

# DOE/EFCOG Fire Protection Workshop A Look at Centralizing Fire Alarm Monitoring, Complex-Wide

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- + Applicable Codes
- + Fire Alarm Overview
- + Supervising Station Types
- + Configurations
- + DOE-Centric Supervising Station



#### Applicable Codes

- + Baseline Codes and Standards
  - DOE O 420.1C, Facility Safety
  - DOE-STD-1066, Fire Protection
  - International Model Codes
    - International Building Code (IBC)
    - International Fire Code (IFC)
- + Primary reference:



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National Fire Protection Association (NFPA) 72, National Fire Alarm and Signaling Code

- + Secondary references:
  - NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems
  - Underwriters Laboratories (UL) 827, Central-Station Alarm Services
  - UL 1981, Standard for Safety, Central-Station Automation Systems

#### Fire Alarm Overview

- + Multiple reasons to install fire alarm system
  - Required by code
    - Occupancy hazard (e.g., large assembly area, IBC 907.2.1)
    - Monitoring of fire suppression system (e.g., for relocatable structure, DOE-STD-1066, C.6.4)
  - To protect area with high Maximum Potential Fire Loss (MPFL), DOE-STD-1066, 4.2.3
- + Fire alarm systems have a variety of elements
  - Initiating devices (fire/smoke detection, sprinkler waterflow)
  - Notification appliances (sound and lights)
  - Emergency control functions (elevator recall, fan shutdown)
  - Interfaces to other systems (security, emergency alarm)
  - Monitoring/Supervision



#### NFPA 72's Helping Hand

**3.3.263.9**\* *Supervisory Signal.* A signal that results from the detection of a supervisory condition. (SIG-FUN)

- + No *definitions* in IBC/NFPA 72 for Monitoring
- + Used within definitions and code in different ways
  - Monitor circuits for integrity
  - Monitor systems to take action

#### **IBC** Definitions

**[F] SUPERVISING STATION.** A facility that receives signals and at which personnel are in attendance at all times to respond to these signals.

**[F] SUPERVISORY SERVICE.** The service required to monitor performance of guard tours and the operative condition of fixed suppression systems or other systems for the protection of life and property.

**[F] SUPERVISORY SIGNAL.** A signal indicating the need of action in connection with the supervision of guard tours, the fire suppression systems or equipment or the maintenance features of related systems.

**[F] SUPERVISORY SIGNAL-INITIATING DEVICE.** An initiation device, such as a valve supervisory switch, water-level indicator or low-air pressure switch on a dry-pipe sprinkler system, whose change of state signals an off-normal condition and its restoration to normal of a fire protection or life safety system, or a need for action in connection with guard tours, fire suppression systems or equipment or maintenance features of related systems.

### Fire Alarm Reporting Systems

- + Fire alarm systems are at Protected Property, generate different signals
  - Alarm
  - Supervisory
  - Trouble
  - Guard Tour (type of supervisory)
  - Water flow (type of alarm)
- + Offsite Communication
  - Transmits these signals to a constantly attended location
  - Leads to response by fire department
  - Fosters repairs to broken or impaired systems or components



Intermountain Region US Forest Service

- + Example sources of requirements:
  - IBC 901.6.1, 903.4.1: Monitoring of sprinkler systems
  - IBC 907 6 6: Mc 901.6 Supervisory service. Where required, *fire protection*
  - IFC 3805.3.1: Msystems shall be monitored by an approved supervising sta- oratories
  - IFC 5004.10: M<sup>tion</sup> in accordance with NFPA 72.

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- 901.6.1 Automatic sprinkler systems. Automatic sprinha kler systems shall be monitored by an *approved* supervising station.
- DOE-STD-1066
  - 4.2.3: Fire alarm reporting systems (large MPEL facilities)
    - [F] 903.4.1 Monitoring. Alarm, supervisory and trouble
  - 4.2.8.1: Fire alarm signals shall be distinctly different and shall be automati-
  - E 2 1 10; Fire clar calles the manufited to an annual annamiating station on
- Automatic fire detection, occupant warning, manual fire alarm, and fire alarm reporting ٠ systems (considered together) combined with a sufficiently-staffed, properly-equipped, and adequately-trained fire department or brigade.

### NFPA 72 Supervising Stations

- + Central Supervising Stations
- + Proprietary Supervising Stations
- + Remote Supervising Stations



Source: AHJ Resource Guide, AES-corp.com

#### **Central Supervising Stations**

- + Listed
- + Typically, commercial
- + Requirements for
  - Services/signals received
  - Construction
  - Personnel
  - Signal disposition
  - Records retention
- + Receive signals, retransmit to dispatch



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## **Proprietary Supervising Stations**

- + Not Listed
- + All facilities under one owner
- + Requirements for
  - Services/signals received
  - Construction
  - Personnel
  - Signal disposition
  - Records retention
- + Receive signals, retransmit to dispatch



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#### **Remote Supervising Stations**

- + Not Listed
- + Not required to serve one owner
- + Requirements for
  - Services/signals received
  - Personnel
  - Signal disposition
  - Records retention
- + Receive signals, can be co-located with dispatch
- + Construction requirements typically stem from dispatch (NFPA 1221)



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# Configuration

- + Multiple sites have "proprietary" supervising stations with
  - A primary location
    - 2 servers and 2 sets of receivers
    - Workstations and clients for 2 operators
  - An alternate location
    - Potentially duplicated, from servers to workstations
    - Possibly with fewer features (e.g., no dedicated workstations)
  - Additional clients (e.g., for maintenance use)
- + Several are replacing head-end equipment (end-of-life)
- Monitoring of local buildings and remote facilities (<1000 total)</li>
- + Operators have other duties
  - Dispatch

Terror warnings

Weather alerts

- Etc.



- + One-way Radio
- + Two-way Radio
- + Performance-Based Technologies (Cell, IP)
- + Digital Alarm Communicator Transmitter/Receiver (DACT/DACR)
  - Plain Old Telephone Service (POTS)
  - Voice Over Internet Protocol (VOIP)



### Consideration: Proprietary DOE Supervising Station Serving All Sites

- + Equipment and manning costs of supervising stations are substantially similar whether supervising
  - One site
  - All sites
- + Current configurations are remote supervising stations, owing to dispatch (and other duties)
- + A DOE-centric supervising station would focus on supervising, relaying information to local dispatch
- + Manpower
  - Likely increase in manpower at global level (2 operators per shift, per station)
  - No manpower change at local sites owing to other duties (dispatch, coordination with employees)
- + Primary and backup supervising stations can be at different sites
  - Reduces risk of loss of both stations (e.g., from wildfire risk or other site-wide emergency)
  - Possibly expand monitoring scope of existing facilities

# Synergy

- + Limited sources for US-based supervising station software
- + US-based providers moving towards cloud-based services
  - Reduction in on-site equipment at supervising stations
  - Transfer of equipment upgrade costs
- + Federal Risk and Authorization Management Program (FedRAMP) enables cloud usage
- + Centralized data collection could also allow for analysis of system performance
  - Determination of "bad actors" (potentially owing to unique DOE exposures)
  - Additional options for reporting mechanisms

# **Questions/Comments?**

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