



Cable Services

CABLE SERVICES

■ Summary

- Most cable system operations are not expected to be crippled by Y2K.
- Large- and medium-sized MSOs, who serve over 80 percent of the nation's cable subscribers, will suffer only limited Y2K problems because they have been at the forefront of remedying their systems.
- Small MSOs and small operators are more likely to experience scattered cable outages because they often lack the large MSOs' resources and access to information.

INTRODUCTION

The cable industry delivers video and other programming to over 65 million subscribers throughout the country and its territories. Cable television signals are delivered via coaxial cable (or a combination of optical fiber and coaxial cable) directly to the home. The signals deliver content imported from a variety of sources, including broadcast signals and satellite programming. In addition, cable systems may originate their own programming. Cable television operators are also in the midst of developing and deploying advanced services such as digital video, high speed data delivery and internet access, and cable telephony. Thus, the industry must play an important role in minimizing Y2K concerns.

The Cable section of this report (1) describes cable systems and the impact of Y2K; (2) assesses industry readiness of large, medium and small operators; (3) reviews contingency planning efforts; and (4) discusses industry efforts, including testing.

THE CABLE SYSTEM

This section discusses the elements of a cable system that pose potential Y2K problems by partitioning the affected elements into three categories: network elements, support systems, and auxiliary systems.

Network Elements

Network elements are defined as those systems, components, or software that directly affect communications transmission and reception. Examples of network elements are controllers, ad insertion equipment, converters, scramblers, encoders, computer switches, routers, amplifiers, and addressable set-top boxes. Cable operators have focused primarily on network elements, which are often designated as mission critical items, since Y2K problems with a network component could affect the delivery of cable service to subscribers. Most two-way services, such as cable modems and cable telephony, are not expected to have disruptions because the equipment used was developed recently and is likely to have considered the implications of Y2K. However, we recognize that the newness of the equipment does not guarantee that it is Y2K ready.

A cable system's operations are usually controlled from its headend; thus, it is the focus of our concern. For the purposes of this report, a cable system's network elements may generally be divided into three categories: elements that (1) receive cable television signals from outside sources, (2) process these signals into cable channels, and (3) deliver cable channels to the cable subscriber.

Headend Reception of Cable Television Signals

A headend receives the majority of its video signals from three main sources: broadcast television stations, satellite programming providers and producers of locally originated programming. We generally concur with the Cable Television Laboratories, Inc. (CableLabs) and the National Cable Television Association's (NCTA) assessment that broadcast signals are not received with equipment that raises Y2K concerns. Satellite programming, however, poses concerns because its transmission to the satellite depends on automated video playback equipment that is sometimes outdated and requires software updates. The companion satellite reception equipment at the headend may be affected as well. Finally, locally originated programming is generally not automated and does not rely on time and dates.

Headend Processing of Cable Television Signals

Once these signals are received, they are passed on to signal processing equipment. The equipment used to process broadcast signals is generally not dependent on the date or time. Likewise, satellite-programming signal processing equipment does not depend on the date or time. However, premium satellite channels, such as HBO and Showtime, are scrambled when they arrive at the headend and must be unscrambled for further processing by the cable operator. Most of the time, these premium signals are then re-scrambled for delivery and descrambled at the subscriber's home. Some cable systems will also send the signals through automated equipment that switches among the various signals to feed a single cable channel. Many of these switches are not Y2K ready and must be upgraded. If a switch is not Y2K ready, then the signal will not pass through to the subscriber (see Attachment, Letter from NCTA, November 16, 1998, page 119).

A cable operator may also insert local commercials into satellite programming at the headend. Most commercial insertion equipment that is date and time sensitive will likely require substantial upgrades or replacement in order to be Y2K ready (see Attachment, page 119).

Delivery of Cable Television Channels

Cable channels are then transmitted through coaxial cable or a combination of optical fiber and coaxial cable to subscribers' homes. Signal amplifiers in the optical fiber and coaxial cable are not dependent on the time or date in order to transmit the signal. However, the signal amplifiers may contain control or testing devices, which are date and time sensitive, that monitor the condition of the system. Nevertheless, any failure of these devices will not likely interfere with signal distribution.

At the subscriber's home, cable set-top boxes perform certain functions as needed, such as processing a subscriber's request for a scrambled premium channel like HBO or a pay-per-view program. Although addressable set-top boxes are aware of the time and date, they do not have their own internal clocks, but rather are told the date by "addressable controllers" that are located at the headend. NCTA and CableLabs state that, according to manufacturers, no set-top box will need to be replaced, but some addressable controllers must be upgraded or replaced to be Y2K-ready. Some operators, including small cable operators and smaller MSOs, may use "non-addressable" set-tops that do not rely on software and accordingly do not pose Y2K problems.

Support Systems

Support systems are defined as operations support and administrative maintenance systems, such as maintenance, billing, parts ordering, and software for logging service calls/dispatching personnel. Customer Care Systems and testing equipment





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are the two primary support system elements that potentially might pose Y2K problems. These two systems are areas of concern for the cable operator since problematic billing and testing could not only affect the customer but also affect the operator's revenue flow. First, Customer Care Systems process installation, disconnection and service repair calls as well as billing and account maintenance. Customer Care Systems also interact with Automated Response Unit (ARU) systems to process service orders and to send commands to addressable controllers for pay-per-view and unscrambling of premium channels. These systems may require Y2K compliance upgrades (see Attachment, page 119). Additionally, customer support systems that use retail personal computers (PCs) and popular software programs may also require upgrades or replacements. However, some small cable operators still prepare their bills and maintain their accounts manually and thus will not have any Y2K problems with their billing.

Second, testing equipment and monitoring devices potentially have Y2K problems because they are often date and time sensitive. Their failure could lengthen the time it takes for a cable operator to locate the source of outages that may or may not be related to Y2K, and therefore may delay any needed repairs.

Auxiliary Systems

Auxiliary systems are defined as systems or components such as payroll, human resources, backup systems, security and alarm control systems, and environmental control systems. According to NCTA, failure of auxiliary systems may be an "inconvenience" to the cable operator and its employees, but will not likely disrupt service to cable subscribers (see Attachment, page 119). However, as noted earlier, failure of air conditioning systems may cause a network element that overheats to fail. Furthermore, building security, such as locks or passwords or other environmental control mechanisms also require review for Y2K related problems.

THE ASSESSMENT

Methodology

The FCC survey targeted 50 cable operators that serve approximately 88 percent of the nation's 65,400,000 cable subscribers. Subscriber counts were based on information obtained from Warren Publishing's 1998 Cable Television Fact Book and NCTA's "Cable Television Developments-Spring 1998." The total number of cable subscribers was obtained from the Commission's Fifth Annual Report, *In re Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, CS Docket No. 98-102, Table C-1 (rel. Dec. 23, 1998). The cable operators selected included 20 large multiple system operators (MSOs), 7 medium-sized MSOs, and 23 small MSOs and individual operators from rural and low population areas, with one operator serving communities in Puerto Rico. The response rate to our survey was 96 percent. In addition, the Commission received responses from 28 cable operators who voluntarily submitted information to the questionnaire. Information from the additional responses was included in the aggregate data.

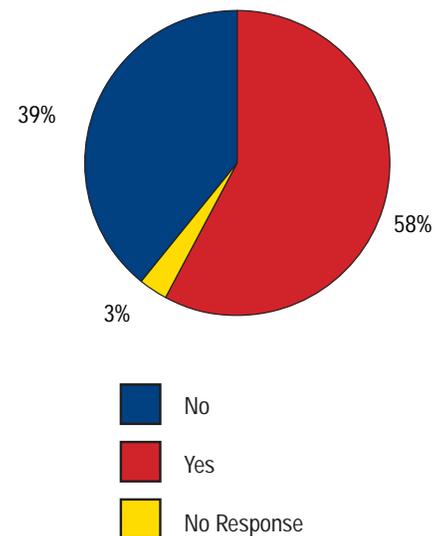


Figure 1. Percent Respondents with Formal Y2K Remediation Plan



Overview

The Y2K questionnaire revealed that approximately 60 percent of the respondents have implemented a formal Y2K remediation plan or process (see Figure 1). The remaining respondents have not initiated a formal process or indicate that they are addressing Y2K concerns as they arise or as part of regularly scheduled system upgrades.

The charts found in this report reveal average percentages of completion and average completion dates across all respondents of the survey. Each phase is broken down into network elements, support systems and auxiliary systems. The Emergency Alert System (EAS) will be discussed in the Emergency Services section (see page 90). These categories were defined and explained in detail in the Cable System Discussion section of this report.

As Figures 2 and 3 show, the respondents who have devised a formal process for managing Y2K remediation efforts, have completed, on average, over 90 percent of the inventory and around 80 percent of the assessment stages for network elements. Final inventory and assessment is expected to conclude by March 1999. However, only half of the remediation phase and approximately one-third of the testing and rollout phases have been completed. Rollout of network elements is expected to conclude by August 1999. With regard to support systems, as Figure 3 shows, the inventory and assessment stages are close to completion by March 1999. The remediation, testing, and rollout phases are less than 50 percent complete, with an anticipated compliance date of August 1999 (see Figures 2 and 3). As for auxiliary systems, like network elements and support systems, the inventory and assessment stages of auxiliary systems are near completion. Figures 2 and 3 also indicate that remediation, testing, and rollout phases are hovering around 50 percent or less complete. These systems are also expected to come into Y2K compliance by August 1999.

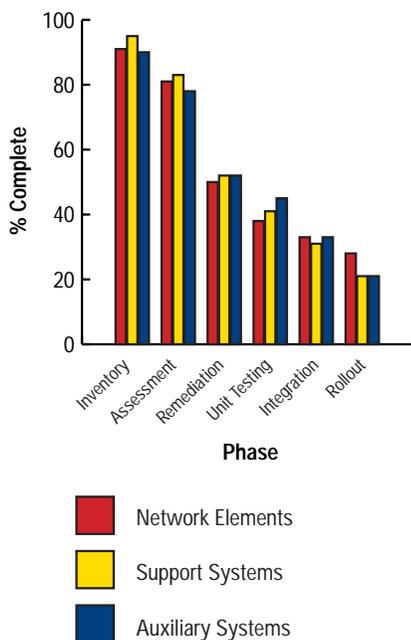


Figure 2. Average Percent Complete

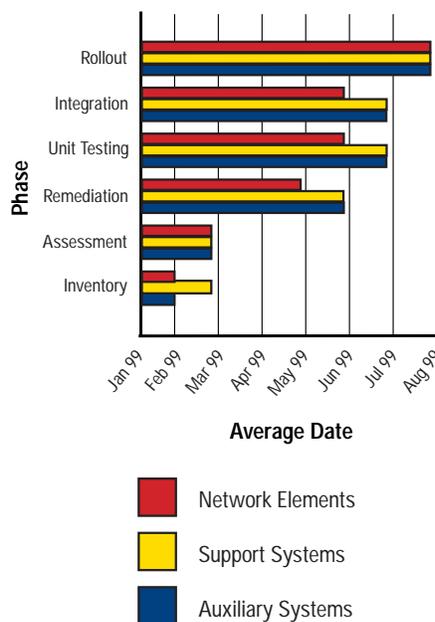


Figure 3. Average Estimated Completion Dates



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Assessment by Size of Operator

The following section analyzes the industry's survey data by cable operator size: large MSOs, medium-sized MSOs, and small operators.

Cable Operator Size Definitions

- Large MSOs ranged from approximately 240,000 to 12.4 million subscribers with a median of 1,108,549 subscribers.
- Medium-sized MSOs ranged from approximately 54,000 to 175,000 subscribers with a median of 125,396 subscribers.
- Small MSOs and small operators ranged from 169 to 44,800 subscribers with a median of 1835 subscribers.

Large MSOs

According to subscriber counts provided in the survey, the large MSO respondents provide service to approximately 82 percent of the country's cable subscribers. Large cable operators have, on average, completed over three-quarters of their inventory and assessment phases and expect to conclude by April 1999 (see Figures 4 and 5). The remediation, testing and rollout stages are less than 50 percent complete and are scheduled to conclude by August 1999. As for risk assessment, large MSOs are averaging near 70 percent (see Figures 6 and 7). Finally, contingency planning is near 40 percent complete and has an average completion date of July 1999.

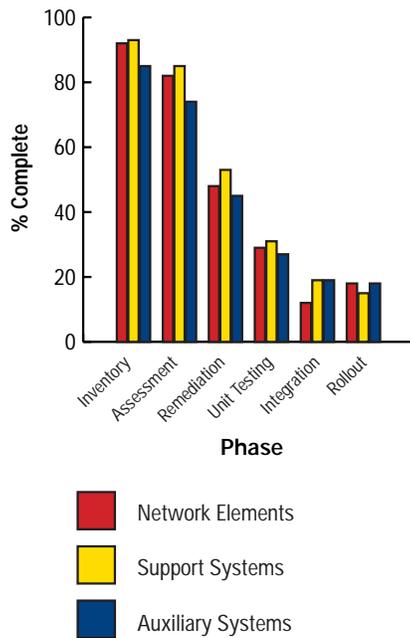


Figure 4. Average Percent Complete — Large Cable MSOs

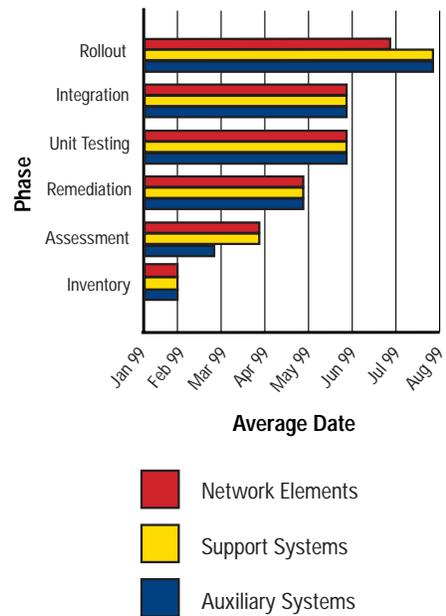


Figure 5. Average Estimated Completion Dates — Large Cable MSOs

Medium-sized MSOs

The mid-sized operators represented in this survey serve approximately 1.5 percent of cable subscribers. The medium MSOs who had initiated a formal process for Y2K remediation indicated that they had completed 100 percent of the inventory phase and over 90 percent of the assessment phase (see Figures 8 and 9). Remaining assessment on all systems had an average completion date of April 1999. However, the

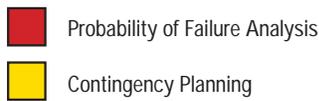
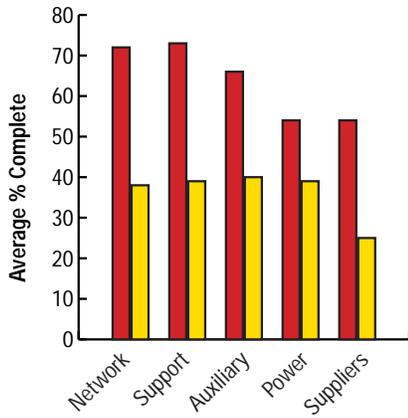
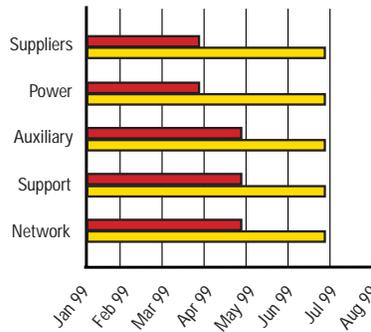


Figure 6. Contingency Planning — Large Cable MSOs



Average Completion Dates

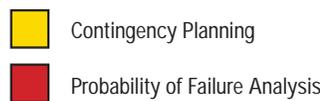


Figure 7. Contingency Planning — Large Cable MSOs

integration testing and the rollout phases are less than one-half complete, with an expected conclusion date of August 1999. Medium-sized MSOs are optimistic regarding the probability of failure phase. On the other hand, mid-sized respondents are behind on contingency planning, with an anticipated completion date by April or June 1999 (see Figures 10 and 11).

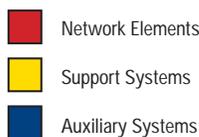
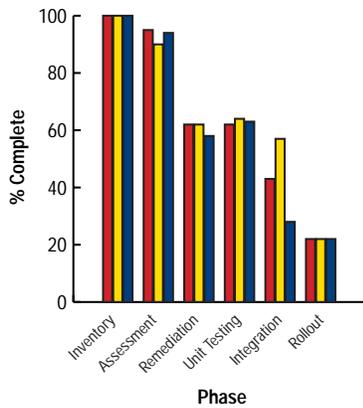


Figure 8. Average Percent Complete — Medium Cable MSOs

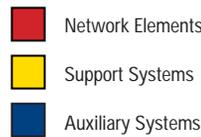
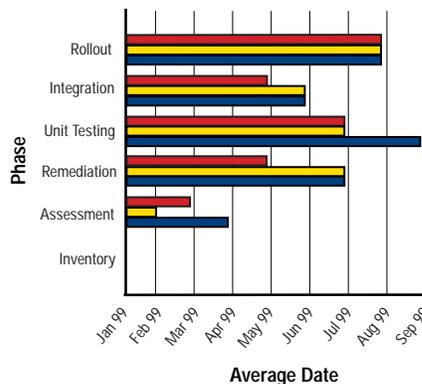


Figure 9. Average Estimated Completion Dates — Medium Cable MSOs

Small Operators

Combined, the small operators represented in the survey serve close to 0.5 percent of cable subscribers. As Figures 12 and 13 show, small cable operators have, on average, completed the majority of their inventory and assessment phases. The remediation and testing stages are primarily in the 40 and 50 percentiles with June and July



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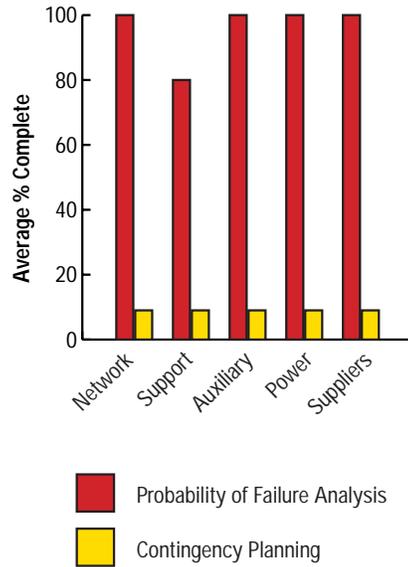


Figure 10. Contingency Planning — Medium Cable MSOs

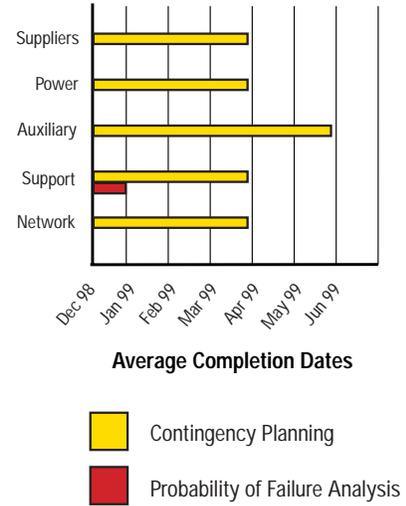


Figure 11. Contingency Planning — Medium Cable MSOs

1999 completion dates. Less than half of the rollout phase is complete, with an average completion date of October 1999. On the other hand, small cable operators were well along in analyzing the probability of failure and expect to conclude the risk assessment phase by April 1999 (see Figures 14 and 15). Among the three different size operators, small operators had the highest percentages in the contingency planning phase. Small operators anticipated an average completion date for contingency planning in July 1999.

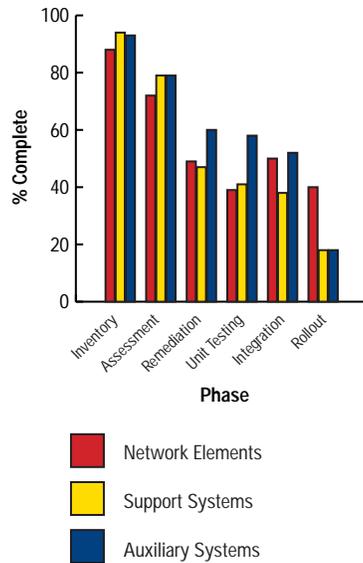


Figure 12. Average Percent Complete — Small Cable Operators

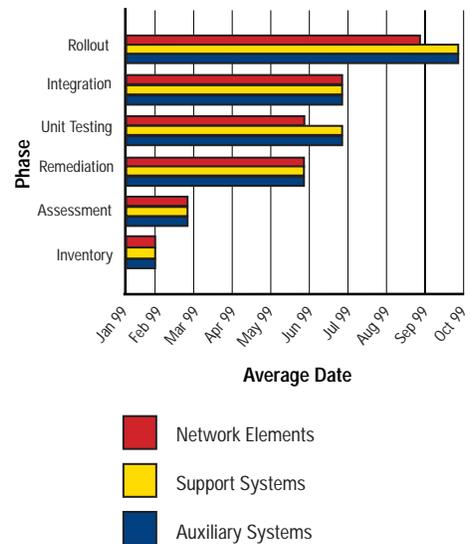


Figure 13. Average Estimated Completion Dates — Small Cable Operators

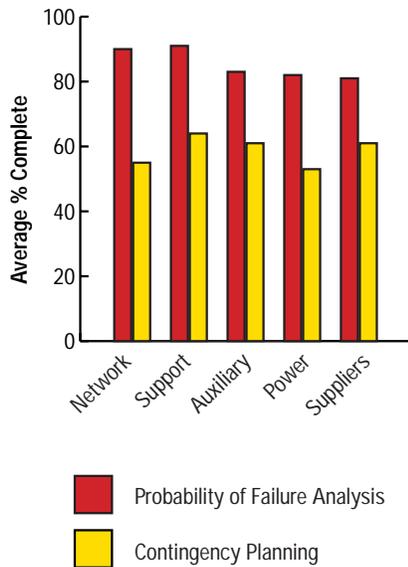


Figure 14. Contingency Planning — Small Cable Operators

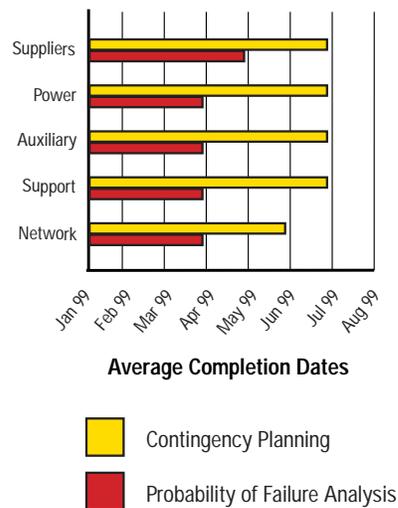


Figure 15. Contingency Planning — Small Cable Operators

As noted in the sections above, large and medium-sized operators expect to complete the rollout phase by August while small operators have an average target date of October 1999. Various small operators cite their limited resources and their inability to get an expedient response and delivery from their vendors as reasons for the delay in rollout. In addition to a lack of qualified personnel, the cost of Y2K compliance for the small operator is often much greater than the cost to large and medium-sized MSOs. Small operators, when combined, serve less than 1 percent of cable subscribers, yet they operate a large number of headends. As a result, they have a large quantity of equipment to be upgraded or replaced. Consequently, when measured in terms of subscribers per headend, the expense for the small operator is much greater than the expense for the large and medium-sized MSO.

Additional Assessment Data

The survey also queried whether the industry had adopted a standard definition for Y2K compliance, who cable operators were involved with on Y2K, the status of their interactions with their vendors and customers, the availability of resources, the status of joint testing initiatives, and whether cable operators encountered any unique problems during their Y2K remediation efforts. Survey results show an even split between operators who have and have not adopted an industry developed definition. The commonly chosen definitions were IEEE 2000.1, GSA, Bellcore, and the British Standard. However, the majority of operators chose to modify one of the above standards or create their own company standard.

Cable operators also commented on the Y2K preparedness of their business partners. Respondents asserted that the parties (e.g., other carriers, entities, or foreign countries) they were involved with were adequately addressing the Y2K problem and they do not anticipate any impact on their operations. Additionally, many cable operators are working with cable industry associations such as NCTA, CableLabs, the Cable Telecommunications Association (“CATA”), Small Cable Business Association (“SCBA”), state cable associations, their vendors, other cable companies, and other communication industry associations to share and obtain information regarding the Y2K problem.

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Overall, the responses indicate moderate satisfaction in the interactions with vendors (see Figure 16). As Figure 17 illustrates, over 80 percent of the respondents have begun to work with their vendors in dealing with the Year 2000 problem. Many operators have contacted their vendors requesting the status of equipment, as well as verification that equipment is Y2K ready. Some operators are in the early stages of this process, starting with the most critical equipment vendors. Most of the operators are in the process of evaluating vendor responses, installing upgrades, or purchasing new equipment for replacement. Some respondents have contacted their banking partners and other suppliers such as billing and programming providers and evaluation is in progress.

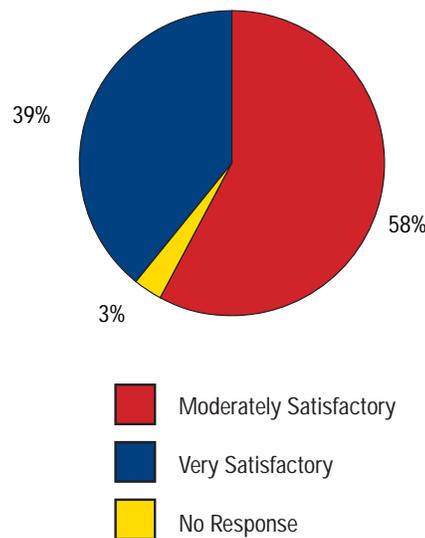


Figure 16. Satisfaction with Vendors

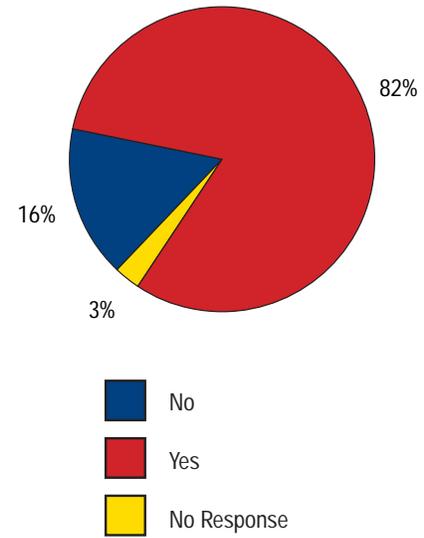


Figure 17. Percent Working with Vendors/Supply Chain

In response to the Commission's inquiry into the question of resources, over two-thirds of the respondents indicated that they do not lack information or resources (see Figure 18). Approximately 20 percent of the respondents claimed a shortage in personnel, 6 percent in information, and 4 percent in monetary resources. Many operators cited personnel as a concern because employees who are capable of addressing the Y2K problem are also tasked with performing technical support or maintaining normal cable operations. This situation is especially difficult for smaller operators who stated that since the year 2000 project is complex and time-consuming, it is a burden on their small staff. Other operators who have attempted to hire full time employees to address the Y2K problem cited the limited number of technically proficient and skilled personnel available in a highly competitive job market. As for lack of information, one respondent pointed to the reliance on information supplied by business associates and vendors as a potential problem due to the cable operator's lack of control. Other respondents referred to a difficulty in locating their vendor's Y2K personnel or obtaining a response from the vendor. Another respondent remarked that it was unable to find information on areas of concern related specifically to their own business. Finally, some operators mentioned that they may not have enough money to address all the Y2K problems that may arise.

Approximately 50 percent of the respondents have begun or plan on conducting joint testing with their customers and vendors. However, some operators are relying



solely on their vendors to conduct testing. Other operators have ongoing internal testing, primarily of mission critical items, and are assessing the need for interoperability testing. Many operators have set aside the first and second quarters of 1999 to begin joint testing, with completion dates set from June 1999 until the fourth quarter of 1999. Several operators are working with CableLabs, NCTA and the Society of Cable Telecommunications Engineers (SCTE) to help organize vendor integration testing. NCTA and CableLabs have indicated that they are facilitating a report for the cable industry on the results of the interoperability tests of addressable set-top controllers, ARUs, and Customer Care Systems. Conclusion of the interoperability tests and a report is expected by May 15, 1999.

In addition, the Commission asked respondents if they encountered any unique problems or circumstances in their Y2K remediation process. One concern was the delay in one vendor's release of equipment until the latter part of 1999. Another operator commented on the problem of custom-made, widely distributed customer premises equipment (CPE) no longer supported by the vendor. One respondent noted that acquisitions of cable systems which contained old, non-compliant equipment was a problem. A few operators mentioned their uncertainty regarding the status of video programming providers and satellite delivery systems.

CONTINGENCY PLANNING

According to the survey, approximately one-third of the respondents have started to develop contingency plans in the event of Y2K malfunctions (see Figure 19). The remaining two-thirds expect to initiate contingency planning at various times during 1999, with start dates from first quarter 1999 to third quarter 1999. Further, as Figures 20 and 21 show, the respondents with contingency plans in place had completion percentages close to 50 percent and anticipated concluding by July 1999. These respondents finished, on average, over three-quarters of the risk assessment of network elements, support systems and auxiliary systems. (For EAS contingency planning, see Emergency Services Section, page 90). The risk assessment phase is expected to come to a close by April 1999.

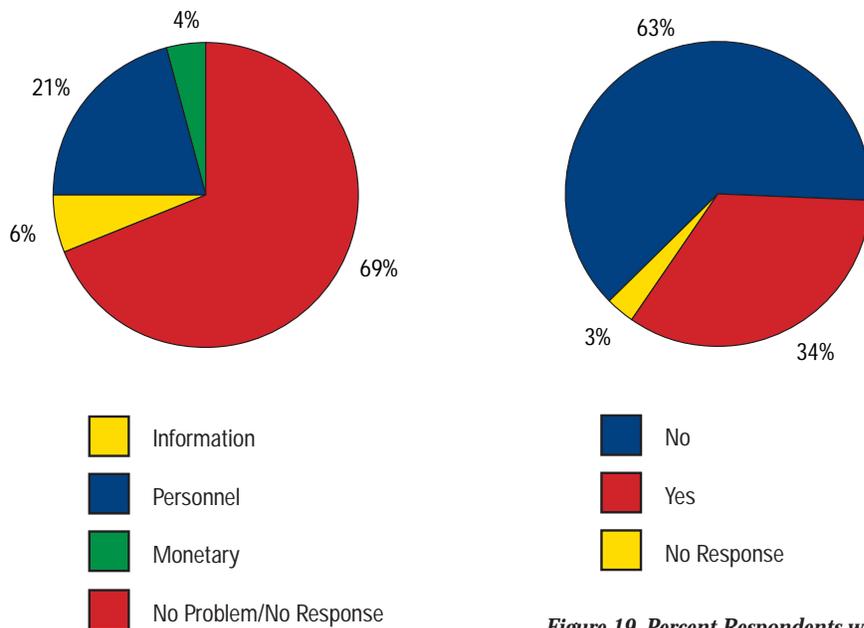


Figure 18. Percent Lack of Resources

Figure 19. Percent Respondents with Contingency Plan



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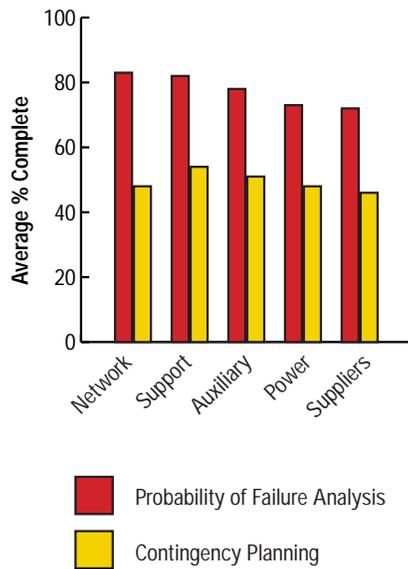


Figure 20. Contingency Planning

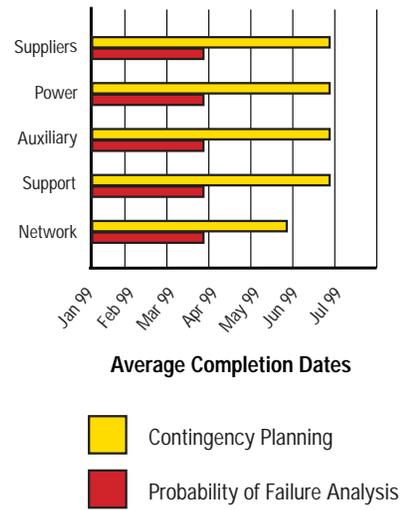


Figure 21. Contingency Planning

Additionally, NCTA and CableLabs have engaged an independent consulting organization to observe the testing scheduled to occur at several host cable operator locations. The consultant will also work with CableLabs to prepare a generic cable industry contingency plan. The contingency plan, to be completed by June 15, 1999, will act as a guideline for the industry and will address “cable operations,” which is defined to include all areas affecting the operators’ ability to deliver service.

SOURCES OF INFORMATION IN THE INDUSTRY

The most significant repository of cable Y2K information is CableLabs, a research arm of the cable industry. CableLabs created a Y2K Working Group to collect information from cable operators as they assess, repair and test Y2K problematic equipment. In addition, in September 1998, CableLabs hosted a Year 2000 Vendors Symposium in Denver at which cable industry vendors, including representatives from addressable set-top box manufacturers, billing systems and headend component manufacturers, presented their Y2K plans. The vendors also discussed their testing and certification plans both publicly and privately in one-on-one conversations with cable operators. As data is collected from cable operators and its meetings, CableLabs posts information on problematic equipment and software, as well as, to the extent possible, solutions, behind the firewall on its website. All franchised cable operators are permitted access to this website.

CableLabs and NCTA have presented the Commission with general assessments of certain categories of cable equipment and software without identifying particular companies. In evaluating the information we received from CableLabs and NCTA, we also examined information received from the survey discussed above and separate meetings and discussions with MSOs, small cable operators, engineers, vendors and industry groups. In addition to individual meetings, last year we held a general cable forum at which cable operators, industry groups, equipment and software vendors, and video programmers attended. For a summary of the forum, see our Y2K web page at <www.fcc.gov/year2000>. We note, however, that no industry-wide

organization exists to independently test and verify a cable system's Y2K readiness and publish the results. In addition, we are not aware of any other reports on the cable industry's Y2K readiness.

According to NCTA and CableLabs, all Y2K problematic cable hardware and software have repair or replacement solutions. NCTA and CableLabs also state that there are new functional equivalents for old non-compliant hardware. In addition, because new addressable controllers use standard personal computers, the upgrade costs to the new controllers are modest. Based on their conversations with ARU and Customer Care System manufacturers, NCTA and CableLabs state that they are highly confident that Y2K upgrades for these systems will be available. NCTA and CableLabs also state that they are confident that the satellite video programmers will repair their video playback equipment in a timely manner. Finally, and most notably, NCTA and CableLabs state that broadcast signals are not dependent on time or date sensitive cable equipment and will be delivered to the subscriber.

CONCLUSION AND REMAINING CONCERNS

There are a few remaining concerns. Although the survey demonstrates that the largest MSOs plan to complete repairs and unit testing by June and July and have already completed most of their repairs, our survey indicates that many small operators have testing and rollout dates that extend through December 1999, leaving little margin of error for unforeseen trouble or unexpected test results. We are also concerned about respondents who did not have a formal process in place for addressing Y2K issues. An operator must conduct a thorough assessment of all systems. Without a formal plan of action, an operator risks an insufficient review that could fail to uncover all vulnerabilities. In addition, if an assessment is not initiated early enough, there may not be time to complete all steps before the year 2000 date roll over. Finally, we are concerned about the low level of interoperability testing that has been conducted to date. We are aware, however, that NCTA and CableLabs will fund interoperability testing of addressable controllers, Customer Care Systems, and ARUs.

Small cable operators have unique problems. Although small cable operators serve a relatively small percentage of the nation's cable subscribers, they carry a disproportionate Y2K burden because they operate a large majority of the nation's 11,000 headends. In addition, survey respondents also indicate that they sometimes lack necessary access to Y2K information, vendors, personnel and money. To assist small operators in assessing their Y2K readiness, the Commission is working with industry groups, such as SCBA, to disseminate Y2K information and to encourage small operators to contact CableLabs, where the small operators may take advantage of the large MSOs expertise.

Our survey indicates that some small operators have had difficulty getting responses from their vendors to their inquiries. We are concerned about any disparity in the ability of large and small companies to obtain vendor fixes and will be watching this closely. Small cable operators are also concerned that, if Y2K ready addressable controllers are not available for the existing set-top boxes, they will be forced to purchase more expensive set-top boxes as well. For example, one small operator may need to purchase a new electronic system manager with an addressable controller that operates channel scramblers and pay-per-view, which can be very expensive. As many small operators serve less than five thousand subscribers, this could be a substantial expense. On the other hand, some small cable operators are ironically fortunate to have older equipment that is not time or date sensitive, such as non-addressable set-top controllers and manual billing systems.





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While it is generally thought that Y2K problems will not cripple cable system operations, equipment such as switching devices, commercial insertion equipment, satellite video playback equipment, addressable controllers, ARUs and Customer Care Systems are at risk. Although we have received assurances that there are repairs or replacements (functional equivalents) for each piece of faulty software or hardware, we remain concerned that not all cable operators will be able to implement these repairs or replacements in time because of the disparity in readiness between large and small operators. Based on the information that we have received to date, it appears that the largest MSOs are at a low risk of suffering Y2K problems because they have been on the forefront of remedying their systems. Thus, the vast majority of cable subscribers who receive service from the large- and medium-sized MSOs are at a low risk of encountering problems. Smaller MSOs and small operators, which lack the larger MSOs' resources, access to information, and attention from key vendors, are at a higher risk of experiencing cable outages.

Consumer Tips

- A cable system is likely to function, except for scattered channel outages.
- Will not need to replace set-top boxes, but check with your cable operator.
- Have an antenna handy to ensure reception of over-the-air broadcast signals.
- If subscribing to cable internet or telephone service, ask your cable operator about Y2K compliance.
- For customer-owned electronic devices, such as TVs and VCRs, check with your electronic manufacturer.