DSL Technology

Q. The parties have been asked to provide evidence concerning DSL technology. Can you briefly describe this technology?

A. Digital Subscriber Line (DSL) is a relatively advanced method of transmitting information over ordinary (copper) telephone lines. Unlike traditional analog technology (which has been in use since the days of Alexander Graham Bell), DSL transmits voices and other information in a digital format. This technology has several important advantages. First, it provides a more efficient way of handling computer traffic, since digital information doesn't need to be converted to analog and back to digital (the function performed by traditional analog modems). Second, it makes it possible to transmit data over a copper loop many times faster than can be achieved with the best analog modems. Data can typically be transmitted at speeds of up to 1.54 Mbps, which is 50 times faster than a typical 28,800 bps modem. Over short distances, such as 1,000 feet, DSL can deliver data at an even faster rate. Third, it makes it possible to combine voice and data traffic on a single line, or to carry multiple voice paths on a single pair of copper wires. Even without compression, a transmission path of 1.54 Mbps is capable of carrying 24 separate conversations. With compression, the potential capacity of a DSL line is even greater.

Q. Are there limitations to the use of DSL?

A. Although DSL works with existing copper loops, it works best over short distances, and it doesn't work with loops that are longer than 18,000 feet. Also, it may be necessary to "condition" the loop (e.g. by removing load coils).

Q. What effect does DSL have on the seven remaining accounts?

A. In general, DSL will tend to extend the life of existing copper cable–particularly distribution cable, and cable which is located within 18,000 feet of the wire center.

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. The full life of the car extends far beyond the initial ownership period.

Similarly, even if traditional analog copper technology were to become obsolete over the next decade, there is no reason to assume the underlying cables themselves would no longer have any economic value. To the contrary, today's DSL technology is powerful enough to extend the life of existing copper cable for many years into the future. At least from an economist's perspective, depreciation should consider the full duration of an item's economic value, including uses to which an item can be converted after the initial use.

Today's DSL technology is capable of providing businesses and residences with very fast data services in addition to traditional voice services. While the popularity of DSL service will depend upon many factors, including price levels, marketing strategies, and the pace at which demand for faster data connections grows, it is clear that this technology will extend the life of many copper cables well into the "digital age."

The same trends which are pushing down the cost of computers and modems will tend to make DSL technology more attractive, and extend the economic life of existing copper cables. To be sure, fiber offers important advantages over copper, and thus there will also be a trend towards increased use of fiber optic cable. Nevertheless, the rapid decline in the cost of electronic components, and rapid growth in the demand for fast Internet connections, video services, and other high-speed applications will also increase the demand for DSL (and successor technologies) which will extend the life of the of the installed base of copper cable. In evaluating this situation, it must be recognized that the 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 will also serve to extend the economic life of copper cable. Copper cable will only become economically obsolete if demand for bandwidth outstrips the capabilities of copper based technologies, or if the electronics needed for a copper-based system were far costlier than the analogous electronics for a fiber-based system. At least during the next decade or two, there is no reason to anticipate that copper cable will be completely replaced by fiber optic cable, nor is there any reason to believe that it will completely lose its

economic value.