FIRE & RISK ALLIANCE

BlueWave Energy

Worthington Battery Energy Storage System

Fire, Explosion, Plume & Soil

James Caulfield

- **QUALIFICATIONS:**
- Active New Jersey Firefighter
- 22 years of Law Enforcement and Fire Service experience
- Retired Police Officer
- National Tactical Officer Association operator
- Monmouth County Police Academy Instructor
- Threat, Risk and Vulnerability assessment coordinator
- Incident Command System 100, 200, 300, 700 and 800
- FBI Crisis management
- Sports and special events incident management
- Field training officer
- TTT Civilian response to active shooter
- Emergency response team operator
- Community policing / Crisis management

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TEXAS FIRE TRAINING SCHOOL EST. 1930 TEEX-ESTI

NATIONAL TACTICAL OFFICERS ASSOCIATION NTOA

Agenda

BATTERY ENERGY STORAGE

BATTERY SYSTEM FAILURES

FIRE

EXPLOSION

PLUME

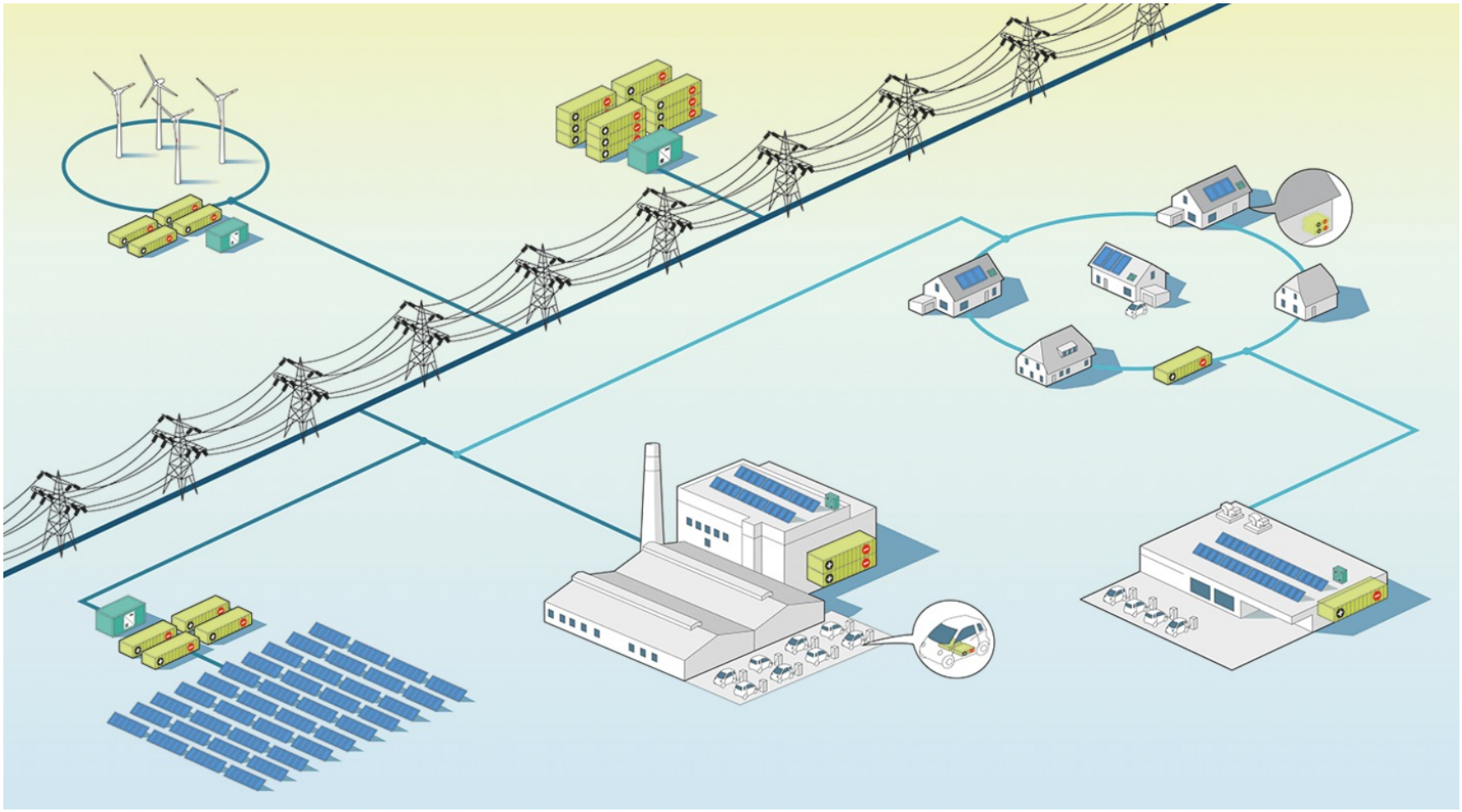
SOIL

FIRE & RISK ALLIANCE

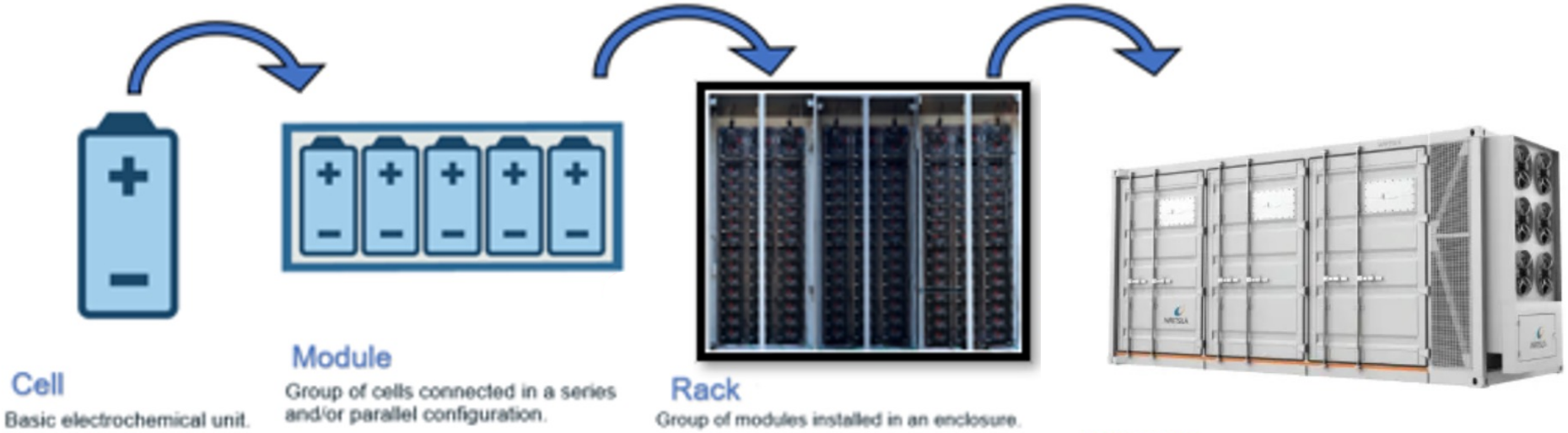
Battery Energy Storage

Concept & Overview

BATTERY ENERGY STORAGE SYSTEM CONCEPT



Battery System Anatomy



Cell
Basic electrochemical unit.

Module
Group of cells connected in a series and/or parallel configuration.

Rack
Group of modules installed in an enclosure.

Site Layout

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Battery System Failures

Cause & Correction

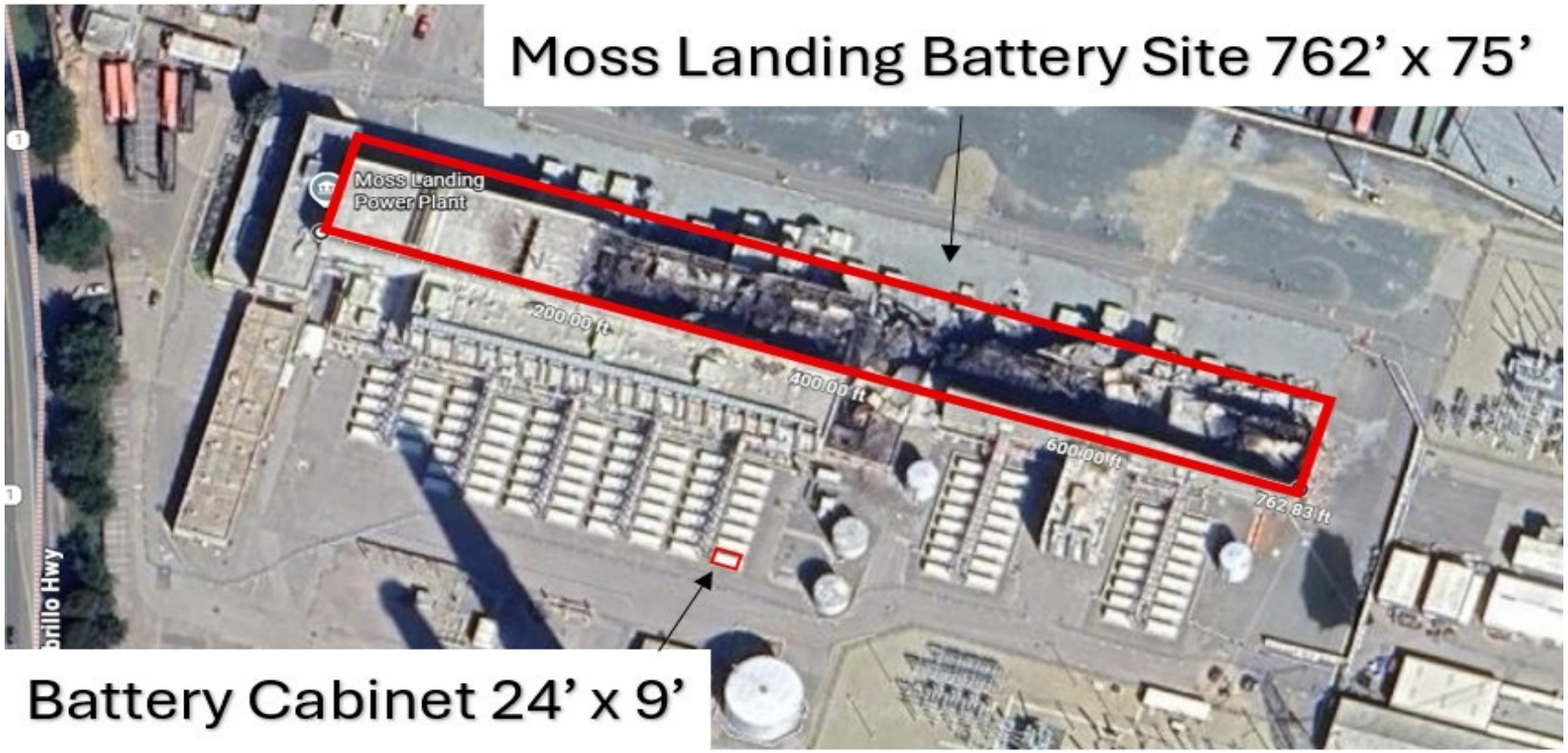
Moss Landing Incident

Open Design

Single Room / No Fire Breaks

Installed 2020

Before Codes / Standard were Established


Moss Landing Battery Site 762’ x 75’
Moss Landing
Power Plant
200.00 ft
400.00 ft
600.00 ft
762.83 ft
Battery Cabinet 24’ x 9’

Moss Landing Soil Samples: Executive Summary

Executive Summary

Terraphase Engineering Inc. (Terraphase) has prepared this *Soil Sampling Report,* on behalf of Vistra Corp., to present the results of surface and near-surface soil sampling conducted in the vicinity of the Moss Landing Power Plant at 7301 Highway 1, Moss Landing, California (MLPP; the Site; Figure 1). The sampling program was requested and approved by the County of Monterey Health Department's Environmental Health Bureau (EHB) in response to the January 16, 2025, lithium-ion battery fire which occurred at the Moss Landing 300 MW battery storage facility.

On May 8, 18, and 22, and June 20, 2025, Terraphase collected surface and shallow subsurface soil samples from 27 pre-determined locations within a 10-mile radius of ML300. The 108 primary and 10 duplicate soil samples were submitted for analysis of metals associated with the batteries that were damaged in the ML300 fire (aluminum, cobalt, copper, lithium, manganese, and nickel), as well as lead, pH, and moisture content. Sixteen soil samples from four selected boring locations were additionally analyzed for polycyclic aromatic hydrocarbons, and dioxins and furans.

Data generated during the investigation were compared to EHB-approved screening levels, which were based on residential health protective standards established by the Department of Toxic Substances Control and/or United States Environmental Protection Agency. There were no detections of aluminum, copper, lithium, nickel, polycyclic aromatic hydrocarbons, or dioxins and furans above the EHB-approved screening criteria.

There were no exceedances of residential screening levels of the other metals (cobalt, lead, and/or manganese) in 110 out of 118 soil samples. The few isolated detections of cobalt, lead, and/or manganese in 8 out of 118 soil samples are not indicative of fire-related impacts, because of one or more of the following reasons: (a) the exceedances were observed in the subsurface but not the surface soil sample; (b) the exceedance was only for lead, which is not a key metal associated with the lithium-ion batteries involved in the ML300 fire; (c) although an exceedance was observed in the original analysis of a shallow soil sample, the result from the reanalysis of this sample was below the screening level; and/or (d) the concentrations were within the range of naturally occurring metals concentrations observed in soils.

Based on the data generated from this investigation, Terraphase has concluded that no further soil investigation is warranted.

EPA Air Monitoring – Moss Landing

EPA Completes Air Monitoring Near Moss Landing Vistra Battery Fire

Emergency Response -- Monitoring by the state and Vistra will continue to watch for any risks to public health

January 20, 2025

Contact Information
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(213) 317-5259

MONTEREY— On January 20, the U.S. Environmental Protection Agency (EPA) concluded supplemental air monitoring in the vicinity of the Vistra Energy battery power storage facility fire in Moss Landing, CA. Results for hydrogen fluoride and particulate matter showed no risk to public health throughout the incident, and smoke from the facility has greatly diminished. The EPA demobilized air monitoring operations after consultation with the Monterey County Incident Command for the Vistra fire.

EPA began monitoring for hydrogen fluoride, a highly toxic gas produced by lithium-ion battery fires, and for particulate matter after the fire began on January 16. The request for air monitoring came from Monterey County. As part of the multi-agency emergency response, EPA installed a total

Water Intrusion 2-NYS 1-Idaho

Jul 07, 2023, 6:45am • *Updated on Jul 07, 2023*

By: **News 12 Staff**

IP66 Enclosure Rating

1,600 GPM for 20 Minutes

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Community Exposures

Distance To Exposures

- **The nearest residence is the landowner's property, approximately 535′ from the edge of equipment pad where the batteries will be.**

- **The nearest abutting residence is approximately 775′ from the edge of the equipment pad.**

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Fires

Response Philosophy

Extinguishing Fire: Life & Property

Intervention: Containment

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Cell Failure

Venting & Thermal Runaway

Overcoming Internal Pressure

90% State of Charge

< 30 % State of Charge

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Explosion

Arizona 2019 - APS McMicken

EXPLOSION RISK – LESSONS LEARNED

Explosion Control Systems

NFPA 68: Deflagration Vents

NFPA 69 FLAMMABLE GAS PURGE

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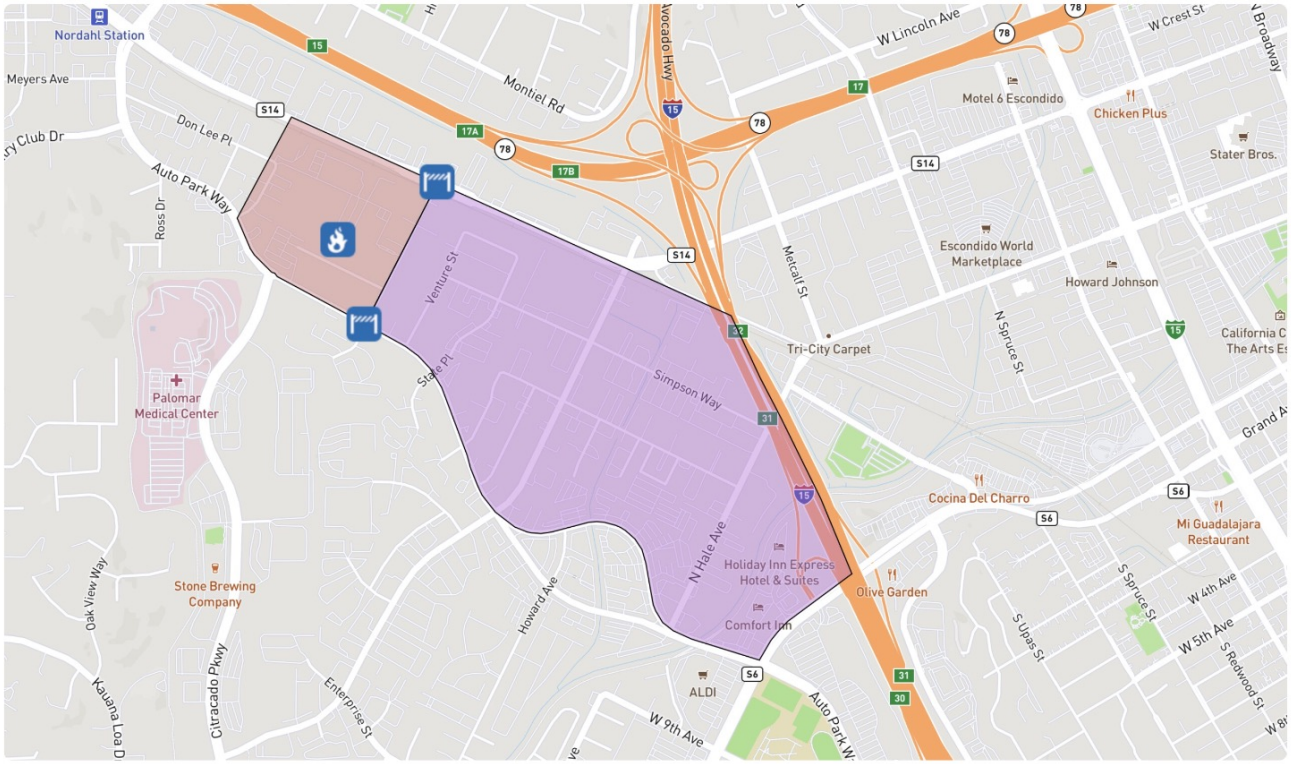
Plume

Escondido Battery Fire

Escondido Battery Fire

EVACUATION MAP (RED AREA: EVACUATIONS; PURPLE AREA: SHELTER IN PLACE):



Fire Department Air Monitoring

Active Air Monitoring	% Detected	IDLH
Carbon Monoxide	0	1,200 PPM
Carbon Dioxide	0	40,000 PPM
Hydrogen Fluoride	0	30 PPM
Hydrogen	0	
Hydrogen Sulfide	0	100 PPM
Hydrogen Cyanide	2 PPM	50 PPM
Oxygen	20.8	
LEL	0	

Post Fire Water & Plume Reports

CESA
CALIFORNIA ENERGY STORAGE ALLIANCE

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Oct 2, 2024 11:23:38 AM

Air and Water Quality Data from Escondido Fire Show Minimal Contamination

CESA

Share:

Energy storage is essential to decarbonize electricity supplies, but some communities have expressed concern about the safety implications of proposed energy storage facilities. While the energy storage industry strives to minimize the likelihood of BESS incidents, the findings of two recent reports add further evidence demonstrating that fires at energy storage facilities produce emissions that are comparable to other structure fires and pose minimal risk for public health and the environment.

On September 19, two weeks after the September 5 fire that occurred at an energy storage facility in Escondido, the City of Escondido released two reports on the findings of the air and water quality monitoring that took place during the incident. The air quality data came from 11 different locations monitored by San Diego County HAZMAT and 17 locations monitored by Haley & Aldrich, Inc., an engineering and environmental compliance firm under contract with SDG&E, the operator of the facility. The stations were located approximately 100 feet to as far as 4,000 feet from the affected container and monitored six toxic gases. The equipment only detected the presence of two of the monitored gases, carbon monoxide and hydrogen cyanide, but readings for both gases were well below acceptable limits. The report concludes that "... only normal products combustion [sic] of a structure fire were detected and at levels considered by NIOSH and OSHA to be well below exposure thresholds."

Samples of runoff water were assessed for the presence of 17 toxic metals. The analysis detected some level of six of the 17 metals, but the report notes that the concentrations were well below EPA drinking water standards and the runoff "poses minimal risk to both human health and the environment."

Plume Gas Results & Action Thresholds

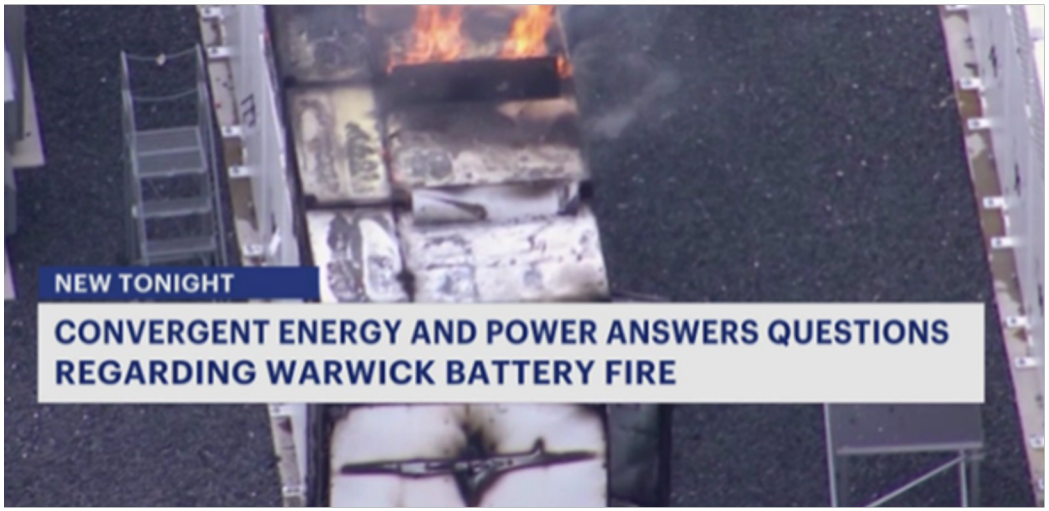
Gas		CDC IDLH Thresholds	Actual %
Carbon Monoxide	CO	**1,200 PPM**	145,960 PPM
Carbon Dioxide	CO_2	**40,000 PPM**	269,250 PPM
Hydrogen	H_2	N/A	
Methane	CH_4	N/A	
Hydrogen Chloride	HCL	50 PPM	
Hydrogen Cyanide	HCN	50 PPM	
Hydrogen Fluoride	HF	30 PPM	

Distance & Dissipation

Plume Behavior

Natural Gas - Propane

Energy Storage Fire vs. Residential Fire



Energy Storage Fire vs. Commercial Fire

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Soil

NextEra, East Hampton, NY
Gateway, Otay Mesa, CA

East Hampton BESS – 24 Hour Deluge

Fire Shuts Down East Hampton Energy Storage Batteries

Government Public Safety

DECEMBER 21, 2023 | Albany, NY

Governor Hochul Announces Release of Initial Findings From Inter-Agency Fire Safety Working Group on Emergency Response

Available Analyses Find No Reported Injuries, No Harmful Levels of Toxins Detected at Sites of Battery Storage Fires

Chaumont Battery Fire – Water Applied

New York State Findings

The data assembled and analyzed by the Working Group includes:

- An air monitoring report from the OFPC, and soil and water sampling data received from DEC from the Chaumont site.
- On-site air monitoring results collected from the Warwick sites and relayed to the Working Group by local officials.
- On-site **soil sampling results from the East Hampton site** relayed to the Working Group by a project developer.
- An independent **third-party** site inspection report consisting of **air monitoring and surface sampling** at school buildings in the vicinity of the June 27, 2023, fire at the Warwick site.

Based on the information available to date, there is no evidence of significant off-site migration of contaminants associated with the fires.

Gateway BESS Fire – 6 Million Gallons of Water

Thank You

Questions

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