TECHNOLOGY FUTURES INC. 13740 Research Boulevard, Suite C-1, Austin, Texas 78750-1859 • (800) TEK-FUTR • (512) 258-8898
Fax: (512) 258-0087 • Internet: http://www.tfi.com • e-mail: info@tfi.com

December 22, 1999

Dr. Jason Zhang
GTE Corporation
600 Hidden Ridge, HQE02D33
Irving, TX 75038

Dear Dr. Zhang,

Technology Futures, Inc. (TFI) offers the following comments concerning the use of one of its reports in the FCC's 10th Report and Order on Universal Service, paragraph 305 and associated footnote 638:

- The FCC incorrectly concluded that the 8% "shell" investments in the TFI Study included all Main Distributing Frame (MDF) and power investments.
- The FCC's proposed adjustment also incorrectly applied the 8% factor to the RUS data which included only investments without MDF and power. The correct factor for the proposed adjustment for the 8% is 8.7%.
- Based on the TFI Study and the FCC's 1996 data, a conservative estimate of the "shell" investment which does not include all MDF and power investment is at least $33 per line for 1999.

Paragraph 305 states:

> *We find that we should adjust the RUS data for MDF and power equipment costs in a way that is more consistent with the way in which these costs are estimated in the depreciation data set. In depreciation data, MDF and power equipment costs are estimated as a percentage of the total cost of the switch, as are all other components of the switch. Based on the estimates of Technology Futures, Inc., we find these costs were eight percent of total cost.[638] Because we are adjusting the RUS data so that they are comparable with the depreciation data, we find it is appropriate to use a comparable method to estimate the portion of total costs attributable to MDF and power equipment. Accordingly, in order to account for the cost of MDF and power equipment omitted from the RUS information, we conclude that the*

> *cost of switches reported in the RUS data should be increased by eight percent.*

Footnote 638 states:

> *Lawrence K. Vanston, Ray L. Hodges, Adrian J. Poitras, Technology Futures, Inc.,* Transforming the Local Exchange Network: Analyses and Forecast of Technology Change *149 (2d ed. 1997) (TFI Study). The terminology used in the TFI study differs somewhat. What TFI calls "shell" is "the common equipment, such as cabling and power equipment, that is not modular and lasts the life of the switch entity." TFI Study at 136. This includes MDF and power investment.*

The footnote acknowledges a difference in terminology between TFI's definition of the "shell" and MDF and power equipment as omitted from the RUS data. There are, in fact, significant differences. It must be understood that the TFI study is a life analysis and was not intended to identify the total cost of power and MDF. The study instead attempts to group the various components of the digital switch into modules with similar life characteristics. These modules are: processor/memory, switching fabric, trunk interface, digital loop carrier interface, baseband (analog) line interface, and shell.

The "shell" is defined on page 136 (TFI Report) as "the common equipment, such as cabling and power equipment, that is not modular and lasts the life of the switch entity." The FCC footnote 638 correctly contains this definition but inappropriately states, "This includes MDF and power investment." The last quote is incorrect when used to infer that it includes the *total* costs attributable to MDF and power. First, a significant portion of MDF costs are the protectors and the outside plant (OSP) cable terminated on the MDF. These costs are not part of the switching account in depreciation studies. The cabling from the line equipment to the MDF is all that is included. Therefore, some, but not all, of the MDF costs are included as "shell" in the TFI study. Second, all of the power equipment is not included in the "shell." There are significant investments in power cables, fuse panels, filters, and low voltage electronic power equipment which is associated with specific modules of the life study. This portion of the power investment was assigned directly to modules other than the "shell" since it would retire along with the equipment it supports.

Even without the additional MDF and power investments identified above, the TFI Study found that the "shell" investment per line based on 1996 FCC data was about $33 per line.[1] The "shell" investment per line for 1999 is expected to be even higher. The MDF is primarily metal works and cables while the power equipment is primarily batteries, copper busses and cables, and chargers. These material intense components do not benefit from technology advances and associated price declines as with other components of the digital switch. In fact, they are most likely to increase over time.

In summary, the TFI report category "shell" includes some, but not all, of the MDF and power costs. Based on the TFI report using the FCC's 1996 data, even without including all the MDF and power investments, the "shell" investment per line in 1996 was $33 per line. The "shell" investment per line for 1999 is expected to be even higher.

Sincerely,

Ray L. Hodges
Senior Consultant

[1] Based on an investment of $48,998,744,000 from the 1996 Statistics of Common Carriers Report, Table 2.7 by the FCC. The investment was divided by the number of access lines served by digital switches in 1996 (18,149,000) from Table 10.1 in the June 1999 FCC Monitoring Report. Eight percent of this cost per line equates to $33 per line.