Q. It appears that in most instances, the lives used by the Company are shorter than those prescribed by the FCC. Has Mr. Marsh addressed the discrepancies between his recommended lives and those prescribed by the FCC?

A. Not specifically. However, he does discuss regulated depreciation rates in general. Mr. Marsh argues that these rates should be ignored. First, he feels that regulated rates "do not accurately reflect the effect of rapid technological change and competition on plant obsolescence." [Marsh, p. 3.] Second, Mr. Marsh states that "most, if not all" of the Company's potential competitors do not have their depreciation rates established by regulators. [Id., pp. 3-4.]

Mr. Marsh later elaborates on his first point by distinguishing between economic lives and accounting lives. According to Mr. Marsh,

> Economic life is much more concerned with the expected demand of the customers for service capability and flexibility, while the regulated accounting life generally deals with the physical life of a group of assets in an account as measured primarily by engineers and historical experience. [Id., p. 6.]

Mr. Marsh further states that the relevant customers (i.e., those who will purchase unbundled elements) will be sophisticated and knowledgeable and will demand access to the latest technology and development. [Id., p. 7.] Thus, the implication is that facilities used to provide unbundled elements will be retired more quickly than projected by regulators, due to changing market conditions and changing technology.

Q. Are the current FCC-prescribed depreciation lives forward looking, reflecting the effects of rapid technological change and competition?

A. Yes. For instance, in setting the generic ranges prescribed in Docket No. 92-296, the FCC made clear that it was following a forward looking approach. As stated by the FCC,

> [W]e based the ranges on statistical studies of the most recently prescribed factors. These statistical studies required detailed carrier-by-carrier analyses of the most recent plant retirement patterns, the carriers' plans, and the current technological developments and trends. Because the proposed ranges reflect these data, we believe that the ranges provide a reasonable degree of confidence that the basic factors falling within their bounds will produce depreciation rates

> accurately reflecting plant retirements, company plans, and technological trends. [*Second Report and Order*, Docket No. 92-296, ¶ 25].

It is clear that the FCC has attempted to take into account both technological change and economic obsolescence in establishing the generic ranges, as well as the depreciation rates set for individual companies like Ameritech-Indiana. Furthermore, it is readily apparent that most, if not all, of the prescribed lives are considerably shorter than the expected physical life of the property in question. In other words, the FCC anticipates that property will be retired for economic reasons prior to the time that wear and tear or physical deterioration would preclude its continued use.

While one can disagree with the precise lives which have been approved by the FCC (as I do, in some cases) it is misleading to imply that the FCC considers nothing but physical lives when prescribing depreciation rates. To the contrary, the underlying historic data and trends which are considered by the FCC reflect the impact of economic factors, as well as physical factors. Furthermore, the FCC does not simply wait for obsolescence to occur before taking it into account. Instead, the FCC anticipates trends and tries to project future patterns of economic obsolescence. It tries to accurately anticipate the future pattern of retirements for each category of investment, based upon economic and engineering judgments relating to future technological change, changing customer preferences, and similar economic factors.

In order to overcome the presumption that the FCC's prescribed lives are appropriate for TELRIC purposes, it is certainly not sufficient to simply imply that the FCC is looking only at physical wear and tear, or to argue that the FCC isn't doing an adequate job of interpreting and analyzing the underlying technological and economic trends.

Q. Let's turn to the specific plant categories. Would you please comment on the Company's proposed lives for fiber optic cable?

A. Yes. As shown on Schedule 1, the Company has assumed an economic life of 12 years for Aerial Fiber, Underground Fiber, Buried Fiber, and Intrabuilding Fiber. In my opinion, a 12-year life for newly installed fiber-optic cable is far too short. In fact, it would not surprise me if

fiber buried today would continue to retain economic value, and to be used and maintained for communication purposes, for another 40 or 50 years. Granted, improvements continue to be made in the design and manufacturing of fiber, making it easier to move larger and larger amounts of bandwidth through a single pair of fibers. However, much the same benefits of enhanced bandwidth are also being achieved through improvements in the electronics and software that drive the fiber system. In future years, when carriers seek to increase the bandwidth or capacity of their networks, they are much more likely to replace the electronics than the fiber itself. Hence, it may be a very long time indeed before today's fiber will be so outdated as to be no longer used or economically valuable.

In my opinion, it simply isn't reasonable to assume that fiber installed today will be economically worthless in 12 short years, or to allocate the entire cost of this investment over the first 12 years of its entire life span. While it is not inconceivable that technological advancements or other phenomena will cause today's fiber to be totally obsolete in 12 years, such a scenario surely lies at towards the extreme lower limits of plausibility--particularly for application to an entire network (as opposed to a particular route or segment). In my opinion, a life span of 20 to 25 years is much more realistic, falling toward the middle of the potential range of outcomes. More specifically, I would estimate the economic life of Aerial and Intrabuilding fiber to be 20 years and the economic life of Underground and Buried Fiber to be 25 years. These recommendations are very similar to the lives prescribed by the FCC for Ameritech-Indiana. My recommended lives are also similar to, or slightly shorter than, the midpoint of the generic range of 20 to 30 years prescribed by the FCC in Docket 92-296.

I recommend a shorter life for Aerial fiber than for fiber placed below grade, in recognition of several factors. First, a fraction of all aerial cable will be prematurely retired due to storms, accidents, and other physical causes. Second, physical deterioration will adversely impact aerial cable more quickly than buried or underground installations. Third, aerial cable is somewhat more costly to maintain; this may result in somewhat earlier retirement of these facilities on the basis of anticipated cost savings from replacement technology. While the latter two factors may not be sufficient, of themselves, to justify replacement of the cable within 20 years, these factors will to be considered by management in the future, and will tend to tip the

scales in favor of retirement at an earlier date than with below-ground installations.

Q. Would you please comment on the Company's proposed lives for copper cable?

A. Yes. The Company has used a 12-year life for Aerial, Underground, Buried, and Intrabuilding copper—far shorter than the lives prescribed by the FCC for these accounts. While I believe the Company's life assumption is too low, I do not dispute the fact that a relatively short life should be used for copper cable. In my opinion, there is a reasonable likelihood that copper cable will become economically obsolete within the next couple of decades, due to the inherent advantages of fiber over copper. The difficulty lies in predicting how soon this will occur. Changing technology always raises the possibility of stranded investment, and some consideration of this risk should be given in developing an economic cost study, particularly if one is attempting to analyze the economic tradeoffs between copper and fiber technology.

Fiber optic cable and the associated electronics continue to decline in cost, and fiber holds the potential for handling video dial tone, broadband data services, and other offerings that require an enormous expansion of bandwidth. These new offerings cannot be handled as easily over metallic cable. That does not mean that the existing copper cable is an albatross hanging around the Company's neck. To the contrary, manufacturers are working aggressively on new technologies that hold the potential for offering higher bandwidth services over ordinary copper wires. Depending upon how successful they are in these development efforts, copper cable installed today may continue to be used, and economically valuable, for 20 or more years.

In my opinion, copper cable won't become economically obsolete (without any remaining net salvage value) for many years to come. To be sure, if there is a rapid decline in the cost of fiber electronics, and rapid growth in the demand for video dial tone, fast Internet connections, and other high-speed applications, the economic value of the installed base of copper cable may decline fairly rapidly. However, in evaluating the speed of this potential decline, it must be recognized that these trends are not entirely one-sided in favor of fiber and against copper. In fact, improvements in component miniaturization, advances in manufacturing techniques, increasing demand, and other factors that are contributing to the downward trend in

fiber electronics costs may also serve to extend the economic life of copper cable. Within the next 5 to 10 years, it may be technically feasible and cost effective to provide the average household with enough bandwidth on copper to meet their demand for high-speed Internet connections, and to provide VHS quality video signals. If so, copper cable would become economically obsolete only if the electronics needed for a copper-based system were far costlier than the analogous electronics for a fiber-based system.

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

In many an American family a car bought new is considered obsolete after three or four years, and the family is ready to trade it in for something better (or at least different). However, that does not mean that the car's economic life has been exhausted, as proven by the fact that other people will be willing to pay a substantial sum to lease or purchase that same car. Similarly, if copper cable is still sufficiently valuable that it can be profitably leased or sold to a competitor, even if it is no longer needed by the carrier that originally installed it, there is no reason to conclude that its economic life has expired merely because the original owner has decided to move onto a fiber system. Particularly in an increasingly competitive market, economic depreciation must be based upon the full duration of an item's economic value, considering the entire market, not merely the firm which initially purchases and installs the item.

Nevertheless, I recognize that there is a chance that improvements in the electronic systems used with fiber cable will so greatly exceed those associated with copper that the latter type of cable will cease being economically viable at all. While such a scenario is not highly probable, it is not completely implausible. An IBM compatible 286 computer may still be capable of performing the same functions that it performed when it was new. However, newer, more powerful computers are so vastly superior that very few consumers are satisfied with the performance of a 286 computer, and thus very few of these computers remain in use today.

Analogously, there may come a time when copper cable will be little used, even though it is still capable of providing voice quality services at reasonable cost.

In future years, the continued economic viability of copper cable will likely depend upon the extent to which consumers depend upon telecommunications systems to receive video and data services, and the extent to which consumers demand very rapid data transfers and/or high quality video signals. On the one hand, if most households demand high speed services, ordinary voice services may be provided over a high speed fiber network as nearly cost-free "byproduct." In that eventuality, copper cable may become economically obsolete. On the other hand, copper cable will likely continue to be economically viable if most households rely on cable television, or are satisfied with the level of quality currently provided by VHS tapes, and if their data transfer needs can be adequately accommodated at speeds that are perhaps 10 to 30 times faster than today's standard modems. Stated differently, while it is possible that copper cable may become economically obsolete, this will depend in large part on how rapidly the demands for bandwidth outstrip the capabilities of copper cable, and how rapidly the cost of copper electronics decline, relative to the cost of fiber electronics.

Considering all of the factors and uncertainties just discussed, I believe it is reasonable to assume that the economic life of copper cable installed today will be shorter than fiber cable, but not as short as the Company has assumed. More specifically, I would recommend a life of approximately 15 years for all four types of copper cable (Aerial, Underground, Buried and Intrabuilding). If one were to distinguish between aerial and below-grade installations, the former category could reasonably be expected to have a slightly shorter life (e.g., 14 years vs. 16 years) for the same reasons discussed earlier.

Q. Could you now discuss the circuit electronics categories?

A. Yes. The Company has used 5 years for these plant categories, which is again too short. As shown on schedule 1, the FCC has prescribed a generic range of 11 to 13 years for digital circuit equipment, and it has prescribed a life of 10.5 years for the Company specifically. In my opinion, the generic FCC projections are reasonable for this category, although it would also be acceptable to use a slightly lower life, such as the 10.5 years prescribed for Ameritech-Indiana.

The Company has not offered any persuasive evidence to support its assumption of 5 years, and this figure is clearly too low. Of course, the cost of this type of equipment can be anticipated to decline in future years, along with other electronic components; thus it is reasonable to assume that economic obsolescence will largely drive future retirements in this category. However, this category is not limited to line cards and other electronic components. It also includes site preparation, equipment cabinets, power supply facilities, and other items which are unlikely to experience a rapid decline in cost or economic value.

Furthermore, installation labor is a major component of these costs. Even if the electronic components installed today could be replaced with new components at zero cost in 5 years, the labor required to install the replacements would be substantial; and thus it is not self-evident that replacement would be cost effective this quickly. More realistically, a large fraction of these components will continue to be adequate to meet the Company's needs for many years, and while replacements may be available at lower cost, the price will not drop to zero. In any event, the FCC evaluates these trends and other factors when it develops projection lives for this category. I believe the 11-to-13-year range is reasonable, and recommend use of a 12-year life for this category, which is much more reasonable than the 5-year figure used by the Company.

Q. The Company has also used 5-year lives for the Radio and Operator Systems categories? Are these appropriate?

A. No. Radio equipment has largely been displaced by the deployment of fiber cable. In the Company's most recent triennial review, the FCC did not even prescribe a life for the Radio account. However, to the extent that this type of equipment is considered appropriate to include in a forward looking cost study, I would recommend a life of 9 years, which is the low end of the generic FCC range. Similarly, the Company has not met its burden of proof in showing that 5 years is appropriate for operator systems. I would recommend using instead the low end of the generic range, which is the same as the 8 years specifically prescribed by the FCC for Ameritech-Indiana.

Q. Would you now please discuss Poles and Conduit?

A. Yes. The Company has used a 30-year life for Poles. This is reasonable, and entirely consistent with the 25-to-30-year range generically prescribed by the FCC and the 30-year life prescribed for Ameritech-Indiana specifically. For Conduit, the Company assumed a life of 55 years. The FCC has prescribed a range of 50 to 60 years for this category, and it has specifically prescribed 55 years for the Company. In my opinion, the 55-year life used by the Company is reasonable, although I typically recommend a slightly shorter period of 50 years.

Q. Would you please discuss the appropriate life to use for central office switching equipment?

A. Yes. The Company has used a life of just 5 years for newly installed switching facilities. While there has been a downward trend in the life of this equipment, this figure is far shorter than the actual experience of the industry, and it is far below the projected lives established by the FCC in recent years. For digital switching plant accounts the FCC has prescribed a generic range of 16 to 18 years, and it has prescribed 17 years for the Company specifically. Although switching investments have historically lasted for 20 or more years, it is reasonable to assume that equipment installed currently will not remain in service as long as equipment installed in the past, due to the rapid pace of technological change and the rapid decline in the cost of electronic components. While I find the FCC's prescribed range of 16 to 18 years to be more realistic than the 5 year figure used by the Company, my own judgment falls between these two figures. More specifically, I would recommend using a life of 12 years for this category. At 12 years, I am recognizing the possibility that the current generation of digital switches may be replaced by new technology (e.g., broadband switches) within a decade or so, while also recognizing that with software upgrades the existing switches may meet the needs of most customers for 15 or more years.