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O P E R A T I O N S M A N U A L

STANDARD INSTRUCTION 02 SPECIAL RESPONSE GUIDELINES

SECTION xx BATTERY ENERGY STORAGE SYSTEM FAILURES

I. PURPOSE

To establish operational guidelines for effective response, mitigation, and safe operational procedures for outdoor battery energy storage systems (BESS).

II. SCOPE

This policy shall apply to all sworn San Diego Fire-Rescue Department (SDFD) personnel.

III. AUTHORITY

The fire chief authorizes the information within this policy.

IV. DEFINITIONS

A. Battery Energy Storage System (BESS): Battery Energy Storage Systems, or BESS, are rechargeable electrochemical batteries that can store energy from different sources and discharge it when needed. BESS consist of one or more batteries.

B. Thermal Runaway: Lithium-ion (Li-ion) battery thermal runaway occurs when a cell, or area within the cell, achieves elevated temperatures due to thermal damage, mechanical damage, internal/external short circuiting, or electrochemical abuse. This elevated temperature releases energy which in turn further increases temperature. It is a phenomenon known as a positive feedback loop in which the lithium-ion cell enters an uncontrollable, self-heating state.

C. Propagation: The spreading of fire between Lithium-ion battery cells initiated by a thermal runaway.

V. POLICY

A. PPE
   1. Wear self-contained breathing apparatus (SCBA).
   2. Wear structural firefighting gear.

B. Signs of possible Battery Energy Storage System Failure
   1. Smoke or suspicious odor emanating from an Energy Storage System can be an indication of an abnormal and hazardous condition.
   2. Battery thermal runaway fires are preceded by highly flammable gas vapor clouds often mistaken for smoke.

C. If fire, vapor clouds, or suspicious odor is observed emanating from the product at any time, perform the following:
   1. If possible, shut off the unit/system.
   2. Consider shelter-in-place or evacuation of all non-emergency personnel depending on incident and exposures.

3. Do not approach the unit and attempt to open any doors. BESS have a variety of safety mechanisms. Some are designed to maintain the doors shut, and some have automatic doors designed to aid in ventilation.
4. If not already done, contact the site emergency contact and/or manufacturer.
5. Maintain a minimum 50' distance from the unit and monitor for evidence of continued gas venting or fire.
6. **There may be periods during which the thermal runaway propagates from battery modules to battery modules. During such time, the battery may not generate visible signs of thermal event although the event can still be active, and the battery can flare up.**
7. Complete area size-up and establish water supply.
8. If a fire has not developed:
    i. Be aware of deflagration risk and maintain a minimum or 50' distance from unit.
    ii. Position attack lines to protect neighboring exposure structures or other electrical equipment.
9. If a fire develops:
    i. Allow the affected unit to consume itself as it is designed to do. Applying water to the burning unit will only slow its eventual combustion and create run-off concerns.
    ii. For exposure protection, use wide-fog stream, at lowest volume possible, to achieve desired cooling of neighboring battery enclosures. Coordinate procedure with site emergency contact or product manufacturer.
10. Allow the battery pack to cool down (this process may take 12-48 hours or longer).