. Then by paying the \$7, incurring the \$2 per ton
27 charge and selling in the end market at \$10, the railroad obtains \$1 contribution to
28 its joint costs. If that is enough to keep it in business, then the entry is efficient. If
29 it is not, then railroads that can deliver the product for \$10 will do it and not one
30 that needs more.

1 **Q. But you are assuming the prices are initially efficient. What happens if they**
2 **are not?**

3 **A.** I assume you are referring to the situation of a regulated partial monopoly where
4 some products are provided in a competitive environment and some are provided
5 in a regulated environment. Assuming the regulatory commission rebalanced rates
6 initially so that they are near the efficient ones, there will be no problem. If,
7 however, the rates have a large built in cross-subsidy or are frozen at too low or
8 too high levels, then the result won't be efficient. Indeed, inefficient entry may be
9 induced, and if the rates are far enough out of line, the incumbent may be driven
10 out of business. This might happen if a subsidized rate were frozen by legislative
11 mandate below cost and the cross-subsidizing product exposed to resale.
12 Competition would take away all the contribution from the subsidizing product
13 leaving nothing to cover the costs of the subsidized product.

14 **Q. Doesn't this mean your proposal is flawed then?**

15 **A.** No. The problem is not the principle of making the incumbent indifferent between
16 using an input itself or selling it to the competitor. Instead, the problem is initially
17 with unbalanced rates, rates too far from efficiency. Ideally, rates would be
18 rebalanced to most easily and directly achieve efficient pricing. However, to the
19 extent that rebalancing cannot or does not occur, if prices are above TSLRIC and
20 generate revenues at or below SACs, then the rates still represent an improvement
21 in efficiency, and represent the best that can be done without experiencing
22 additional losses in contribution.

23

24 **Q. You mentioned fairness, how is this proposal fair?**

25 **A.** Since GTEFL is indifferent between selling the input to a competitor or not, it is no
26 worse off. Presumably, it cannot raise its rates to the end users, so they are no
27 worse off, and if the competitor succeeds in lowering rates, they are better off. The
28 competitors are able to obtain a necessary input at a price that allows them to
29 compete if they are efficient, and does not require them to install costly duplicative
30 equipment, so they are better off. Thus no one is made worse off as a

1 consequence of this policy and, if the competitor is efficient, ratepayers subscribing
2 to the competitors, as well as the stockholders of the competitor, are made better
3 off.

4

5 **Q. Would you summarize GTEFL's position on pricing inputs sold to**
6 **competitors?**

7 **A.** Yes. In pricing inputs sold to competitors, the commission should strive to
8 emulate the working of a competitive market. Price caps should be set so that
9 revenues do not exceed Stand Alone Cost, while price floors should be set at
10 TSLRIC. Otherwise, rates to end users should be set at Ramsey-prices, or as close
11 as possible. The firm should then be required to sell to its competitor at a price
12 that makes it just indifferent between using the input itself or selling it to a
13 competitor. The price can be calculated in either of two ways. In the case of a
14 single product firm where there is a preexisting end user price, the price to the
15 competitor should be the end user price minus the firm's retailing costs plus the
16 firm's wholesaling price.

17
$$P_{\text{to competitor}} = P_{\text{end user}} + \text{wholesaling unit costs} - \text{retailing unit costs}$$

18

19 When an end user price does not exist, the price should be TSLRIC + wholesaling
20 costs + opportunity costs of lost revenues or contribution to margin.

21

22
$$P_{\text{to competitor}} = \text{TSLRIC} + \text{wholesaling unit costs} + \text{contribution to margin.}$$

23 In the case of a multiproduct firm, where the goods are complementary in
24 production, the first formula must be amended to include lost contribution to
25 margin from any complementary products. That is,

26
$$P_{\text{to competitor}} = P_{\text{end user}} + \text{wholesaling unit costs}$$

27
$$\quad \quad \quad - \text{retailing unit costs}$$

28
$$\quad \quad \quad + \text{CTM lost from complementary services.}$$

29

1 Q. Turning now to the MFS petition and Mr. Devine's testimony, can you
2 summarize MFS' position concerning pricing?

3 A. Yes. MFS would have GTEFL price the unbundled loop at a rate capped by
4 TSLRIC (Devine Direct Testimony at 22). MFS claims that such a plan will be
5 fair, promote consumer well being and will create incentives for facilities based
6 competition (MFS Statement of Disputed Facts and Issues at 5) .

7

8 Q. Should prices be capped at TSLRIC?

9 A. No. As I noted in my testimony above, TSLRIC is a floor for the price of a
10 product, not a cap. Pricing at TSLRIC in a single product firm drives it to
11 bankruptcy if it has any unrecovered common costs or if it ever needs to invest
12 in plant and equipment again. In a multiproduct firm operating in a competitive
13 environment, the same will happen; the market will not allow cross-subsidies
14 and will drive firms that try to engage in them either out of business, or back to
15 competitive pricing. What Mr. Devine would do is insist that GTEFL lose money.
16 Currently, R1 rates are priced below TSLRIC (see Trimble Direct Testimony).
17 This is possible because rates of other products are priced so that their
18 contributions cover the contribution and cost missing from the R1 rate. If
19 GTEFL is required to wholesale a product heretofore used to help defray the
20 cost of R1 service at a price equal to TSLRIC, then GTEFL loses a source for
21 this cross-subsidy and puts additional burden on other services. Indeed, the
22 burden that the other services need now includes not only the unrecovered part
23 of TSLRIC and R1 common costs, but also the common costs of the wholesale
24 product now sold at TSLRIC. Competition will drive every service priced above
25 its competitive level to its competitive level. GTEFL will then be left with no
26 sources of contribution for R1s, and will be forced to operate at a loss by failing
27 to recover those costs. Because local rates are frozen under Florida law, to
28 agree to Mr. Devine's pricing plan is to voluntarily lose money for GTEFL's
29 stockholders, because there are no services from which to recover the lost
30 contribution to common costs. In a competitive market, this would not happen;

1 no firm would sell to MFS under those terms. MFS and the incumbent firm
2 would either have to agree to reasonable prices or go out of business. To use
3 an analogy, Mr. Devine seems to be claiming that requiring a grocery store to
4 sell its entire inventory to him at direct cost, without costs for storage, for the
5 store floor space, for the employees who clean the store, and then requiring the
6 store to provide space for him to resell that inventory at some allocated cost per
7 foot, is a fair and equitable way for a grocer to make money doing business with
8 Mr. Devine. Clearly this is not fair or equitable, and no grocer would agree to it.

9 I'm sure if the Commission were to require MFS to resell their unbundled loop
10 and all value added services at TSLRIC to anyone that wanted to buy them,
11 MFS would decide not to enter this business.

12

13 **Q. Will MFS's pricing plan induce facilities based competition?**

14 **A.** No, and MFS is inconsistent on this in its own testimony. I quote from Mr.
15 Devine " it would be both infeasible and economically inefficient...for them
16 [companies such as MFS] to seek to construct duplicate facilities. Replication of
17 the existing LEC loop network... would be cost prohibitive;..." (Devine Direct
18 Testimony at 13). Thus, by MFS' own words it would seem the pricing plan
19 they suggest will not induce them to develop their own facilities. And why
20 should they? Their proposal gets them a price they could never achieve on
21 their own devices or by their own merits. They want GTEFL stockholders to pay
22 for their inability to compete fairly.

23

24 **Q. But isn't MFS' position fair?**

25 **A.** No. MFS tries to make the point that GTE had special treatment that MFS
26 doesn't enjoy. But this "special treatment" which GTE allegedly enjoyed was
27 accompanied by unique obligations, e.g., universal service, social policy
28 obligations, and administrative regulatory requirements, to mention a few, that
29 persist in large measure for GTEFL, but which MFS will not have to bear.
30 Moreover, from an economic point of view, it is not what happened in the past

1 that is important but what goes on in the future. MFS asks essentially that the
2 value in the local network -- which was put into place by GTE investors in
3 conjunction with the Commission and based on the Commission's promise of
4 an opportunity to make a fair rate of return on its investment-- be transferred to
5 MFS stockholders. Had the Commission announced in advance that it intended
6 to make such a transfer, stockholders would have been loath to invest in GTE.

7

8 Fair is what GTEFL proposes. It offers selling the input in such a way as to
9 make GTEFL indifferent to selling or not.

10 **Q. What about Mr. Devine's proposal that the sum of the unbundled rate
11 elements must be no greater than the price of the bundled dial tone line?**

12 **A.** First, he has stated no support for the proposal, and I know of no economic
13 theory that would support such a plan. Under efficient economic principles, as
14 explained above, the prices of each of the components should be at the TSLRIC
15 of each component, plus contribution. The price of the bundled dial tone line
16 should be the TSLRIC of the dial tone line plus contribution. Except in a very
17 special case where there are no economies of scale or scope, there is no direct
18 link between the sum of the prices of these components offered separately, and
19 the price of the bundled components.

20

21 **Q. But what if there are no economies of either scale or scope?**

22 **A.** Even then the answer cannot be determined a priori. It would depend on the
23 amount of common costs and the elasticities and cross elasticities alluded to
24 above. However, if there are no economies of scale and scope, then there is no
25 need for regulation, because then the LEC has no so-called bottleneck and
26 MFS or anyone else can freely and efficiently enter. However, even MFS claims
27 that "it is economically more efficient for competitors to utilize GTE loops" than
28 to put in their own. So by their own statement the special case does not exist.

29

1 **Q. What about Mr. Devine's assertion that the ratio of prices to LRIC be the**
2 **same?**

3 **A. This is confused, and might be just another way of saying that prices should**
4 **equal TSLRIC, so that the company is denied any contribution to margin. That,**
5 **of course, would require the ratio to be 1.0. But Mr. Devine did not reveal the**
6 **ratio he had in mind. Beyond that, only a peculiar set of elasticities and cross-**
7 **elasticities would give a constant ratio as an economically sound result. But in**
8 **any case, without calculation of explicit elasticities and cross elasticities, the**
9 **assertion is without support, and most probably is simply wrong.**

10

11 **Q. Does this conclude your testimony?**

12 **A. Yes it does.**

13

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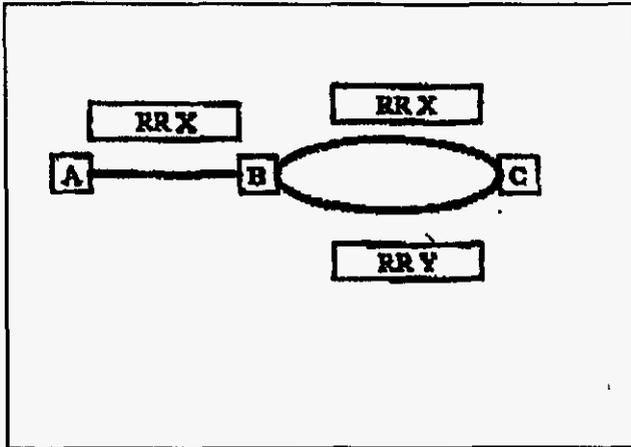


figure 1