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Question:

EFSB-S-9 List all systems and other engineering features that are designed to prevent overcharging, overheating, internal shorts, or any other failure that could lead to a thermal emergency, spill, or other type of emergency event.

a. For each feature, describe its function and the potential failure(s) (and consequent emergency or emergencies) that the feature would be designed to prevent or manage.

b. For each feature, describe any risks of failure and the potential causes of such failure during both normal operations and emergencies. Describe any physical redundancies or response protocols that would address such risks or causes.

Response:

a. The Project incorporates multiple engineered systems and design features intended to prevent overcharging, overheating, internal shorts, or any other failure that could lead to a thermal emergency, spill, or other type of emergency event. The BMS continuously monitors cell- and module-level voltage, temperature, and current and initiates protective actions to prevent abnormal operating conditions. The TMS regulates battery temperatures during normal operation; abnormal thermal behavior is detected and managed through automated shutdown or isolation. Additional protection is provided through layered electrical safeguards, including fuses, disconnects, ground fault detection, overcurrent protection, and inverter-side isolation, which are intended to interrupt abnormal currents and isolate faulted components. Passive design features within each unit, such as non-combustible enclosures, internal component separation, and integrated venting systems, are intended to limit the consequences of battery failures.

b. Potential risks of failure include sensor malfunction, control or communication loss, or mechanical damage during normal operations or emergencies. These risks are addressed through redundant and layered protections, such that failure of a single component does not defeat overall system safety. Remote monitoring provides continuous visibility into system status and alarms, supporting early detection and coordinated response, while operational procedures and emergency response protocols address abnormal conditions and post-incident stabilization.

   A site-specific Hazard Mitigation Analysis will document credible failure modes, evaluate potential consequences, and identify the hardware, passive design features, management systems, and response measures that function as preventive and consequence barriers.