In My Opinion...

Dean Says:

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The Controversy Continues—Part 5

For the last four issues, I've written about one aspect of NFPA 72-2010, *National Fire Alarm and Signaling Code*®, that connects this document with all previous editions: controversy regarding certain requirements within the *Code*. This same controversy continues, now that the National Fire Protection Association has released NFPA 72-2013.

This particular controversy continues to plague Authorities Having Jurisdiction as they try to sort out the proliferation of alternative service providers offering telephone services that may also transport alarm signals.

In the last issue, I shared the shock that rocked the Highly Protected Risk insurance industry in the late 1980s when it learned that the communications pathway provided by the Local Exchange Carrier did not have standby power if it relied on field-located optical fiber multiplex transponders. The very idea of making so profound a change to the reliability of the "black box"—the public untility telephone company—was unthinkable.

Nevertheless, this change had begun. Fortunately, not all deployments of the field-located optical fiber muliplex tansponders failed to include standby power. But, the quantity of standby power varied widely.

Some deployments included four hours of standby power. Some included eight hours of standby power. Some included 24 hours of standby power. But, no deployment included the 72 hours of standby power or more that the typical public utility telephone company wire center routinely provided.

This meant that, as early as the late 1980s, the fire alarm industry faced the problem of having premises equipment with 24 hours of standby power transmitting signals over a communications pathway that might have as little as no standby power. More commonly, such pathways would have four or eight hours of standby power.

The problem was that the alarm industry and the Authorities Having Jurisdiction (AHJs) did not know about this significant change.

As time went on, fewer telephone circuits extended from the public utility telephone company wire center directly to the customer. Then came the internet.

The internet introduced an alternate communications pathway into many buildings. Soon, virtually all business and many private residences would have a communications pathway available other than the one provided by the public utility telephone company.

Yes, at first, many internet connections consisted of dial-up service using the telephone pathway. But, as cable television service providers expanded their service options to include high speed internet access, and as providers of Data Subscriber Line (DSL) service began to piggyback onto the telephone pathway, more and more customers had an alternate pathway.

This made it possible for the development of alternate telephone service providers. These alternate services ranged from fully capable telephone service provided by cable televison service providers, to customers purchasing an internet interface at their local drug store.

This opened up a major problem for the alarm industry. The vast difference in the inherrent reliability of the alternate service providers made it initially difficult for the alarm industry to determine which alternate providers would offer communications pathways acceptable for fire alarm system signal transmission.

A Task Group of the NFPA Technical Correlating Committee on Signaling Systems for the Protection of Life and Property began to investigate possible ways of determing the relative reliability of the various alternate service providers. This Task Group soon discovered that the service providers divided into two distinct groups: those that used a Managed Facilities-Based Voice Network (MFVN) and those that did not.

The majority of the telephone service offered by the cable television service providers used facilities very similar to that of a public utility telephone company wire center. The Task Group developed the following definitions:

3.3.290 Switched Telephone Network.

3.3.290.1 Loop Start Telephone Circuit. A loop start telephone circuit is an analog telephone circuit that supports loop start signaling as specified in either Telcordia GR-506-CORE, LATA Switching Systems Generic Requirements: Signaling for Analog Interface, or Telcordia GR-909-CORE, Fiber in the Loop Systems Generic Requirements. (SIG-SSS)

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3.3.290.2 Public Switched Telephone Network. An assembly of communications equipment and telephone service providers that utilize managed facilities-based voice networks (MFVN) to provide the general public with the ability to establish communications channels via discrete dialing codes. (SIG-SSS)

But, what constitutes an MFVN? The Task Group also offered the following definition:

3.3.152* Managed Facilities-Based Voice Network (MFVN). A physical facilities-based network capable of transmitting real time with formats unchanged that is managed, operated, and maintained by the service provider to ensure service quality and reliability from the subscriber location to public switched telephone network (PSTN) interconnection points or other MFVN peer networks. (SIG-SSS)

A.3.3.152 Managed Facilities-Based Voice Network (MFVN). Managed facilities-based voice network service is functionally equivalent to traditional PSTN-based services provided by authorized common carriers (public utility telephone companies) with respect to dialing, dial plan, call completion, carriage of signals and protocols, and loop voltage treatment and provides all of the following features:

(1) A loop start telephone circuit service interface.
(2) Pathway reliability that is assured by proactive management, operation, and maintenance by the MFVN provider.
(3) 8 hours of standby power supply capacity for MFVN communications equipment either located at the protected premises or field deployed. Industry standards followed by the authorized common carriers (public utility telephone companies), and the other communications service providers that operate MFVNs, specifically engineer the selection of the size of the batteries, or other permanently located standby power source, in order to provide 8 hours of standby power with a reasonable degree of accuracy. Of course, over time, abnormal ambient conditions and battery aging can always have a potentially adverse effect on battery capacity. The MFVN field-deployed equipment typically monitors the condition of the standby battery and signals potential battery failure to permit the communications service provider to take appropriate action.
(4) 24 hours of standby power supply capacity for MFVN communications equipment located at the communication service provider's central office.
(5) Installation of network equipment at the protected premises with safeguards to prevent unauthorized access to the equipment and its connections.

When providing telephone service to a new customer, MFVN providers give notice to the telephone service subscriber of the need to have any connected alarm system tested by authorized fire alarm service personnel in accordance with Chapter 14 to make certain that all signal transmission features have remained operational. These features include the proper functioning of line seizure and the successful transmission of signals to the supervising station. In this way, the MFVN providers assist their new customers in complying with a testing procedure similar to that outlined in 26.2.3 for changes to providers of supervising station service.

The evolution of the deployment of telephone service has moved beyond the sole use of metallic conductors connecting a telephone subscriber's premises with the nearest telephone service provider's control and routing point (wire center). In the last 25 years, telephone service providers have introduced a variety of technologies to transport multiple, simultaneous telephone calls over shared communication's pathways. In order to facilitate the further development of the modernization of the telephone network, the authorized common carriers (public utility telephone companies) have transitioned their equipment into a managed facilities-based voice network (MFVN) capable of providing a variety of communications services in addition to the provision of traditional telephone service.

These two definitions become very important, for they describe the kind of service necessary for use as a communications pathway acceptable for supervising station service.

Note the following highlighted requirements for Digital Alarm Communicator Transmitters from Chapter 26 of NFPA 72-2013, *National Fire Alarm and Signaling Code*®:

26.6.3.2.1.5 DACT Transmission Means. The following requirements shall apply to all digital alarm communications transmitters:

(1) A DACT shall be connected to two separate means of transmission at the protected premises.
(2) The DACT shall be capable of selecting the operable means of transmission in the event of failure of the other means.
(3) The primary means of transmission shall be a telephone line (number) connected to the public switched network.
(4)* The first transmission attempt shall utilize the primary means of transmission.

A.26.6.3.2.1.5(4) Where two telephone lines (numbers) are used, care should

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be taken to assign the primary DACT telephone line (number) to a nonessential telephone line (number) at the protected premises so that the primary line used in the premises is not unnecessarily interrupted.

(5) Each DACT shall be programmed to call a second receiver when the signal transmission sequence to the first called line (number) is unsuccessful.

(6) Each transmission means shall automatically initiate and complete a test signal transmission sequence to its associated receiver at least once every 6 hours. A successful signal transmission sequence of any other type, within the same 6-hour period, shall fulfill the requirement to verify the integrity of the reporting system, provided that signal processing is automated so that 6-hour delinquencies are individually acknowledged by supervising station personnel.

(7)* If a DACT is programmed to call a telephone line (number) that is call forwarded to the line (number) of the DACR, a means shall be implemented to verify the integrity of the call forwarding feature every 4 hours.

A.26.6.3.2.1.5(7) Because call forwarding requires equipment at a telephone company central office that could occasionally interrupt the call forwarding feature, a signal should be initiated whereby the integrity of the forwarded telephone line (number) that is being called by DACTs is verified every 4 hours. This can be accomplished by a single DACT, either in service or used solely for verification, that automatically initiates and completes a transmission sequence to its associated DACR every 4 hours.Asuccessful signal transmission sequence of any other type within the same 4-hour period should be considered sufficient to fulfill this requirement.

Call forwarding should not be confused with WATS or 800 service. The latter, differentiated from the former by dialing the 800 prefix, is a dedicated service used mainly for its toll-free feature; all calls are preprogrammed to terminate at a fixed telephone line (number) or to a dedicated line.

In summary, the various court decisions—including the dissolution of the tight control that AT&T held over the operational reliability of the public telephone company utility—coupled with the evolution of digital communications technology has permitted entities other than the authorized common carriers (public utility telephone companies) to deploy robust communications services and networks and offer a variety of communications services, including telephone service.

These alternate service providers fall into two broad categories. The first category includes those entities that have emulated the MFVN provided by the authorized common carriers. The second category includes those entities that offer telephone service using means that do not offer the rigorous quality assurance, operational stability, and consistent features provided by an MFVN.

NFPA 72-2013, *National Fire Alarm and Signaling Code®*, intends to only recognize the use of the telephone network transmission of alarm, supervisory, trouble, and other emergency signals, by means of MFVNs.

For example, the *Code* intends to permit an MFVN to provide facilities-based telephone (voice) service that interfaces with the premises fire alarm or emergency signal control unit through a digital alarm communicator transmitter (DACT) using a loop start telephone circuit and signaling protocols fully compatible with and equivalent to those used in public switched telephone networks. The loop start telephone circuit and associated signaling can be provided through traditional copper wire telephone service (POTS—"plain old telephone service") or by means of equipment that emulates the loop start telephone circuit and associated signaling and then transmits the signals over a pathway using packet switched (IP) networks or other communications methods that are part of an MFVN.

Providers of MFVNs have disaster recovery plans to address both individual customer outages and widespread events such as tornados, ice storms, or other natural disasters, which include specific network power restoration procedures equivalent to those of traditional landline telephone services.

Over the course of the last five issues of ***TM-WSR,*** I have attempted to give you the background of how telephone service in the United States has evolved into the presently available service options. I hope this information will materially assist you as you evaluate the service offerings of the diverse service providers.

When installing contractors propose to add a supervising station fire alarm system to a new or existing building, the contractor must carefully determine the nature and character of the telephone service the building owner has purchased. The contractor must discover which service provider serves the facility. And, the contractor must make certain that the service provider has chosen to use a Managed Facilities-based Voice Network to provide that service.

Likewise, Authorities Having Jurisdiction who review proposed supervising station fire alarm systems must determine that the telephone service communications pathway comes from a service provider employing MFVN.

If either the contractor or the AHJ determine that the telephone service does not originate as part of an MFVN, then the contractor must work with the building owner to provide some other communications pathway acceptable to the requirements of the *Code*. ❑

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