Li-ion Tamer[®] Early Detection System

Improved Monitoring for Li-ion Battery Health & Safety

Steve Cummings

Director, Sensor Business Unit

November 7, 2019





Li-ion Tamer[®] has installations throughout the world...



Projects

Cumulative Sensor Hours

MWhr pipeline projects

Battery fires occurred in systems with Li-ion Tamer



What is Li-ion Battery Off-gas?

Definition (per NFPA 855/UL 9540A):

- The event in which the cell case vents due to a rise in internal pressure of the cell.
 Why is it Unique?
- Gas generation in lead acid vs. lithium ion batteries
- Can be used for incipient fault detection











What are the Stages of a Battery Failure?

Battery Failure Stages

- Stage 1: Abuse factor
 - Internal mechanisms increase cell pressure
- Stage 2: Off-gas generation
 - Occurs regardless of cell form-factor
- Stage 3: Smoke generation
 - Catastrophic failure is imminent
- Stage 4: Fire generation
 - Likelihood of propagation drastically increases



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How can off-gas detection provide an additional barrier to thermal runaway?

Battery Fault Detection

- Off-gas is precursor to battery failure
- Detection of off-gas can provide early warning
- Incipient fault detection

Battery Failure Mitigation

- Remove abuse from cell
- Additional barrier to thermal runaway
- Improves hazard mitigation analysis for a BESS







What are the benefits of off-gas detection?



Redundant detection and protection for lithium ion battery systems

- Additional *layer of safety* for detecting and protecting against thermal runaway
- Improve risk analysis with *additional barriers* to thermal runaway



Independent of other detection and protection system

- Most barriers are based on electrical interrogation of the cells
- Off-gas detection offers an *independent detection method* by monitoring gases release during venting



Case Study: Saft & Duke Energy

System Details:

- 6 racks, 650 kW
- Li-ion Tamer[®] product installed on site
- Continuous monitoring for cell off-gas
- Li-ion Tamer connected to control room
- Li-ion Tamer used to shut down system





Duke Energy's Microgrid Control Room Screen

Case Study: Saft & Duke Energy



