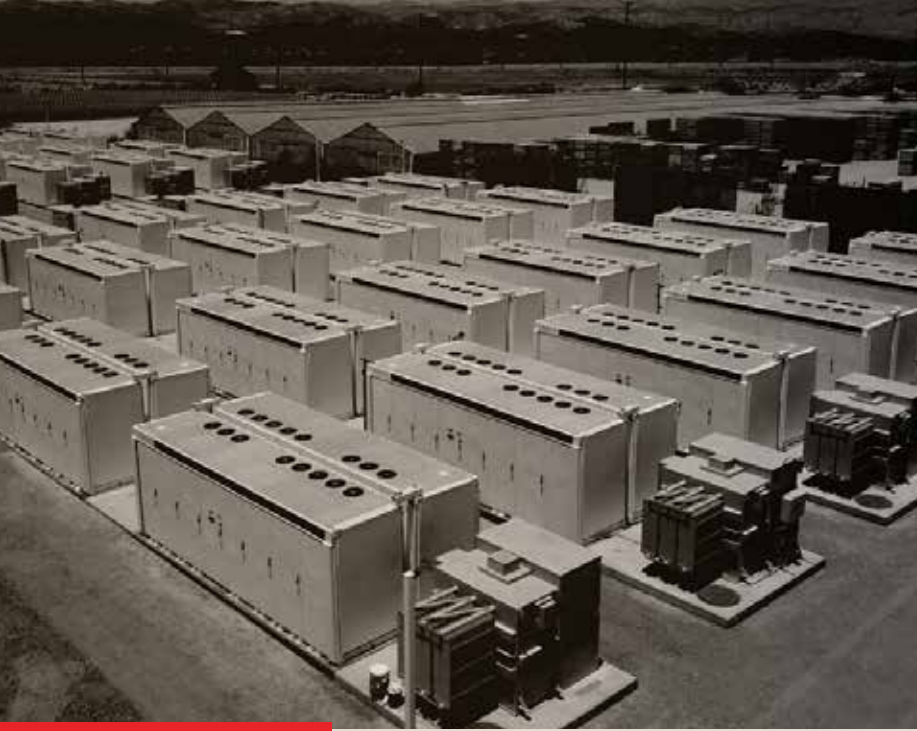




Electric Power Hazard Protection

**FIRE SUPPRESSION
IN AN ENERGIZED
ENVIRONMENT**





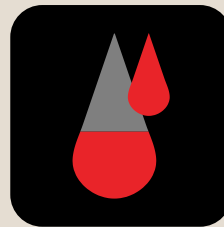
**VANDALISM, GUNFIRE
AND MORE COVERT CYBER
ATTACKS CONTINUE TO
DAMAGE SUBSTATIONS,
THREATENING THE POWER
GRID'S STABILITY**

EXPLORING

POWER GRID FIRE HAZARDS

The electric power grid faces several modern threats. Cascading failures with the potential to affect large areas of the country can result from aging equipment, extreme weather and natural disasters.

Grid damage, whether accidental (i.e. lightning, collisions, etc.) or intentional (i.e. gunfire, cyber attacks, etc.), continues to threaten electric power grid stability. It has never been more important to remain prepared in the face of adversity through adequate fire protection to prevent these failures.



OIL LEAKS

Oil leaks can lead to equipment overheating, creating a fire hazard.



FIRES

Extreme weather and grid damage can induce ignition.



FAILURE

Transformer and power grid failure is a growing concern.

HAZARD CONTROL TECHNOLOGIES

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PROTECTING

TRANSFORMERS

High voltage, oil leaks and the need for environmental cleanup can complicate a transformer fire.



ENERGY STORAGE

A violent lithium-ion battery fire will include toxic flammable off-gases and corrosive runoff.



SOLAR PANELS

Electrocution is a possibility while fighting solar panel fires in sunlight.



WIND TURBINES

One wind turbine fire can cost your facility millions in damages if not properly mitigated.

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EXPLORING

SAFETY

Transformer installations in the United States peaked in the mid-70's. The average lifespan of a transformer is 40 years. Failures are predicted to increase 500% as many approach their retirement. Sources state that 1 in 5 transformer failures will result in a fire.

FERC, IMIA, US COMMERCE DEPT

FDNY SOG STANDOFF DISTANCES WHILE USING ENCAPSULATOR AGENTS FOR LIVE, DENERGIZED AND ISOLATED EQUIPMENT



**15 FEET ON LIVE 138 KV
25 FEET ON LINE 345 KV**
Requires 30° or greater fog streams.



**75 FEET ON LIVE 138 KV
125 FEET ON LIVE 345 KV**
Requires all straight or solid streams.



ENERGIZED ENVIRONMENTS

3%

FDNY SOG SUBSTATION FIREFIGHTING

WATER

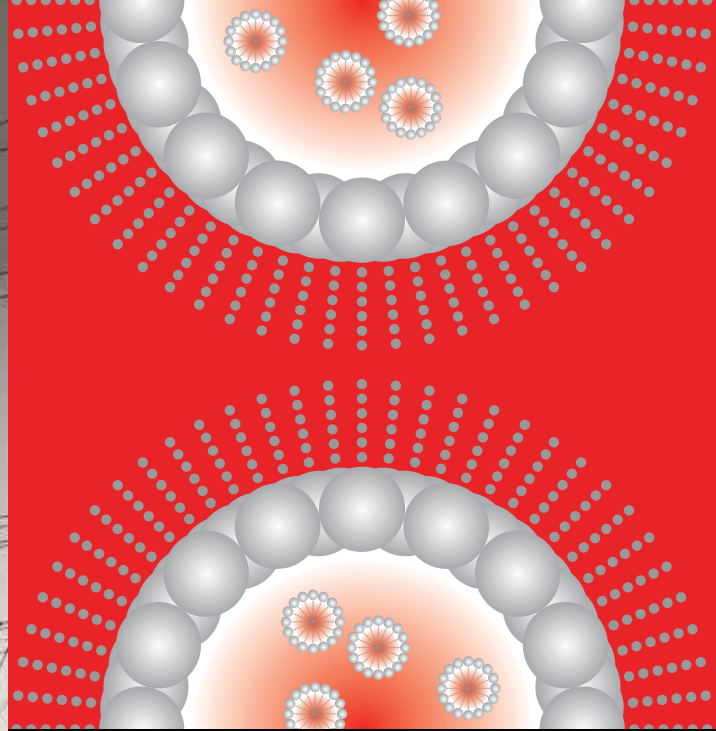
“The use of water should be limited to protecting exposures and controlling smoke.

Attempts to use water to suppress a transformer fire may result in a "boil-over".”

ENCAPSULATOR AGENTS

“F-500 Encapsulator Agent (F-500 EA) is used exclusively by Con Edison. They will supply the product via 5-gallon cans.

Con Edison will supply large caliber fixed monitors and a 2 Y2 eductor that will enable FDNY members to draw from the 5-gallon containers.”



NFPA 18A

ENCAPSULATOR AGENTS (EA)

SECTION 7.7

This section covers the test procedure to evaluate the ability of a water additive solution to form and maintain stable spherical micelles capable of encapsulating combustible and flammable liquids (polar and non-polar), rendering the flammable liquids non-flammable, non-ignitable and non-explosive and maintaining that encapsulation in the presence of high heat over an extended period of time.

SPHERICAL MICELLE STABILITY

ANX 4.3 LITHIUM-ION BATTERIES

Encapsulator Agents conforming to Section 7.7 have been tested extensively by independent third-parties. This testing has been controlled, scientific and instrumented, documenting fire suppression, control and the elimination of thermal runaway as well as the encapsulation of flammable electrolyte and other explosive off-gases, reducing the toxicity.

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DOMINION

SPRINKLER TEST

F-500 Encapsulator Agent (F-500 EA) extinguished the fire three times faster at half the sprinkler density.

WATER

PREBURN	1,100°F-1,300°F
EXTINGUISHED	33 SEC

SPRINKLER	0.40 GAL/MIN/SF
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3% F-500 EA



PREBURN	1,100°F-1,300°F
EXTINGUISHED	11 SEC

SPRINKLER	0.20 GAL/MIN/SF
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EXPLORING

LUBE OIL FIRES

An EPRI study concluded that, based on a 30-year plant life, there has been one fire in roughly 200 unit-years. This means that one out of seven turbine generators in operation will experience a fire. The average loss attributed to this type of fire is \$26 million in damages with service outages that can last for a minimum of 2 weeks and up to 48 weeks depending on the damage. There are additional losses resulting from extended business interruption and obligatory contract penalties.

ENCAPSULATOR AGENTS ARE CAPABLE OF SAFELY EXTINGUISHING THREE-DIMENSIONAL AND FLOWING FUEL FIRES, INCLUDING HAZARDOUS UNDER TURBINE LUBE OIL FIRES, WHERE TEMPS CAN REACH 1,500°F OR MORE



SOUTHERN COMPANY

575V TRANSFORMER FIRE CASE HISTORY

In March of 2017, the Current Transformer (CT) above a 575V Station Service Transformer (SST) failed, burning through the mount. This caused the CT to fall into the 575V SST bushings below, allowing it to track to the ground and fault the SST. Video footage confirmed active arcing for about forty seconds, creating a visible fireball. The plant did not have a structural fire brigade, but they did have an automatic deluge sprinkler system equipped with a 900-Gallon F-500 EA powered bladder tank protecting both the SST and GSU.

THE FIRE WAS EXTINGUISHED IN MINUTES

Southern Company's automatic deluge sprinkler system was activated within seconds, providing a 3% F-500 EA solution. Video footage as well as ground personnel confirmed that the addition of F-500 EA not only contained the fire, but also quickly extinguished it completely in just over three minutes time. Intervention from local fire departments was not needed. Containment levels never got high enough to breach it and cleanup was minimal due to less water being used for extinguishment.

**WE OFFER CUSTOM
ENGINEERED BLADDER
TANK AND WATER-DRIVEN
PROPORTIONER SYSTEMS
DESIGNED TO MEET YOUR
FACILITY'S NEEDS**

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