

1       **4.   BA-Del's Model Assumptions and Approach**

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3       **Q.    Would you now discuss the third flaw in the Company's modeling assumptions--their**  
4       **inconsistency regarding short economic lives and reduced market share on the one**  
5       **hand and low fill factors on the other?**

6       A.    Yes. First, BA-Del witness Dr. Lawrence K. Vanston recommends economic lives for the  
7       Company's plant investments that are substantially shorter than those which have generally been  
8       approved by state and federal regulators. Dr. Vanston reaches his conclusions by making  
9       certain assumptions about the pace of technological change in the network over the next  
10       decade or so. For example, he appears to assume that copper in the local loop will be  
11       substantially replaced by fiber within the next decade:

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13               We expect wideband digital services enabling Internet-type applications to be the  
14               dominant concern through the year 2005 for most customers. ...[T]he high end of  
15               the TFI recommended range reflects our "middle scenario" for distribution fiber.  
16               The middle scenario ... assumes that fiber will dominate as the technologically  
17               superior solution once demand for wideband services becomes sufficiently  
18               widespread. The lower end of the TFI range reflects our "early scenario" for  
19               distribution fiber. This scenario assumes that most of the demand for wideband  
20               services is served on fiber-based systems. We believe that most LECs will fall  
21               between the early and middle scenarios, which corresponds to TFI's  
22               recommended range of 7-10 years for distribution copper ... Thus BA-Del's use  
23               of 10 years for the buried and aerial [copper] accounts is conservative.

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26       BA-Del Exhibit No. 5, at 16. If I understand this reasoning Dr. Vanston is arguing that within  
27       the next decade, large amounts of fiber will be deployed in order to meet demand for high-  
28       speed (broadband) digital applications. While this scenario is entirely possible, perhaps even  
29       likely, it does not eliminate the functional capabilities of the installed base of copper cable, nor  
30       does it eliminate its economic value. If Bell Atlantic installs large amounts of fiber, it may be able  
31       to rent or sell its existing copper cable to other carriers. Unless and until the cost of the fiber

1 electronics declines sharply, it won't completely eliminate the potential for providing lower  
2 quality voice applications over traditional copper networks.

3 In my opinion, copper cable won't become economically obsolete (without any  
4 remaining salvage value) for many years to come. If there is a rapid decline in the cost of fiber  
5 electronics, and rapid growth in the demand for video dial tone, high bandwidth Internet  
6 connections, and other high-speed applications, the value of the installed base of copper cable  
7 will decline more rapidly in the future than it has in the past. However, it must be recognized  
8 that these trends are not entirely one-sided in favor of fiber and against copper. In fact,  
9 improvements in component miniaturization, advances in manufacturing techniques, increasing  
10 demand, and other factors that are contributing to the downward trend in fiber electronics costs  
11 may also serve to extend the economic life of copper cable. Within the next 5 to 10 years, it  
12 may be technically feasible and cost effective to provide the average household with enough  
13 bandwidth on copper to meet their demand for high-speed Internet connections, and perhaps  
14 even to provide VHS quality video signals. If so, copper cable would become economically  
15 obsolete only if the electronics needed for a copper-based system were far costlier than the  
16 analogous electronics for a fiber-based system

17 In considering the likely economic life cycle of copper cable, it is important to recognize  
18 that even if Bell Atlantic were to migrate entirely to a fiber system, that would not necessarily  
19 imply full exhaustion of the economic value of the installed copper plant. The copper cable will  
20 not be economically obsolete as long as it is still cost effective to operate and maintain and  
21 capable of providing service of acceptable quality. In this regard, one must consider not only its  
22 value to its original owner, but also its potential value to others.

23 In many an American family a car bought new is considered obsolete after three or four  
24 years, and the family is ready to trade it in for something better (or at least different). However,  
25 that does not mean that the car's economic life has been exhausted, as proven by the fact that  
26 other people will be willing to pay a substantial sum to lease or purchase that same car.

1 Similarly, if copper cable is still sufficiently valuable that it can be profitably leased or sold to a  
2 competitor, even if it is no longer needed by the carrier that originally installed it, there is no  
3 reason to conclude that its economic life has expired merely because the original owner has  
4 decided to move onto a fiber system. Particularly in an increasingly competitive market,  
5 economic depreciation must be based upon the full duration of an item's economic value,  
6 considering the entire market, not merely the firm which initially purchases and installs the item.

7 When viewed from this perspective, it is apparent that many of the economic lives used  
8 by BA-Del are too short. For instance, a 15-year life for fiber-optic cable is far too short. In  
9 fact, it would not surprise me if fiber which is buried today would continue to be used and  
10 maintained for communication purposes for 40 or 50 years into the future. Admittedly,  
11 improvements continue to be made in the design and manufacturing of fiber, making it easier to  
12 move larger and larger amounts of bandwidth through a single pair of fibers with greater and  
13 greater ease. However, much the same benefits can be achieved through improvements in the  
14 electronics and the software that are used to drive the fiber system. Hence, it may be a very  
15 long time indeed before today's fiber will be so outdated as to be no longer economically  
16 useful.

17 In my opinion, it simply isn't reasonable to assume that fiber installed today will be  
18 economically worthless in 15 short years. While this scenario is not outside the range of  
19 possibility, it surely lies at towards the lower limits of plausibility. I think a life span of 20 to 25  
20 years is much more realistic, falling toward the middle of the potential range of outcomes.  
21 Hence, this is the average economic life I have used for fiber when running the Telecom  
22 Economic Cost Model in this proceeding

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24 **Q. How do BA-Del's depreciation schedules square with its fill factors?**

25 A. Not very well. For example, the assumed life for copper cable, which is less than 10 years, is  
26 particularly inappropriate when this assumption is combined with an assumption that it needs to

1 install 3 cables pairs per household. Within the relatively short number of years in which copper  
2 cable would remain in the network under the Company's study, it hardly seems likely that the  
3 number of loops demanded per household will increase to the level contemplated by the  
4 Company.

5           According to the testimony of Mr. Sanford, BA-Del's fill factor inputs

6           are determined from actual measurements in BA-Del's network and then  
7           adjusted to make them forward looking. The existing fill factors are adjusted  
8           based upon BA-Del's forward-looking engineering guidelines which provide that  
9           distribution pairs be engineered on the basis of 2 to 3 pairs per household.  
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13 The details of this procedure, including the "adjustment" from historical to "forward-looking"  
14 engineering guidelines, are not completely clear to me. However, it appears that the Company  
15 has developed cost estimates in which a substantial volume of extra copper cable is installed,  
16 relative to the quantity that is actually needed to serve the number of working loops included in  
17 the study.

18           In other words, the Company is apparently modeling a network in which it installs  
19 enough copper distribution cable to provide 2 to 3 loops to each household. It then spreads the  
20 cost of this enormous amount of copper over a relatively few years in the immediate future--  
21 prior to the time it assumes this copper will be eliminated and replaced with fiber to the  
22 customer premise. I seriously doubt that demand for ordinary copper loops will grow rapidly  
23 enough to absorb this vast amount of extra cable within the few years available before the  
24 investment would be fully depreciated under the Company's assumptions. But, even if one  
25 accepts the plausibility of such a growth scenario, it wouldn't be appropriate to spread the  
26 resulting cost of 2 to 3 pairs per household over the current number of loops-- which is closer to  
27 1 pair per household. In other words, if the demand for second and third lines is growing fast  
28 enough to justify the large amount of copper distribution cable modeled by the Company, it  
29 would be appropriate to calculate unit costs on the basis of a projected future quantity of loops.

1 If the anticipated growth in second and third lines were considered in this manner, the resulting  
2 costs per loop would be substantially below those reported in the Company's studies in this  
3 proceeding

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5 **Q. Would you please elaborate on the reasons why you disagree with the Company's**  
6 **distribution plant fill factor?**

7 A. Yes. Despite what BA-Del witness Dr. William E. Taylor claims in his direct testimony, there  
8 has been no showing that a very low distribution fill factor is necessary or appropriate in a long-  
9 run economic cost study, even if one were to abandon the standard economic concept of the  
10 "long run" and instead prepare a study which assumes "that long-run costs are incurred over  
11 time." BA-Del Exhibit No. 6, at 12. As I argued earlier, a classic long-run cost study optimizes  
12 the amount of plant investment to best match the volume of output. It is not intended to be a  
13 simulation of the real-world situation, in which the carrier has installed plant over a period of  
14 many decades, and periodically comes in and overbuilds a particular route by adding additional  
15 cable, or replacing the older cable.

16 But even if one were to ignore this problem and accept the idea of preparing a study in  
17 which the carrier is assumed to install a very large volume of plant in anticipation of potential  
18 growth over time, the appropriate calculations would still be different from those prepared by  
19 BA-Del. In such a study, it would be necessary to offset the costs of the extra capacity installed  
20 to meet future growth with the present value of the revenues which are anticipated to be  
21 generated by this growth in demand, in order to get a proper matching of costs and benefits.  
22 Properly handled, the cost of extra capacity which is installed to serve future demand would not  
23 place a substantial burden on current ratepayers, because it would be recognized that this extra  
24 capacity will be paid for by future ratepayers.

25 If one doesn't want to complicate the issue by considering future revenue streams, it is  
26 at least necessary to adjust the quantities used in calculating the final cost results, to ensure a

1 reasonable level of internal consistency. In BA-Del's study, it hasn't achieved a reasonable  
2 match between the size of the network it has modeled and the quantity of network elements that  
3 it considered in computing costs per unit. For example, if the Company wanted to prepare a  
4 forward-looking study in which the average household uses 2 or 3 loops, it should have divided  
5 the resulting total cost estimate by the higher number of working loops that is implied by such a  
6 growth scenario.

7 What BA-Del has done is quite different. It has overlaid its existing network design with  
8 an assumed amount of extra distribution cable (resulting in 2 to 3 pairs per household), thereby  
9 substantially increasing this portion of its cost estimate. It has then taken the resulting costs and  
10 spread them over a much lower volume of loops, based upon the number of loops which are  
11 currently being used. The effect is to inflate the estimated cost per loop and to effectively force  
12 its competitors to pay for theoretical future distribution capacity that will actually be used and  
13 paid for by future customers--assuming such capacity is ever actually installed.

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15 **Q. The rationale behind the adjustment to 2 or 3 loops per household clearly assumes**  
16 **substantial growth in the Company's network. Is the Company's testimony consistent**  
17 **on this point?**

18 A. No. According to Dr. Taylor,

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20 A forward-looking study must account for factors that will either decrease or  
21 increase demand in the future. For example, we are entering a new era of  
22 competition. Therefore, we must account for the fact that competition is likely to  
23 reduce the demand for a company's services as the company loses market share  
24 to competitors....

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26 Continued use of the incumbent LEC's *total* demand to calculate incremental costs  
27 clearly builds in the effect of economies of scale that are only possible under the soon to  
28 be extinct single-provider system.

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30 Id., at 15. I believe this to be a correct observation. To the extent Dr. Taylor is arguing that  
31 BA-Del's market share is unlikely to remain at 100% into the indefinite future, I certainly agree.

1 The entire thrust of the 1996 Telecom Act was to break down barriers to entry, and to  
2 encourage the established local exchange carriers to enter the interLATA long distance market,  
3 to encourage the established IXCs to enter the local exchange markets, and to generally  
4 encourage a competitive free for all. While it is exceedingly difficult to predict how this will all  
5 play out, if the intent of Congress is to be achieved, it seems apparent that the incumbent LECs  
6 will have to lose market share.

7 In any event, this issue isn't adequately captured in BA-Del's model, and it is also  
8 unclear how the Company reconciles the possibility of lost market share with its view that it  
9 needs substantial amounts of spare capacity to accommodate future growth. Surely, even if we  
10 accept the speculation that in the near future the average household will use 2 to 3 lines, it isn't  
11 plausible to also assume that every household will continue to be served by BA-Del. In other  
12 words, if the market is expanding that rapidly, surely some facilities-based entry will also  
13 occur, syphoning off at least some portion of this rapid growth.

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15 **Q. Is it then your conclusion that BA-Del's assumed fill factors are in conflict with the**  
16 **Company's depreciation schedules and its argument that market share losses are**  
17 **likely to occur in the future?**

18 A. Yes; the Company's position is not internally consistent. BA-Del's fill factors for copper plant  
19 are apparently based on historical ratios, adjusted upward in the case of distribution plant. It  
20 simply isn't consistent to assume rapid obsolescence of copper distribution plant within a  
21 decade, an enormous expansion plan which would increase the Company's investment to  
22 include an average of 2 or 3 copper loops for every household in the Company's service  
23 territory, and the assumption that the Company will be losing market share to other facilities-  
24 based carriers. If this combination of assumptions is accepted by the Commission, the  
25 Company's competitors will be forced to pay for large numbers of copper distribution loops

1           which they never use and which in fact are retired before they are even placed into service! By  
2           no stretch of language can this modeling approach be termed optimally efficient.