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BULLETIN NO.

11-2

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Subject: Fire Alarm Transmission Channels
and Managed Facilities Voice Networks

Reference: Section 907.6 of the building
subcode; Section R314.2 of the one-
and two-family dwelling subcode

An issue has arisen in reference to providing phone service to facilities that are required to have a monitored fire alarm system. This bulletin provides guidance on whether or not Managed Facilities Voice Networks (MFVNs) can provide the required transmission means to an alarm system monitoring company.

Background

Starting in the early 1980's, fire alarm transmissions from protected premises to the supervising station were sent through Digital Alarm Communicator Transmitters (DACTs) over "Plain Old Telephone Service" (POTS). DACTs were originally designed to utilize POTS on the Public Switched Telephone Network (PSTN). POTS is the old copper line system that served every home or business with a telephone line. For many years, only this style of wiring was used and NFPA required that the primary transmission channel be a "telephone line (number)". This ensured that the transmission means was on a reliable circuit to the telephone company central office and then was switched to the number that the caller was trying to reach. Many times, when the signal left the telephone company office, it was carried on optical fiber. All POTS was on a battery backup power system. (Think about how many storms there were while you were growing up and your power went out, but you still had phone service.) POTS was and is a very reliable system, however the telephone company found a better way to transmit its communications and started using light over fiber optic service for telephone transmission. In many areas, POTS has been replaced with optical fiber, so your phone line (number) now comes to you by fiber optic service; you can also receive internet and television service through that means.

Code Requirements

The New Jersey Uniform Construction Code currently adopts the International Building Code (IBC)/2009 and International Residential Code (IRC)/2009.

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Both the IBC/2009 and IRC/2009 reference the National Fire Protection Association (NFPA) 72-2007 standard, which requires that DACT's be connected to the PSTN.

NFPA 72-2007, Section 8.6.3.2.1.5 requires that DACT's be connected to two separate means of transmission at the protected premises; the primary means must be a telephone line (number).

NFPA 72-2007, Section 11.7.8.1.1, Household Fire Alarm Systems, only requires a single telephone line (number) connection when a DACT is used for dwellings. Such systems are allowed in the International Residential Code (IRC)/2009, Section R314.

The secondary means of transmission for a DACT installed in other than an IRC building is not limited to a telephone line (number) pursuant to NFPA 72-2007, Section 8.6.3.2.1.4 and may employ any of the following;

- (1) *A second telephone line (number)*
- (2) *A cellular telephone connection*
- (3) *A one-way radio system*
- (4) *A one-way private radio alarm system*
- (5) *A private microwave radio system*
- (6) *A two-way RF multiplex system*
- (7) *A transmission means complying with 8.6.4*

The code does not mandate that only DACT's be used for fire alarm transmission. Where a DACT is not installed, any approved transmission means recognized by NFPA 72 can be utilized, including but not limited to, internet communicators and radio transmitters.

NFPA 72-2010, which is not the edition adopted by reference in the current building subcode, contains a new term, "Managed Facilities Voice Networks" (MFVNs). Subsections 29.7.8.1.5 and A.29.7.8.1.5 of NFPA 72-2010 were deleted by Tentative Interim Amendment (TIA) 10-3. This TIA clarifies the definition of MFVN and provides new text that states MFVN's are functionally equivalent to PSTNs. Below are relevant excerpts of the TIA that provide modified text and extensive explanatory information that the Fire Subcode Official can use in determining the equivalency of the communications channel.

"Section 3.3.141, Managed Facilities-based Voice Network (MFVN) -- A physical facilities-based network capable of transmitting real time signals 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.

Section A.3.3.141, 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 connection.*

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.

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."

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When a required fire alarm system is installed, all transmission channels must provide an eight-hour standby power supply capacity for MFVN communications equipment, whether it is located at the protected premises or field deployed.

Both NFPA 72-2007 and NFPA 72-2010 require that the secondary power supply for protected premises fire alarm systems have sufficient capacity to operate the fire alarm system under quiescent load (system operating in a non-alarm condition) for a minimum of 24 hours and, at the end of that period, shall be capable of operating all alarm notification appliances used for evacuation or to direct aid to the location of an emergency for five minutes (four minutes for household systems.) This requirement does not mandate the standby power of an MFVN to be more than eight hours; it mandates that the fire alarm panel, including the fire alarm communicator, whether it be a DACT or any of the other approved communications methods, have a standby power supply of 24 hours plus five minutes of alarm (four minutes of alarm for household systems.)

Guidance

NFPA 72-2007, Section 1.5, Equivalency, allows the local fire subcode official to accept systems that provide equivalent protection. NFPA 72-2007 already addresses this issue when service companies provide the telephone line (number) required by the standard. The companies need to provide a means of transferring the signal from the fire alarm communicator to their network and provide the required backup power supply on any interface equipment. MFVNs can be used provided that they meet the above mentioned features. In addition to the above mentioned features, the Fire Subcode Official must verify line seizure and the successful transmission of signals to the supervising station by an approved fire alarm contractor. The MFVN installers can't offer this service unless they have an employee who is approved to perform fire alarm system work. Before the existing approved transmission service is disconnected, the MFVN provider must notify the subscriber that an approved fire alarm contractor must be present for the installation of the new service to make certain that all signal transmission features have remained operational. Once the conditions of NFPA 72-2010 TIA 10-3 are met and the communications of the required signals to the monitoring company are verified, the MFVN connection is acceptable.