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*Comment Received From: The Acton Town Council  
Submitted On: 4/2/2024  
Docket Number: 24-BSS-01*

**Acton Town Council comments in Docket 24-BSS-01 pertaining to the “Staff Workshop on BESS Safety”**

*Additional submitted attachment is included below.*



April 1, 2024

Elizabeth Huber, Director  
Siting, Transmission and Environmental Protection Division  
California Energy Commission  
Docket Unit, MS-4  
Docket No. 24-BSS-01  
715 P Street Sacramento, California 95814

Subject: Staff Workshop on BESS Safety February 28, 2024.

Reference: Notice of Staff Workshop on BESS Safety Posted February 2, 2024, in  
Docket 24-BSS-01.

Dear Director Huber;

The Acton Town Council respectfully submits the following comments in response to the California Energy Commission's ("Commission's") solicitation of public comment in the referenced Notice.

The Acton Town Council is a non-profit advocacy group that represents the interests of rural residents in the unincorporated community of Acton in North Los Angeles County; members of the Council are selected by the registered voters of the community of Acton, and any registered voter residing within the geographic boundaries of Acton is eligible to hold office and vote in its elections. The Acton Town Council is organized pursuant to its bylaws to represent the interests of rural residents in Los Angeles County and advocate on their behalf in matters ranging from local land use decisions to large "public benefit" projects such as electrical utility development. Moreover, the rural residential area of East Acton is slated for the development of more than 2,285 MW of new Lithium-based Battery Energy Storage Systems ("BESS"); this concentrated generation capacity in our rural town is larger than the Diablo Canyon nuclear generating station. The first of these projects has already been approved with no consideration or regard for environmental impacts or public safety. Accordingly, we have a substantial stake in the matters addressed in the referenced docket pertaining to safety considerations related to BESS project siting, permitting, construction and operation, and we respectfully offer the following comments to inform the Commission's consideration of matters pertaining to BESS facility siting and permitting. In the interest of brevity, our comments are arranged sequentially by topic.

## **The Acton Town Council Appreciates the Panel Discussion Convened in 24-BSS-01.**

The Acton Town Council appreciates the Discussion convened by the Commission on February 23, 2024, to address land use and permitting issues (among other things) pertaining to large scale BESS facilities. In particular, we appreciate Mr. Kennedy's participation in the Panel because the concerns he highlighted are similar to the concerns we have in our own community. The Acton Town Council also appreciates the recommendation made by the moderator (Rohima Moly) that a statewide group of experts be convened as a resource for city and county planning staff; however, it is critical that such a "statewide group of experts" not be populated by industry shills or agents of energy developers who have a direct financial interest in expanding the deployment of lithium-based BESS facilities. One example of such an industry agent is Mr. Scott Murtishaw who participated in the Panel Discussion; his performance on the panel was appalling and it was clear from his statements that he is not an expert and that his only interest is in expanding BESS facilities as quickly as possible regardless of community risk or concerns.

## **The Acton Town Council is Concerned that the Commission is Unaware of Dangers Posed by LFP BESS.**

One issue that became clear during the February 23 Panel Discussions is that the Commission has the mistaken impression that BESS facilities which utilize a "Lithium-Iron Phosphate" (LFP) chemistry are much safer than, and avoids the thermal runaway problems of, "Lithium-Nickel/Manganese/Cobalt" ("LNMC") batteries. For instance, in his introductory remarks, Chairman Hochschild stated "Certainly, the migration from NMC to LFP chemistry reduces significantly thermal runaway risk"<sup>1</sup>. The mistaken notion that LFP batteries are safe compared to LNMC batteries was further perpetuated by the self-acknowledged non-expert Mr. Murtishaw<sup>2</sup> who stated "the concerns about thermal runaway and the intensity of fires actually apply to NMC and not to lithium iron phosphate<sup>3</sup>". This statement by Mr. Murtishaw is categorically false: LFP batteries *do* pose a significant thermal runaway risk (particularly when overcharged because their "thermal runaway" ignition temperature drops precipitously<sup>4</sup>). Moreover, recent

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<sup>1</sup> Time stamp 06:58.

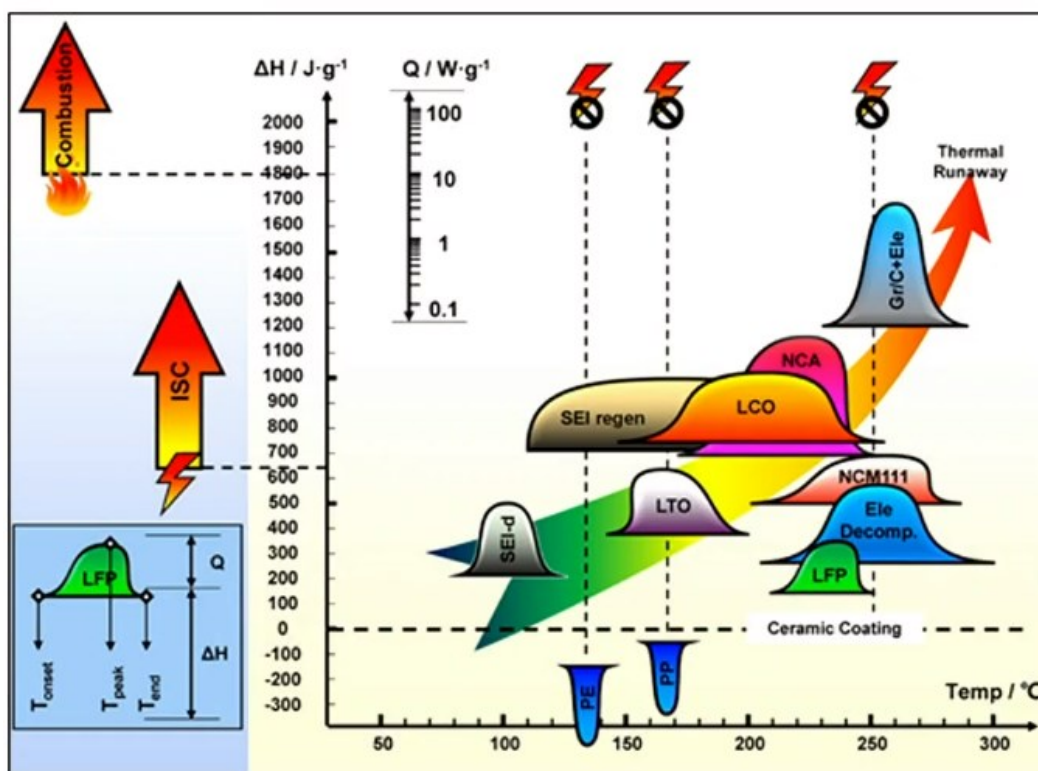
<sup>2</sup> Mr. Murtishaw affirms he is "far from being an expert"[ Timestamp 1:16:34]; the description of his background indicates he has no expertise in engineering, chemistry, fire protection, or battery systems.

<sup>3</sup> Timestamp 1:11:39.

<sup>4</sup> *Study on Temperature Change of LiFePO<sub>4</sub>/C Battery Thermal Runaway under Overcharge Condition*. Fei Gao et al 2021. Presented at the 3<sup>rd</sup> International Conference on Air Pollution and Environmental Engineering. IOP Conference Series: Earth and Environmental Science 631. <https://iopscience.iop.org/article/10.1088/1755-1315/631/1/012114/pdf>

findings released by the United Laboratory's Fire Safety Research Institute ("FSRI") utterly contradict Mr. Murtishaw's claim that the intensity of LFP fires is not a concern; specifically, FSRI found that LFP BESS fires are **more intense** and are arguably more explosive than LNMC BESS fires because thermal runaway events in LFP systems generate far more hydrogen gas and combustible hydrocarbons than thermal runaway events in LNMC system<sup>5</sup>. This *fact* has been corroborated by others<sup>6</sup>. Furthermore, industry shills like Mr. Murtishaw claim that LFP systems are "safe" because their thermal runaway temperature is high compared to LNMC systems; however, and as shown in Figure 1, FSRI data show the difference is less than 80°C.

Figure 1. Temperature Trends of Battery Chemistries



Source: *The Science of Fire and Explosion Hazards from Lithium Ion Batteries*. Presentation by Adam Barowy at the UL Fire Safety Research Institute Lithium-Ion Battery Symposium March 2023 [timestamp 13:55]. <https://fsri.org/research-update/lithium-ion-battery-symposium-resource-library>.

<sup>5</sup> LFP batteries release approximately 50% hydrogen and 20% hydrocarbons, whereas LNMC batteries release approximately 30% hydrogen and 16% hydrocarbons. *The Science of Fire and Explosion Hazards from Lithium Ion Batteries*. Presentation by Adam Barowy at the UL Fire Safety Research Institute Lithium-Ion Battery Symposium March 2023 [timestamp 18:10]. <https://fsri.org/research-update/lithium-ion-battery-symposium-resource-library>

<sup>6</sup> *A Review of Thermal Runaway Prevention and Mitigation Strategies for Lithium Ion Batteries*. Seham Shahid, Martin Agelin-Chaab. Published the Elsevier Journal of Energy Conversion and Management; Vol. 16. December 2022. Table 2. <https://www.sciencedirect.com/science/article/pii/S2590174522001337/pdf?md5=bbada63bcd4dca9cce371e45dc62c00&pid=1-s2.0-S2590174522001337-main.pdf>

In other words, and contrary to what Commission staff have been told by industry representatives, LFP batteries *are* susceptible to thermal runaway and they are ***particularly susceptible*** when overcharging occurs because overcharging drops the thermal runaway initiation temperature to as low as 116°C<sup>6</sup> (which is actually lower than the thermal runaway initiation temperature for LNMC batteries). Furthermore, in experiments with fully charged (but not overcharged) LFP batteries, *degradation of the protective solid electrolyte interphase (SEI) film can begin at only 80 °C*; this exposes the anode which is the initiating factor for thermal runaway<sup>7</sup>. The Acton Town Council is very concerned that the Commission has the impression that LFP batteries are safe and that the LFP chemistry eliminates BESS public safety concerns; it does not. The Acton Town Council cannot fathom why energy developers continues to perpetuate the myth that LFP batteries are safe; nonetheless, we are committed to ensuring that neither the regulators nor the public are "taken in" by the LFP myth.

### **UL Certification Does Not Render BESS Facilities "Safe".**

United Laboratories ("UL") has promulgated test method UL 9540A as the primary certification protocol for assessing the explosion and flame characteristics of Battery Energy Storage Systems (BESS), and it establishes that a large, container-based BESS system is UL-compliant if the flames and/or explosion that result from its deflagration do not propagate "beyond the width of the initiating BESS" (see Figure 2); this means that, even if a BESS container explodes or catches fire, it is still certifiable *as long as it does not cause other BESS containers to explode or catch fire*. UL 9540A constitutes a tacit admission that UL-compliant BESS pose very real fire and safety risks because they can (and do) explode and catch fire. And, while an engulfed UL-compliant BESS unit may not ignite other units, the embers generated by such an event can (and will) ignite surrounding vegetation or structures (particularly in wind-prone fire hazard areas). Consider for example the photograph provided in Figure 3 which was taken of a BESS fire in Australia in March of 2021; the Acton Town Council understands that this BESS facility was constructed in 2020 with "Tesla Megapack" products which, according to TESLA, was tested according to UL 9540A as of 2020<sup>8</sup>.

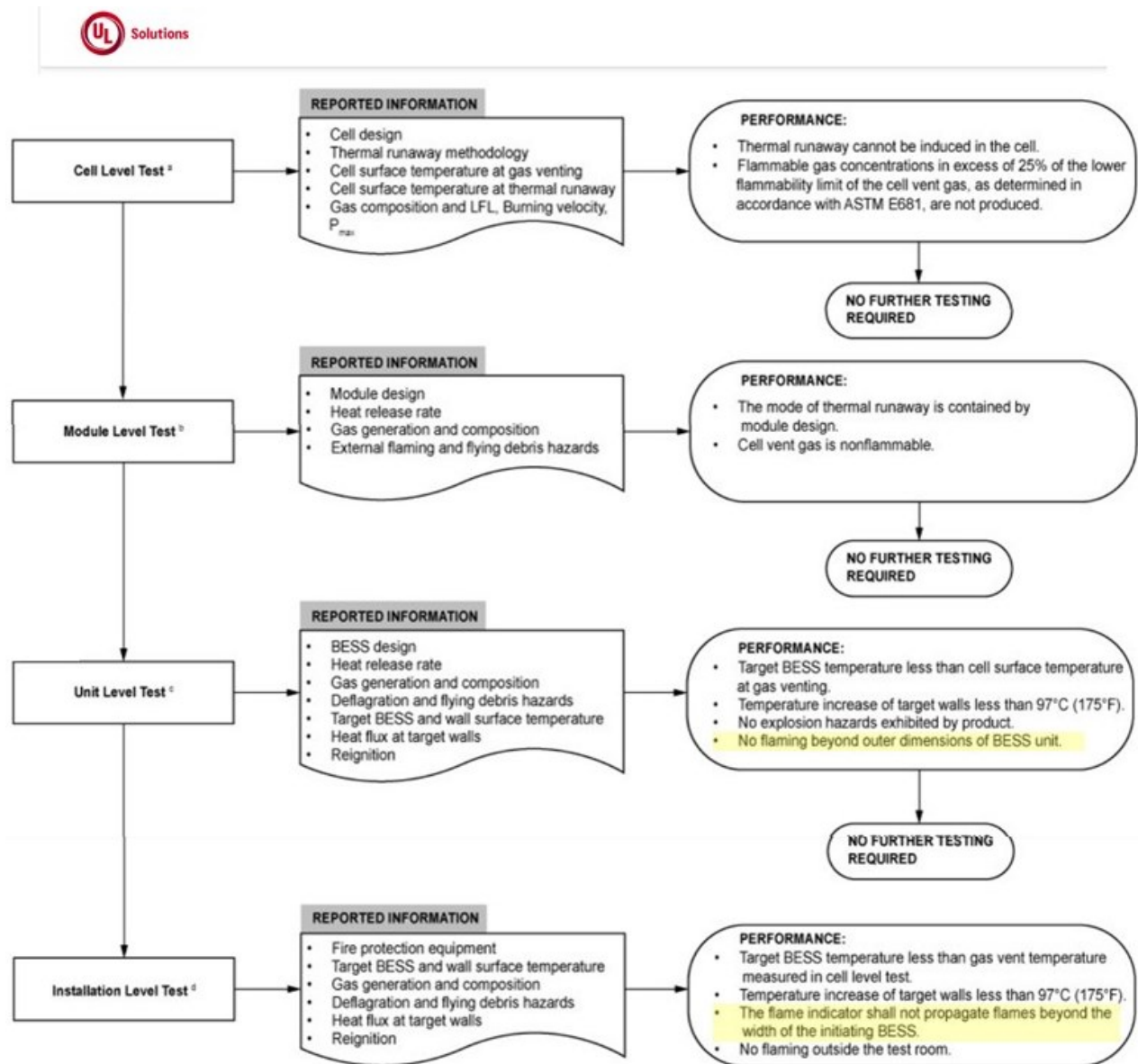
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<sup>6</sup> Thermal Runaway can be initiated at only 116 °C in overcharged LiFePO<sub>4</sub> batteries. *Study on Temperature Change of LiFePO<sub>4</sub>/C Battery Thermal Runaway under Overcharge Condition*. Fei Gao et al 2021. Presented at the 3<sup>rd</sup> International Conference on Air Pollution and Environmental Engineering. IOP Conference Series: Earth and Environmental Science 631. <https://iopscience.iop.org/article/10.1088/1755-1315/631/1/012114/pdf>

<sup>7</sup> *Revealing the Thermal Runaway Behavior of Lithium Iron Phosphate Power Batteries at Different States of Charge and Operating Environment*. Tianyi Li, Yinghou Jia. Journal of Electrochemical Science (September 2022) Article Number: 221030 <http://www.electrochemsci.org/papers/vol17/221030.pdf>

<sup>8</sup> <https://r6.ieee.org/sfias/wp-content/uploads/sites/67/J-Gromadzki-Tesla-On-site-Energy-Storage-Systems.pdf>. Page 32.

Figure 2. UL-9540A Test Method Acceptance Chart.



Source: "UL 9540A Battery Energy Storage System (ESS) Test Method" by Howard D. Hopper, FPE - Global Regulatory Services Manager. [<https://www.ul.com/news/ul-9540a-battery-energy-storage-system-ess-test-method>].

**Note:** As indicated in the highlighted portions of this "Flow Chart", a BESS Container 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 Container Unit.



Figure 3. Containerized BESS After Thermal Runaway Initiates.



Source: <https://www.crowdjustice.com/case/bess-battery-storage-hazardous-material/>

BESS fires can be ignited for any number of reasons ranging from manufacturing defects to "glitches" in their cooling systems. The latter is a particular concern because battery cells generate significant heat when charging and discharging; therefore, BESS facilities are always constructed with extensive internal cooling facilities that heavily rely on fans. The reliance of BESS facilities on mechanical cooling systems renders them susceptible to failure. It should also be noted that "safe" BESS containers are designed to include "explosion vents" to direct flames and toxic gases out into the environment as indicated in Figure 4. The threat that this design scheme poses to communities in high fire hazard severity areas cannot be overstated.

### **Toxic Releases from BESS Fires and Explosions Must Be Considered.**

Explosion and fire are not the only risks posed by Lithium-based BESS; in deflagration mode, Lithium-based BESS emit significant quantities of highly toxic gases which spread throughout surrounding areas; these toxic gases include hydrogen fluoride ("HF"), hydrogen chloride ("HCl"), and hydrogen cyanide ("HCN"). A study published by *Nature* determined that 20-200 milligrams of HF are released per watt-hour of battery discharge capacity<sup>9</sup>; reconciling this value with a typical Li-BESS container unit

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<sup>9</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5577247/>



Figure 4. BESS Containers are Designed to Discharge Flames Upward.



*Explosion vent panels are installed on the top of battery energy storage system shipping containers to safely direct an explosion upward, away from people and property. Courtesy: Fike Corp. Source: "Protecting Battery Energy Storage Systems from Fire and Explosion Hazards"; an article published by Power [<https://www.powermag.com/protecting-battery-energy-storage-systems-from-fire-and-explosion-hazards/>]*

capacity of 7.6 MWh yields an HF release rate of 152-1,520 kg (or 334-3344 pounds) per deflagration event! When these values are input to the Environmental Protection Agency's air dispersion model (known as the "Areal Locations of Hazardous Atmospheres") and programmed for typical weather conditions in Acton, the results indicate that a single Li-BESS container deflagration will create a toxic HF cloud that is more than half a mile long and could exceed two miles in length (see Figures 5 and 6). Recent BESS fire events underscore the concerns surrounding toxic releases. For instance, during the 2023 Warwick BESS fire in New York, air sampling showed that "dozens of toxins were detected during the three-day fire"<sup>10</sup> and during the Lyme fire,

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<sup>10</sup> <https://www.iomosaic.com/contact/demos/2023/09/19/battery-fires-challenge-warwick-ny-energy-storage-safety-measures>.

Figure 5. Dispersion Model Results of Low HF Release Levels

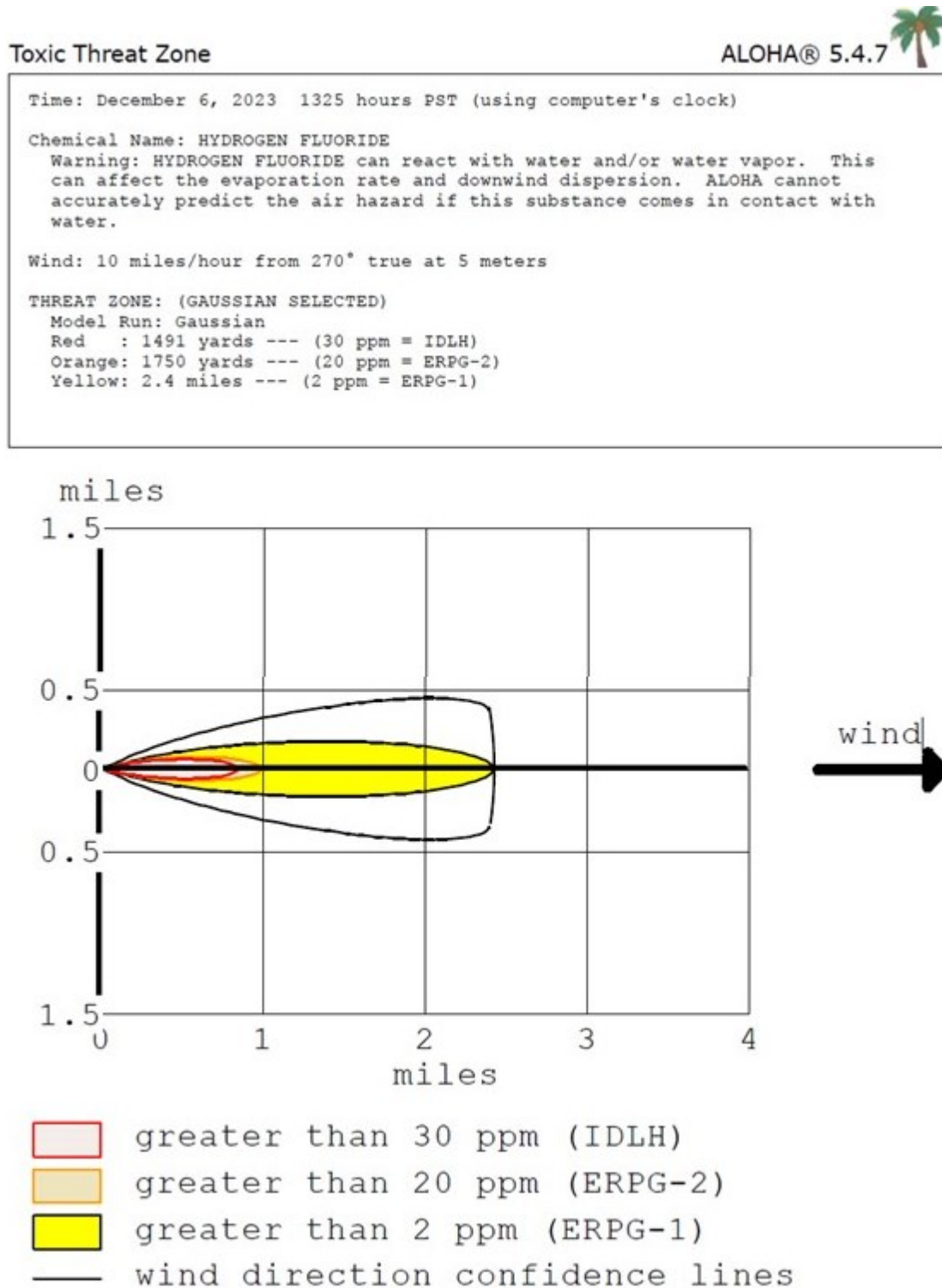


Figure 6. Dispersion Model Results of High HF Release Levels

# Toxic Threat Zone

ALOHA® 5.4.7



Time: December 6, 2023 1325 hours PST (using computer's clock)

Chemical Name: HYDROGEN FLUORIDE

Warning: HYDROGEN FLUORIDE can react with water and/or water vapor. This can affect the evaporation rate and downwind dispersion. ALOHA cannot accurately predict the air hazard if this substance comes in contact with water.

Wind: 10 miles/hour from 270° true at 5 meters

THREAT ZONE: (GAUSSIAN SELECTED)

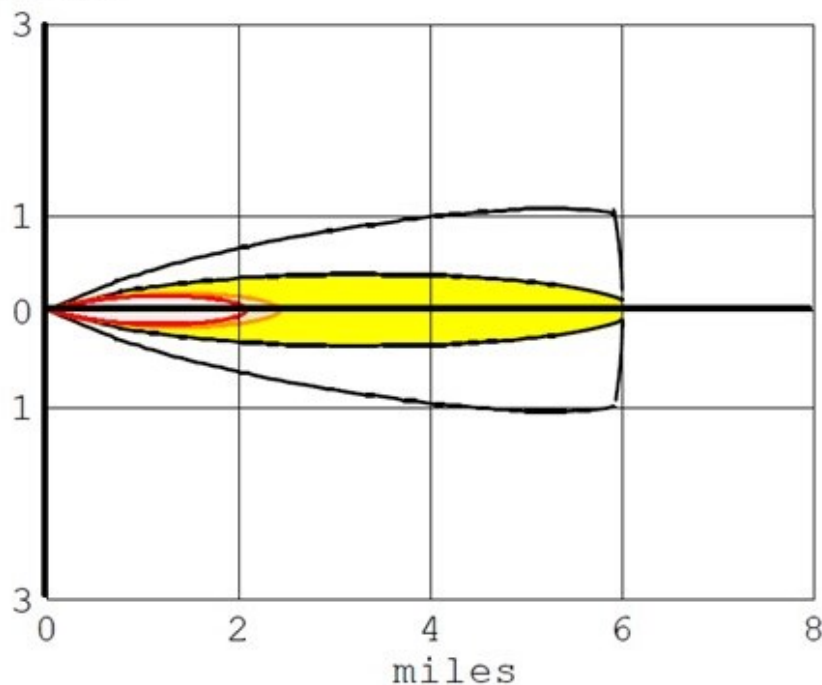
Model Run: Gaussian

Red : 2.1 miles --- (30 ppm = IDLH)

Orange: 2.4 miles --- (20 ppm = ERPG-2)

Yellow: 6.1 miles --- (2 ppm = ERPG-1)

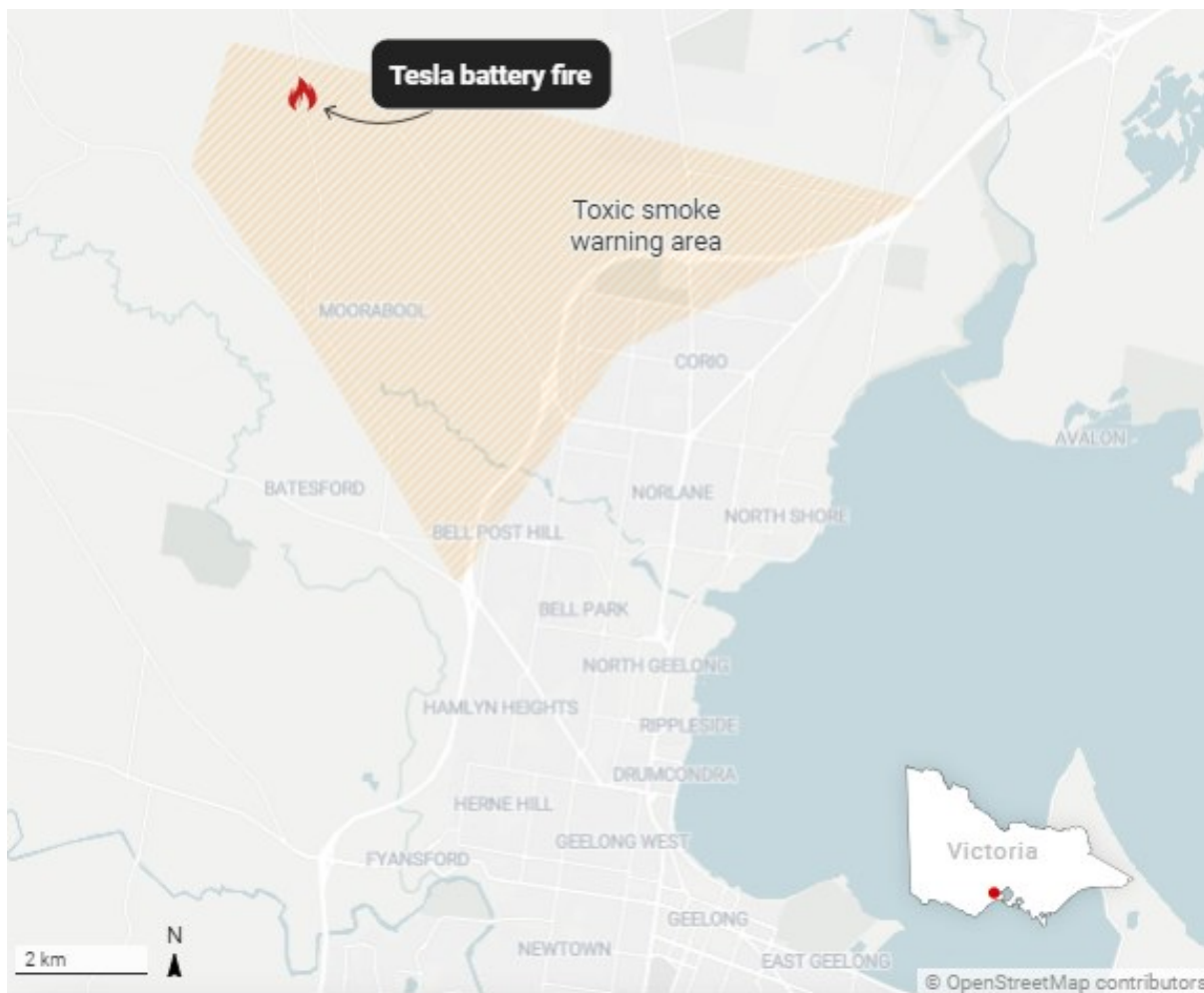
miles



- greater than 30 ppm (IDLH)
- greater than 20 ppm (ERPG-2)
- greater than 2 ppm (ERPG-1)
- wind direction confidence lines

residents within a one-mile radius of the BESS fire were ordered to shelter in place for several hours<sup>11</sup>. The risk from toxic gases released by the Moss Landing BESS fire in California was so significant that shelter in place orders were initiated and *Highway 1 was closed for 12 hours*<sup>12</sup>. And, in response to the Australia BESS fire described above, people within 6 miles and downwind of the BESS facility were directed to "shelter in place"; a map of the affected area is provided in Figure 7. It is also a fact that the gases released from lithium-based batteries kill; According to Congressional Testimony offered by Chief Fire Marshal Flynn of the New York City Fire Department, the cause

Figure 7. Area Affected by "Shelter in Place" Orders During Australia BESS Fire Event.



Source: <https://www.theage.com.au/national/victoria/blaze-at-tesla-big-battery-extinguished-after-three-day-battle-for-control-20210802-p58f6x.html>

<sup>11</sup> <https://www.northcountrypublicradio.org/news/story/48209/20230727/solar-farm-battery-fire-in-jefferson-county>.

<sup>12</sup> <https://www.ksbw.com/article/highway-1-reopened-near-moss-landing-shelter-in-place-lifted/41302918>

of deaths in multiple New York City micro battery fires was the toxic fumes released by the batteries. He said "There was no fire that extended to the apartments of the people that were killed there. The smoke from these devices is so toxic that if it reaches your apartment, you're immediately overcome by this toxic gas"<sup>13</sup>. Given these facts, it is entirely imprudent to locate lithium-based BESS facilities near residences or anywhere near commuter corridors, train corridors, or in locations where large numbers of people congregate. Additionally, in communities like Acton where there are many animal rescue and animal training facilities, lithium-BESS facilities are particularly unsuitable because it would be difficult if not impossible for such facilities to bring all their animals "indoors" safely and quickly at a moment's notice.

### **The High Incidences of Manufacturing Defects Substantially Increase the Public Safety Risks Posed by BESS.**

BESS fires and explosions can occur for any number of reasons ranging from manufacturing defects to "glitches" in the control system leading to overcharging to a mechanical failure in the cooling system; any of these events can result in thermal runaway. Manufacturing defects are perhaps the most insidious of all because they are invisible and can be virtually undetectable. Clean Energy Associates released a report just two months ago (in February 2024) which summarized the results of inspections conducted by CEA at 64 percent of the "Tier 1" lithium-based BESS manufacturers around the world (specifically, in the United States, South Korea, India, Viet Nam, and China) and found that 26% had deficiencies related to the *fire detection and suppression system* and 18% had deficiencies related to the *thermal management system*<sup>14</sup>. These statistics pertaining to manufacturing defects constitute further proof that lithium-based BESS systems pose real and significant public safety concerns. They also substantiate the fact that BESS health and safety risks increase within a particular area as the concentration of BESS facilities increases in the area because the probability of thermal runaway increases with increased numbers of batteries<sup>15</sup>.

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<sup>13</sup> <https://goldman.house.gov/media/press-releases/video-and-rush-transcript-congressman-dan-goldman-pushes-greater-regulation>

<sup>14</sup> *BESS QUALITY RISKS: A Summary of the Most Common Battery Energy Storage System Manufacturing Defects*. February, 2024. CEA Insights. <https://info.cea3.com/hubfs/CEA%20BESS%20Quality%20Risks%20Report.pdf>

<sup>15</sup> It is purely a "numbers game" in which the likelihood that a defective BESS unit (which could experience thermal runaway) is placed at a particular location increases as the total number of BESS units increase at that location. A recent study issued by Pacific Northwest Laboratories ("PNL") states "This point of failures being contained to the unit of origin is critical in both system design and assessing the project's overall risk profile. The risk of a fire incident at a battery storage project does not increase with project size; the two are decoupled in a well-designed system that prevents a fire in one unit from spreading to neighboring units. Regardless of project size, the fundamental question in assessing a project's risk is (continued)



### **Local Agencies with Permit Responsibilities Must Factor in Public Safety Concerns Before Approving any BESS Facility Permit.**

Local agencies (including cities and counties) with permit authority over BESS facilities are required to comply with the California Environmental Quality Act ("CEQA") which, among other things, requires agencies to factor in the public health and safety risks posed by any proposed BESS facility. Specifically, agencies are required to either mitigate the public safety risks posed by the BESS facility to a level that is "less than significant" or adopt a finding that the benefits accrued by the BESS project outweigh the public health and safety risks that it poses. It is axiomatic that the health and safety risks posed by lithium-based BESS facilities are driven by the size of the facility, its proximity to people, and its location in relation to high fire risk areas. For example, a utility scale, lithium-based BESS facility placed in a Very High Fire Hazard Severity Zone poses a much greater wildfire risk than the same BESS facility located in a "low fuel" area. Similarly, a lithium-based BESS facility located in a residential area poses a much greater toxic gas risk than the same facility located in an unpopulated area. Accordingly, CEQA demands that local agencies weigh all these factors before approving any BESS facility despite the preference of energy developers to have BESS facilities approved without CEQA review or community input<sup>16</sup>. It is critical that any report issued by the Commission in this Docket clarify that BESS permitting (and particularly lithium-based BESS permitting) comply with CEQA and take into consideration the unique, location-specific factors that exist at every proposed BESS location.

Regardless of what industry representatives claim, communities have a right to demand a safe living environment and local agencies have an obligation to listen to these demands and reject BESS developments that endanger communities. The community "pushback" against BESS developments that local agencies are now experiencing is a predictable outcome of the carelessness shown by energy developers who have thoughtlessly pursued, advanced, and heavily advocated in favor of dangerous lithium-based storage technologies in the interest of expediency and despite the existence of safer alternatives that were rejected because they would take a little longer to develop. Rather than admit this error, energy developers have instead gone "all in" on lithium-

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(continued) what happens if a single unit fails, rather than what happens if every unit fails at once." These statements merely articulate that the likelihood of a fire incident resulting from thermal runaway in a single BESS container has a low risk of spreading to other BESS containers if all the BESS containers are UL 9540A compliant because fires in UL 9540A certified BESS containers are less likely to spread to surrounding containers. However, the PNL report does not challenge, and cannot challenge, the indisputable fact that the probability of a BESS fire occurring in a particular area increases as the number of BESS units increase in a particular area. The PNL Report is "*Energy Storage in Local Zoning Ordinances*". October 2023. [https://www.pnnl.gov/main/publications/external/technical\\_reports/PNNL-34462.pdf](https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-34462.pdf)

<sup>16</sup> For example, Mr. Murtishaw advocates in favor of "ministerial" review of lithium-based BESS so that they can be approved without CEQA, without public comment, and without any notice to affected communities. Timestamp 1:17:38.



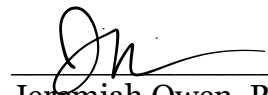
based battery systems and seek to expand these technologies by whatever means necessary (including understating the dangers of Lithium-based BESS facilities<sup>17</sup> and denigrating public concerns regarding BESS facilities<sup>18</sup>). The blame for community opposition to BESS development lies entirely with the energy developers who chose expediency and profits over public safety when they pursued only lithium-based storage technologies and disregarded safer technologies.

### **Conclusion**

The Acton Town Council urges the Commission to conduct an honest and unbiased assessment of public safety concerns relating to lithium-based BESS and thereby ensure that siting guidance developed for these systems is accurate and appropriate; moreover, this assessment must be developed without influence by energy developers or their agents (all of whom have a significant financial interest in the widespread deployment of lithium BESS facilities). In particular, the Acton Town Council recommends that the Commission's guidance document discourage the development of utility-scale BESS facilities in high fire hazard zones or near transit corridors or in populated areas.

If you have any questions or wish to discuss the concerns presented herein, please do not hesitate to contact me at [atc@actontowncouncil.org](mailto:atc@actontowncouncil.org).

Sincerely;

  
Jeremiah Owen, President  
The Acton Town Council

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<sup>17</sup> In his remarks during the Panel Discussion, Mr. Murtishaw incorrectly stated that "a lot of the concerns about thermal runaway and the intensity of those fires actually apply to NMC [batteries] and not to lithium iron phosphate [batteries]". Timestamp 1:11:39. This statement is categorically false; both LNMC batteries and LFP batteries are susceptible to thermal runaway and LFP batteries are particularly susceptible if they are overcharged; furthermore, LFP battery fires are actually far more intense than LNMC batteries (as discussed above).

<sup>18</sup> In his remarks during the Panel Discussion, Mr. Murtishaw said that the public comment he heard at a County Board of Supervisor meeting was "based on old information that apply to different technologies or ways that energy source projects were developed in the past but are no longer" [Timestamp 1:09:51]. The meeting that Mr. Murtishaw referred to took place in Los Angeles on December 19, 2023; several Acton Town Council members were present and we can assure the Commission that all the information conveyed in public comment pertained solely to lithium BESS technologies. Additionally, all the information conveyed by the public was current and represented the latest in technological information. Mr. Murtishaw's commentary on the efficacy and accuracy of public comment was not only insulting, it was also patently false. The meeting transcript is found here: [https://file.lacounty.gov/SDSInter/bos/sop/transcripts/1153948\\_121923.pdf](https://file.lacounty.gov/SDSInter/bos/sop/transcripts/1153948_121923.pdf); public comment begins on page 143.