Division *of*
Risk Management

Fire Protection/Detection Impairments

Background

Well-maintained fire protection and fire alarm systems are designed to promote safe occupant evacuation and reduce property damage. These systems are made of numerous devices and appliances that must work together to notify building occupants and detect and control fire events. This can only be achieved when the systems are fully operational; any deviations from fully operational conditions are considered impairments.

When one or more of the system(s) components are modified from the originally designed intent (removed, disconnected, damaged, etc.) the system(s) are considered impaired. System impairments will prevent a fire event from being properly detected and controlled, resulting in threats to life and property.

Impairments are a normal part of fire protection and fire alarm systems; however, dangers arise when fires occur during the impairment duration or when the systems are not returned to normal operating conditions after work completion. Statistics from the NFPA (National Fire Protection Association) and the insurance industry indicate that sprinklers operated in 92 percent of fires and were effective at controlling the fire in 96 percent of the incidents in which they operated. The number one cause of failure of a fire sprinkler system is a closed control valve.

Impairment Summary

Impairment Types:

- **Planned Impairments** – Planned system modifications that require shutting down all or a portion of the system(s). Planned impairments have the benefit of pre-planning to help minimize impairment duration. A few examples include improvement or modification to the system(s), replacing old fire sprinklers, replacing detection devices, etc.

- **Emergency Impairments** – Unplanned system modification that requires shutting down all or a portion of the system(s). Unplanned impairments are dangerous due to the lack of pre-planning. A few examples include broken fire sprinkler supply/piping, severed fire alarm system wiring, loss of communications, etc.

- **Hidden/Concealed** – Hidden/concealed impairments are inherently the most dangerous type of impairment. These types of impairments can be hidden/concealed for years, even decades. A few examples include closed curb-box valves, internal piping obstructions, covered smoke detectors, covered fire sprinklers, etc.

Fire Sprinkler System Impairment Examples

- Closed PIV (Post Indicator Valve(s))
- Closed water supply curb valve
- Obstructed Standpipe
- Obstructed FDC (Fire Dept. Connection)
- Power loss to electrically driven fire pump
- Broken fire sprinkler supply/piping
- Closed fire sprinkler system zone control valve
- Maintenance/Repair
- Fire pump maintenance

Fire Alarm System Impairment Examples

- Open circuitry
- Covered/broken detectors/notification appliances
- Loss of communication with the central alarm station
- Loss of backup power source
- Lack of required Fire Alarm Testing
- Ignored/silenced supervisory/trouble codes

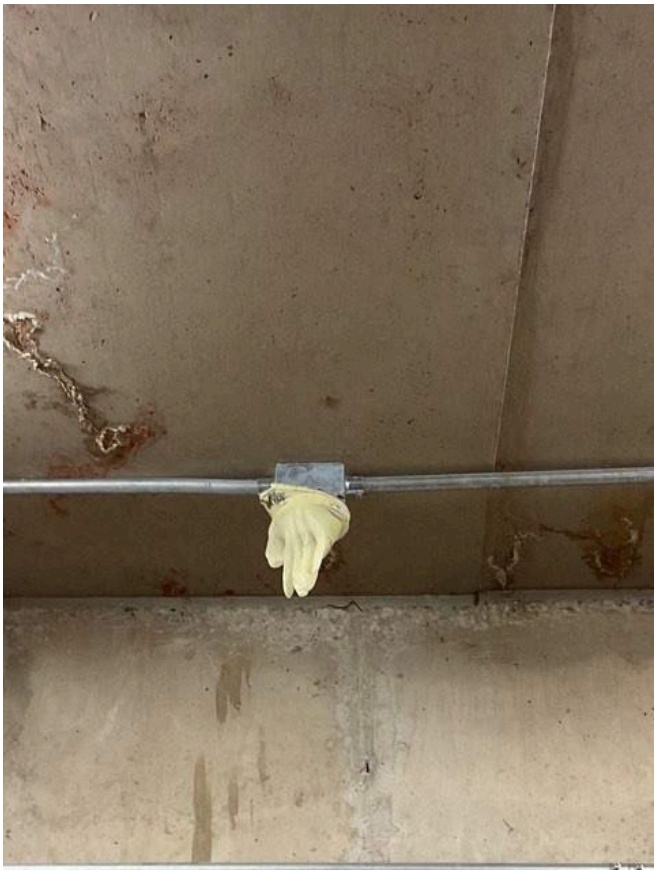

FIGURE 1 - IMPAIRED BOILER ROOM SMOKE DETECTOR

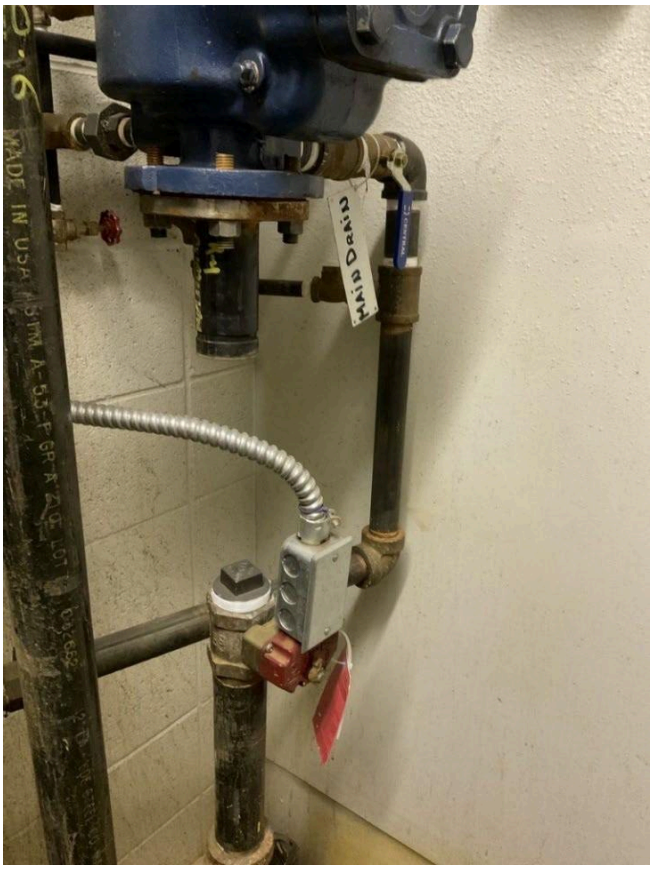

FIGURE 2 - MISSING FIRE SPRINKLER PIPING

FIGURE 3 - COVERED FIRE SPRINKLER

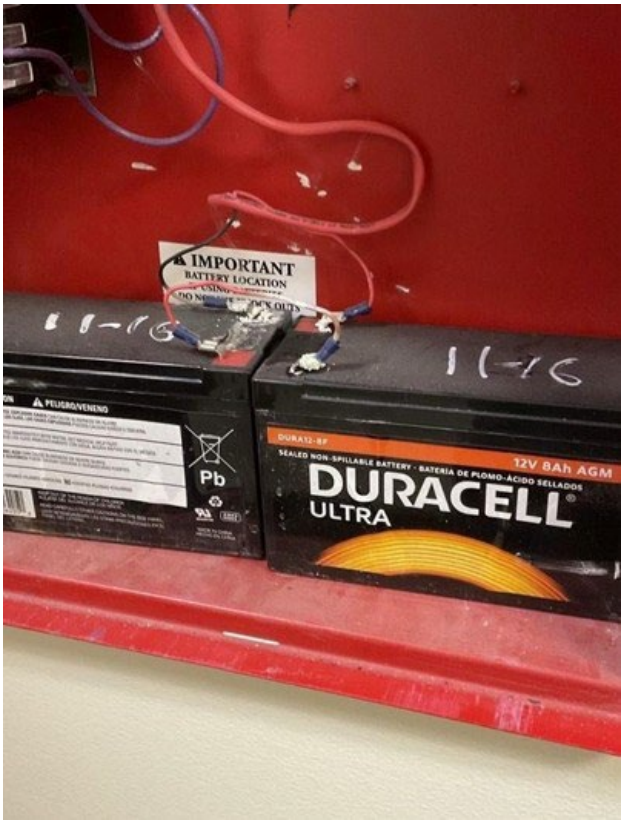

FIGURE 4 - CORRODED FIRE ALARM PANEL BACKUP BATTERY TERMINALS

Impairment Checklist

To be completed during fire protection/fire alarm impairments. Refer to referenced codes/Standards for detailed requirements.

☐ Notify the Utah State Fire Marshal's office

☐ Notify the local fire authority

☐ Notify all department heads, within the building or area, of the impairments and the expected duration

☐ Require State/DFCM approved Hot Works program and permit process on all hot work

☐ Provide a fire watch, approved by the State Fire Marshal's Office, to monitor the area until impairment is resolved

☐ Prohibit all hazardous operations during impairment

☐ Ensure as many sprinklers/detectors remain in service as possible

☐ Provide extra fire extinguishers to the affected area(s)

☐ Provide a visual indication at the device responsible for the impairment (example: hang an impairment tag on a closed valve, fire alarm panel, etc.)

☐ Notify the alarm monitoring entity (if applicable)

☐ Notify the insurance company's Fire Protection Impairment Department (if applicable)

Impairment Restoration Checklist

To be completed for fire protection/fire alarm impairments. Refer to referenced Code/Standards for detailed requirements.

☐ Notify the Utah State Fire Marshal's office

☐ Notify the local fire authority

☐ Verify all control valves are reopened

☐ Verify fire sprinkler system is fully operational (visual, testing, etc.)

☐ Verify fire alarm system is fully operational (visual, testing, etc.)

☐ Verify any fire service equipment placed in manual mode has been reverted to automatic

☐ Confirm impairments have been fully addressed

☐ Inform alarm monitoring entity of the updated status of system(s)

☐ Inform department heads of updated status of system(s)

Referenced Codes/Standards

☐ 2024 International Fire Code (IFC) § 901.7 Systems out of Service

☐ 2023 NFPA 25 § Chapter 15 Impairments *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*

☐ 2022 NFPA 72 § 10.21 Impairments *National Fire Alarm and Signaling Code®*

☐ OSHA 29 CFR 1910 Subpart L *Fire Protection*