United States General Accounting Office

GAO

Report to the Ranking Minority Member, Committee on Commerce, Science, and Transportation, U.S. Senate

August 2000

TELECOMMUNICATIONS

Issues Related to Local Telephone Service

GAO/RCED-00-237

Contents

Abbreviations

ADSL	asymmetric form of DSL
ARMIS	FCC's Automated Reporting Management Information System
CLECs	Competitive local exchange carriers
DSL	digital subscriber line
FCC	Federal Communications Commission
ILECs	incumbent local exchange carriers

United States General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-285105

August 31, 2000

The Honorable Ernest F. Hollings
Ranking Minority Member
Committee on Commerce, Science,
and Transportation
United States Senate

Dear Senator Hollings:

As you know, the Telecommunications Act of 1996 fundamentally changed the laws and regulations governing the telecommunications industry. Through this act, the Congress sought to increase competition in local telephone service and reduce regulation in order to secure lower prices and higher quality services for consumers and to encourage the rapid deployment of new telecommunications technologies, such as digital subscriber line (DSL), which, among other things, enables high-speed access to the Internet. Overall, the time since the act's passage has been characterized by significant adjustments for regulators, companies, and consumers. A variety of companies, including incumbent telephone companies and new competing carriers, have spent considerable resources responding to the incentives and obligations created by the act. They have pursued new business plans, developed new technologies, invested in new facilities, restructured their businesses through mergers, and otherwise refocused their companies toward the future. One aspect of these activities involves the sale of telephone facilities, including access lines (that is, the connection between customers and a local telephone company's central office),[1] in rural areas—those areas outside of a metropolitan statistical area.[2]

[1] Sales of telephone facilities typically include the sales of access lines, local switches, and trunks. The local switches connect access lines for the duration of the telephone calls, and trunks connect one local switch to another or to the long distance network. The size of a telephone facility sale is expressed by the number of access lines served.

[2] The general concept of a metropolitan statistical area is that of a core area containing a large population nucleus, together with adjacent communities having a high degree of economic and social integration with that core. The current standards provide that each newly qualifying metropolitan statistical area must include at least one city with 50,000 or more inhabitants, or a Census Bureau-defined urbanized area (of at least 50,000 inhabitants) and a total metropolitan population of at least 100,000 (75,000 in New England).

This report responds to your request for information on three issues that relate to developments in the local telephone service market:[3]

- the number of rural access lines that have been sold since the act's passage by large incumbent local exchange carriers, known as major ILECs;[4]
- the development of DSL technology and the basis for variations in its rate of deployment; and
- the quality of local telephone service, as indicated by customer complaints and customer survey data reported to the Federal Communications Commission (FCC) by the major ILECs.

To respond to the first issue, we reviewed FCC data on sales of access lines by the major ILECs since 1996. Per your request, we considered ILECs with more than 2 percent of the total telephone access lines in the United States as "major." Thus, our study included the Regional Bells, GTE, and Sprint/United, which together owned 92 percent of the access lines in the nation as of December 31, 1998. We also surveyed 51 state utility commissions (50 states and the District of Columbia) to obtain information on access line sales approved by the commissions and on those still pending their approval.[5] Our survey of state utility commissions, with its 100-percent response rate, also allowed us to collect information (which was not readily available from other sources) on the estimated number of access lines sold in rural areas—those areas outside of metropolitan statistical areas. To address the second issue, we reviewed publications by FCC and others on the development of DSL, and we spoke with communications industry officials and experts about trends in DSL deployment. For the third issue, we analyzed two different service quality indicators: (1) customer complaint data and (2) customer dissatisfaction survey data. Both indicators are compiled by the major ILECs and reported

[3] Local telephone service includes calls that are made within a designated geographic area or locality without paying long distance charges.

[4] ILECs include the Regional Bells as well as many other independent local telephone carriers that were providing local telephone service before the 1996 act was passed. We considered ILECs with more than 2 percent of the total telephone access lines in the United States as "major."

[5] We report sales in the year the state utility commission approved them. For most sales, FCC must subsequently approve a waiver to change an ILEC's geographic service area. FCC granted waivers for all sales by major ILECs that required waivers and were approved by state utility commissions from 1996 through 1999.

to FCC. We also reviewed studies on quality-of-service issues that FCC developed from its own analysis of the telephone company data. Our scope and methodology are discussed in more detail in appendix I.

Results in Brief

Of the nearly 832,000 access lines sold by major ILECs from January 1996 through April 2000, an estimated 68 percent were in rural areas, according to state utility commission officials.[6] The estimated 562,000 rural access lines sold represented only 2 percent of the major ILECs' total rural access lines in 1999. After a steady annual decline in sales of access lines from 1997 through 1999, the first 4 months of 2000 saw a dramatic increase in sales, particularly in rural areas. In fact, the number of rural access lines sold from January through April 2000 already exceeds the total number of rural lines sold during the previous 4 years. The sharp increase in rural sales appears to be continuing. GTE and US WEST have sales pending with state utility commissions or FCC involving a total of over 870,000 additional rural access lines. According to GTE and US WEST officials, their companies made business decisions to sell access lines at several times in the past. FCC, on the other hand, believes that most of the delay is the result of the negotiation process between the ILEC and potential purchasers, rather than the state and federal approval processes.

DSL technology was initially developed in the late 1980s and tested in the early 1990s as a means for providing video services over the telephone network. In the mid-1990s, as the Internet began to surge in popularity, technical trials were conducted by several telephone companies to assess the feasibility of using the asymmetric form of DSL (ADSL) for high-speed Internet access. Although the commercial availability of ADSL did not begin for nearly 10 years after its development, telephone companies have rapidly deployed DSL over the past 3 years. ILECs intensified their ADSL deployment in recent months in response to both the ADSL deployment by competitive local exchange carriers, known as CLECs, and the cable industry's foray into Internet access with cable modem service. A number of communications industry officials and some industry experts told us that ADSL deployment did not occur sooner because the ILECs were concerned about potential harm to revenues generated by other existing high-speed telephone services, and because of the unproven nature of the technology. Several ILEC officials told us that ADSL was not deployed

[6] Intrastate telephone services are regulated by state agencies, generally called public utility commissions. In this report, we refer to these agencies as state utility commissions.

sooner because trials of ADSL for delivery of video services had been unsuccessful, the technology had various technical limitations, and federal regulations that had been issued for ADSL lines serve as a disincentive to its more rapid deployment.

We reviewed two key indicators that raise concerns about the quality of telephone service. First, the number of customer complaints to state and federal regulators about the quality of local telephone service fell slightly between 1996 and 1997 but increased after 1997 to a significantly higher level than that in 1996, as measured by the number of complaints per 1,000 access lines filed with state utility commissions and FCC. The increases are attributable to higher complaint levels for five of the eight major ILECs included in our analysis of complaint data. Second, according to telephone companies' own customer surveys for 1996 through 1999, there is no clear trend in the overall level of customer dissatisfaction; the levels vary from company to company by the type of customer and type of service. However, most of the major ILECs experienced increases in customer dissatisfaction in 1999 (the most recent available data) compared with 1998.

Background

AT&T's domination of the local telephone markets came to an end in 1984, in the aftermath of an antitrust suit brought by the Department of Justice, which alleged that the company was engaging in anticompetitive behavior to the detriment of new competitors in the long distance and telephone equipment markets.[7] Under a consent decree, AT&T was required to divest its ownership of the 22 Bell Operating Companies. These 22 companies were initially reorganized into seven Regional Bell Operating Companies—Ameritech Corporation, Bell Atlantic Corporation, BellSouth Corporation, NYNEX Corporation, Pacific Telesis, Southwestern Bell Corporation, and US WEST, Inc. By 1999, these seven companies had merged into four: Bell Atlantic, BellSouth, SBC Communications, and US WEST. [8] Approximately 1,300 independent telephone companies continue to operate, ranging from small ones with only a few hundred access lines to the largest, Sprint/United, with millions of access lines. Along with the mergers of whole companies, smaller realignments are taking place, including the sale of access lines by one company to another. In general, the major ILECs are selling access lines to smaller companies. A telephone company that plans to sell access lines must obtain approval from the appropriate state utility commission. Additionally, the telephone company must get approval from FCC to discontinue service.[9] Finally, in most cases, an ILEC must apply to FCC for a waiver when the company plans to sell access lines that will change the geographic service area of its operations.[10]

[7]By the early 1980s, AT&T had carried roughly 80 percent of the nation's local telephone traffic through its 22 subsidiary Bell Operating Companies. The remaining 20 percent of local telephone traffic (much of which was concentrated in rural areas) was carried by a myriad of independent telephone companies unaffiliated with AT&T. Because both the Bell Operating Companies and the independent companies held franchises giving them the right to serve geographically distinct areas that did not overlap, very few consumers had a choice of providers for local telephone service.

[8]In this report, we provide information on the original seven Regional Bell Operating Companies, GTE, and Sprint/United, each of which owns more than 2 percent of the access lines in the United States. In recent years, SBC Communications, the parent of Southwestern Bell, has acquired Ameritech and Pacific Telesis, along with Southern New England Telephone Company. Bell Atlantic has acquired NYNEX. FCC approved two new mergers in June 2000. Bell Atlantic and GTE are now called Verizon. US WEST and Qwest are now called Qwest.

[9]Section 214 of the Communications Act of 1934, as amended, 47 U.S.C. 214.

[10]In 1984, FCC froze the geographic boundaries where ILECs provide service, known as study areas. An ILEC must apply to FCC for a waiver when a sale or purchase of access lines will change the study area boundary.

The digital age is bringing new business opportunities to local telephone companies as the volume of data traffic carried over the public telephone network increases. The rapid growth of the Internet and of electronic commerce is driving the demand for broadband access that provides a continuous connection to the Internet, coupled with the capability of both receiving and transmitting data at high speeds. To capitalize on the demand for broadband service, telephone companies are taking steps to exploit the unused carrying capacity of the copper wiring with DSL technology that connects homes to the telephone companies' switching centers, so that broadband signals can be carried along this "last mile" from the switching center into homes.

Maintaining the quality of telephone service amidst the changes in the telecommunications marketplace is increasingly important. Telephone lines provide critical communications connections between electronic devices that have become integral to how consumers, businesses, and government send and receive information. As competition develops and the telecommunications industry becomes a network of networks, it will be increasingly challenging to maintain seamless, high-quality service. State utility commissions continue to play a major role in overseeing the quality of local telephone service within their states. Since the rules on service quality differ from state to state, telephone companies must comply with the specific service quality rules for the states in which they operate. At the federal level, FCC monitors the quality of service as part of its regulatory responsibilities. While FCC has not established service quality standards for local telephone companies, it evaluates telephone companies' performance on the basis of industry standards and an analysis of trends in service quality data, as reported to FCC by the companies themselves. These data include companies' customer complaints and surveys of customer dissatisfaction.

Most Access Lines Sold by Major ILECs Are in Rural Areas

State utility commission staff participating in our nationwide survey estimate that about 68 percent of the nearly 832,000 access lines sold by the major ILECs from January 1996 through April 2000 were in rural areas. More than half of these approximately 562,000 rural access lines were sold during the first 4 months of 2000. The survey also found that while sales of access lines by the major ILECs declined steadily from 1997 through 1999, they surged during the first 4 months of 2000. Although the number of rural lines sold from January 1996 through April 2000 represented only 2 percent of the total number of rural access lines that these ILECs owned in 1999, the upswing in rural line sales appears to be continuing. Two major ILECs

have plans pending with state utility commissions to sell more than 870,000 additional rural lines.

Access Line Sales Have Been Concentrated in Rural Areas

From January 1996 through April 2000, in 31 separate sales, the major ILECs sold 831,424 access lines in 18 different states; 68 percent of these lines, or 561,982, were concentrated in rural areas.[11] The number of all access lines per sale ranged from 94 to 242,110. Most of the individual sales involved relatively small numbers of access lines: an average 2,726 lines per sale, with 19 out of 31 sales involving 5,000 or fewer lines. As indicated in figure 1, sales generally involved access lines in the central and mountain regions of the country.

[11] Because we gathered data from state utility commissions, sales listed in this report were approved by the state utility commissions. However, sales also require FCC approval. A few recent sales received FCC approval shortly after April 2000 or are pending FCC approval.

Figure 1: States Where Major ILECs Sold Access Lines, January 1996-April 2000

Source: GAO's survey of state utility commissions .

Utility commission staff in 15 of the 18 states where sales occurred reported in our survey that all of the lines sold in their states were in rural areas. (See table 1.) The four states with the greatest sales of access lines were Arkansas, Illinois, Missouri, and Oklahoma. The number of lines sold in these states accounted for 73 percent of all lines sold and an estimated 61 percent of all rural lines sold.

Table 1: Estimated Access Lines Sold in Rural Areas, January 1996-April 2000

States with access line sales	Total access lines sold in rural and nonrural areas	Estimated percent of access lines sold in rural areas	Estimated rural access lines sold
Arkansas	242,110	62%	150,108
Arizona	1,250	100%	1,250
Colorado	94	100%	94
Idaho	14,545	100%	14,545
Iowa	23,573	100%	23,573
Illinois	132,000	0%	0
Kansas	3,015	100%	3,015
Michigan	11,200	100%	11,200
Minnesota	27,743	100%	27,743
Missouri	120,506	100%	120,506
Nebraska	12,497	100%	12,497
North Dakota	17,000	100%	17,000
Oklahoma	116,066	61%	70,626
South Dakota	4,919	100%	4,919
Texas	13,043	100%	13,043
Utah	5,000	100%	5,000
Washington	1,863	100%	1,863
Wisconsin	85,000	100%	85,000
Total	**831,424**	**68%**	**561,982**

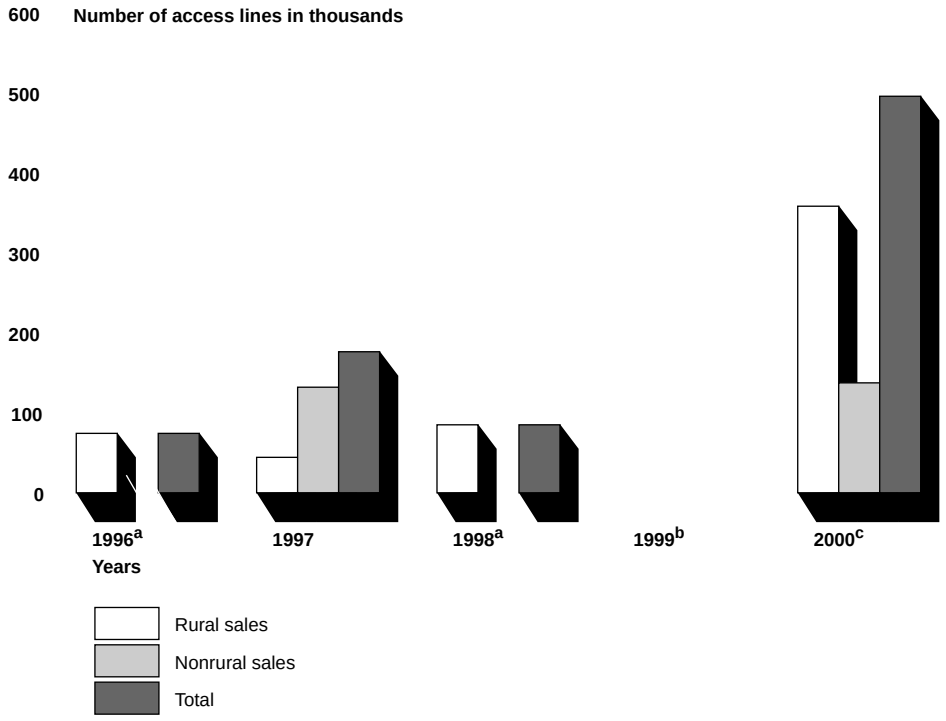
Source: GAO's survey of state utility commissions. Rural lines sold were estimated from state utility commission staff estimates of the percent of access lines sold in rural areas.

Sales Increased Sharply During 2000, After a 3-Year Decline

As shown in figure 2, the number of access lines sold annually by the major ILECs decreased from 1997 through 1999, with only one sale (for 94 lines) occurring during 1999. However, the picture changes dramatically in 2000. The number of access lines sold from January through April 2000 exceeds the total number of lines sold from 1996 through 1999. Similarly, the major ILECs sold more lines in rural areas in the first 4 months of 2000 than the total number of rural lines they sold from 1996 through 1999. According to GTE and US WEST officials, their companies made business decisions to sell access lines at several times in the past. The fluctuations in annual sales between 1996 and 2000, according to these officials, is attributable to the time required to obtain state and federal regulatory approvals to effect

the transfer of the lines to the purchasers. For example, sales for 1996 through 1999 resulted from decisions to sell access lines in 1994, while sales in 2000 resulted from 1999 decisions to sell additional lines. FCC disagrees with the notion that the delays associated with state and federal approvals are responsible for the pattern of sales. According to FCC, the majority of the delay between a strategic decision to sell lines and final approval is the result of negotiations between the ILEC and potential purchaser. FCC estimates that federal approval generally takes no more than 2 months.

Figure 2: Access Lines Sold by Major ILECs in Rural and Nonrural Areas January 1996—April 2000



[a]All sales in 1996 and 1998 were rural.

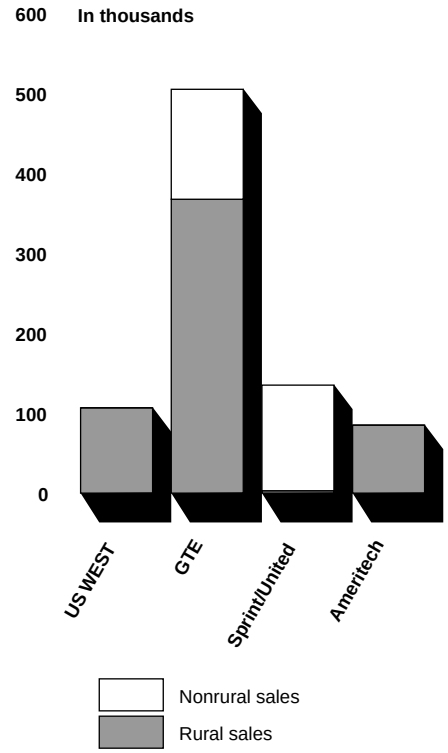
[b]One sale of less than 100 lines.

[C]Includes sales from January-April 2000.

Source: GAO's survey of state utility commissions. Rural sales were estimated by state utility commission officials.

Figure 3 shows the total sales in rural and nonrural areas from January 1996 through April 2000 for the four ILECs.

Figure 3: Rural and Nonrural Access Lines Sold by Major ILECs January 1996—April 2000



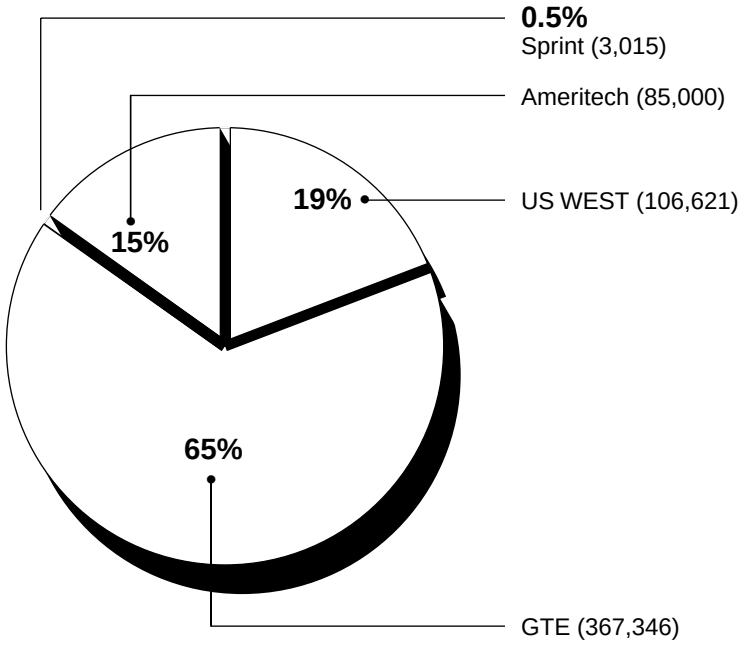
Note: Two percent of Sprint/United sales were in rural areas.

Source: GAO's survey of state utility commissions. Rural sales were estimated by state utility commission staff.

As indicated in the figure, all of the access lines sold by US WEST and Ameritech were in rural areas. In addition, nearly three-quarters of the lines sold by GTE and 2 percent of the lines sold by Sprint/United were in rural areas. Figure 4 shows, by major ILEC, the estimate of rural access lines sold from January 1996 through April 2000. Of the estimated rural lines sold (561,982), GTE and US WEST sold 84 percent (473,967) and accounted for 27 of the 31 sales transactions. Sprint/United conducted three sales and Ameritech conducted one sale. Our estimates of the remaining rural sales

include 3,015 lines sold by Sprint/United in Kansas and 85,000 lines sold by Ameritech in Wisconsin.

Figure 4: Estimated Rural Access Lines Sold by Major ILECs, January 1996-April 2000



Note: Percents do not add due to rounding.

Source: GAO's survey of state utility commissions. Rural sales were estimated by state utility commission staff.

Two Major ILECs Plan to Sell Additional Access Lines in Rural Areas

The increase in sales of access lines appears to be continuing. As of April 2000, US WEST and GTE had notified state utility commissions that they were planning 30 additional sales involving over 1 million access lines, primarily in rural areas. If approved, these sales would transfer more access lines than were sold from January 1996 through April 2000. We have information on 27 pending sales of rural and nonrural access lines; one state commission could not provide the total number of lines to be sold in the pending sale; and two state commissions could not distinguish between rural and nonrural access lines.[12] Figure 5 indicates that, as with sales approved by state utility commissions, most of the states with pending access line sales are in the central and mountain regions of the country.

Figure 5: States With Pending Sales of Access Lines, as of April 2000

Note: Sales are pending in Arizona, Montana, and New Mexico; however, state utility commissions were unable to provide the total number of lines to be sold.

Source: GAO's survey of state utility commissions.

More specifically, in the 27 pending sales for which complete information was available, US WEST and GTE plan to sell a total of 901,379 access lines. An estimated 97 percent of these lines (871,818 lines) are in rural areas, according to our survey of state utility commissions. In 24 of these 27 sales, the commission staff reported that US WEST and GTE plan to sell access lines exclusively in rural areas. Table 2 provides information on the total

[12]The Arizona Corporation Commission was unable to provide the total number of lines pending sale. In Montana and New Mexico, the state utility commissions were able to provide the total number of lines to be sold but were unable to determine how many of these lines are in rural areas.

number of rural access lines planned for sale, by state. The number of lines per pending sale for the 27 sales varies widely, ranging from 169 lines for one sale in Utah to 313,800 lines for a sale in Texas. In the other three pending sales for which state utility commission staff provided complete information in our survey, US WEST and GTE plan to sell access lines in both rural areas and urban areas. Among these sales, for example, GTE plans to sell 128,000 lines in Minnesota, 78 percent of which are estimated to be in rural areas, while US WEST has two sales planned in Wyoming, one involving 2,336 lines (50 percent estimated to be in rural areas) and the other involving 4,664 lines (95 percent estimated to be in rural areas).

Table 2: Estimated Percent of Rural Access Lines Involved in Pending Sales

States with pending sales of rural access lines[a]	Total access lines to be sold in pending sales	Estimated percent of rural access lines in pending sales	Estimated rural access lines to be sold in pending sales
Alaska	23,796	100%	23,796
California	50,700	100%	50,700
Colorado	36,000	100%	36,000
Idaho	45,000	100%	45,000
Iowa	50,000	100%	50,000
Minnesota	128,000	78%	99,840
Nebraska	74,953	100%	74,953
South Dakota	2,360	100%	2,360
Texas	313,800	100%	313,800
Utah	34,622	100%	34,622
Washington	10,148	100%	10,148
Wisconsin	125,000	100%	125,000
Wyoming	7,000	80%	5,599
Total	**901,379**	**97%**	**871,818**

[a]Pending sales by state are as follows: Colorado, Idaho, Iowa, Minnesota, South Dakota, Texas, and Washington each have one; California, Nebraska, Wisconsin, and Wyoming each have two; Alaska has five; and Utah has seven.

Source: GAO's survey of state utility commissions. Rural lines sold were estimated from state utility commission staff estimates of the percent of access lines sold in rural areas.

In addition to involving greater numbers of access lines in total, the individual sales that US WEST and GTE have pending with state utility commissions are, on average, larger than the sales that have been approved by the state utility commissions. Specifically, the average number of lines

to be sold in the pending sales is 11,500, compared with an average of 2,726 lines sold in sales that have been approved by the state utility commissions. Moreover, while 18 out of 29 of the pending sales (for which we have complete information on total lines) are for more than 5,000 lines, about the same number of past sales were for 5,000 or fewer lines. Only two states (South Dakota and Wyoming) have pending sales of under 10,000 lines, while seven states (California, Iowa, Minnesota, Nebraska, New Mexico, Wisconsin, and Texas) have sales pending for 50,000 lines or more.

Deployment of "Digital Subscriber Line" Technology Has Increased Substantially Since Adaptation for Internet Access

DSL technology was initially developed in the late 1980s and tested in the early 1990s as a means for providing video services over the telephone network. In the mid-1990s, as the Internet began to surge in popularity, technical trials were conducted by several telephone companies to test the asymmetric form of DSL (ADSL) to provide high-speed Internet access. Although the commercial deployment of ADSL technology did not begin for nearly 10 years after its development, telephone companies' deployment of ADSL for residential high-speed Internet access has grown substantially since late 1997 when it was first deployed. According to a number of communications industry officials and some industry experts, ILECs did not deploy ADSL sooner because of concern that the technology could harm existing high-speed telephone services. ADSL deployment by ILECs increased in recent years, we were told, in response to ADSL deployment rates of CLECs and the cable industry's deployment of cable modem Internet service. Representatives of several ILECs contend that ADSL was not deployed sooner because the trials of the technology for video on-demand service were unsuccessful, the technology had technical limitations, and federal regulations were issued for DSL service.

DSL Supports High-Speed Broadband Services Over Existing Telephone Lines

DSL is the generic name for a communications technology that supports the transmission of high-speed broadband services over telephone companies' existing local loops—the twisted pair of copper wires connected from virtually every home and business in the nation to the public switched telephone network. One version of the technology, ADSL, provides faster speeds for downloads than uploads and has become the most widely deployed form of DSL technology by the nation's telephone companies for the provision of high-speed Internet access. This technology facilitates the transmission of data signals over the high-frequency portion of the loop in their original form, bypassing the public network, and routing the signals between a user's computer and the Internet. Without DSL service, data signals must be converted by a modem for transmission over

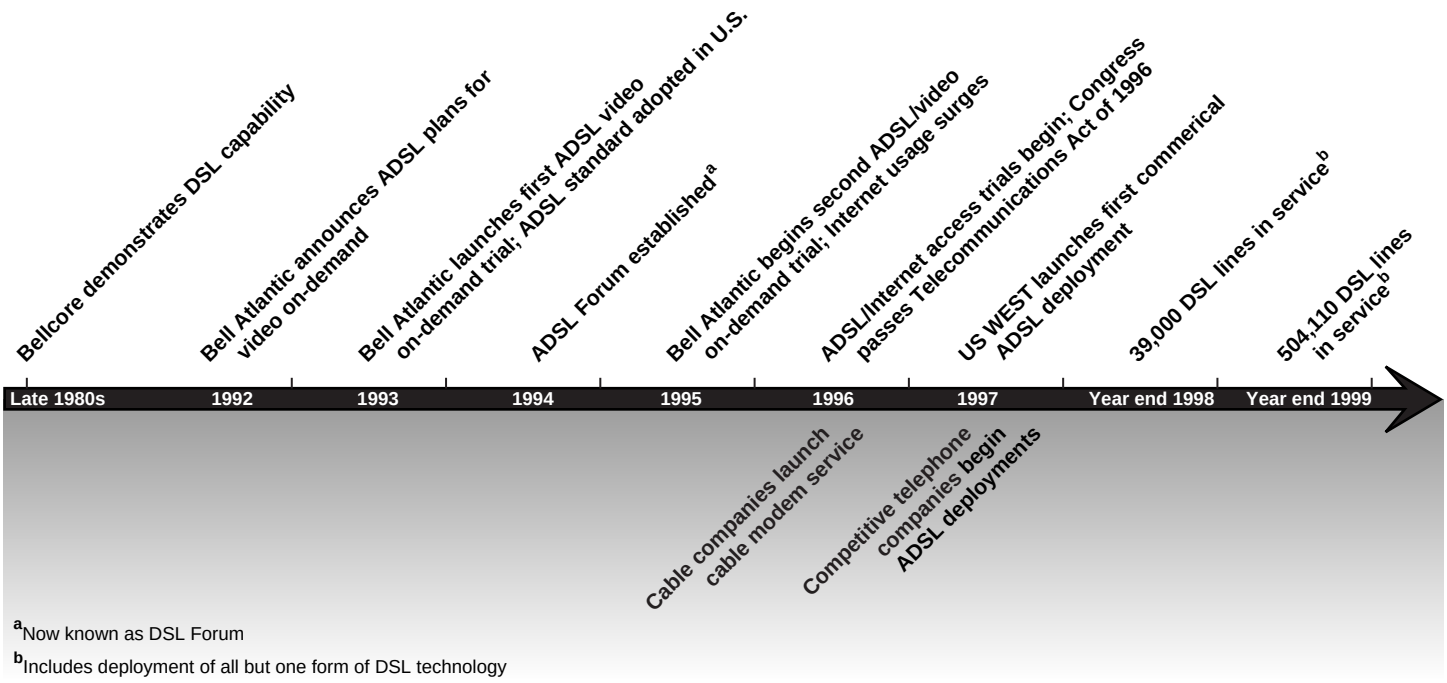
copper loops and reconverted back to their original form at their destination point. Because different portions of copper loops' bandwidth are engaged in transmitting voice and data signals, both can be transmitted simultaneously with DSL technology, thereby enabling a DSL customer to talk on the telephone and use the Internet at the same time.

Originally Conceived for Video Services, DSL Technology Was Adapted for Internet Access

Efforts to maximize the existing copper loop infrastructure of the telephone network for the transmission of video and other services requiring greater bandwidth began in the late 1980s. Bell Communications Research (Bellcore),[13] the former research and engineering consortium of the Regional Bell Operating Companies, is largely credited with the initial research on DSL. Overcoming a general belief that the telephone companies' local copper loops had limited capacity, Bellcore researchers demonstrated that the bandwidth available on the loops was not fully utilized for voice services and that the transmission capacity was significantly higher than estimated earlier. Because voice signals only utilize a small portion at the lowest frequency of the available bandwidth on local loops, DSL technology was developed to exploit the unused high-frequency portion of copper loops to transport data signals at high speeds. Figure 6 shows the timeline of DSL development.

[13]In 1997, Bellcore was sold by the Regional Bell Operating Companies to Science Applications International Corporation and was renamed Telcordia Technologies.

Figure 6: Timeline of DSL Development Activities



[a]Now known as DSL Forum

[b]Includes deployment of all but one form of DSL technology

Research on DSL continued into the early 1990s to improve the technology and its ability to support the delivery of broadband services to telephone customers. Several techniques were developed by private sector and academic researchers to code, or modulate, data signals that are transmitted over local loops using DSL technology in order to provide an "asymmetrical" capability—that is, a higher speed for downloading data using greater bandwidth and slower speeds using less bandwidth for uploading data—considered key to delivering video. A division within the DSL developer community over the competing modulation techniques resulted in the formation of the ADSL Forum in 1994, which brought the DSL industry together to support further research, development, and deployment of DSL technology. The most widely deployed form of DSL technology today, ADSL was considered practical for video services and later for Internet access because it mimics typical customer usage patterns of substantial download and minimum upload activities.

In October 1992, Bell Atlantic announced plans to test a video on-demand service using ADSL-equipped telephone lines to transmit video by customers' request. When the 2-year trial was launched in April 1993 with the participation of 300 employees, Bell Atlantic became the first known company in the world to deploy ADSL technology outside a laboratory. In a second phase, begun in May 1995, Bell Atlantic tested video on-demand over ADSL technology under field conditions with actual customers. At the conclusion of this commercial trial, Bell Atlantic announced plans to deploy ADSL for on-demand broadband services in selected markets beginning in 1997.[14]

By the mid-1990s, the popularity of the Internet surged because the graphical nature of the World Wide Web greatly improved public access to the Internet. In addition, alternative methods for Internet access—such as cable modem service—became available to consumers, and the ILECs began to face competition for both conventional local telephone and DSL services, in part because of the enactment of the Telecommunications Act of 1996. Upon realizing at this time that new media services would become more widely available through the Internet over a personal computer than over television sets, ILECs' efforts to bring ADSL technology to commercialization were redirected to capitalize on the growing demand for Internet access and services based on the World Wide Web. ADSL field trials conducted by other telecommunications companies in the mid-1990s were designed to test the technology for providing broadband Internet access. For example, GTE began an Internet access trial using 30 ADSL-equipped lines in Irving, Texas, in February 1996, and conducted a second trial in partnership with Microsoft in Redmond, Washington, 2 months later. Other known ADSL trials for Internet access were conducted in 1996 by Ameritech, NYNEX, Pacific Telesis, SBC Communications, and US WEST.

US WEST in Phoenix, Arizona, made the first known commercial offering of ADSL service for Internet access in late 1997. Ameritech, GTE, and SBC soon followed with commercial deployments of ADSL service in late 1997 and 1998. As CLECs began to gain access to incumbent carriers' networks and facilities, as permitted by the Telecommunications Act of 1996, DSL

[14] In anticipation of the commercialization of video on-demand, three of the Regional Bell Operating Companies—Bell Atlantic, NYNEX, and Pacific Telesis—established a partnership known as "TELE-TV" in October 1994 to provide a nationally branded package of entertainment, information, and educational services. A similar company, known as "Americast," was formed by Ameritech, BellSouth, Southwestern Bell, GTE, Southern New England Telephone Company, and the Disney Company.

service also began to be rolled out to CLECs' customers. For example, Covad Communications launched ADSL service in December 1997 in the San Francisco Bay area; ICG Communications launched ADSL service to customers in areas of California, Colorado, Ohio, and parts of the southeastern United States in March 1998. Market research data show that by the end of 1998, 39,000 DSL lines were deployed across the country. One year later, at the end of 1999, the number of DSL lines in service was estimated at 504,110. The most recent data available from industry experts indicate that at the end of the second quarter of 2000, 1,204,478 DSL lines were in service. On the basis of recent trends, industry experts estimate that DSL deployment will reach over 2 million in-service lines by the end of 2000.

Failure of Video On-Demand and Other Factors Affected DSL Deployment

Although DSL service has held the promise for several years of transforming the telephone companies' copper loops into high-speed connections delivering broadband services, there are concerns that the technology has not been rolled out by the Regional Bell Operating Companies and other ILECs as rapidly as possible. For example, the *1999 Economic Report of the President* noted that, despite the availability of DSL technology since the 1980s, local telephone companies have only recently begun to offer DSL service to business and residential customers.

According to a number of communications industry officials and some industry experts we spoke with, the recent rapid deployment of DSL by the ILECs has occurred primarily to compete for high-speed Internet access with CLECs, which have aggressively rolled out DSL, and with cable companies deploying broadband cable modem service. Although DSL was first conceived as a means to enter the video market and compete with cable companies, the ILECs' interest in the technology diminished until they feared that competitors would use the technology to force their way into the local telephone market, according to some industry officials and experts. In addition, some industry analysts we spoke with indicated that the ILECs began to understand they had no choice but to test-market and deploy DSL more quickly or risk losing market share of the broadband Internet services market to cable companies.

Numerous reasons were offered by some communications industry officials and experts whom we spoke with for the ILECs' initial slow deployment of DSL service. Most frequently cited was a concern among the ILECs that DSL might negatively affect the revenues generated by other high-speed services offered by these companies. In addition to the effects

on other services, we were told that it takes a long time for new technology to be deployed by the telephone industry. One industry analyst told us that telephone companies are more risk-averse than other market participants, such as the cable companies, and are less likely to roll out an unproven technology.

By contrast, officials of several ILECs and others told us that DSL was not rolled out sooner largely because the original application for which it was intended—video on-demand—was not successful in field trials. We were also told that (1) the standards for DSL were not promulgated quickly enough, (2) public demand for broadband services did not arise until recently, and (3) there were and continue to be many technical limitations of DSL technology. These limitations include the following: DSL service can only be provided to customers who reside at a distance of no greater than 18,000 feet from a telephone company's central office;[15] the customers' telephone lines must be in good enough physical condition to support the service; and the telephone companies have had to address the issue of the compatibility of DSL technology used on copper loops with fiber optic cable deployed from central offices to remote facilities placed in neighborhoods. Finally, we were told that the regulation of DSL technology under provisions of the 1996 Telecommunications Act serves as a disincentive to its more rapid deployment by the ILECs.

Telephone Service Quality Indicators Raise Concerns

We reviewed two key indicators that raise concerns about the quality of telephone service. One of the indicators is customer complaints filed with state and federal regulators. Following a decline in the number of complaints per 1,000 access lines from 1996 to 1997, we found a steady increase in complaint levels between 1997 and 1999. The other indicator is telephone companies' own survey data on customer dissatisfaction with the quality of a variety of telephone services. We found that the changes in customer dissatisfaction levels from 1996 to 1999 varied considerably from company to company, depending on type of customer (residential, small business, and large business) and the type of service. Although no overall trend is evident for the entire 1996-99 period, the data do indicate that customers of most major ILECs were more dissatisfied with their telephone service in 1999 than they were in 1998.

[15]Although the distance limitation of DSL is acknowledged in FCC documents, some industry officials and experts with whom we spoke disputed the limitation.

Level of Customer Complaints to State and Federal Regulators Is Increasing

The telephone industry has developed and widely uses service quality indicators to track the quality of key telephone services. The telephone companies are required to report data on these service quality indicators to FCC, which maintains the information in its Automated Reporting Management Information System (ARMIS) [16] and produces an annual report on telephone service quality.[17] The ARMIS service quality data are self-reported by the major ILECs and are not verified by FCC.

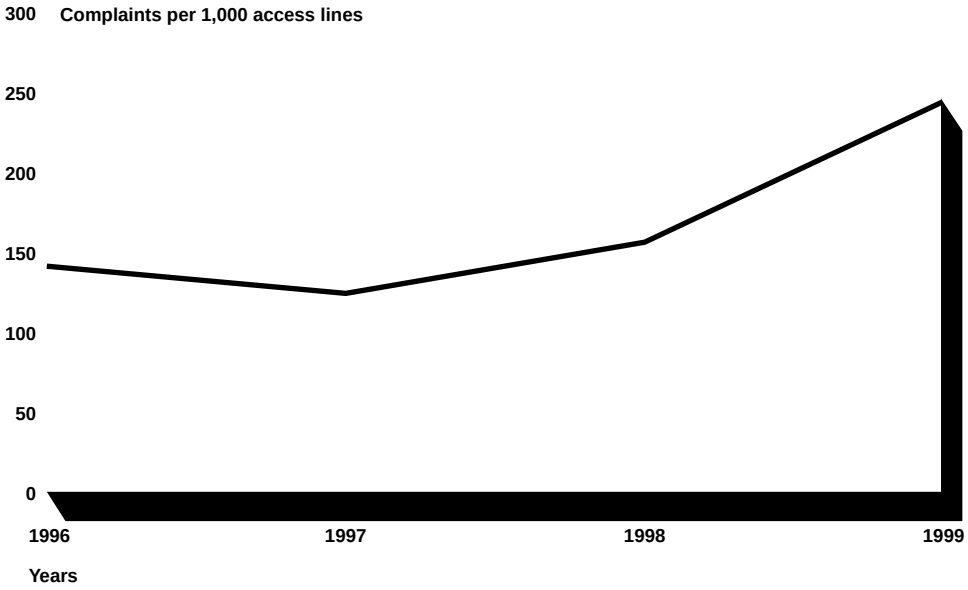
One of the key indicators tracked in the ARMIS database is the number of customer complaints filed with state utility commissions and FCC about service problems. These customer complaints concern service quality issues only and exclude complaints about billing, operator service providers, and information services provided by other companies (such as 900 or 976 services used to hear sports scores and stock quotes). We calculated the number of complaints per 1,000 access lines for eight of the major ILECs. Because some major ILECs are larger than others, we calculated the number of complaints per 1,000 lines to provide a comparable measure across the companies. We excluded NYNEX from our analysis because of a change in the company's data reporting methodology, which would have caused inconsistent data to be used for comparison. FCC officials agreed that NYNEX data should not be included in our analysis of complaint data.

As indicated in figure 7, the level of customer complaints per 1,000 access lines filed with state and federal regulators against the major ILECs has increased overall since 1996. Following a modest decrease from 1996 to 1997, the complaint level increased to a point significantly higher in 1999 than in 1996.

[16]The service quality indicators that the telephone companies report on are switch outages and downtime, trunk blockages, installation and repair intervals, customer complaints, and customer survey data.

[17]Sprint/United is not required to submit an ARMIS report on customer satisfaction.

Figure 7: Complaints per 1,000 Access Lines for Major ILECs, 1996-99



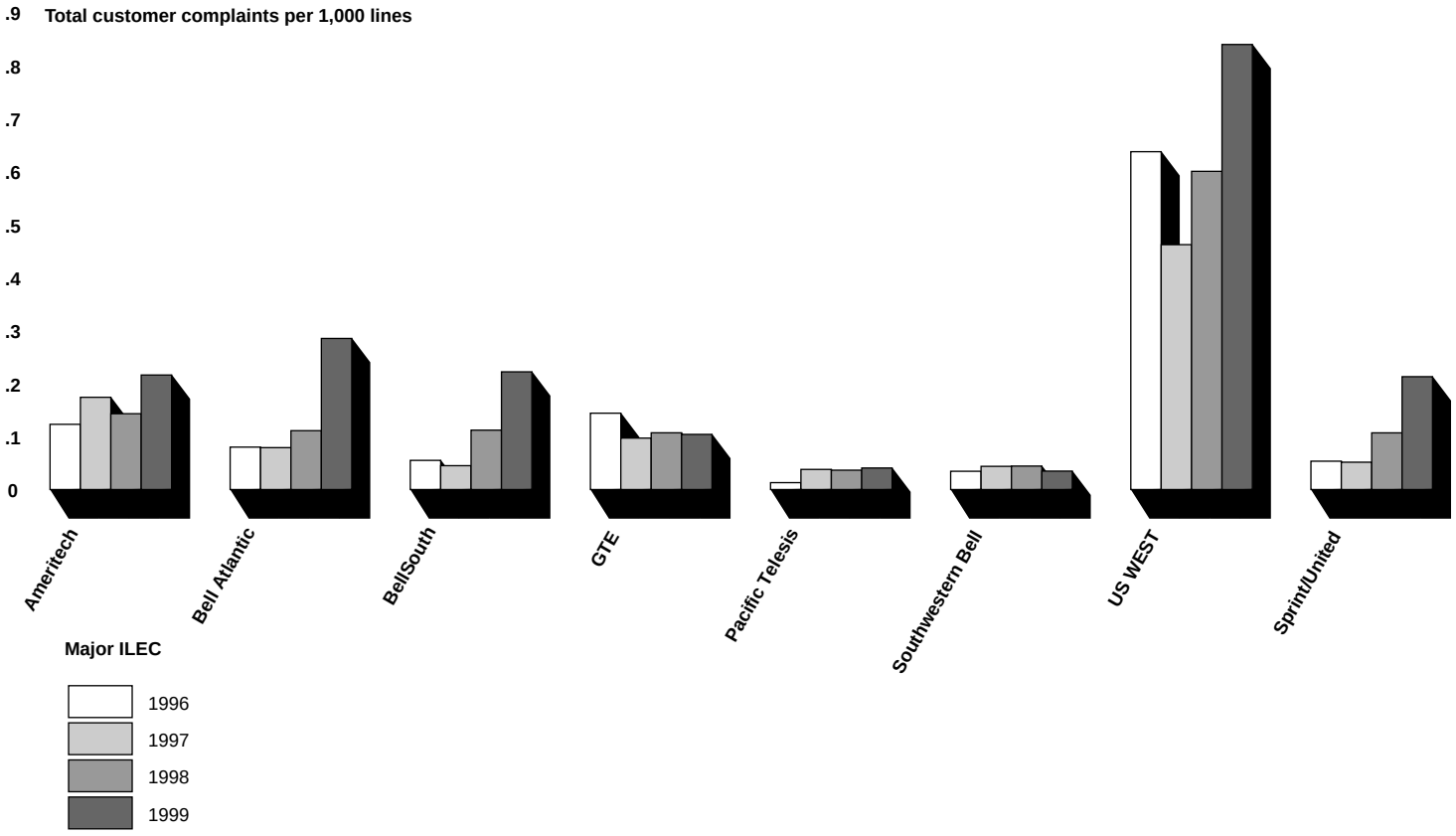
Note: These data include Ameritech, Bell Atlantic, BellSouth, US WEST, Sprint/United, Southwestern Bell, Pacific Telesis, and GTE. They exclude NYNEX, which changed in how it reports data during this period.

Source: GAO's analysis of FCC's data.

Figure 8 provides a breakdown of the overall customer complaint levels per 1,000 access lines for each of the eight major ILECs. The overall increase between 1996 and 1999 is attributable to higher complaint levels for five of the eight major ILECs included in our analysis for this service quality indicator: Ameritech, Bell Atlantic, BellSouth, US WEST, and Sprint/United.[18] Two companies' complaint levels remained relatively unchanged during this period—Southwestern Bell and Pacific Telesis, while GTE's complaint levels declined. Concerning the relative number of complaints per 1,000 access lines across the major ILECs in 1999, as reported by the companies themselves, Southwestern Bell and Pacific Telesis are the lowest, while US WEST is the highest.[19]

[18]We are reporting telephone company data as reported to FCC. Telephone companies are continuing to report data to FCC in an unconsolidated form, even though many companies are now merged.

Figure 8: Total Customer Complaints Per 1,000 Lines, 1996-99



Source: GAO's analysis of FCC's data.

For the ILECs we examined, we found no difference in the level of complaints for both urban and rural customers. That is to say, Ameritech, Bell Atlantic, BellSouth, Pacific Telesis, US WEST, and Sprint/United had more complaints per 1,000 access lines among both urban and rural customers in 1999 than in 1996; Southwestern Bell's complaint levels remained relatively unchanged among both urban and rural customers

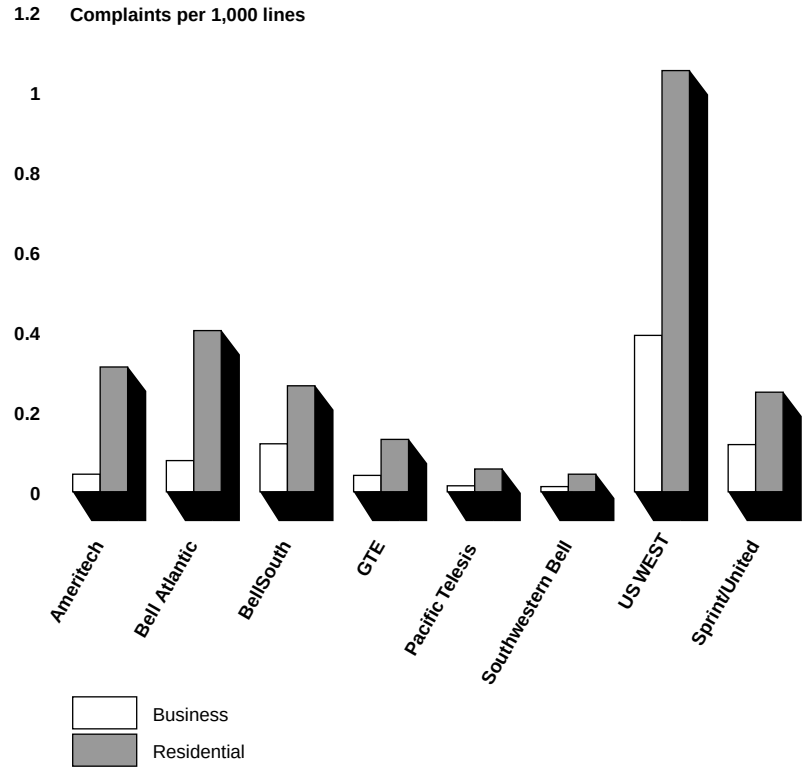
[19]To access the accuracy of the Pacific Telesis and Southwestern Bell data, FCC contacted six state utility commissions in the territories that these companies serve. Five of six reported a greater number of complaints received about the companies than the companies reported in their ARMIS filings for 1999.

between 1996 and 1999; and GTE's complaint levels declined among both urban and rural customers between 1996 and 1999.

Although we did not find differences between urban and rural complaint levels, we did find that residential customers appear to be experiencing a higher level of service problems than business customers. From 1996 through 1999, all of the major ILECs had more complaints per 1,000 access lines filed against them by residential customers than by business customers.[20] The complaint levels can be the result of several factors, including customers' distance from the central office. Figure 9 shows the level of complaints for business and residential customers in 1999.

[20]The complaint results are consistent with the data that we found on companies' trouble reports, which are also filed with FCC. Since there are more residential consumers than business consumers, presumably there would be more residential complaints. To normalize the complaint data for purposes of comparing residential and business customer compliant levels, we calculated the number of residential customer complaints per 1,000 residential access lines and the number of business customer complaints per 1,000 business access lines.

Figure 9: Business Versus Residential Customer Complaints, 1999



Source: GAO's analysis of FCC's data.

Changes in the number of residential and business complaints from 1996 through 1999 were generally similar to changes seen in each company's total level of complaints. Namely, Ameritech, Bell Atlantic, BellSouth, US WEST, and Sprint/United had more residential and business customer complaints per 1,000 access lines in 1999 than in 1996. Southwestern Bell's residential and business customer complaints per 1,000 lines stayed about the same while GTE's declined. The only anomaly was Pacific Telesis; its level of complaints from business customers was about the same for 1996 through 1999, while complaints from residential customers increased. FCC officials told us they are concerned about the increasing level of complaints, especially since most of the customers are residential.

Customer Dissatisfaction Survey Data Vary by Company, Type of Customer, and Type of Service

A second key indicator tracked by FCC are survey data on customer dissatisfaction. Most major ILECs design and conduct annual surveys to determine how dissatisfied their customers are with various aspects of their service and then report the results of these surveys to FCC. In FCC's annual report on service quality, the percentage of dissatisfied customers is reported by company for three types of customers—residential, small business, and large business—and for three types of services—installations, repairs, and business office services.[21] As with other ARMIS service quality data, the customer satisfaction data are self-reported by the telephone companies and not verified by FCC.

In contrast to customer complaints, the ARMIS data for 1996 to 1999 show no consistent trend in the level of customer dissatisfaction across the major ILECs, the three types of customers, or the three types of services we examined. Rather, there is much variation in the levels of dissatisfaction, depending on the company, the type of customer, and the type of service. For example, the residential customers of Ameritech, BellSouth, and Pacific Telesis were more dissatisfied with all three types of services—installation, repair, and business office—in 1999 than in 1996. In contrast, Bell Atlantic and NYNEX residential customers were less dissatisfied with these three types of services in 1999 than in 1996. There was no consistent pattern of change for the residential customers of the remaining three companies. The patterns for small business and large business customers were even more varied. However, if we narrow the time frame and compare 1999 data with 1998 data, we find that customers for most ILECs generally expressed more dissatisfaction with all types of services. FCC officials have told us they are concerned about this recent general increase in dissatisfaction. Appendix II provides detailed information on customer dissatisfaction levels for 1996 through 1999 by company, type of customer, and type of service.

Agency Comments

We provided a draft of this report to the Federal Communications Commission for review and comment and subsequently spoke with the Chief of the FCC's Accounting Safeguards Division. The agency concurred

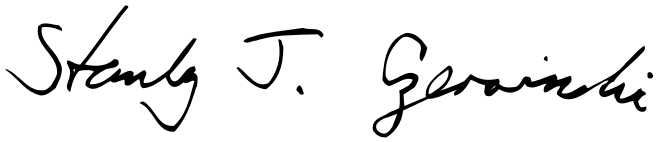
[21]The categories for type of customer and type of service are defined and interpreted by each reporting carrier because each carrier's survey can be different. Thus, strict comparisons on the level of customer dissatisfaction between carriers will not be precise.

with our findings and provided several points of clarification, which we incorporated into our final report.

We are sending copies of this report to interested congressional committees; the Chairman, Commissioners, and Managing Director, FCC; the Director, OMB; and other interested parties. We will also make copies available to others upon request.

If you or your staff have any questions about this report, please call me on (202) 512-7631. Key contributors to this report are listed in appendix III.

Sincerely yours,



Stanley J. Czerwinski
Associate Director, Housing, Community Development,
and Telecommunications Issues

Scope and Methodology

We reviewed Federal Communications Commission (FCC) data to identify cases in which major incumbent local exchange carriers, known as ILECs, had sought the Commission's approval for changes in the geographical boundaries of their operations in connection with sales of access lines since 1996. We also mailed surveys to staff at the state utility commissions in all 50 states and the District of Columbia. The surveys included information on the sales of access lines obtained from FCC and asked the state utility commission staff to verify this information. Thus, respondents provided the number of access lines sold in each sale. In reporting the average number of lines sold in sales that have already occurred and in pending sales, we used the median to represent the average. The median is the midpoint in a range of numbers. The survey also requested information on any other sales or pending sales of access lines. Respondents estimated the percentage of access lines that were in rural areas—areas outside metropolitan statistical areas—for (1) actual sales and (2) pending sales. We received survey responses from all 51 state utility commissions.

To describe the development of digital subscriber line (DSL) technology and the basis for variations in its rate of deployment, we reviewed FCC publications and public sources for documentation and information on DSL technology. In addition, we talked with industry officials—including representatives of telephone companies (e.g., Bell Atlantic, GTE, SBC, and US WEST); cable companies; and other communications companies—and industry experts to identify trends in how DSL technology is being deployed.

To identify service quality issues associated with the large incumbent local telephone companies, we interviewed FCC staff and reviewed FCC and public reports on service quality. In addition, we analyzed service quality information in FCC's Automated Reporting Management Information System (ARMIS) database. This information is supplied to FCC by the large telephone companies.[1] Because FCC does not audit the service quality data, these data may contain errors that cannot be determined at this time. Also, carriers periodically revise submitted data as problems are discovered and, therefore, the data used for this report may not contain the latest available data on file. Furthermore, caution is needed when analyzing some of the service quality data indicators because different companies

[1]These data are from telephone carriers that are required to file because they are either a "price cap carrier" or because their annual revenues exceed $114 million. A "price cap carrier" is a telephone company whose prices are regulated or "capped."

may view what is included in a category differently. For example, services that one company considers installation, repair, or business office services may be viewed differently by another company. Finally, because performance within any single category may vary over time, using only a single indicator category may be misleading. We also reviewed other service quality data supplied to FCC by the large telephone companies as required by law or by merger agreements.

We performed our review from March through August 2000 in accordance with generally accepted government auditing standards.

Trends for Percent of Customers Dissatisfied, 1996 and 1999

Reporting ILECs are required to provide data to FCC on the percent of residential, small business, and large business customers dissatisfied with installation, repair, and business office services and procedures.

Tables 3 through 11 show the eight major ILEC's performance for 1996 through 1999 (the most recent data) for each type of customer and types of service. The tables provide the underlying percentage data used to create the figures that follow them. As the tables and figures indicate, companies varied considerably in the changes in level of dissatisfaction between 1996 and 1999 in each of the categories. We highlight instances where individual ILECs show a clear trend of increasing levels of customer dissatisfaction over the period.

Residential Customers' Dissatisfaction With Installation Services

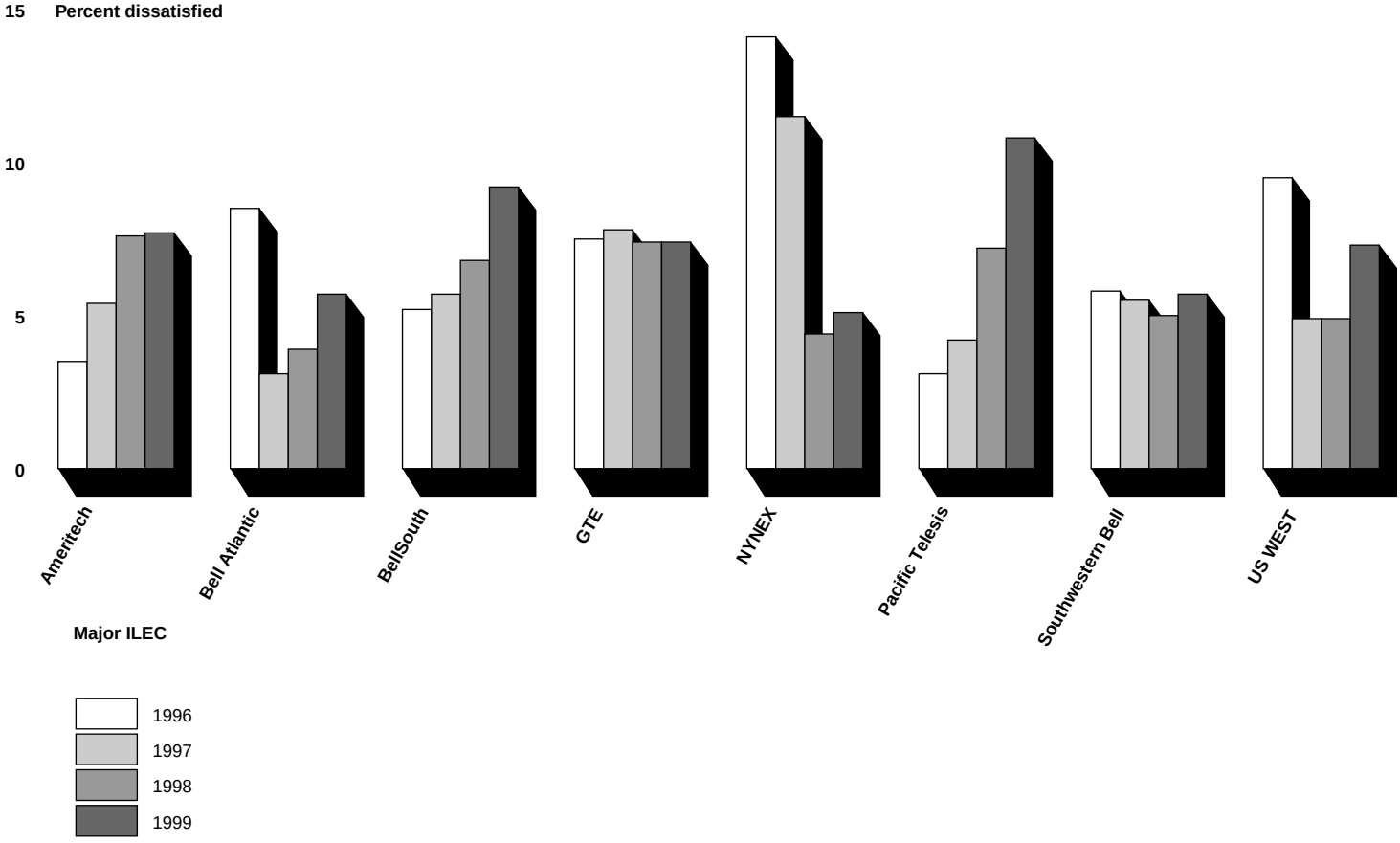
Table 3 and figure 10 provide information on residential customer dissatisfaction with installation services over the 1996 to 1999 period. Ameritech, BellSouth, and Pacific Telesis residential customers were increasingly dissatisfied during this period.

Table 3: Percent of Residential Customers Dissatisfied With Installation Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	3.5	5.4	7.6	7.7
Bell Atlantic	8.5	3.1	3.9	5.7
BellSouth	5.2	5.7	6.8	9.2
GTE	7.5	7.8	7.4	7.4
NYNEX	14.1	11.5	4.4	5.1
Pacific Telesis	3.1	4.2	7.2	10.8
Southwestern Bell	5.8	5.5	5.0	5.7
US WEST	9.5	4.9	4.9	7.3

Source: GAO's analysis of FCC's data.

Figure 10: Percent of Residential Customers Dissatisfied With Installation Services, 1996-99



Source: GAO's analysis of FCC's data.

Residential Customers' Dissatisfaction With Repair Services

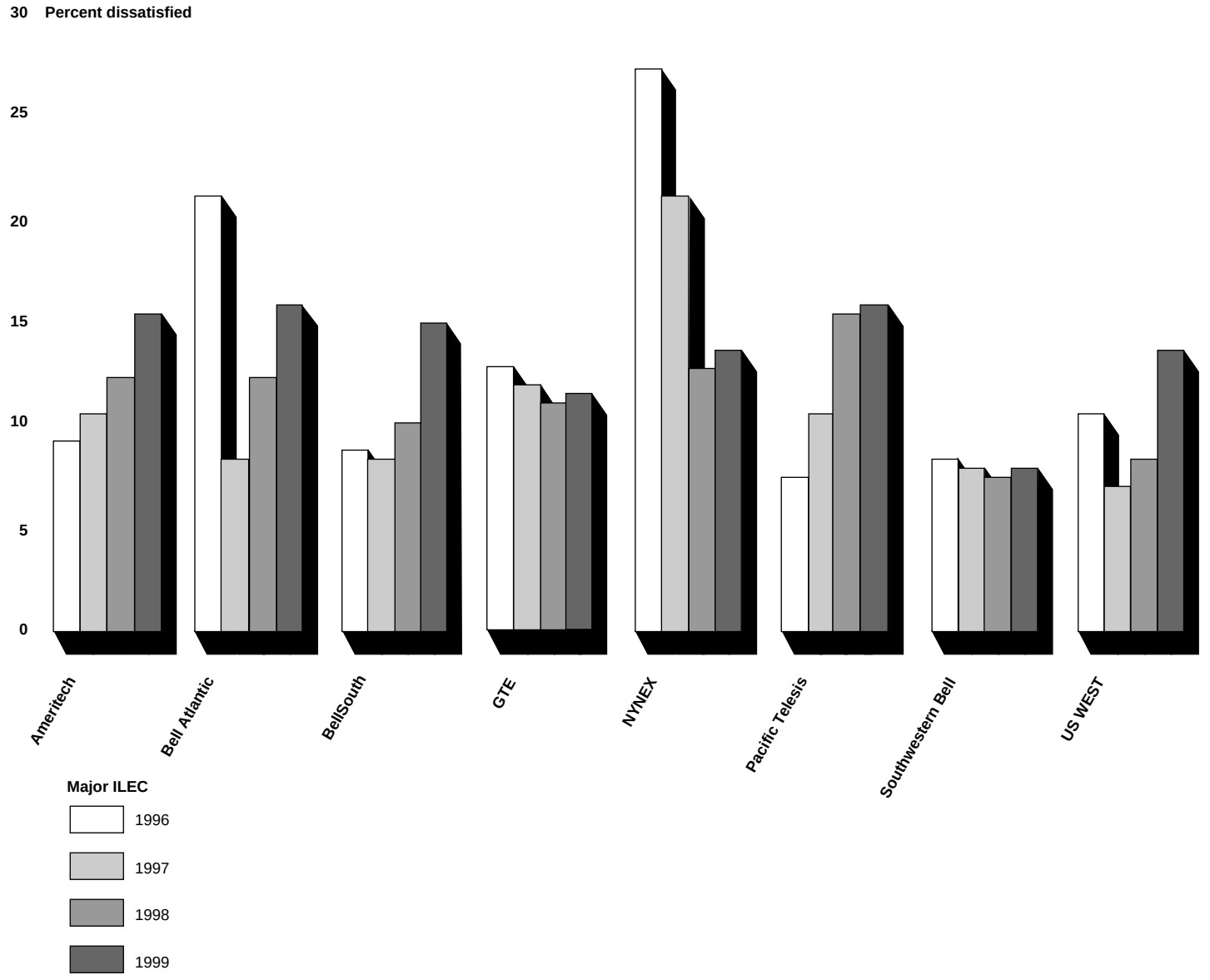
Table 4 and figure 11 illustrate the trend in residential customer dissatisfaction with repair services for 1996 through 1999. Ameritech, BellSouth, Pacific Telesis, and US WEST customers became more dissatisfied during this period.

Table 4: Percent of Residential Customers Dissatisfied With Repair Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	9.1	10.4	12.4	15.4
Bell Atlantic	21.1	8.3	12.3	15.8
BellSouth	8.7	8.5	10.2	15.1
GTE	12.8	11.8	11.0	11.6
NYNEX	27.3	21.4	12.7	13.9
Pacific Telesis	7.4	10.6	15.6	15.8
Southwestern Bell	8.4	8.0	7.6	7.9
US WEST	10.6	7.1	8.3	13.9

Source: GAO's analysis of FCC's data.

Figure 11: Percent of Residential Customers Dissatisfied With Repair Services, 1996-99



Source: GAO's analysis of FCC's data.

Residential Customers' Dissatisfaction With Business Office Services

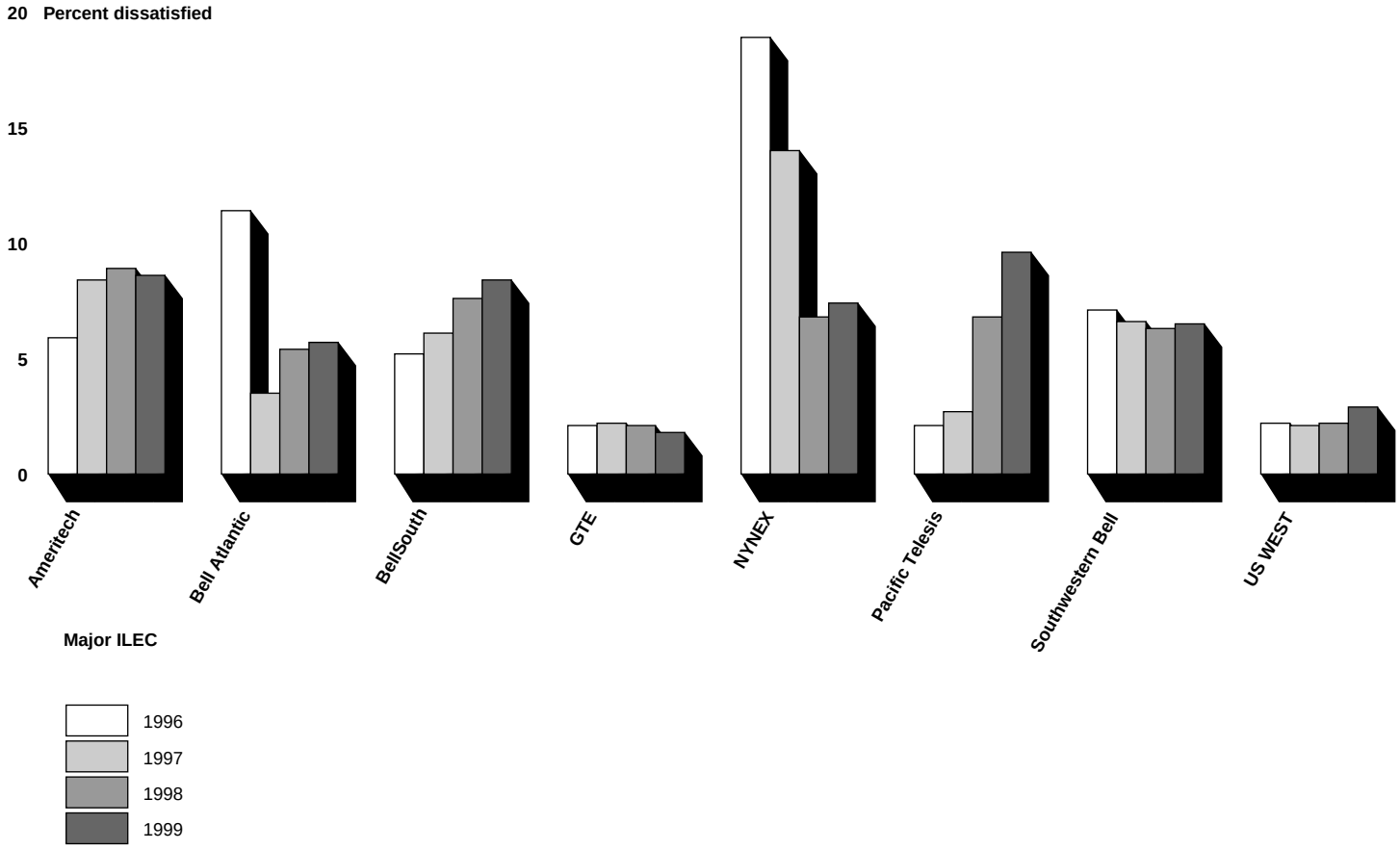
Table 5 and figure 12 provide information on residential customers' dissatisfaction with business office services. Ameritech, BellSouth, and Pacific Telesis residential customers generally became more dissatisfied during 1996 through 1999.

Table 5: Percent of Residential Customers Dissatisfied With Business Office Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	5.9	8.4	8.9	8.6
Bell Atlantic	11.4	3.5	5.4	5.7
BellSouth	5.2	6.1	7.6	8.4
GTE	2.1	2.2	2.1	1.8
NYNEX	18.9	14.0	6.8	7.4
Pacific Telesis	2.1	2.7	6.8	9.6
Southwestern Bell	7.1	6.6	6.3	6.5
US WEST	2.2	2.1	2.2	2.9

Source: GAO's analysis of FCC's data.

Figure 12: Percent of Residential Customers Dissatisfied With Business Office Services, 1996-99



Source: GAO's analysis of FCC's data.

Small Business Customers' Dissatisfaction With Installation Services

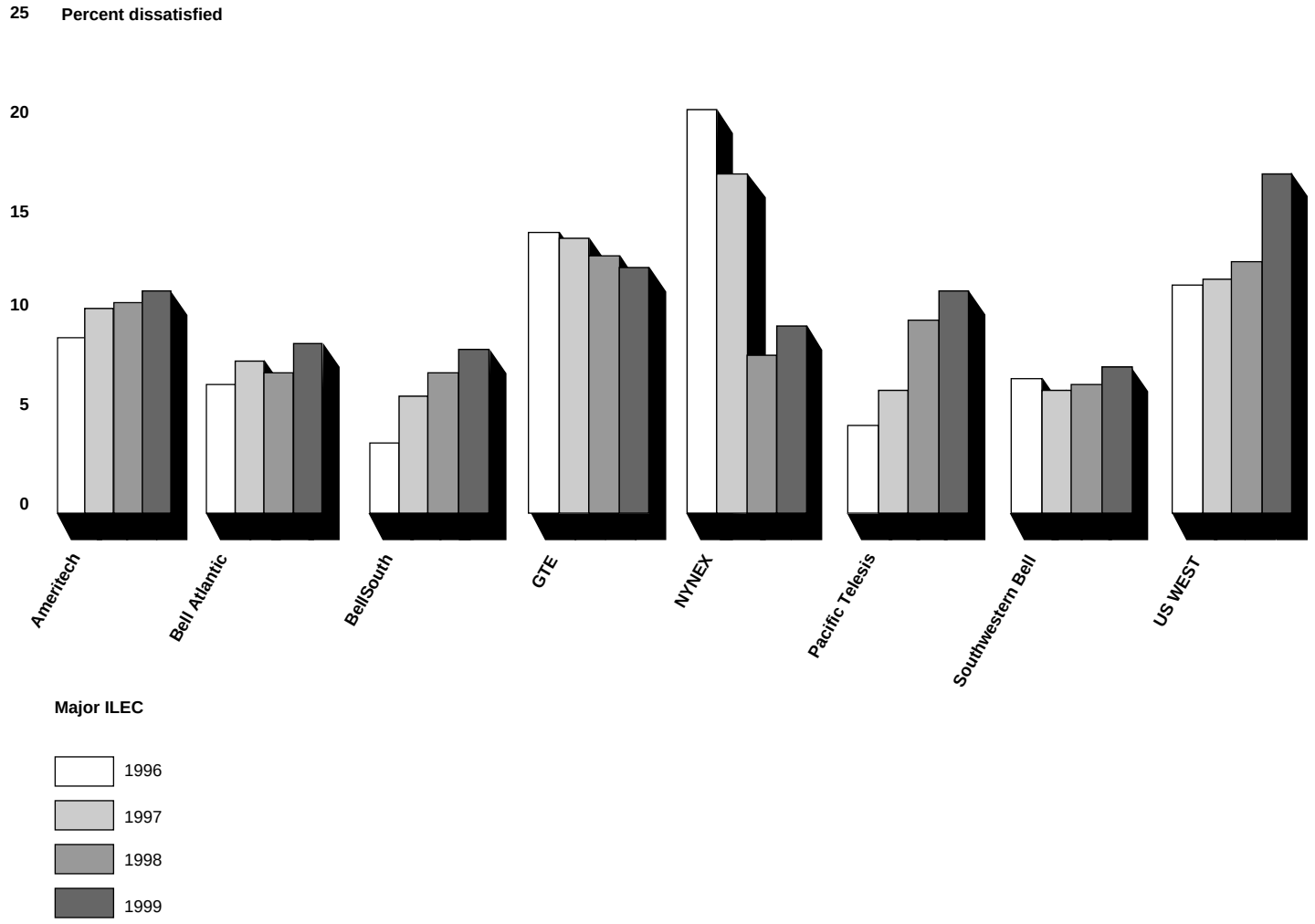
Table 6 and figure 13 illustrate small businesses' dissatisfaction with installation services. With the exception of GTE, NYNEX, and Southwestern Bell, all companies report generally increasing levels of dissatisfaction for 1996 through 1999.

Table 6: Percent of Small Business Customers Dissatisfied With Installation Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	8.9	10.3	10.9	11.4
Bell Atlantic	6.5	7.8	7.1	8.6
BellSouth	3.5	5.8	7.2	8.2
GTE	14.2	14.0	13.1	12.5
NYNEX	20.5	17.1	8.1	9.5
Pacific Telesis	4.5	6.2	9.9	11.2
Southwestern Bell	6.9	6.3	6.4	7.4
US WEST	11.6	12.0	12.8	17.2

Source: GAO's analysis of FCC's data.

Figure 13: Percent of Small Business Customers Dissatisfied With Installation Services, 1996-99



Source: GAO's analysis of FCC's data.

Small Business Customers' Dissatisfaction With Repair Services

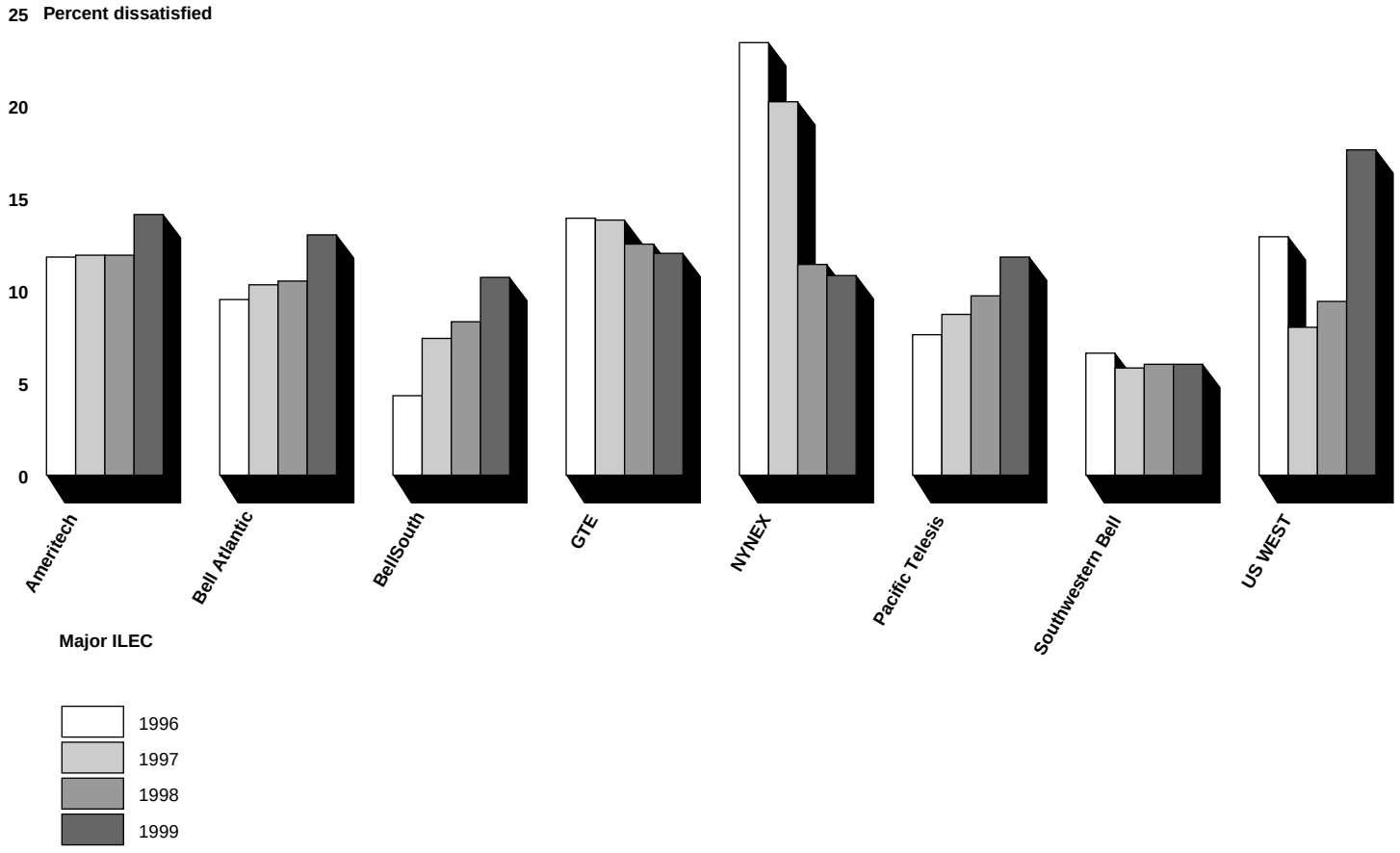
Table 7 and figure 14 provide information on small business customers' dissatisfaction with repair services. Ameritech, Bell Atlantic, BellSouth, Pacific Telesis, and US WEST small business customers became more dissatisfied between 1996 and 1999.

Table 7: Percent of Small Business Customers Dissatisfied With Repair Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	11.8	11.9	11.9	14.1
Bell Atlantic	9.5	10.3	10.5	13.0
BellSouth	4.3	7.4	8.3	10.7
GTE	13.9	13.8	12.5	12.0
NYNEX	23.4	20.2	11.4	10.8
Pacific Telesis	7.6	8.7	9.7	11.8
Southwestern Bell	6.6	5.8	6.0	6.0
US WEST	12.9	8.0	9.4	17.6

Source: GAO's analysis of FCC's data.

Figure 14: Percent of Small Business Customers Dissatisfied With Repair Services, 1996-99



Source: GAO's analysis of FCC's data.

Small Business Customers' Dissatisfaction With Business Office Services

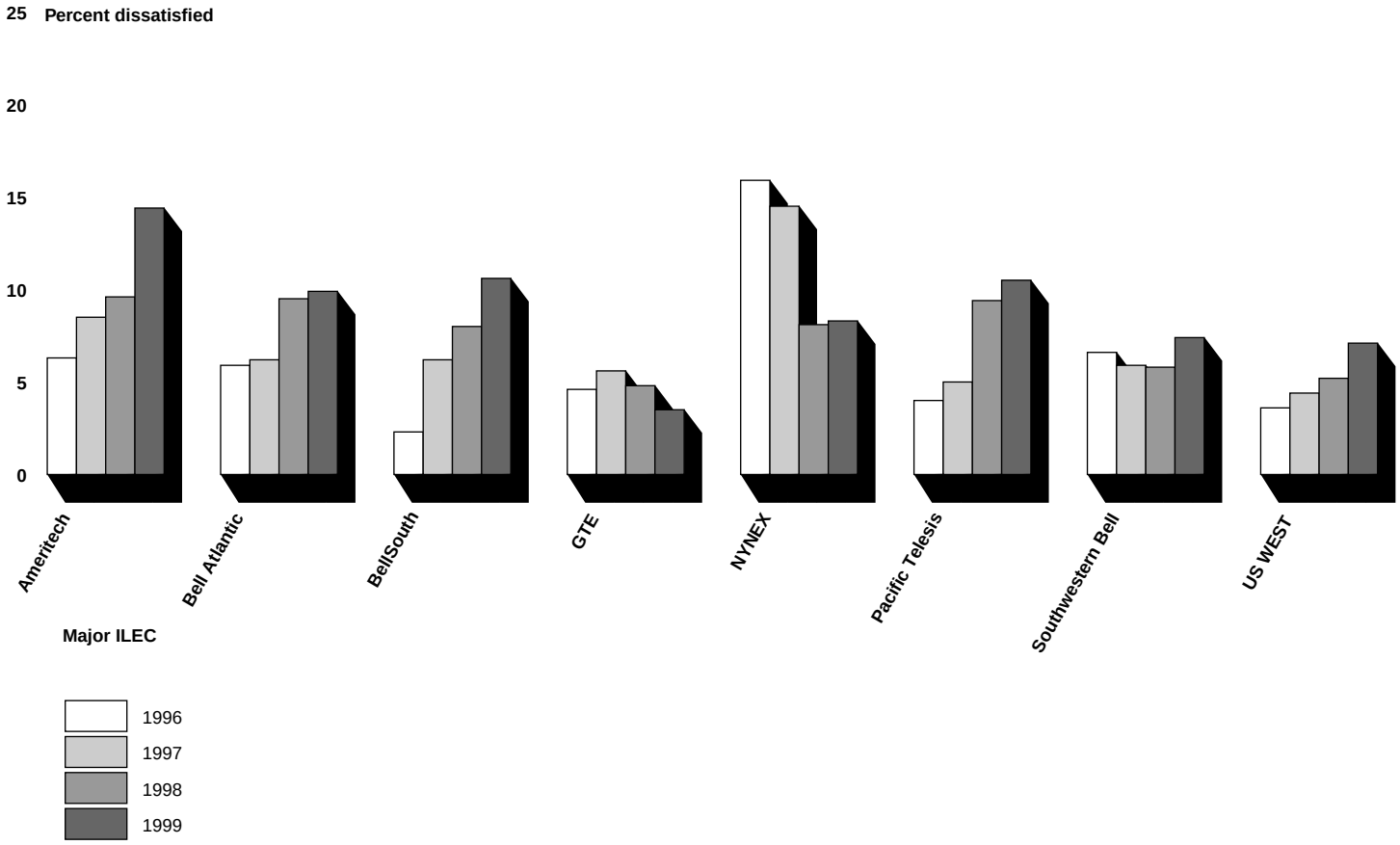
Table 8 and figure 15 illustrate the trend in small businesses' dissatisfaction with business office services. With the exception of GTE, NYNEX, and Southwestern Bell, all companies report generally increasing levels of dissatisfaction for 1996 through 1999.

Table 8: Percent of Small Business Customers Dissatisfied With Business Office Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	6.3	8.5	9.6	14.4
Bell Atlantic	5.9	6.2	9.5	9.9
BellSouth	2.3	6.2	8.0	10.6
GTE	4.6	5.6	4.8	3.5
NYNEX	15.9	14.5	8.1	8.3
Pacific Telesis	4.0	5.0	9.4	10.5
Southwestern Bell	6.6	5.9	5.8	7.4
US WEST	3.6	4.4	5.2	7.1

Source: GAO's analysis of FCC's data.

Figure 15: Percent of Small Business Customers Dissatisfied With Business Office Services, 1996-99



Source: GAO's analysis of FCC's data.

Large Business Customers' Dissatisfaction With Installation Services

Table 9 and figure 16 illustrate the trend in large business customers' dissatisfaction with installation services for 1996 through 1999. Two companies show an increase (BellSouth and Pacific Telesis). Ameritech data for 1999 were not available.

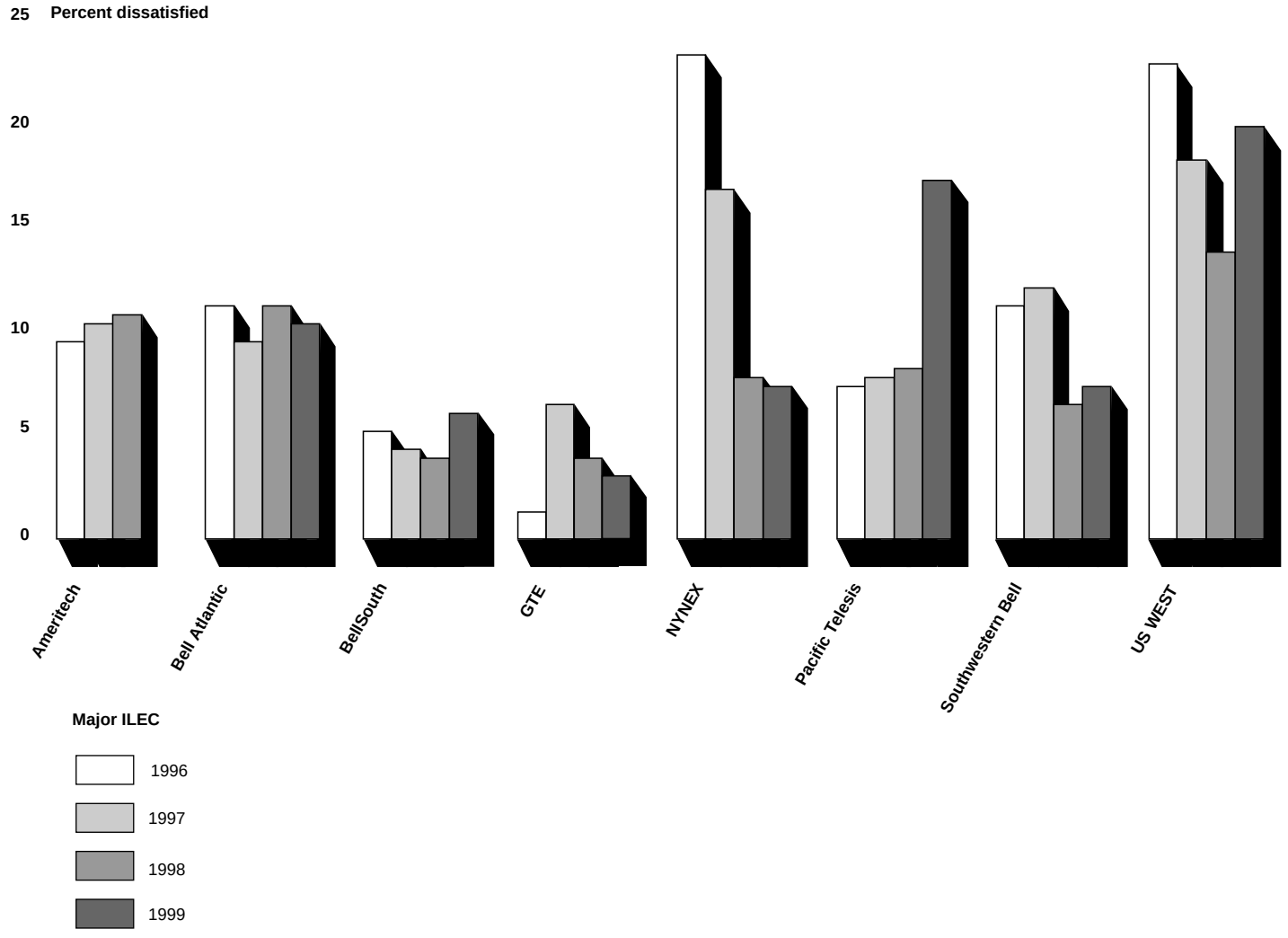
Table 9: Percent of Large Business Customers Dissatisfied With Installation Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	9.4	10.3	10.8	[a]
Bell Atlantic	11.3	9.3	11.0	10.3
BellSouth	5.0	4.5	3.8	6.1
GTE	1.2	6.4	4.1	3.0
NYNEX	23.4	16.9	7.9	7.2
Pacific Telesis	7.4	7.8	8.3	17.1
Southwestern Bell	11.2	11.9	6.3	7.4
US WEST	23.0	18.0	14.0	19.7

[a]Ameritech has not submitted these data.

Source: GAO's analysis of FCC's data.

Figure 16: Percent of Large Business Customers Dissatisfied With Installation Services, 1996-99



Note: Ameritech data for 1999 were not available.

Source: GAO's analysis of FCC's data.

Large Business Customers' Dissatisfaction With Repair Services

Table 10 and figure 17 illustrate the level of large business customers' dissatisfaction with repair services. BellSouth, GTE, and Pacific Telesis large business customers became more dissatisfied. Ameritech data for 1999 were not available.

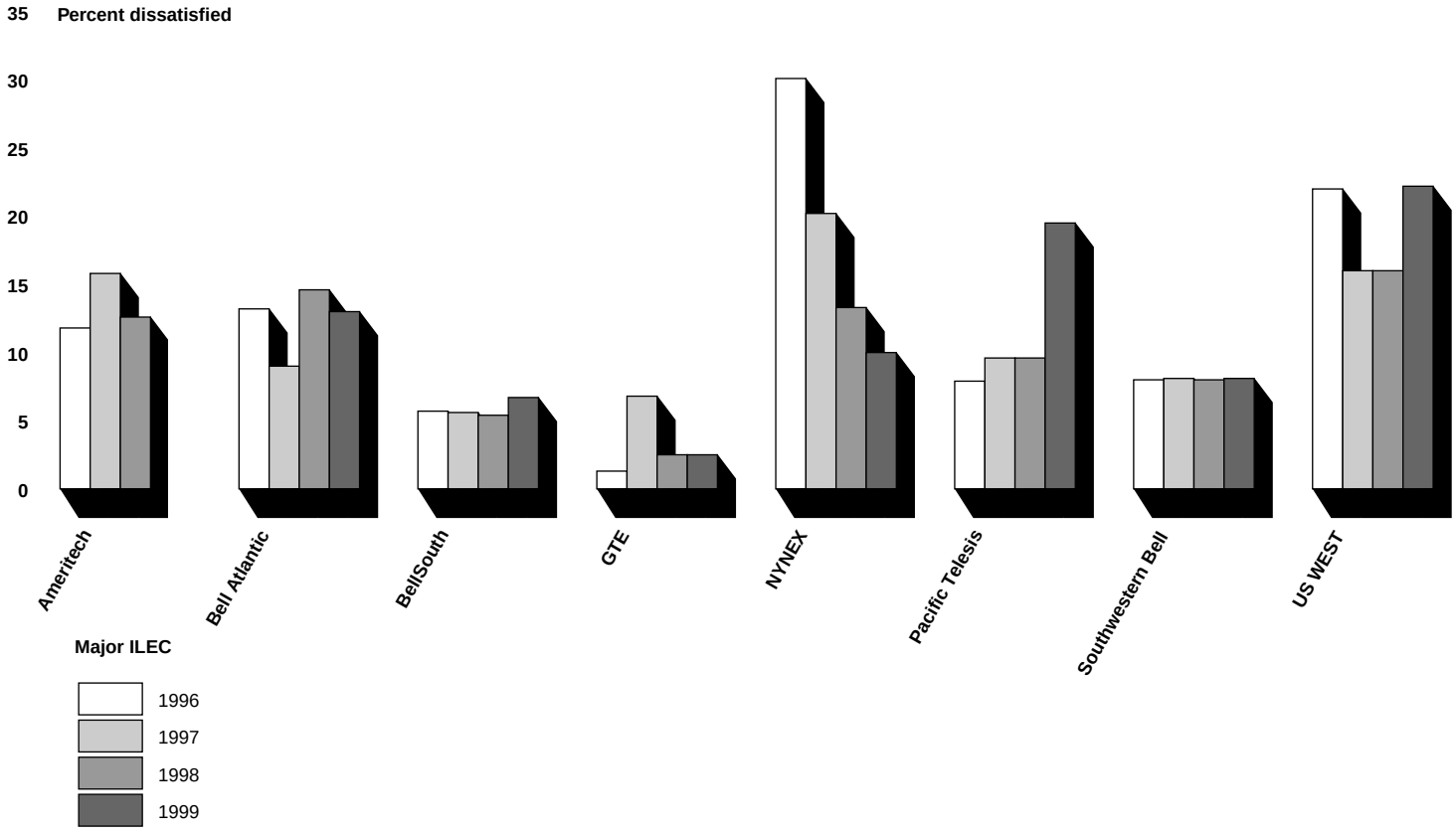
Table 10: Percent of Large Business Customers Dissatisfied With Repair Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	11.8	15.8	12.6	[a]
Bell Atlantic	13.2	9.0	14.6	13.0
BellSouth	5.7	5.6	5.4	6.7
GTE	1.3	6.8	2.5	2.5
NYNEX	30.1	20.2	13.3	10.0
Pacific Telesis	7.9	9.6	9.6	19.5
Southwestern Bell	8.0	8.1	8.0	8.1
US WEST	22.0	16.0	16.0	22.2

[a]Ameritech has not submitted this data.

Source: GAO's analysis of FCC's data.

Figure 17: Percent of Large Business Customers Dissatisfied With Repair Services, 1996-99



Note: Ameritech data for 1999 were not available.

Source: GAO's analysis of FCC's data.

Large Business Customers' Dissatisfaction With Business Office Services

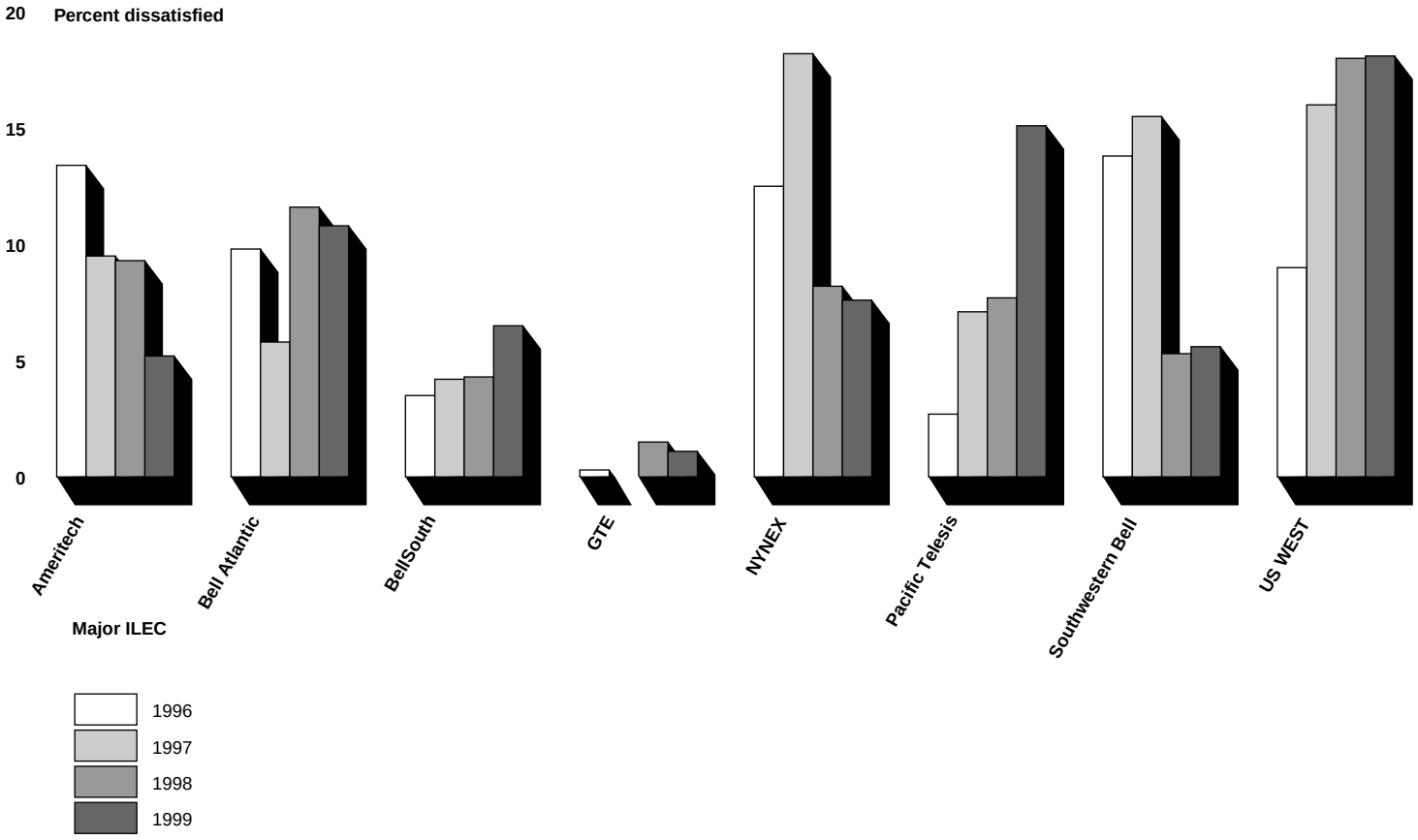
Table 11 and figure 18 provide information on large business dissatisfaction with business office services. Bell Atlantic, BellSouth, Pacific Telesis, and US WEST large business customers became more dissatisfied with business office services for 1996 through 1999.

Table 11: Percent of Large Business Customers Dissatisfied With Business Office Services, 1996-99

Company	1996	1997	1998	1999
Ameritech	13.4	9.5	9.3	5.2
Bell Atlantic	9.8	5.8	11.6	10.8
BellSouth	3.5	4.2	4.3	6.5
GTE	0.3	0.0	1.5	1.1
NYNEX	12.5	18.2	8.2	7.6
Pacific Telesis	2.7	7.1	7.7	15.1
Southwestern Bell	13.8	15.5	5.3	5.6
US WEST	9.0	16.0	18.0	18.1

Source: GAO's analysis of FCC's data.

Figure 18: Percent of Large Business Customers Dissatisfied With Business Office Services, 1996-99



Source: GAO's analysis of FCC's data.

GAO Contacts and Staff Acknowledgements

GAO Contacts

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Acknowledgements

In addition to those named above, Dennis Amari, Michael Clements, Sally Coburn, Fran Featherston, Donna Lucas, and Joan Mahagan made key contributions to this report.

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- **1-800-424-5454 (automated answering system)**

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