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*Comment Received From: Energy Safety Response Group  
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**Technical Clarifications on Modern Utility-Scale BESS Design,  
Safety, and Emergency Response**

*Additional submitted attachment is included below.*



February 19, 2026

Dear California Energy Commission Opt-In Program Staff:

Energy Safety Response Group (“ESRG”) respectfully submits these comments in the California Energy Commission’s (“CEC” or “Commission”) Prairie Song Reliability Project Opt-In docket (“Docket”) to provide technical clarification regarding modern utility-scale Battery Energy Storage System (“BESS”) design and safety considerations. These comments are intended to clarify certain inaccurate or incomplete statements submitted to the Docket related to BESS design and operational safety, and to assist the Commission in developing a complete and accurate administrative record.

ESRG brings together highly-experienced firefighters, engineers, and safety professionals who have dedicated their careers to advancing the safe design, deployment, and operation of energy storage systems. Our collective expertise encompasses product design, testing, permitting, training, and emergency response, reinforced by years of medium- and large-scale fire testing conducted both independently and with public- and private-sector partners. Through this work, ESRG has supported manufacturers in strengthening battery safety, assisting developers and owners in implementing appropriate protective measures, and worked alongside local fire authorities to enhance preparedness and effective response strategies.

Accordingly, ESRG provides the following clarifications regarding specific aspects of utility-scale BESS design and safety that are not fully or accurately characterized in the 25-OPT-02 record:

- I. Modern BESS Design Differs Materially From Earlier Large-Scale Deployments With Documented Safety Incidents and Are Governed by Comprehensive Safety Frameworks**
- II. Empirical Data From U.S. and Global Deployments Demonstrate a Sustained and Substantial Decline in BESS Failure Rates, Driven by Improvements in Design, Standards, and Operational Controls**
- III. The Proposed Lithium Iron Phosphate Chemistry is a Well-Understood Lithium-Ion Variant, and Certain Statements in the Record Misrepresent Its Associated Hazards**
- IV. Assertions Regarding the Frequency, Inevitability, and Manageability of Thermal Runaway Events Do Not Accurately Reflect the Certification, Permitting, and Safeguard Framework Governing Modern Utility-Scale BESS**



- V. Empirical Data From Testing, Monitoring, and Real-World Incidents Do Not Support Claims of Significant Off-Site Toxic or Environmental Impacts From Documented BESS Incidents**
- VI. Claims that BESS Incidents Would Require Specialized or Extraordinary Fire Service Response Lack Support in Current Fire Service Practice, Particularly in Los Angeles County**
- VII. Applicable Department of Transportation Classifications and Incident Data Do Not Support Claims in the Docket Regarding Transportation Risks of Batteries**

## Frequency of Fire Events in Energy Storage Systems

As with any technology transitioning from emerging to accepted—and consistent with patterns observed throughout the built environment since the earliest buildings— some battery energy storage system (BESS) failures have occurred, sometimes resulting in fire. When these events do occur, their rarity often amplifies the media attention they receive. This coverage can create the impression that such incidents are common, when in reality they remain infrequent and continue to decline even as deployment increases rapidly.

Work by the Electric Power Research Institute (EPRI), Pacific Northwest National Laboratory (PNNL), and TWAICE demonstrates a sharp decline in global BESS failure rates, dropping from 9.2 incidents per gigawatt in 2018 to 0.2 per gigawatt in 2023 [1]. These findings were published in a 2024 EPRI white paper [2]. Since that publication, complete data for 2024 has become available. During 2024, global BESS deployment increased by 53 percent year-over-year, yet only eight incidents were reported worldwide [3] [4]. When this new data is incorporated, the global failure rate reflects a 98 percent reduction since 2018.

When failure incidents are compared against cumulative deployed capacity through December 31, 2024, measured in gigawatt-hours (GWh) rather than gigawatts (GW), the results show that while installed utility-scale capacity has grown dramatically over the past six years, the rate of failures has continued to fall. This improvement reflects the integration of lessons learned from early events into modern system designs, operational practices, and safety standards, and the battery industry continues to invest heavily in research and development to further strengthen risk-reduction measures.

It is also important to recognize that a large share of early global failures were geographically concentrated. Between 2017 and 2020, South Korea experienced 29 incidents seemingly tied to installation and operational practices unique to that market [4]. Similar systems from the same manufacturers saw few, if any, failures outside South Korea during this period, meaning these events accounted for nearly 88% of known global failures at the time. South Korea implemented significant regulatory reforms in 2021 and 2022, and although 10 additional incidents occurred during that transition, the trend has continued to improve. Based on data available through 2025, only two incidents have occurred in South Korea since the end of 2022. This trajectory



demonstrates the effectiveness of strong regulation, modern fire codes, product standards, and industry best practices, many of which have been pioneered and continually strengthened in the United States.

To provide a final data point, since 2017 there have been 27 reported lithium-ion BESS events in the United States. Of these, 20 were associated with three manufacturers who have since gone out of business or retired the relevant product line and chemistry. Of the remaining seven, three involved small indoor commercial systems of unknown make, and a fourth was identified only as “industrial” with no additional details. Of the final three events from different manufacturers, one manufacturer has not achieved widespread sales in the United States, and another has no additional sales known to ESG beyond the single system involved in the event.

## ESS Comparison to Other Fire and Electrical Hazards

While published data is limited, utility-industry estimates indicate that transformers, which are common electrical equipment found at substations and across commercial and industrial facilities, fail at an average rate of 0.9 to 1.0 percent per year [5]. Despite this far higher failure rate compared to batteries, transformers remain ubiquitous because they are essential to delivering electricity every day.

Direct comparisons between battery energy storage systems and other commodity equipment are difficult, but the broader context is instructive. In the United States in 2023, there were approximately 7,400 fires in nonresidential buildings attributed to electrical malfunctions [6]. That same year, nonresidential buildings in the United States experienced 110,000 fires of all causes, resulting in 130 deaths and 1,200 injuries [7]. Electrical fires in residential buildings are even more numerous, with a significantly greater human toll [8]. By comparison, EPRI reported 15 BESS events *globally* in 2023 [4].

***Further, in the United States to date, there have been no fatalities associated with any BESS event and, with the exception of one globally unique dedicated-use building, there have been no offsite injuries or offsite environmental impact reported in any other BESS fire or failure.***

The regulatory landscape for energy storage systems has advanced rapidly in recent years. NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, has become one of the largest and most active code development committees within the National Fire Protection Association (NFPA). UL 9540, *Energy Storage Systems and Equipment*, the product standard governing stationary ESS, is supported by more than 100 principal technical committee members. Despite the complexity of the technology, codes and standards have evolved quickly, and their enforcement by increasingly well-trained fire officials and Authorities Having Jurisdiction (AHJs) has resulted in progressively safer systems being deployed across the country.

This progress has been driven by extensive battery testing conducted by Nationally Recognized Testing Laboratories (NRTLs) and other research organizations, and by ongoing, transparent



collaboration among safety experts worldwide. Los Angeles County personnel have been particularly influential in this work, serving as a principal member of the UL 9540A Technical Committee and a leading non-voting participant of the NFPA 855 Committee.

As a result, the notion that energy storage system failures are inevitable or poorly understood is not supported by the evidence. Failure modes are well characterized, protections against them are embedded in multiple regulatory requirements, and both system operators and first responders can be fully prepared to manage them. Proprietary and anecdotal information gathered by ESRG from incidents in Australia, the United States, and Europe indicates that many events originate with electrical components such as power electronics that occur throughout the built environment. Other incidents have involved human factors or environmental exposures. In every case, lessons learned have informed improvements in system design, construction practices, and operational procedures, contributing to the continued decline in failure rates.

## “Dangerous Goods” and Transport Hazards

Transportation of energy storage equipment is another area where statements in the record lack necessary context. Some comments incorrectly suggest that BESS modules are classified as “dangerous goods” because of their “propensity to spontaneously ignite.” While lithium-ion batteries can overheat and catch fire under certain abuse conditions due to a phenomenon known as thermal runaway, they do not meet the criteria for spontaneously combustible materials under normal transport conditions and therefore are not classified as Department of Transportation (DOT) Class 4.2: substances liable to spontaneous combustion. In the United States, the DOT classifies these products using the terminology “hazardous materials” rather than “dangerous goods.” Lithium-ion batteries installed in cargo transport units (UN 3536) fall under DOT Class 9: Miscellaneous Hazardous Materials, a broad category that includes routinely transported items such as first aid kits, self-inflating life vests, and dry ice. Class 9 classification simply ensures appropriate packaging, labeling, and handling; it does not indicate that the material is inherently dangerous or unsuitable for transport.

Certain statements in the record also cite two roadway incidents as evidence of substantial transportation risk. In both incidents, battery damage was a consequence of vehicle rollover rather than the initiating event. In at least one of these incidents, the enclosure had been improperly placed on the incorrect type of trailer. BESS equipment is typically shipped at a low state of charge (SOC), specifically to reduce the likelihood and severity of any thermal event during transport. These incidents therefore reflect the risks associated with roadway accidents generally, not risks unique to lithium-ion energy storage systems. Since the most recent of these incidents, additional scrutiny has been applied to shipping practices, and ESRG is not aware of any rollovers since 2024.

Transport of BESS equipment represents a very small portion of overall hazardous materials movement in any region. In 2024, California alone experienced 2,147 hazardous materials transportation incidents across all phases of highway transportation [9]. In the same year, large trucks were involved in 11,459 accidents on California roadways, resulting in 360 fatalities and



5,120 injuries [10]. Large truck accidents frequently result in temporary roadway closures regardless of the cargo involved, and the presence of BESS equipment does not meaningfully change that risk profile [11] [12]. Against this backdrop, the number of BESS-related transport events is extremely small.

Regulators evaluate transportation risk based on DOT regulations and demonstrated incident frequency across all hazardous materials, not on isolated events without a denominator. When compared with the routine and necessary movement of other commodities classified as hazardous materials, lithium-ion BESS equipment does not present a disproportionate or unusual transportation risk. Moreover, transportation exposure is limited to construction, replacement, and decommissioning periods, making it infrequent and time-bounded.

## Lithium Iron Phosphate Battery Safety

The record also includes an assertion that the Prairie Song Reliability Project will rely on a “particularly dangerous lithium-ion battery chemistry.” The chemistry in question is lithium iron phosphate (LFP), which is one of the most widely used lithium-ion chemistries and is increasingly the preferred choice for stationary energy storage worldwide. Comments in the record reference several industry reports containing technical data on LFP failure characteristics, and ESG does not dispute the validity of those sources. These comments also claim that some in the industry incorrectly describe LFP as inherently safer, or even “safe” in an absolute sense, compared to metal oxide chemistries.

ESG is familiar with these discussions and agrees that such absolute claims are not accurate. However, the interpretation of the data in the record and the narrative built around it are highly misleading. Suggesting that LFP batteries are more dangerous than other chemistries is no more accurate than suggesting they are completely without risk.

ESG’s position is that all lithium-ion chemistries present a broadly similar risk profile from a safety and emergency response standpoint. Metal oxide chemistries, such as nickel manganese cobalt oxide (NMC), tend to burn at higher temperatures and heat release rates, have lower thermal runaway initiation thresholds, and appear to have a somewhat higher rate of self-ignition. LFP batteries, in contrast, tend to release larger volumes of flammable gas during failure. These differences are real, but they are also dependent on the specific failure conditions, and they do not translate into fundamentally different response requirements. Both chemistries present fire and deflagration hazards, and both must be addressed in emergency response planning. Likewise, the permitting process should evaluate and mitigate these hazards regardless of the specific lithium-ion chemistry selected for a project.

## Energy Storage System Evaluation and Certification

UL 9540, *Energy Storage Systems and Equipment*, is the primary certification standard governing the safety of stationary energy storage systems in the United States. It evaluates the complete



system, including batteries, enclosures, controls, and protective features, to ensure that the equipment meets defined safety and performance requirements.

UL 9540 certification is built on a foundation of component-level listings. Battery modules must be listed to UL 1973, which evaluates “the battery system’s ability to safely withstand simulated abuse conditions” through detailed construction review and conducting electrical, mechanical, and environmental testing [UL 1973, Third Ed.]. UL 1973 also requires passive protection features such as fuses and thermal switches because the standard explicitly recognizes that active protection devices (i.e., the battery management system or BMS) cannot be solely relied upon to prevent or mitigate abnormal conditions. Required electrical testing further includes a dedicated overcharge test to “evaluate a battery system’s ability to withstand an overcharge condition,” directly addressing one of the hazards noted in the record [UL 1973, Third Ed., §15.1]. Power conversion equipment must also be listed to UL 1741, which governs inverters and related protections. These component listings are prerequisites for UL 9540 and ensure that the individual building blocks of an ESS meet established safety criteria before they are assembled into a system.

In contrast, UL 9540A, *Standard for Safety: Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems*, is not a certification. It is a test method used to “evaluate the fire and explosion hazard characteristics of those battery energy storage systems that have demonstrated a capability to undergo thermal runaway” [UL 9540A, Fifth Ed., §1.1]. The data generated through this testing is intended to inform decisions on enclosure separation and appropriate fire and explosion protection measures and is only one component of the broader UL 9540 evaluation. Conflating UL 9540A with UL 9540 misrepresents both the purpose of the test and the structure of the certification process.

The record also includes statements asserting that UL 9540A is “only valid” when ambient wind speeds do not exceed 12 mph, and that this constitutes a real-world operating limit for BESS facilities. That is incorrect. UL 9540A is a laboratory test method designed to characterize failure behavior under controlled, repeatable conditions. The 12-mph wind speed limit is a test control, allowing meaningful performance comparison across products and laboratories. It is not, however, a restriction on the real-world use of listed equipment in winds greater than 12 mph.

If this logic were applied consistently, many foundational safety standards would be “invalid” whenever wind or controlled environmental variables are present. Controlled laboratory conditions are standard practice, and do not alone indicate real-world operating limits. For example, vehicle crash testing (NHTSA/IIHS) uses fixed speeds, fixed barriers, and standardized dummies under controlled conditions; constraints that are not reasonably interpreted as limits on where or how vehicles may be driven. NFPA 285, *Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components*, provides another example. It evaluates fire propagation characteristics on façade systems and is required to be conducted without wind or precipitation. However, these assemblies are routinely installed on buildings where they are continuously exposed to wind and weather, and the absence of wind in the test does not indicate that these systems can only be installed in zero-wind environments. UL 9540A is no different.



The record also includes a characterization of UL 9540A as a “tacit admission” that BESS containers will ignite and deflagrate. This reflects a misunderstanding of the test method. UL 9540A assumes that under extreme abuse a cell or module may enter thermal runaway and evaluates whether that event can be contained without propagating beyond the initiating unit. This is directly analogous to vehicle crash testing or structural fire-resistance testing, neither of which implies that crashes or fully developed fires are expected or acceptable in normal operation.

The record further contains remarks that a “BESS unit is deemed to meet the UL 9540A standard if it experiences a deflagration event which does not produce flames that extend beyond the width of the BESS Unit.” However, performance criteria during unit-level testing require that “explosion hazards are not observed, including deflagration, detonation, or accumulation (to within the flammability limits in an amount that can cause a deflagration) of battery vent gases” [UL 9540A, Fourth Ed., Table 9.1]. This requirement is evident in the UL 9540A flowchart contained elsewhere in the record. Simply put, evidence of a deflagration event would not allow an ESS to achieve satisfactory performance during unit-level UL 9540A testing.

## BESS Risk Management and Layered Protections

The record includes a discussion of thermal runaway that presents an incomplete and misleading picture of both the causes of failure and the safeguards that govern modern energy storage systems. While lithium-ion batteries can fail under certain abuse conditions, the suggestion that thermal runaway events are frequent, inevitable, or unmanageable is inconsistent with industry data, certification requirements, and the extensive regulatory framework that governs BESS design, installation, and operation.

The various pathways listed in the comment letter including manufacturing defects, BMS failures, cooling failures, and installation mishandling are well-characterized hazards that are addressed in the certification and permitting process. These are not unknown or unmitigated risks; they are the very scenarios UL 1973, UL 1741, UL 9540, and UL 9540A are designed to evaluate and control. Attempts to equate theoretical failure modes with real-world likelihood is unsupported.

The Clean Energy Associates (CEA), now Intertek CEA, manufacturing audit cited in the record is similarly mischaracterized. As Intertek CEA explains, its “proactive and robust quality control and testing program [is] utilized...to proactively identify and resolve issues at every stage of production – before they impact your business” [13]. Intertek CEA conducts quality audits for manufacturers seeking to improve internal processes and buyers to protect their investment. The presence of “deficiencies” in such audits does not mean that certified products are unsafe or that deployed systems contain latent hazards. These findings are used to correct issues before products enter the market and are an important contributor for industry safety. In an updated “BESS Quality Risks” presentation from May 2025, Intertek CEA explicitly states that “none of the systems we inspected were shipped with unresolved thermal management or fire detection/suppression defects” [14]. UL 9540 system certification also requires similar processes for production quality control [UL 9540,



Third Ed., §44.1]. Treating internal QA findings as evidence of field failure rates is not supported by data.

Modern ESS installations are protected through a defense-in-depth strategy, beginning with a system- and project-level evaluation via a hazard mitigation analysis (HMA). Required by both NFPA 855 and the International Fire Code (IFC), the current basis for the California Fire Code, the HMA provides a detailed assessment of the specific project, the selected technology, and the manner in which the system will be integrated. It includes review of the battery system's compliance with UL 9540, which incorporates UL 1973, as well as confirmation of an NFPA 72-compliant fire alarm system. The HMA also requires a comprehensive review of the system's UL 9540A test results and additional engineering analysis informed by those results. At a minimum, this includes a deflagration protection analysis demonstrating compliance with NFPA 68, NFPA 69, or an equivalent protection methodology. The analysis further evaluates large-scale fire testing results or a site-specific heat flux analysis informed by such results to ensure that a fire within a unit poses minimal risk of propagation to adjacent units. These components represent the minimum requirements for permitting an ESS installation. A more detailed outline of the Los Angeles County Fire Department (LACoFD) BESS submittal requirements is provided in Appendix A.

The second layer of defense is the implementation of the NFPA 72-compliant detection and alarm system. This includes smoke, thermal, gas, and radiant-energy detection—used individually or in combination—to identify early signs of fire or system malfunction. All detection devices must be connected to an approved fire alarm control unit (FACU) that reports to a remote annunciator panel located at a designated first responder station away from the site. Together with the integrated BMS and site controllers, this detection architecture provides real-time situational awareness to first responders and subject matter experts (SMEs) and automatically activates any required protection features within the battery enclosure.

The third layer of defense consists of the active or passive protection systems built into the equipment, such as deflagration protection systems, and fire service intervention, although large-scale fire testing and site-specific analyses should demonstrate minimal risk of unit-to-unit fire propagation even without active fire service response. Nevertheless, any fire, regardless of its apparent severity or containment, must be managed by the fire department. Accordingly, any incident involving fire or smoke production from the system will trigger a fire service response. During that response, firefighters will rely on established emergency response plans (ERPs), including the LA County Emergency Response Action Plan (ERAP) template, together with their own training and subject matter expertise, to assess conditions and implement the actions necessary to safely manage the event.

The record includes statements suggesting that BESS lack redundancy because different systems perform different functions. This reflects a misunderstanding of how redundancy is engineered into safety-critical systems. Redundancy does not mean duplicating identical components; it means providing multiple, independent layers of protection that address different failure modes. In a BESS, the BMS, thermal management system, fire detection system, and emergency response plan each mitigate different hazards. Their diversity is intentional and required by applicable codes and



standards. This layered architecture is far more robust than relying on a single redundant component performing the same task.

In short, modern ESS installations are governed by a multilayered safety architecture, rigorous certification standards, large-scale fire testing that is increasingly incorporated into permitting, and stringent jurisdiction-specific requirements, including those in LA County. These measures ensure that the rare incidents that do occur can be safely managed and contained, protecting both responders and the surrounding community.

## BESS Incident Response and Mitigation

The vast majority of fire departments across the United States are fully capable of managing BESS incidents. ESRG has trained departments ranging from small rural volunteer companies to major metropolitan agencies and has consistently found that these departments possess the equipment, operational capability, and foundational knowledge necessary to manage a BESS event. The skills involved include scene size-up, exposure protection, atmospheric monitoring, defensive operations, and incident stabilization and are core competencies of the modern fire service. These competencies are further enhanced by site- and technology-specific training provided during commissioning and ongoing operations. For these reasons, assertions in the record that a BESS incident would *require* a specialized hazardous materials team response are unfounded.

Fire department preparedness is further strengthened by the use of formal ERPs, including the LA County ERAP template. These plans provide a structured, jurisdiction-approved framework that integrates site-specific information, system behavior, communication protocols, and tactical considerations. When paired with site- and technology-specific training during commissioning and ongoing operations, ERPs ensure that responders have the information and structure needed to safely and effectively manage a BESS incident.

The phrase “let it burn” is often used in industry to describe the recommended fire service approach. While current best practice may involve allowing the system to self-consume to reduce the risk of stranded energy, ESRG strongly disagrees with that terminology. The fire service is not “letting it burn;” they are managing the incident in accordance with the response plan, available resources, and the threat posed by the event. Their priorities remain the protection of life and property. Once life safety is established, responders focus on managing low-level smoke or off-gas, protecting adjacent exposures and battery enclosures, and ensuring the event remains contained to its immediate area while the system self-consumes.

Extinguishment of a BESS fire is currently challenging due to enclosure construction, responder familiarity, and the characteristics of lithium-ion systems. Employed defensive operations are not unique to BESS; they mirror long-standing fire service practices used during structure fires when interior operations are not appropriate and the tactical focus shifts to exterior containment and exposure protection, as well as during electrical incidents such as transformer or utility-pole fires. These defensive strategies also significantly reduce the likelihood of contaminated runoff, as water



application is limited, targeted, and primarily used for cooling adjacent exposures rather than attempting full extinguishment.

***Concerns about fire spreading beyond the project boundary are misplaced. To date, ESRG is not aware of any BESS incident in the United States that has resulted in a wildfire or off-site fire spread. Unlike transitional wildland fire sources, BESS failures are not generally associated with production of embers or firebrands capable of traveling beyond the immediate area of the enclosure. The absence of ember production, combined with required setbacks, vegetation management, and site-specific mitigation measures, substantially reduces the pathways by which a BESS event could ignite off-site fuels.***

Even propagation to adjacent containers, while not impossible, is exceedingly rare, and the causes of those historical events are well understood and have been corrected through design and code updates. To ensure that an incident inside the perimeter remains inside the perimeter, ESRG strongly recommends rigorous housekeeping both within and outside the fence line. Vegetation and fire-load management should be prioritized during operation, with sufficient setbacks inside the site and beyond the fence line to ensure that extreme weather is less likely to exacerbate an event. Vegetation should not be permitted within the project perimeter, and any vegetation outside the perimeter should be maintained in accordance with wildland fire protection best practices.

## Smoke Toxicity and Public Health Concerns

Concerns have been raised about the potential toxic gas and environmental impacts of BESS fires. In practice, environmental monitoring *during* and after real-world BESS events has not identified life-safety or environmental hazards in surrounding communities, and ESRG is not aware of any health impacts associated with BESS incidents, with the exception of reports following the Moss Landing event. Initial reports from this incident noted that no injuries or fatalities occurred, and EPA air-monitoring did not detect hydrogen fluoride (HF) or particulate matter at levels posing public risk [15].

At the same time, ESRG recognizes that some residents near Moss Landing later reported health concerns, and that mixed findings regarding localized soil or environmental impacts were raised in subsequent reporting. ESRG does not downplay or dispute these concerns. It is also important to understand the context: Moss Landing was a globally unique, legacy installation, with an unprecedented scale and configuration, that would not meet modern U.S. permitting, design, or operational requirements. The system itself was 1200 MWh (megawatt-hours), which is orders of magnitude larger than modern utility-scale enclosures that typically range from 2-3 MWh, with the largest just exceeding 5 MWh. This does not include the fire load of the legacy building or the substantial balance-of-system hardware housed inside it. A facility of that design cannot be compared to a modern, heavily regulated outdoor containerized BESS installation [16].

Over eight years of destructive lithium-ion battery testing, including outdoor burns with hundreds of health and safety professionals present, ESRG has not experienced a single health-exposure issue



on our site during testing. While lithium-ion batteries can emit harmful gases during fire, data from medium- and large-scale testing and national incident reviews consistently shows that these gases are comparable to those released in ordinary structure or commodity fires, where plastics, foams, and other common materials generate carbon monoxide (CO), hydrogen cyanide (HCN), hydrogen chloride (HCl) [17]. It is also important to recognize that a large portion of the combustible mass inside a BESS enclosure consists of plastics and other common building materials, the same materials that dominate smoke toxicity in residential and commercial structure fires. Ultimately, all fires emit toxic smoke, and standard practices such as avoiding downwind plumes apply universally, not uniquely to BESS.

HF is likewise not unique to lithium-ion batteries; it is also produced when fluoropolymers or fluorinated materials burn and when certain fire suppressants are exposed to elevated temperatures. The relevant question is not whether HF can be theoretically generated, but what concentrations reach ground level under realistic fire behavior, plume rise, and meteorology. Ongoing research at the University of Texas Austin is examining safety standoff distances for ESS events, both combustion (burning) and non-combustion, using a range of modeled scenarios that include conservative and worst-case conditions [18]. In that work, the mean safety distances were at worst approximately 50 meters, and additional refinement is expected as more large-scale test data becomes available. The same research compares electric vehicle (EV) and internal combustion engine (ICE) vehicle fire testing, and the modeled safe distances for EVs and ICE vehicles are similar (~6m), which suggests that the battery system does not introduce hazards beyond those associated with the existing vehicle fire load. Perhaps most importantly, in monitored real-world BESS events, HF has not been detected beyond the facility fence line in any event ESRG is aware of.

Given these observations, it is important to consider how the ALOHA (Areal Locations of Hazardous Atmospheres) model presented elsewhere in the record differs from actual BESS fire behavior. The model compresses the entire theoretical HF production capacity of a BESS enclosure into an instantaneous release, at ambient temperatures. This assumption does not reflect multi-hour BESS fire behavior also described in the record. Furthermore, ALOHA is intended to be an emergency response tool that may overestimate threat distances and cannot account for chemical mixtures, interactions, or buoyant fire plumes [19]. As a result, the modeling provided elsewhere in the record does not represent a technically appropriate method for evaluating BESS off-gas behavior.

Some opposition remarks have also cited New York City micromobility fires as evidence of unacceptable toxic hazards. This comparison is technically inappropriate. As made clear by FDNY, many of these fires involve low-cost, uncertified, unlisted, and often rebuilt or modified aftermarket batteries, not UL-listed, factory-assembled, utility-scale BESS units [20]. These incidents occur inside small, enclosed residential spaces, where toxic smoke accumulates rapidly and escape routes become untenable within seconds. In these environments, smoke inhalation is the primary life-safety hazard, and lethal conditions can develop within seconds regardless of what ignites the fire. This hazard geometry cannot be compared to a modern outdoor, setback-compliant, containerized BESS installation, where open-air dispersion, engineered fire protection systems, and physical separation are inherent to the design.



As research continues, including ongoing national studies examining emissions from both BESS and non-BESS commodity fires, best practices will continue to evolve. ESRG, as an industry leader within BESS safety and compliance, will continue to work with local officials to ensure that emergency response decisions remain grounded in evidence rather than assumptions.

## Conclusion

Based on the information presented in this letter, ESRG is confident that the Prairie Song Reliability Project—when utilizing properly certified BESS from reputable manufacturers, permitted to state and local codes, and supported by appropriate training, planning, and preparedness for local first responders—can be installed with minimal risk to the local community while providing essential energy resiliency to the region. Even as BESS has transitioned from emerging to established technology, concerns are understandable, particularly in today’s media landscape. The energy storage industry and end users continue to strengthen safety practices to ensure that any incident has minimal impact.

Nick Warner, Principal, Energy Safety Response Group

## Appendix A: LACoFD BESS Application Requirements

Before a BESS can be constructed at the site, LACoFD reviews the plans for conformance with applicable fire codes and jurisdiction-specific requirements. Building permits cannot be issued until LACoFD approves the design.

For utility-scale BESS projects, LACoFD provides a submittal-package document checklist for the Building Plan Review Unit phase of review [21]. The required submittal documents are outlined below, presented in an abbreviated format for clarity and conciseness.

- 1. ESS Applicant Declaration Detail of Compliance form**
- 2. LACoFD Request for Modifications of Alternate Materials and Methods Review form**
- 3. Site Plans**, including:
  - a. Fire-apparatus access
  - b. Fire-protection water sources
  - c. Site layout
  - d. Fire-alarm system notification devices and annunciation panels
- 4. BESS-Unit Information**, including:
  - a. Manufacturer's Installation and Use Manuals
  - b. LACoFD BESS-Product Disclosure Document: *Extract of Cell & Unit Design (from ERP)*
  - c. LACoFD BESS-Product Disclosure Document: *Extract of Capabilities (from ERP)*
  - d. Hazard Mitigation Analysis (HMA)
  - e. UL-9540 Listing Certificate
  - f. *Complete* UL-1973 Test Report(s)
  - g. *Complete* UL-9540A Test Reports, including:
    - i. *Complete* Cell-Level Test Report
    - ii. *Complete* Module-Level Test Report
    - iii. *Complete* Unit-Level Test Report
  - h. Explosion-Control and Ventilation System(s):
    - i. *Complete* system shop drawings for the unit/enclosure/room
    - ii. Device specifications, identifying selected setting(s) and configuration(s)
    - iii. Reports of tests/simulations conducted to validate design performance.
  - i. *Complete* Unit-, Enclosure-, and/or Room-Based Fire-Alarm System Details, including:
    - i. *Complete* NFPA-72 system shop drawings for the unit/enclosure/room.
    - ii. Device listings & CSFM approvals



- iii. Device specifications for both detection & notification devices, identifying selected setting(s) and configuration(s).
  - iv. Reports of tests/simulations conducted to validate design performance.
  - v. NFPA-72 system Sequence of Operations, including both full BESS-unit-level portions of the system and site-level outputs.
  - j. Fire-Suppression System (where provided) design, test report(s), etc.
  - k. Secondary-Power Supplies details
  - l. Seismic Approval
  - m. Commissioning Plan
  - n. Decommissioning Plan
  - o. Inspection, Testing, and Maintenance (ITM) Schedules
- 5. Equipment Information for Transformers, Inverters/Converters, including:**
- a. Manufacturer’s Installation and Use Manuals
  - b. SDS for fluids
- 6. Secondary-Containment Information**
- 7. Third-Party “Worst-Case” / “Maximum-Potential” Failure Scenario Testing or Modeling**
- a. Explosion Modeling
  - b. BESS-Fire Modeling/Testing
  - c. BESS Gas-Plume Modeling
  - d. Transformer/PCS Fire Modeling
- 8. Detail Plans & Specifications, including for:**
- a. Explosion-Shielding Walls at BESS-installation perimeter & for first-responder / fire-command stations
  - b. Means of impact protection for BESS units
  - c. Means of security for site and BESS installation
- 9. Proposed Signage**
- 10. Proposed Emergency Response Plan (ERP) utilizing the full LACoFD ERP Template**
- 11. Other documents (if any) required by the latest fire codes or standards**



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