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Comment letter from Save Our Rural Town

Please accept the attached letter from Save Our Rural Town that supplements our prior filings

Additional submitted attachment is included below.

SAVE OUR RURAL TOWN

May 21, 2026

Lisa Worrall, Project Manager
California Energy Commission
715 P Street, MS-40
Sacramento, CA 95814
Electronic filing of a 29 Page Letter and 7 Attachments.

Subject: Supplemental Comments by Save Our Rural Town (SORT).

Reference: AB-205 Application Submitted for a Proposed Battery Energy Storage Project in Acton, CA.
Docket Number 25-OPT-02.

Dear Ms. Worrall;

Save Our Rural Town (SORT) respectfully files the following supplemental comments pertaining to the referenced Licensing Application (Application) submitted by Coval Infrastructure (developer or applicant) to the California Energy Commission (Commission) for the proposed Prairie Song Battery Energy Storage System Project (BESS Project). These comments are prompted by a "Technical Study" that was recently issued by the County of Los Angeles as well as comments that were filed in the referenced Docket by "Energy Safety Response Group" (ESRG). Additionally, presented herein is an expanded analysis of the developer's risk assessment and AERMOD results prepared by SORT's Director, Jacqueline Ayer. SORT respectfully requests that the following comments be factored into the Draft Environmental Impact Report which will be issued by the Commission in late June.

Technical Study Recently Issued by the County of Los Angeles Pertaining to Battery Energy Storage Systems.

In 2024, the County of Los Angeles initiated efforts to update its existing Renewable Energy Ordinance (REO) codified under Section 22.14.510 of the Los Angeles County Zoning Code. Among other things, the REO update process will develop permitting procedures and development standards for Battery Energy Storage Systems (BESS); it will address all utility scale BESS regardless of whether they operate as "stand-alone" electrical grid assets or in conjunction with renewable generation facilities. As part of this effort, the Los Angeles County Department of Regional Planning prepared a

"Technical Study" of siting and regulatory practices pertaining to energy generation and storage land uses in the unincorporated areas over which Los Angeles County has land use jurisdiction. The results of this Technical Study were released in March, 2026[1], and they offer broad insights into the County's perspective on BESS siting principals in unincorporated communities such as Acton (where the proposed BESS project is located). For instance, the Technical Study concluded that Very High Fire Hazard Severity Zones (VHFHSZs) like Acton are not suitable for utility scale BESS developments. Additionally, the Technical Study concludes that large utility scale BESS facilities should not be located near residences or other sensitive uses; in fact, it proposes a minimum setback distance of 300 feet from residential properties. While SORT does not agree that a 300 foot setback is sufficient to protect the public from the risk posed by BESS facilities which utilize flammable or fluorine-rich electrolyte materials (as explained in detail below), we do concur with the general concept that utility scale (i.e. "in front of the meter") BESS facilities should not be located anywhere near residences or other "sensitive uses".

Given these circumstances, SORT respectfully requests that the Commission factor the conclusions set forth in the County's Technical Study into the ongoing consideration of the proposed BESS project, and thereby conclude that the proposed BESS project is too dangerous and should not be approved.

A More Detailed Analysis of the Developer's Risk Assessment and AERMOD Results Pertaining to HF Concentrations.

As explained in detail in SORT's comment letter filed in the Docket on April 6, 2026, the Health Risk Assessment performed by the developer and discussed in the developer's response to Data Request 6 assumes that, when an entire PowerTitan 2.0 BESS is engulfed in flames, only 38.68 pounds of hydrogen fluoride (HF) will be released at an average release rate of only 0.17 grams per second (0.17 g/s). However, this accounts for only 0.6% of all the fluorine in the electrolyte of the PowerTitan 2.0 BESS unit[2], which means that the developer's Health Risk Assessment assumes that the deflagration of an entire BESS unit will burn only a small portion of the electrolyte and release only 0.6% of the fluorine in the electrolyte as HF. Both of these assumptions are exceedingly implausible and technically indefensible because the electrolyte in a PowerTitan 2 BESS

[1] *Renewable Energy Ordinance Update Technical Study* prepared by Aspen Environmental Group and released March, 2026 [https://planning.lacounty.gov/wp-content/uploads/2026/03/REO_Ordinance_Update_Technical_Study_March_2026_Accessible.pdf

[2] Page 14 of the SORT Comment letter filed April 6, 2026 as Tracking Number 269416 found here: https://efiling.energy.ca.gov/GetDocument.aspx?tn=269416&DocumentContentId=106510.

is highly flammable[3], it is particularly rich in fluorine[4], and once combustion is initiated, all the electrolyte that is exposed to heat combusts and fluorine in the combusted electrolyte quickly converts to HF through a multi-step chemical process[5]. Accordingly, a BESS deflagration event will result in the conversion of much more than 0.6% of the fluorine in the electrolyte to HF.

To address this deficiency, SORT has developed more realistic (and thus technically defensible) HF release rate scenarios and reconciled these results with the developer's AERMOD plume study to derive a more accurate assessment of HF concentrations downwind of a BESS fire at the proposed BESS project site. This additional assessment is possible because the output concentration data provided by the developer's AERMOD plume study are normalized based on mass emission rates; this means that they can be used to calculate ground level concentrations under a variety of emission rate scenarios because they represent the quotient of "pollutant ground-level concentration" values (χ in units of $\mu g/m^3$) divided by the "source emission rate" value (Q in units of g/s)[6]. For example, consider the maximally exposed individual receptor (MEIR) location which is identified by the developer's AERMOD plume analysis as having a χ/Q value of 1616 at coordinates 394894.43 meters east, 3816484.26 north[7]: applying the developer's assumed HF emission rate of 0.17 g/s to this χ/Q value of 1616 yields an actual HF concentration of 275 $\mu g/m^3$ at the MEIR location:

$$\frac{1616\ \mu g/m^3}{g/s} \times 0.17\ g/s = 275\ \mu g/m^3$$

Notably, when a more realistic HF emission rate is used, the HF concentrations predicted by the developer's AERMOD plum study are much, much higher. For example, if we assume that 5% of the fluoride in the electrolyte is converted to HF

[3] According to the Safety Data Sheet SDS) supplied by the manufacturer, the electrolyte in the PowerTitan 2.0 BESS consists of diethyl carbonate, ethyl methyl carbonate, ethylene carbonate (all of which are highly flammable) and a large quantity of lithium hexafluorophosphate ($LiPF_6$) salt.
[4] The lithium hexafluorophosphate salt that is utilized by the electrolyte if the PowerTitan 2.0 is 75% by weight fluorine, and every mole of $LiPF_6$ contains 6 moles of fluorine.
[5] Larsson, F., Andersson, F., Blomqvist, P., and Mellander, BE., *Toxic fluoride gas emissions from lithium-ion battery fires*. Published August, 2017.
[6] The developer explains how to find the χ/Q concentration values and the locations at which they occur on page 11 and Exhibit 2 of the Response to Data Request #6.
[7] See page 949 of the developer's Response to Data Request #5. Notably, the developer claims that the MEIR is located at 394942.29 meters east, 3816484.92 meters north and has a χ/Q concentration value of only 872 (page 11 of the Response to Data Request #6); however, page 949 shows that the *actual* MEIR has a χ/Q concentration value of 1616 and is located at 394894.43 meters east, 3816484.26 north. The MEIR claimed by the developer is wrong by nearly 100%.

during a PowerTitan 2.0 combustion event, the HF emission rate is 1.49 grams/second[8], and the resulting concentration at the MEIR location is 2,408 μg/m3:

$$\frac{1616\ \mu g/m^3}{g/s} \times\ 1.49\ g/s\ =\ 2{,}408\ \mu g/m^3$$

This substantially exceeds that Acute Exposure Guideline Level (AEGL) of 818 μg/m3 established by the EPA. Naturally, EPA's AEGL for HF is similarly exceeded at the MEIR location if we assume that 10%, 20%, and 100% of the fluoride in the electrolyte is converted to HF during a PowerTitan 2.0 deflagration: a 10% conversion assumption yields an HF release rate of 2.98 g/s and an HF concentration of 4,816 (μg/m3); a 20% conversion yields an HF release rate of 5.96 g/s and an HF concentration of 9,632 μg/m3; and a 100% conversion yields an HF release rate of 29.8 g/s and an HF concentration of 48,159 μg/m3.

These results also indicate that, when reasonable HF release rates are applied to the AERMOD results, many locations exceed the AEGL. To assess the extent to which this occurs, SORT reconciled the location and χ/Q data reported on pages 949-950 of the developer's AERMOD results[9] with the more reasonable HF release rates described above and then calculated the actual HF concentrations at these locations. The results of this analysis are presented in spreadsheet form in Table 1. They show that, at even a modest HF release rate which assumes only 5% of the fluorine in the electrolyte converts to HF, the resulting HF concentration exceeds the AEGL at a distance of 432 feet from the burning BESS; when 20% of the fluorine in the electrolyte is assumed to convert to HF, the concentration exceeds the AEGL at a distance of more than 700 feet. And, if 100% of the fluorine in the electrolyte converts to HF, the concentration exceeds the AEGL at a distance of more than 1,000 feet; this demonstrates that lithium BESS containers should never be located within 1,200 feet of a residential property or occupied area. To illustrate this, SORT plotted HF concentrations reported in Table 1 at specific points north and east of the burning BESS (based on the predominant wind direction assumed by the developer[10]); plots corresponding to the 5%, 10%, and 20% fluorine conversion rates are provided in Figures 1, 2, and 3, respectively. As Table

[8] As indicated on page 14 of the SORT Comment letter filed on April 6, 2026, if all the fluorine in the electrolyte of a PowerTitan 2 converts to HF during a BESS fire, then 6,630 pounds of HF are emitted. Five percent of 6,630 is 331.5 pounds (round to 330 pounds); this corresponds to 1.49 g/s of HF in 28 hours: $\frac{330\ lb}{28\ hr} \times \frac{1\ hr}{3{,}600\ seconds} \times \frac{1000\ g}{2.2\ lb} =\ 1.49\ g/s$

[9] These results are found in the developer's Response to Data Request #5, Attachment B of Attachment 1.

[10] The AERMOD analysis assumes predominant winds are from southwest to northeast; SORT disagrees with this assumption for the reasons that we have set forth in prior comments submitted into the Docket.

Table 1. AERMOD Plume Study Results Reconciled with Reasonable HF Emission Rates

	UTM Coordinates	Geographic Coordinates		
BESS Location:	394880.53 Easting	34.484000	HF Acute REL:	240 (μg/m^3)
	3816417.7 Northing	-118.144806	HF AEGL 1:	818 (μg/m^3)

Values indicated in red exceed the EPA's AEGL Level of 818

Modeled Receptor Location				χ/Q[a]	Concentration in μg/m^3 at various emission rates in g/s					Distance	Points plotted
UTM Coordinates		Geographic Coordinates		$\left(\frac{\mu g/m3}{g/s}\right)$							
Easting	Northing	Latitude	Longitude		0.17 g/s[b]	1.49 g/s[c]	2.98 g/s[d]	5.96 g/s[e]	29.8 g/s[f]	from BESS	in Figures 1,2,3
394774.77	3816482.62	34.484575	-118.145965	191.64	32.58	286	571	**1142**	**5711**	405 feet	
394798.71	3816482.95	34.484580	-118.145704	379.56	64.53	566	**1131**	**2262**	**11311**	342 feet	
394822.64	3816483.28	34.484585	-118.145444	508.75	86.49	758	**1516**	**3032**	**15161**	285 feet	
394846.57	3816483.61	34.484591	-118.145183	754.42	128.25	**1124**	**2248**	**4496**	**22482**	243 feet	
394870.50	3816483.94	34.484596	-118.144923	1277.7	217.20	**1904**	**3807**	**7615**	**38074**	219 feet	
394894.43	3816484.26	34.484602	-118.144662	1616.1	274.73	**2408**	**4816**	**9632**	**48159**	226 feet	
394918.36	3816484.59	34.484607	-118.144402	1428.7	242.89	**2129**	**4258**	**8515**	**42576**	252 feet	
394942.29	3816484.92	34.484612	-118.144141	872.12	148.26	**1299**	**2599**	**5198**	**25989**	297 feet	Point 1
394966.22	3816485.25	34.484618	-118.143881	530.13	90.12	790	**1580**	**3160**	**15798**	358 feet	
394990.15	3816485.57	34.484623	-118.143620	376.09	63.94	560	**1121**	**2241**	**11207**	421 feet	
395014.09	3816485.90	34.484629	-118.143360	264.74	45.01	394	789	**1578**	**7889**	492 feet	
395038.02	3816486.23	34.484634	-118.143099	194.34	33.04	290	579	**1158**	**5791**	562 feet	
394774.43	3816507.62	34.484800	-118.145972	236.08	40.13	352	704	**1407**	**7035**	450 feet	
394798.36	3816507.95	34.484805	-118.145711	280.53	47.69	418	**836**	**1672**	**8360**	398 feet	
394822.29	3816508.28	34.484811	-118.145451	415.56	70.65	619	**1238**	**2477**	**12384**	351 feet	
394846.23	3816508.61	34.484816	-118.145190	607.87	103.34	**906**	**1811**	**3623**	**18115**	315 feet	
394870.16	3816508.93	34.484822	-118.144930	819.79	139.36	**1221**	**2443**	**4886**	**24430**	300 feet	
394894.09	3816509.26	34.484827	-118.144669	962.01	163.54	**1433**	**2867**	**5734**	**28668**	304 feet	Point 2
394918.02	3816509.59	34.484832	-118.144409	919.79	156.36	**1370**	**2741**	**5482**	**27410**	327 feet	
394941.95	3816509.92	34.484838	-118.144148	658.04	111.87	**980**	**1961**	**3922**	**19610**	364 feet	
394965.88	3816510.24	34.484843	-118.143888	457.6	77.79	682	**1364**	**2727**	**13636**	414 feet	
394989.81	3816510.57	34.484849	-118.143627	349.69	59.45	521	**1042**	**2084**	**10421**	470 feet	
395013.74	3816510.90	34.484854	-118.143367	270.38	45.96	403	806	**1611**	**8057**	532 feet	
395037.67	3816511.23	34.484859	-118.143106	209.68	35.65	312	625	**1250**	**6248**	612 feet	
394774.09	3816532.62	34.485025	-118.145979	192.51	32.73	287	574	**1147**	**5737**	508 feet	
394798.02	3816532.95	34.485031	-118.145718	291.07	49.48	434	**867**	**1735**	**8674**	467 feet	
394821.95	3816533.28	34.485036	-118.145458	321.91	54.72	480	**959**	**1919**	**9593**	420 feet	
394845.88	3816533.60	34.485042	-118.145197	475.69	80.87	709	**1418**	**2835**	**14176**	395 feet	
394869.81	3816533.93	34.485047	-118.144937	625.58	106.35	**932**	**1864**	**3728**	**18642**	380 feet	
394893.75	3816534.26	34.485052	-118.144676	703.65	119.62	**1048**	**2097**	**4194**	**20969**	381 feet	
394917.68	3816534.59	34.485058	-118.144415	731.11	124.29	**1089**	**2179**	**4357**	**21787**	398 feet	Point 3
394941.61	3816534.91	34.485063	-118.144155	594.91	101.13	**886**	**1773**	**3546**	**17728**	432 feet	
394965.54	3816535.24	34.485069	-118.143894	399.89	67.98	596	**1192**	**2383**	**11917**	476 feet	Point 4
394989.47	3816535.57	34.485074	-118.143634	309.33	52.59	461	**922**	**1844**	**9218**	528 feet	
395013.40	3816535.90	34.485079	-118.143373	249.92	42.49	372	745	**1490**	**7448**	583 feet	
395037.33	3816536.23	34.485085	-118.143113	203.61	34.61	303	607	**1214**	**6068**	638 feet	Point 5
395061.26	3816536.55	34.485090	-118.142852	167.78	28.52	250	500	**1000**	**5000**	707 feet	
394612.88	3816548.38	34.485151	-118.147736	48.91	8.31	73	146	292	**1458**	973 feet	
394578.31	3816533.85	34.485016	-118.148111	30.79	5.23	46	92	184	**918**	1067 feet	
394749.82	3816557.29	34.485245	-118.146246	156.21	26.56	233	466	**931**	**4655**	633 feet	
394773.75	3816557.62	34.485251	-118.145985	226.4	38.49	337	675	**1349**	**6747**	578 feet	
394821.61	3816558.27	34.485262	-118.145464	338.24	57.50	504	**1008**	**2016**	**10080**	499 feet	
394869.47	3816558.93	34.485272	-118.144943	600.69	102.12	**895**	**1790**	**3580**	**17901**	459 feet	
394917.33	3816559.58	34.485283	-118.144422	711.95	121.03	**1061**	**2122**	**4243**	**21216**	476 feet	
394965.20	3816560.24	34.485294	-118.143901	482.79	82.07	719	**1439**	**2877**	**14387**	536 feet	
395013.06	3816560.90	34.485305	-118.143380	239.71	40.75	357	714	**1429**	**7143**	634 feet	
395036.99	3816561.22	34.485310	-118.143120	197.81	33.63	295	589	**1179**	**5895**	693 feet	

[a] The χ/Q concentration values and UTM coordinates were obtained from the developer's AERMOD plume study results.

[b] The 0.17 g/s HF release rate assumes that only 0.6% of the fluorine in the electrolyte produces HF when the BESS unit combusts

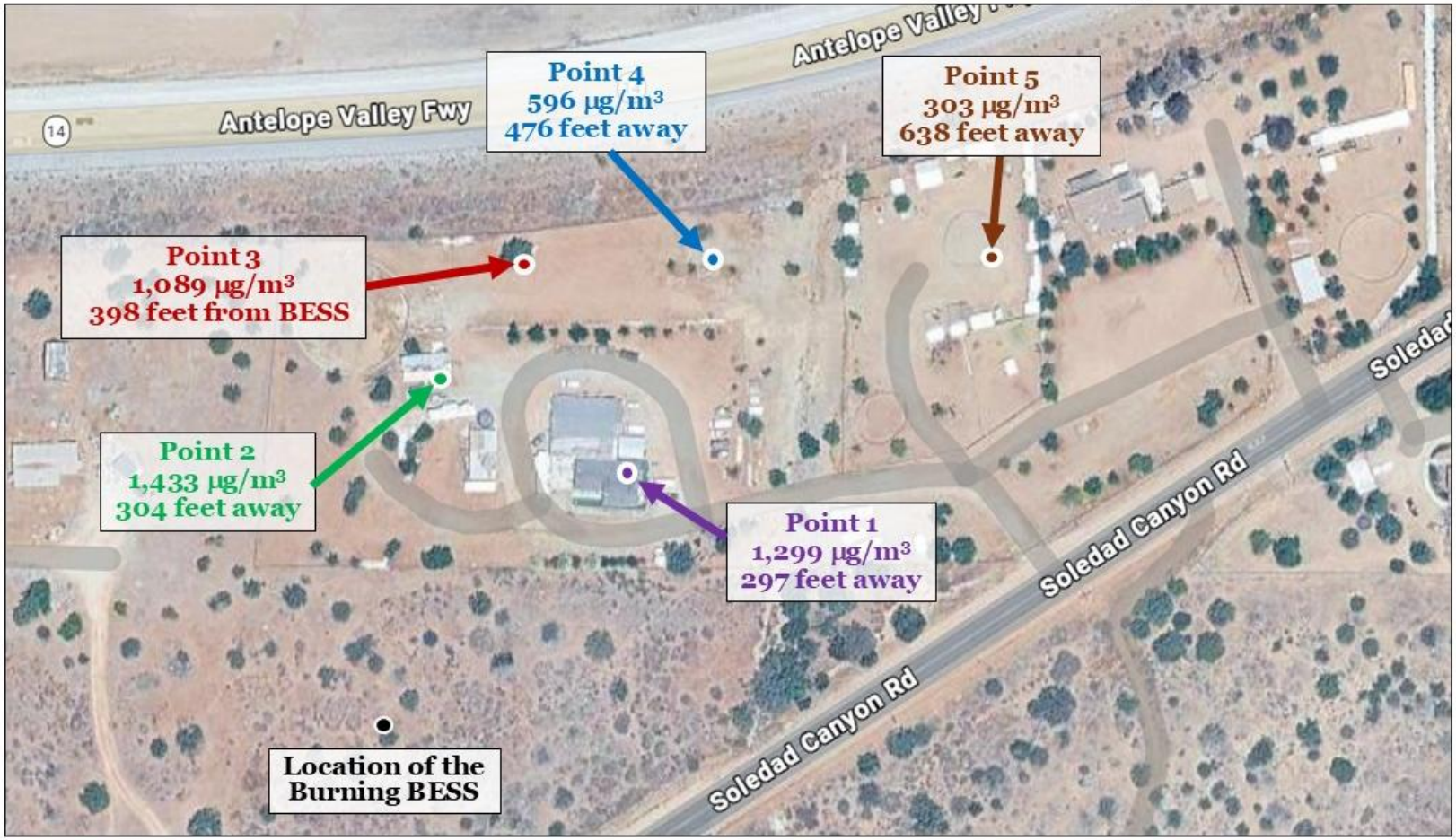
[c] The 1.49 g/s HF release rate assumes that only 5% of the fluorine in the electrolyte produces HF when the BESS unit combusts.

[d] The 2.98 g/s HF release rate assumes that only 10% of the fluorine in the electrolyte produces HF when the BESS unit combusts.

[e] The 5.96 g/s HF release rate assumes that only 20% of the fluorine in the electrolyte produces HF when the BESS unit combusts.

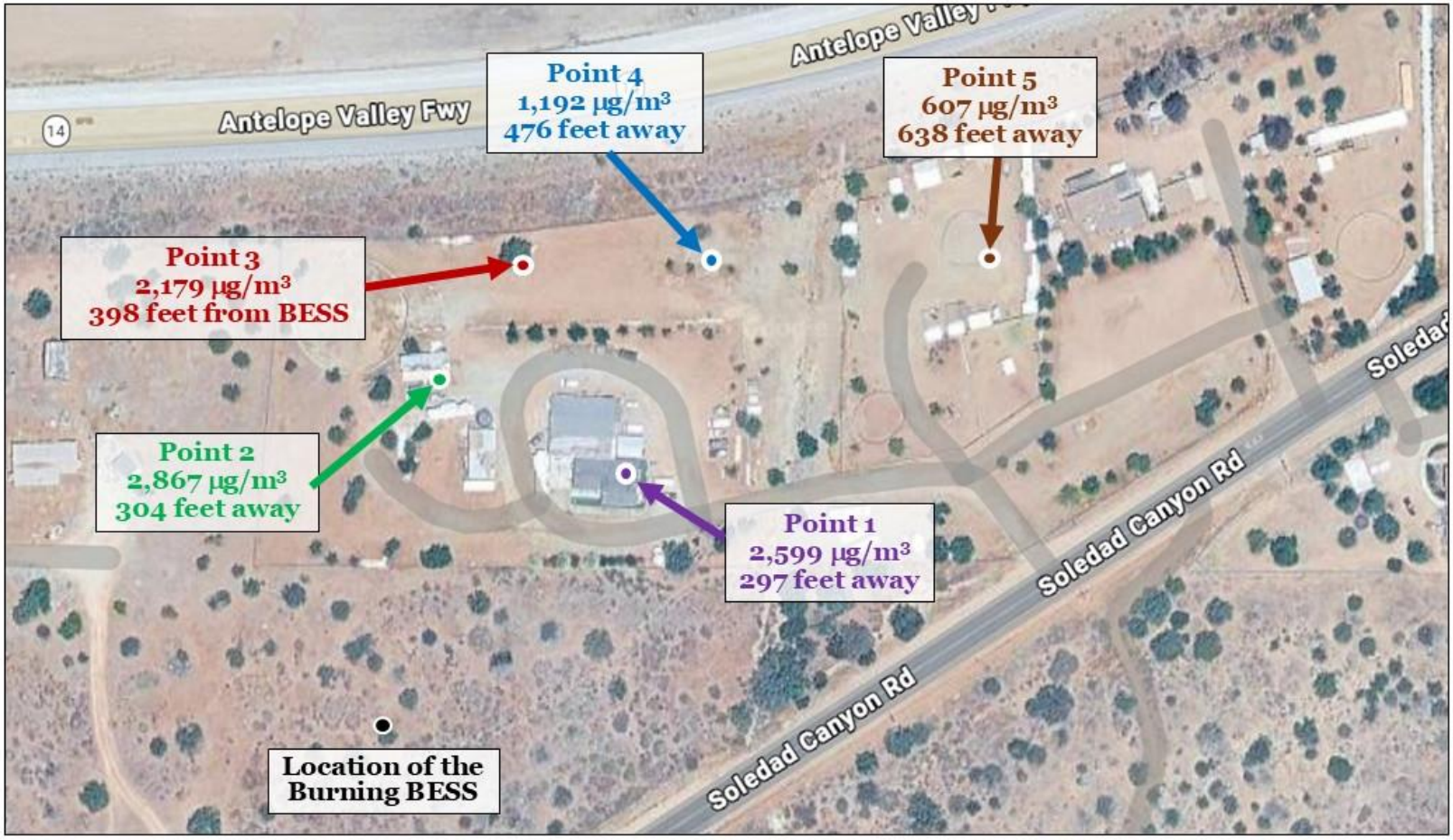
[f] The 29.8 g/s HF release rate assumes that 100% of the fluorine in the electrolyte produces HF when the BESS unit combusts

Figure 1.
HF Concentrations at Various Locations Based on the Developer's AERMOD Results and Assuming that Only 5% of the Fluorine in the Electrolyte Converts to HF and is Released at a Rate of 1.49 grams of HF per Second.



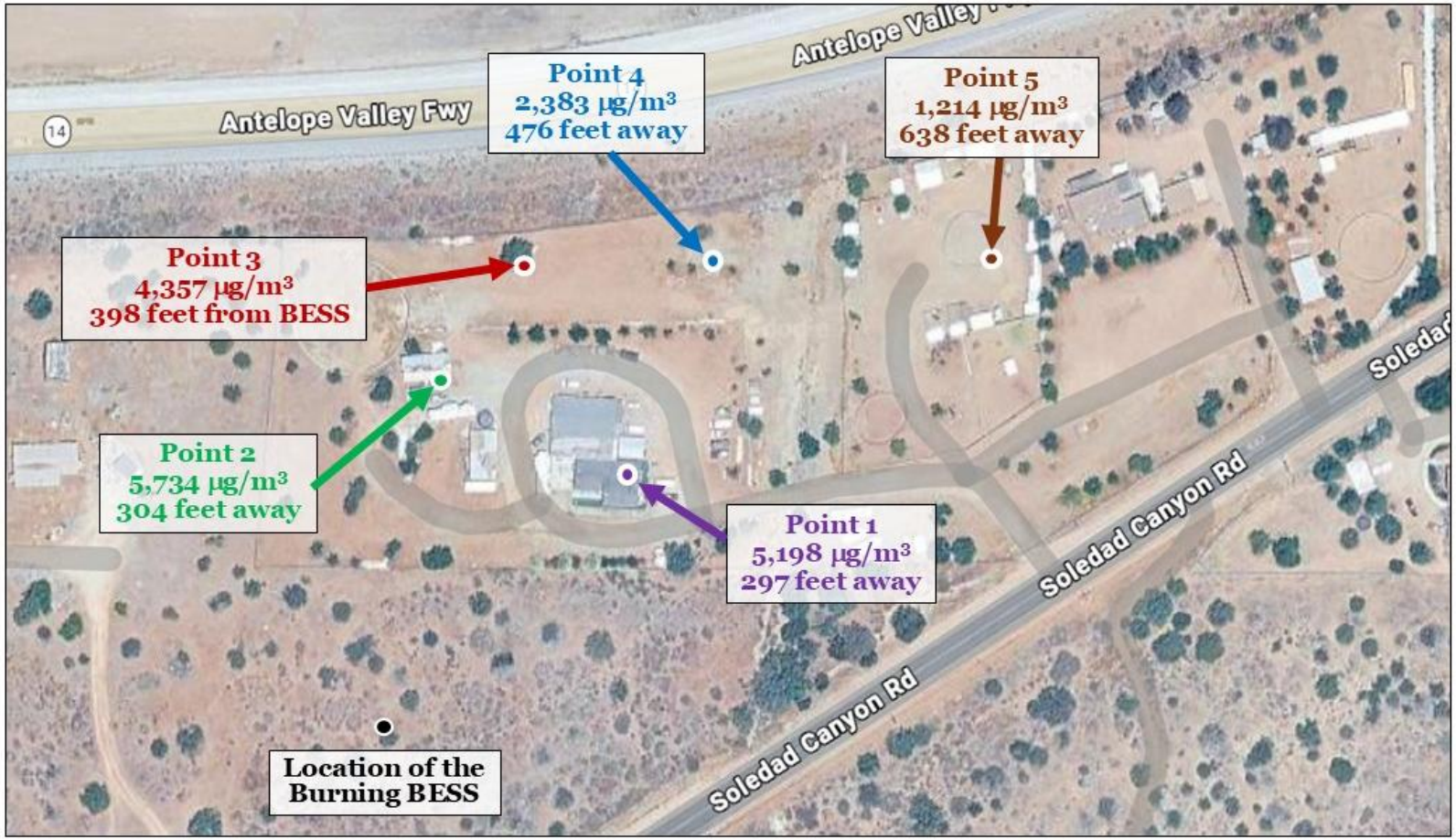
NOTE: THE MAJORITY OF HF CONCENTRATIONS EXCEED THE 818 µg/m³ AEGL.

Figure 2.
HF Concentrations at Various Locations Based on the Developer's AERMOD Results and Assuming that Only 10% of the Fluorine in the Electrolyte Converts to HF and is Released at a Rate of 2.98 grams of HF per Second.



NOTE: MOST HF CONCENTRATIONS EXCEED THE 818 µg/m³ AEGL.

Figure 3.
HF Concentrations at Various Locations Based on the Developer's AERMOD Results and Assuming that Only 20% of the Fluorine in the Electrolyte Converts to HF and is Released at a Rate of 5.96 grams of HF per Second.



NOTE: ALL HF CONCENTRATIONS EXCEED THE 818 µg/m³ AEGL.

1 and Figures 1-3 demonstrate, the BESS project poses real and significant health risks to all surrounding residents. And, because the railroad and portions of the 14 Freeway are within 500 feet of the proposed BESS yard, a deflagration event will result in HF concentrations that exceed the AEGL and pose a danger to freeway and rail travelers.

None of these facts are represented in the developer's analysis because the developer's analysis is predicated on an unreasonable HF emission rate that assumes only 0.6% of the fluorine present in the electrolyte of a PowerTitan 2.0 is converted to HF when the entire BESS unit combusts. Furthermore, the developer offers no explanation regarding what becomes of the remaining 99.4% of fluorine after the highly flammable electrolyte is consumed by the fire; obviously, it does not just disappear[11]. The Commission must not accept the developer's claimed HF exposure results until 1) an explanation is provided regarding why it is reasonable to assume that only 0.6% of the fluorine present in the electrolyte is converted to HF during the combustion of an entire PowerTitan 2.0 BESS unit; and 2) the remaining 99.4% of fluorine in the electrolyte is accounted for.

Extensive anecdotal evidence proves that lithium batteries generate toxic clouds which endanger receptors hundreds of feet away. For example, the combustion of a Tesla Model S vehicle in 2025 severely injured unprotected firefighters who were more than 200 feet away. According to the "Green Sheet" provided in Attachment 1[12], a compromised EV that was believed to be stable suddenly reignited just as the wind shifted; the white mist emanating from the vehicle wafted toward firefighters who had removed their protective equipment because they were in the "cold zone" and believed themselves to be too far away to suffer exposure. They were mistaken, and became seriously injured. SORT notes that, when fluorine reacts with water, it forms a white mist[13]. If the toxic concentrations generated by the combustion of a single electric vehicle (EV) battery pack are capable of seriously injuring firefighters who are hundreds of feet away, the much greater toxic concentrations generated by the combustion of a large BESS unit will cause serious injuries at distances much greater than 200 feet.

SORT Respectfully Disagrees with Comments Offered by ESRG.

On February 19, 2026, the "Energy Safety Response Group" (ESRG) filed comments in the Prairie Song Docket pertaining to the following:

[11] The Law of Conservation of Mass dictates that chemical reactions neither create or destroy matter.
[12] The Green Sheet was entered into the Docket by others on March 3, 2026 [Tracking Number 268918 found here: https://efiling.energy.ca.gov/GetDocument.aspx?tn=268919&DocumentContentId=106111].
[13] https://www.americanchemistry.com/content/download/5432/file/Emergency-Preparedness-and-Response-Guidelines-for-Anhydrous-Hydrogen-Fluoride-AHF-and-Hydrofluoric-Acid-HF.pdf.

- Frequency of Fire Events in Energy Storage Systems (pages 2 - 3)
- BESS Comparison to Other Fire and Electrical Hazards (pages 3 - 4)
- "Dangerous Goods" and Transport Hazards (pages 4 - 5)
- Lithium Iron Phosphate Battery Safety (page 5)
- Energy Storage System Evaluation and Certification (pages 5 - 7)
- BESS Risk Management and Layered Protections (pages 7 - 9)
- BESS Incident Response and Mitigation (pages 9 - 10)
- Smoke Toxicity and Public Health Concerns (pages 10 - 12)

For the reasons set forth below, SORT respectfully disagrees with ESRG's contentions.

SORT Disputes ESRG Contentions Regarding the Frequency of BESS Failures.

ESRG admits that BESS failures have occurred; however, ESRG then argues that such events are rare and that their rarity "amplifies media attention". ESRG further argues that "geographical concentration" should be considered and that the BESS incident database maintained by the Electric Power Research Institute (EPRI) suggests that BESS failure rates are declining. However, ESRG fails to disclose that the EPRI database is incomplete and that it intentionally omits numerous BESS failure incidents. For example, the EPRI database does not include the multiple failures that occurred at the Sanborn BESS development in July of 2024 which SORT discussed in comments submitted into the Docket in August, 2025[14]. EPRI openly admits that the database does not capture "incidents with minimal or local-only media coverage" and that it is very selective in choosing which BESS failure incidents are included in the database. For example, only incidents which have "wider public health and safety" impacts are included, and EPRI appears to be the sole arbiter of what constitutes "wider public health and safety" impacts. Accordingly, the EPRI database is not a reliable source upon which to base any conclusion regarding the frequency of BESS fires. Furthermore, no database reliably reports BESS failures because there is no national reporting mandate. Insubstantial claims pertaining to "media attention" and "geographical concentration" that are based on incomplete data sets are worthless, and the only question that is relevant to the BESS project is whether any of the thousands of lithium-based BESS units that will be installed in Acton can ignite and harm Acton residents. The developer's AERMOD results show the answer to this question is yes, so arguments pertaining to "media attention", "geographical concentration" are completely inapposite.

[14] See Attachment 13 of SORT's comment letter dated August 18, 2025 [Tracking Number 265682 found here: https://efiling.energy.ca.gov/GetDocument.aspx?tn=265682&DocumentContentId=102532].

SORT Disputes ESRG Contentions Pertaining to Non-BESS Fire/Electrical Hazards.
ESRG states that transformers are ubiquitous electrical facilities, that their failure rates may be as high as 1%, and that this statistic is uncertain because there is very little published data. ESRG then goes on to state that, in 2023, 110,000 non-residential building fires occurred and 7,400 of these were attributed to electrical malfunctions; ESRG also states that no fatalities have occurred in the US due to BESS fires, that BESS codes and standards are evolving rapidly, that they are being written by laboratories, organizations, and experts, and that fire officials are becoming better trained. Drawing on these foundational statements, ESRG argues that protections against BESS failure modes are "embedded in multiple regulatory requirements" and that "system operators and first responders can be fully prepared to manage them". However, this argument is not only false, it is a complete non-sequitur: The argument is false because "regulatory requirements" ***do not*** prevent BESS failures because "regulatory requirements" ***do not*** prevent manufacturing defects, installation errors, Battery Management System (BMS) failures, overcharging, mechanical system failures, leakages, dust intrusion, or other triggering events that result in BESS ignition. Furthermore, even if first responders and system operators are fully prepared to respond to a BESS fires, such preparation does nothing to protect Acton residents from the toxic emissions resulting from such events particularly when, as here, the BESS project does not provide sufficient water resources.

The argument is a non-sequitur because statistics pertaining to transformer fires, non-residential fires, and fatalities are not in any way pertinent to BESS failure modes; furthermore, the rapid evolution of codes and standards by experts does not guarantee that BESS fires will be prevented. The developer cannot ensure that, among the thousands of BESS units that are proposed for installation in Acton, none will ever go up in flames. *That* is the only salient issue, therefore, it is not matter how many transformer and non-residential building fires occur each year or how codes and standards are developed.

ESRG Arguments Regarding "Dangerous Goods"/Transport Hazards are Inapposite.
ESRG claims that comments filed in the Docket lack "context" and that one comment in particular is "incorrect" because it "suggests that that BESS modules are classified as 'dangerous goods' because of their "propensity to spontaneously ignite'". This comment was made by SORT in a letter submitted in August, 2025[15] to refute the developer's claim that the BESS project will not "result in significantly increased hazards associated

[15] See page 48 of SORT's comment letter filed on August 18, 2025 [Tracking Number 265680 found here: https://efiling.energy.ca.gov/GetDocument.aspx?tn=265680&DocumentContentId=102530]

with Project related hazardous materials to be transported to or from the Project site". Specifically, we pointed out that moving thousands of lithium BESS containers on freeways and local roads will significantly increase hazards because BESS units have been assigned a Class 9 designation by the Department of Transportation (DOT) due to their ignition potential. This statement is fully corroborated by the DOT's "Lithium Battery Guide For Shippers" which states that lithium batteries are designated as "Class 9 - miscellaneous hazardous materials" because they "can overheat and ignite" and experience "thermal runaway, a chain reaction leading to a violent release of stored energy and flammable gas" (Relevant portions of this DOT Guide are provided in Attachment 2[16]; these quotes are found on pages 2-5). Nonetheless, ESRG argues that SORT's comment is incorrect because DOT does not designate BESS as a Class 4.2 substances that is liable to spontaneous combust. This argument is both specious and absurd; nowhere does SORT ever claim that lithium BESS have a Class 4.2 designation. To the contrary, we clearly explain on page 48 of our August, 2025 letter that lithium BESS have a Class 9 designation because of their ignition potential. ESRG's argument lacks merit.

ESRG then asserts that it is incorrect to refer to lithium BESS as "dangerous goods" because in the United States, they are considered "hazardous materials". While SORT appreciates ESRG's affirmation that lithium BESS are indeed "hazardous materials", we point out that lithium batteries are referred to as "dangerous goods" by numerous organizations that operate in the United States, including the Federal Aviation Administration[17] (a branch of the DOT) and the International Association of Fire Chiefs (which describes materials that are shipped with a Class 9 DOT classification as "Miscellaneous dangerous goods/hazardous materials"[18]).

Next, ESRG criticizes public comments pertaining to two hazardous incidents involving the transportation of BESS containers. Because SORT's letter filed in the Docket in August, 2025 discusses these events, it is assumed that ESRG's criticism is leveled at these SORT comments, so we will address it. ESRG argues "In both incidents, battery damage was a consequence of vehicle rollover rather than the initiating event" and that these incidents "reflect the risks associated with roadway accidents generally, not risks unique to lithium-ion energy storage systems". These arguments are specious for

[16] A full copy of the DOT Guide is found here: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2023-07/Lithium%20Battery%20Guide.pdf
[17] https://www.faa.gov/hazmat/resources/lithium_batteries
[18] https://www.iafc.org/topics-and-tools/hazmat/fusion-center/transportation-commodities/dot-hazard-classification-system

several reasons. First, SORT never claimed that the roadway incidents were initiated by battery damage; in fact, SORT states quite clearly that the BESS explosion which led to a 30 hour closure of the Vincent Thomas bridge was the result of a "traffic mishap"[19]. Second, the risks associated with transporting lithium BESS are *uniquely high* because traffic mishaps initiate thermal runaway and ignite the 10,000+ pounds of highly flammable electrolyte found in typical BESS units[20]; this releases thousands of pounds of highly toxic hydrogen fluoride into the environment. That is why roadway accidents involving BESS transport vehicles cause road closures and public safety concerns which last for days. Moreover, ESRG fails to grasp that *it does not matter what initiates the roadway accident*; what matters is that the BESS ignites and endangers the public when accidents occur whatever their cause. Furthermore, the salient issue is whether the BESS project will "result in significantly increased hazards" due to the transportation of hazardous materials to the project site: while the developer asserts this impact is "less than significant"[21], the record shows the project will significantly increase hazards because it significantly increases the number of hazardous BESS units transported on freeways and local roads. None of ESRG's arguments controvert this indisputable fact.

Next, ESRG cites statistics from 2024 on truck accidents, injuries, fatalities, and hazardous material "incidents" in California and states "Large truck accidents frequently result in temporary roadway closures regardless of the cargo involved" and "the number of BESS-related transport events is extremely small". None of this information is relevant to the salient issue: namely, that the BESS project will "result in significantly increased hazards" because it will place thousands of trucks transporting thousands of hazardous BESS units on our freeways and local roads. These increased hazards are significant because each traffic incident that involves one of these trucks will result in a significant explosion, fire, and the release of thousands of pounds of toxic HF. Nothing in ESRG's argument controverts the indisputable fact that the BESS project will significantly increase transportation hazards.

Finally, ESRG argues that lithium BESS do not "present a disproportionate or unusual transportation risk" because regulators "evaluate transportation risk based on DOT regulations and demonstrated incident frequency across all hazardous materials, not on isolated events without a denominator". ESRG fails to grasp that the issue is not how

[19] See page 12 of SORT's comment letter filed on August 18, 2025.
[20] According to the manufacturers Safety Data Sheet, the PowerTitan 2.0 BESS is up to 20% by weight of flammable electrolyte, and it weighs 61,200 pounds; thus, each unit has up to 12,000 pounds of flammable liquid material.
[21] See page 3.12-2 of the developer's application.

regulators consider DOT regulations or incident frequencies or transportation risk; rather, it is whether the project will "result in significantly increased hazards" due to the transportation of hazardous materials to the Project site. ESRG's argument appears to be that the thousands of trucks which will transport BESS units to the project site do not pose any hazard even though they are carrying extremely hazardous BESS units because the trucks will all presumably comply with DOT regulations. This argument is intrinsically flawed because mere compliance with DOT regulations *does not* mitigate transportation hazards posed by collisions, rollovers, poor driving habits, dangerous road conditions, or mechanical failures. Nothing in ESRG's argument controverts SORT's showing that the BESS project will "result in significantly increased hazards" due to the transportation of hazardous materials; thus, ESRG's argument is meritless.

SORT Responds to ESRG Claims Pertaining to Lithium Iron Phosphate BESS Safety.
ESRG states "The record also includes an assertion that the Prairie Song Reliability Project will rely on a 'particularly dangerous lithium-ion battery chemistry'". However, this is a gross misstatement of the comment offered by SORT in August, 2025 that "The BESS Project Utilizes a Particularly Dangerous Battery Chemistry"[22]. SORT's comment refers to the fact that the BESS project utilizes a dangerous and deflagration prone lithium-based battery chemistry (specifically, lithium iron phosphate or LFP) instead of a safe and stable flow battery technology (such as iron flow). Contrary to what ESRG appears to think, SORT has never commented that the BESS project relies on a "particularly dangerous lithium-ion battery chemistry".

Next, ESRG asserts that LFP batteries are "one of the most widely used lithium-ion chemistries" and "increasingly the preferred choice for stationary energy storage worldwide". This statement is not dispositive because LFP BESS are not rendered safe simply because energy developers chose to use them.

Next, ESRG acknowledges that absolute claims regarding the safety of LFP BESS are not accurate; SORT appreciates this candor. However, ESRG then asserts that comments in the record are "highly misleading"; ESRG also impugns remarks pertaining to the dangers of LFP batteries. It is assumed that these statements are leveled at the comments SORT submitted into the Docket in August, 2025; thus, they are addressed here. The extensive and fully documented evidence pertaining to LFP batteries that SORT has provided clearly prove that, in overcharge and high temperature conditions, LFP batteries are ***more susceptible*** to thermal runaway than other types of lithium

[22] See page 7 of SORT's comment letter filed on August 18, 2025.

batteries. SORT's fully documented evidence also proves that LFP battery fires *are* ***more intense*** and ***more explosive*** than other lithium battery fires. ESRG does not assert any information or cite to any studies or provide any reports which controvert these indisputable facts; therefore, ESRG's claims can be accorded no weight.

Finally, ESRG affirms that "all lithium-ion chemistries present a broadly similar risk profile from a safety and emergency response standpoint" and "Both chemistries present fire and deflagration hazards". SORT does not dispute these affirmations.

ESRG's Analysis of Comments on BESS Evaluations and Certifications is Erroneous.
ESRG offers several paragraphs regarding UL 9540 Certification and UL 9540A testing, and then states "Conflating UL 9540A with UL 9540 misrepresents both the purpose of the test and the structure of the certification process". No context for this statement is provided, and ESRG does identify where any comments in the record have "conflated" UL 9540 with UL 9540A. Certainly, none of the comments that SORT has submitted into the Docket have "conflated" UL 9540 with UL 9540A. In fact, the comments SORT submitted in August, 2025 focus solely on UL 9540A and do not address UL 9540. As proof, we point out that the only place in the August, 2025 comment letter that even mentions UL 9540 is in footnote 35 where SORT quotes an "industry expert" who states that UL 9540 "is a system-level standard". SORT is very clear on the distinction between UL 9540 and UL 9540A: we have neither conflated nor misrepresented them and we certainly have never confused them. Because ESRG fails to cite where the record "conflates" UL 9540 with UL 9540A, such allegations must be accorded no weight.

ESRG next states "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. This is a gross misrepresentation of a statement provided in a comment letter SORT submitted in August, 2025[23]. What SORT *actually* said was "the UL9540A test methodology requires that ambient wind speeds not exceed 12 miles per hour, and it is only under this highly restricted windspeed condition that UL 9540A certification is valid". SORT *never* said that UL 9540A is "only valid" at 12 mph wind conditions; SORT clearly stated that UL 9540A *certification* is "only valid" at 12 mph. There is an *enormous* difference between these two statements. The former means that the UL 9540A test method is invalid in its entirety (a claim which SORT has *never* made); the latter means that the certification provided by UL9540A which ensures BESS container spacing and separation will

[23] See page 9 of SORT's comment letter filed on August 18, 2025.

prevent the propagation of a BESS fire is only valid when ambient windspeeds do not exceed 12. By extension, UL9540A certification *does not* ensure that a BESS fire will not propagate to surrounding units when wind speeds exceed 12 mph even if the facility adheres to certified container spacing and separation distances. In windy areas like Acton (where wind speeds frequently exceed 12 mph), this is a ***critical*** concern because it means that the assurance provided by UL 9540A that a BESS fire will not propagate will be of little value much of the time. This is the basis of SORT's contention that a BESS fire at the proposed project ***will*** spread to surrounding containers despite UL 9540A certification because winds often exceed 12 mph per hour in Acton. These concerns are substantially magnified by the fact that the BESS project has insufficient water resources to sustain a fire response and cool surrounding BESS containers for more than a few hours (as we have previously explained). After the water is gone, the BESS fire will propagate if it is a windy day. Nothing in ESRG's arguments controvert these indisputable facts.

Next, ESRG alleges that comments offered in the Docket assert that the 12 mph wind speed limit established by UL 9540A "constitutes a real-world operating limit for BESS facilities". Unfortunately, ESRG does not identify where this statement is in the record, and SORT cannot find it. Accordingly, this statement appears to be nothing more than vague innuendo which attacks arguments that have never been asserted. Moreover, the allegation is insupportable because UL 9540A does not appear to impose any sort of wind speed "operating limit" on battery systems that are certified pursuant thereto[24]. ESRG then argues that 12 mph is not a "restriction on the real-world use of listed equipment". Again, ESRG attacks a claim that has never been alleged; certainly, SORT has not claimed that 12 mph is a "restriction on the real-world use of listed equipment".

Next, ESRG offers a paragraph on test methods and laboratory conditions developed by the National Highway Traffic Safety Administration (NHTSA) for vehicle crash tests and the National Fire Protection Agency (NFPA) for evaluating fire characteristics of exterior wall assemblies. The paragraph appears to be in support of ESRG's claim that the 12 mph test limit is not a "restriction on the real-world use of listed equipment"; however, this claim is not in dispute.

Next, ESRG states that comments offered in the Docket characterize UL 9540A as a "tacit admission that BESS containers will ignite and deflagrate". Once again, ESRG fails to provide a citation, and once again, SORT presumes that it refers to comments we

[24] The UL 9540A results entered into the Docket do not appear to limit project site wind speeds [https://efiling.energy.ca.gov/GetDocument.aspx?tn=266065&DocumentContentId=103081].

offered in August, 2025[25]. However, SORT ***does not*** state or even infer that UL 9540A is a "tacit admission that BESS containers will ignite and deflagrate". To the contrary, what SORT actually states is "UL 9540A constitutes a tacit admission that BESS pose very real fire and safety dangers". Once again, ESRG grossly misrepresents SORT's arguments and claims.

Furthermore, UL9540A testing ***does*** constitute a tacit admission that BESS containers pose very real fire and safety dangers because the whole point of UL 9540A is to "evaluate the fire and explosion hazard characteristics of those battery energy storage systems that have demonstrated a capability to undergo thermal runaway"[26]. Furthermore, the purpose of UL 9540A testing is to establish appropriate BESS container separation spacing and fire/explosion protection measures (as ESRG is aware[27]). Accordingly, SORT stands by our statement that UL 9540A constitutes a tacit admission that BESS pose fire and explosion hazards because *the characterization of such features is the whole point of UL 9540A*. ESRG does not controvert this essential point or identify any error in SORT's claim. Instead, ESRG alleges that SORT "misunderstands" Ul 9540A and argues that UL 9540A testing merely evaluates whether a thermal runaway event "can be contained without propagating beyond the initiating unit" the same way NHTSA requires vehicle crash testing and NFPA requires structure burn testing. However, it is ESRG who misunderstands: UL 9540A testing is required because dangerous battery self-ignitions ***do*** occur in the same way that NHTSA testing is required because dangerous vehicle crashes ***do*** happen and NFPA testing is required because dangerous structure fires ***do*** ignite. Said another way: if there were not a strong possibility that a vehicle could experience a dangerous crash, then NHTSA vehicle testing would be unnecessary, and if there were not a strong possibility that a structure could experience a dangerous fire, then NFPA structure testing would be unnecessary. Similarly, if there were not a strong possibility that a dangerous BESS self-ignition could occur, then UL 9540A testing would be unnecessary. However, vehicle *do* crash, structures *do* burn, BESS *do* ignite, and the existence of testing methodologies to assess such events constitutes a tacit admission that they are dangerous.

Finally, ESRG criticizes a comment in the Docket claiming "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, ESRG does not identify any error in this claim or explain what the criticism is. For the record, this

[25] See page 9 of SORT's comment letter filed on August 18, 2025.
[26] UL 9540A, Fifth Ed., §1.1.
[27] See page 6 paragraph 3 of ESRG comments filed February 19, 2025 [Tracking Number 268717].

is a statement in a comment letter SORT submitted into the Docket[28] that pertains to performance criteria established by UL-9540A. As shown in Figure 4 of our August, 2025 letter, the criteria for Unit Level testing includes "No flaming beyond outer dimensions of BESS unit" and the criteria for Installation Level testing includes "the flame indicator shall not propagate flames beyond the width of the initiating BESS". It is clear from the plain language of these criteria that SORT accurately summarizes the fact that a BESS unit is deemed to meet the UL 9540A standard if it "does not produce flames that extend beyond the width of the BESS Unit". Accordingly, ESRG's criticism lacks merit. Perhaps ESRG objects to the term "deflagration", and if so, SORT has no objection to amending the statement to "a "BESS unit is deemed to meet the UL 9540A standard if, when it explodes and/or burns, it ~~experiences a deflagration event which~~ does not produce flames that extend beyond the width of the BESS Unit".

SORT Responds to ESRG Claims of BESS Risk Management and Layered Protection.

ESRG asserts "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… 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". Unfortunately, ESRG fails to identify what "discussion" is referred to or explain how it is "incomplete" and "misleading"; ESRG also fails to cite any "industry data", "certification requirements", or "regulatory frameworks" which prove thermal runaway events are not frequent or inevitable or unmanageable. The vagueness of ESRG's criticisms make them difficult to address; nonetheless, SORT offers the following response. First, there is no reliable "industry data" that addresses how "frequent" thermal runaway events are. Certainly, the EPRI database is not a reliable source for assessing the frequency of BESS failures because (as explained above) EPRI is very selective regarding the BESS failures it chooses to report; EPRI makes such choices based on its own inscrutable objectives as an organization that represents the interests of energy developers and utilities. Furthermore, "frequency" is a highly subjective term, and organizations like ESRG that serve energy developers[29] and benefit by the expansion of BESS developments are likely to argue that a thermal runaway frequency rate of 10-15 per year[30] is low and thus perfectly acceptable; however, a

[28] See page 10 of SORT's comment letter filed on August 18, 2025.
[29] As ESRG explain on page 1 of its comment letter, ESRG professionals have "dedicated their careers" to advancing energy storage systems.
[30] The EPRI data base states 14 BESS fires occurred in 2023 though the actual number is higher.

residential community like Acton (where multiple large utility scale BESS are proposed) would rightly argue that such a BESS failure rate is unacceptably high and entirely too frequent. Second, "certification requirements" and "regulatory frameworks" do not mitigate BESS safety concerns because most (if not all) of the BESS that have failed over the last decade were constructed in compliance with "certification requirements" and "regulatory frameworks". Yet, they failed nonetheless and when they failed, they endangered the public. Third, ESRG is flat out wrong to argue that thermal runaway events cannot become "unmanageable"; in fact, a thermal runaway event at the proposed the BESS project will quickly become unmanageable because windy conditions at the site will cause BESS fire propagation which will not be suppressed for more than a few hours due to a paucity of water resources (as SORT has previously explained[31]). Accordingly, these vague criticisms about "incomplete" and "misleading" comments in the record should be accorded no weight.

Next, ESRG affirms SORT's contention that there are many ways in which BESS failures can occur; SORT appreciate this affirmation. However, ESRG then argues that this multitude of failure modes is not a concern because UL 9540A and other tests/ standards are "designed to evaluate and control" these failure modes. SORT notes that UL 9540A and other tests/standards ***do not*** "control" a BESS failure; the best they can do is react to it. For example, the purpose of the thermal sensors and smoke detectors required by adopted standards is to sense and react to a BESS fire that has already ignited by triggering further actions (such as venting flammable gases and toxics to the outside); these sensors *do not* control the BESS fire, they merely detect and react to it (as long as they have no manufacturing defects). Furthermore, BESS testing and standards do not preclude BESS fires; for example, UL 9540A which establishes that a BESS container is perfectly certifiable as long as the flames resulting from an ignition do not spread beyond the container at wind speeds of 12 mph or less.

Next, ESRG asserts "Attempts to equate theoretical failure modes with real-world likelihood is unsupported". This statement makes no sense. First, manufacturing defects, installation errors, errors in battery management systems, and other problems are not "theoretical" BESS failure modes; they are ***actual*** failure modes that have caused ***actual*** BESS failures[32]. Second, it is undisputable that the higher the number of

[31] Pages 5-9 of our CEQA Scoping Comments submitted March 4, 2026 [Tracking Number 268944 found here: https://efiling.energy.ca.gov/GetDocument.aspx?tn=268944&DocumentContentId=106134]

[32] For example, the PG&E Moss Landing BESS fire in 2022 was caused by an "improperly installed vent shield" that "dislodged an umbrella valve on the top of the Megapack, causing an unnatural water ingress point, ultimately resulting in battery cell overheating and thermal runaway".

manufacturing defects, the higher the likelihood that such defects will result in a failure mode. ESRG fails to provide any evidence to controvert this fact; therefore, ESRG's arguments lack merit.

Next, ESRG claims that comments have "mischaracterized" a manufacturing audit by Clean Energy Associates (CEA). Presumably, this criticism is directed at comments that SORT submitted to the Docket in August, 2025 letter, and we offer the following response: SORT's discussion pertaining to the CEA audit is fully documented and cited, and it is not controverted by anything that ESRG alleges; therefore, it continues to have substantial evidentiary value. Moreover, because ESRG fails to explain how the CEA audit was "mischaracterized", this allegation lacks evidentiary support. Additionally, the more recent manufacturing audit published by CEA in 2025 does not support ESRG's allegation that the 2024 CEA audit was "mischaracterized". To the contrary, this more recent CEA audit (provided in Attachment 3) fully substantiates and even amplifies all of the concerns previously raised by SORT because it shows that "System-Level" defects have increased from 48% to 72%, that these defects "pose serious risks to BESS safety", and that 6% of the System Level defects actually caused failures in subsequent performance tests. CEA also points out that these failures pose serious safety consequences and can lead to fires. Furthermore, the 2025 CEA audit shows that 28% of all the BESS units that were inspected had fire detection and suppression system defects, including non-responding release actuators for the fire extinguishing agent as well as non-responding smoke and temperature sensors.

These are *stunning* statistics and they demonstrate that there is a distinct possibility the "detection" component of the "layered" BESS protection system will not detect a thermal runaway event after it initiates; there is also a distinct possibility the "fire suppression" component of the "layered" BESS protection system will not activate even when thermal runaway is detected. Equally stunning, 15% of the inspected BESS units had thermal management system defects that would result in either insufficient cooling or coolant leakage; this means that there is a distinct possibility the "thermal management" component of the "layered" BESS protection system will either result in leakage that causes internal short circuiting and thermal runaway or it will fail to maintain the lithium battery cells at the requisite temperature to avoid thermal runaway. This is just a some of the defects and safety problems revealed by the 2025 CEA Audit; the full audit results are provided in Attachment 3.

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https://www.pge.com/en/newsroom/currents/safety/pg-e-shares-findings-of-september-2022-moss-landing-megapack-inc.html

Nonetheless, ESRG trivializes these alarming findings by pointing to a statement in the recent CEA Audit Report that all the defects which were found by the auditors were corrected before the systems were shipped. However, this dismissive statement ignores the fact that *the defective units which were manufactured before the audit team arrived and after the audit team left were not corrected before they were shipped* ***because the audit team was not there to detect them***. Nothing in ESRG's comments refutes or controverts SORT's concerns regarding the high incidence of BESS manufacturing defects the safety risks that such defects present.

Next, ESRG devotes several paragraphs to a description of the "layered" protection systems required for BESS installations. However, none of the information that ESRG provides refutes any of the facts presented by SORT's comments submitted in August, 2025 which show that these protection "layers" merely react to thermal runaway events and do not prevent them. Thus, SORT's comments on the limitations and inadequacies of BESS protection "layers" remain unrefuted in the record. Furthermore, the above comments show that the equipment which comprises these BESS protection "layers" is manufactured with an alarmingly high defect rate; this further diminishes the efficacy and value of BESS protection "layers".

Furthermore, the protection systems that ESRG describes are not "layered"; in fact, they are not even "overlapped" because they are functionally distinct. Each individual protection system must continuously operate independently and perfectly at all times: If the thermal management system fails because of a manufacturing defect, the BESS ignites regardless of whether all other protection systems are functioning; if a smoke detection system fails, the BESS ignites regardless of whether all other protection systems are functioning. And, given the alarming number of manufacturing defects in these protection systems, it is a certainty that an unacceptable percentage of BESS protection systems are intrinsically susceptible to failure. In short, nothing in ESRG's comments regarding BESS protection "layers" refutes or controverts SORT's concerns regarding the frailty and unreliability of so-called BESS "layers of protection".

Next, ESRG asserts that testing demonstrates there is "minimal risk of unit-to-unit fire propagation even without active fire service response" but that a BESS fire "will trigger a fire service response". These claims must be carefully examined through the lens of the proposed BESS project. First, ESRG's assurance that there is "minimal risk of minimal risk of unit-to-unit fire propagation even without active fire service response" stems directly from the UL 9540A certification process; however, this assurance is only meaningful when ambient wind speeds do not exceed 12 mph. These are not the

circumstances at the proposed BESS project site because windspeeds in Acton frequently exceed 12 mph. Second, ESRG's assurance that a BESS fire will "trigger a fire service response" is only valid when there are sufficient water resources available to support a fire service response (which entails the application of water onto surrounding BESS units for more than 24 hours to prevent them from igniting). Because the water resources provided by the BESS project are not sufficient to sustain a fire response for more than a few hours, ESRG's assurances are meaningless in the context of the proposed BESS project.

Next, ESRG disputes comments in the record that BESS protection "layers" are not redundant, and asserts that such comments reflect a "misunderstanding" of how redundancy is "engineered into safety-critical systems"; ESRG then goes on to explain that each "layer" is "independent" and address "different hazards", that their "diversity" is "intentional", and that this makes the system more "robust". Remarkably, these statements prove that BESS protection "layers" are not redundant because each "layer" operates independently to address different hazards; therefore, each layer constitutes an *independent point of potential failure* which, upon such failure, will result in a BESS fire. If the detection system fails to detect smoke or heat, then the fully functionable suppression system will not be activated and there is no BESS protection. If the release actuators for the fire extinguishing agent in the suppression system do not respond when triggered by the fully functionable detection system, then there is no BESS protection. If the battery management system fails, whole blocks of cells will overcharge and/or overheat and there is no BESS protection. Because BESS safety systems are "independent", they *do not have engineered redundancy* and, contrary to what ESRG asserts, redundancy is not "engineered into" any BESS "safety-critical systems".

Finally, ESRG asserts that the "layers" of BESS protection "ensure that the rare incidents that do occur can be safely managed and contained", thus protecting "both responders and the surrounding community". Presumably, the term "incident" refers to a BESS fire; however, the very existence of such an "incident" constitutes proof that the "layers" of BESS protection *failed* to "ensure" that a thermal runaway was "safely managed and contained". Furthermore, neither responders nor the surrounding community are protected during such "incidents" because of the toxic emissions and the wildfire potential that they pose. This is particularly true for the proposed BESS project which 1) does not provide the water resources needed to sustain a proper fire response and prevent fire propagation to other BESS containers, and 2) is susceptible to BESS fire propagation because it is in a very windy area.

SORT Disputes ESRG Claims Regarding BESS Incident Response and Mitigation.

ESRG devotes several paragraphs to a discussion on BESS fire response and explains that ESRG has trained numerous fire departments, that first responders are all trained to handle a BESS fire, that they have emergency response plans to react to such events, that the "core competencies" of the "modern fire service" cover the skills needed to respond to a BESS fire, and that BESS fire response policies should not be referred to as "let it burn" policies because "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"[33]. These generalized comments offer a reassuring commitment: there is nothing to worry about because fire response is always adequate, comprehensive, and robust. However, this commitment presumes that fire response teams have the water resources needed to "manage" smoke, "protect" adjacent BESS units, and ensure a BESS fire remains "contained to its immediate area"; this is particularly important in windy areas like Acton where frequent high winds devalue the assurance offered by a UL 9540A certification that BESS container fires do not propagate. Unfortunately, the proposed BESS project ***does not*** provide sufficient water resources to deliver on ESRG's commitment (as explained in detail in SORT's CEQA "Scoping Comments" submitted in April, 2026); accordingly, this commitment rings hollow. Furthermore, fire is not the only danger posed by a burning BESS; as explained above, substantial public safety risks are posed by the significant quantities of HF and other toxics that are released when a BESS burns. These dangers are not mitigated by BESS fire response actions even when sufficient water resources are available.

Next, ESRG argues that concerns about fire spread are misplaced because no BESS fire in the United States has ever spread beyond the borders of the BESS facility and because BESS fires do not tend to create fire brands. SORT suspects that the BESS fires that have occurred were either responded to by emergency response personnel who had the water resources needed to control fire spread or they occurred in areas that have little or no wildfire or public harm potential (such as the Sanborn BESS fire that occurred in the middle of the Mojave Desert). These are not the circumstances presented by the proposed BESS project which is not equipped with sufficient water resources and is located in a very high fire hazard area. Moreover, fire is not the only risk posed by a BESS "incident"; toxic emissions are also a substantial concern.

[33] ESRG also criticizes "assertions in the record that a BESS incident would require a specialized hazardous materials team response". SORT made no such assertion and found no such assertion in the record. SORT has described BESS fire incidents where hazard teams have responded (i.e. the SDGE fire).

SORT Disputes ESRG Claims Regarding BESS Fire Toxicity and Public Health.
ESRG trivializes the concerns that SORT and others have raised regarding the dangers posed by toxic emissions released from a burning BESS. For example, ESRG asserts that environmental monitoring of BESS fires has not identified environmental hazards in surrounding communities. And, citing an article that was published just days after the Vistra BESS fire began at Moss Landing on January 16, 2025, ESRG asserts that "EPA air-monitoring did not detect hydrogen fluoride (HF) or particulate matter at levels posing public risk". These claims warrant careful review.

After the Vistra BESS fire began at approximately 3 PM on January 16, local news outlets reported that the County issued an evacuation order at 6:30 PM and that this order was lifted at 6 PM on January 17 (see article provided in Attachment 4[34]). However, the EPA did not initiate 24-hour HF sampling until January 18 and long after evacuation orders were lifted (see Monterey County Website screenshot provided in Attachment 5[35]). And, while a few "spot" sample results are reported for January 17 at locations "Fire North" "Fire East" and "Fire West"[36], it is not known where these locations are, who collected the samples, what the sampling circumstances were, or what QA/QC was involved. These facts demonstrate that *HF was not monitored during the most violent and destructive stages of the Vistra BESS fire*; therefore, no credible conclusions can be drawn regarding the toxic concentrations that resulted from it.

It is not just the Vistra incident where responding agencies "missed the boat" on conducting proper and timely monitoring of toxic BESS fire emissions. For example, the report issued for a the 2024 SDGE BESS fire in the City of Escondido (provided in Attachment 6[37]) indicates that the incident began at 12:09 on September 5, but monitoring did not begin until 2:30. And, among the three monitors that were utilized (EAGLE 2 CGI, RedWave XplorIR, and MultiRAE Pro), none of them were capable of detecting HF at sub-part per million levels[38] (although the MultiRAE Pro can detect

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[34] As of May 18, 2026, this article was accessible here: https://www.montereycountynow.com/news/cover/the-vistra-fire-in-moss-landing-caught-everyone-by-surprise-what-can-we-learn-from/article_7c3112af-73d0-4ca5-a599-05e77d09963b.html

[35] The website was accessed May 20, 2026 [https://www.readymontereycounty.org/emergency/2025-moss-landing-vistra-power-plant-fire/us-environmental-protection-agency-epa-the-monterey-bay-air-resources-district-mbard-and-vistra-air-quality-monitoring-updates].

[36] These are "SPM Flex data" https://www.countyofmonterey.gov/home/showdocument?id=137861

[37] https://www.escondido.gov/DocumentCenter/View/6716/SDGE-Battery-Fire-Air-Quality-Report-PDF

[38] The EAGLE 2 CGI monitors CO, H_2S, O_2, and LEL. Honeywell reports the MultiRAE Pro cannot be used for HF (https://sps-support.honeywell.com/s/article/HCl-sensor-Which-RAE-monitors-take-the-HCl-sensor) . Because the RedWave XplorIR utilizes Fourier Transform Infrared Analysis, it is inappropriate for HF monitoring (as explained in SORT Scoping comments); also, the detection limit is 10 ppm or more (https://academy.webvent.tv/uploads/assets/1240/document/20250424CriticalGapsinGasDetectionMonitoringFINAL.pdf).

hydrogen cyanide or HCN). This means that the monitoring procedures that were implemented were incapable of detecting HF at concentrations below the AEGL of 818 μg/m3. Perhaps in recognition of these limitations, the report indicates that the HazMat team used "Fluoride Paper" to measure HF levels (see page 5). However, "Fluoride Paper" is not capable of detecting HF at part per million levels; in fact, manufacturer specifications indicate that "Fluoride Paper" cannot detect HF until it reaches a concentration of 20 mg/L[39] (or 20,000,000 μg/m3) which exceeds the AEGL by orders of magnitude. The SDGE BESS fire report does state that HCN was measured more than 260 feet from the burning BESS at a concentration of 2 ppm (or 2,211 μg/m3); however, this measurement is not shown in any of the graphs that are included in the report, so its veracity could not be assessed. Nonetheless, 2 ppm of HCN substantially exceeds the 340 μg/m3 Acute REL value established for HCN. All of these facts controvert ESRG's claim that air monitoring results indicate that BESS fires do not pose a public safety risk.

Next, ESRG argues that the "context" of the Moss Landing BESS facilities is important and that the large scale of Moss Landing was "globally unique" because it provided 1200 MWh of battery capacity and was therefore much larger than typical BESS which "range from 2-3 MWh, with the largest just exceeding 5 MWh". Apparently, ESRG is unaware that the proposed BESS is a 9,200 MWh facility; this means that it is nearly 8 times *larger* than the Moss Landing BESS development and thus far more "globally unique" than the Vistra BESS.

Next, ESRG argues that it has tested lithium batteries for 8 years, and "has not experienced a single health-exposure issue on our site during testing". SORT is surprised that ESRG would raise such an argument, given that their battery burn test facility in Piqua Ohio was found to be operating outside the scope of their operating permit issued by the Ohio EPA. According to the City of Piqua, the permit authorized "limited, small-scale testing of lithium-ion batteries in a controlled environment" for "beneficial fire safety training"[40]. Because ESRG did not confine operations to the limits imposed by the permit, Ohio EPA issued an NOV[41] and performed HF dispersion modeling using "U.S. EPA's preferred model" to "assess potential ground-level impacts for the three largest burns conducted on the site". The brief summary report issued by the Ohio EPA is provided in Attachment 7[42], and the isoconcentration plots reported

[39] https://ctlscientificsupply.com/flyers/hazmat.pdf
[40] https://www.piquaoh.org/m/newsflash/Home/Detail/272?arc=407
[41] https://edocpub.epa.ohio.gov/publicportal/ViewDocument.aspx?docid=2559199
[42] https://piquaoh.org/DocumentCenter/View/1723/Air-Quality-Impact-Evaluation-PDF

therein indicate that ground-level HF concentrations exceeded 422 μg/m^3 at distances greater than 650 feet, and exceeded 1,362 μg/m^3 at distances greater than 250 feet. The isoconcentration plots in the Ohio EPA report do not provide a scale; however, distances were ascertained using the Google Earth platform to plot the limits of isoconcentration boundaries and measure their distances from the estimated burn location. A figure showing these measurements is included in Attachment 7. The aerial images in the Ohio EPA report suggest that no homes were within 422 feet of the burn location, and presumably, unprotected individuals who were on the ESRG premises at the time were not affected because they remained upwind of the burn source. Importantly, the Ohio EPA's dispersion modeling results clearly show that HF concentrations exceeded AEGL levels well beyond 175 feet; this is relevant because Acton residential properties are within 175 feet of the proposed BESS yard. And, because the batteries burned by ESRG were smaller than a full-scale BESS container, they emitted far less HF than what will be released by the deflagration of one of the PowerTitan 2.0 BESS containers proposed for the BESS project. Accordingly, the residential properties located within 175 feet of the BESS yard will likely experience HF concentrations much greater than the 1,362 μg/m^3 predicted by Ohio EPA.

Next, ESRG cites a study published in 2008 to claim that data show gaseous emissions from BESS fires "are comparable to those released in ordinary structure or commodity fires"; however, the study cited by ESRG makes no such representations. In fact, the study does not even mention batteries. Accordingly, ESRG's claims are meritless.

Next, ESRG claims BESS fires are similar to residential and commercial structure fires because "a large portion of the combustible mass inside a BESS enclosure consists of plastics and other common building materials" and that these are "the same materials that dominate smoke toxicity in residential and commercial structure fires". ESRG is incorrect. The SDS provided by the developer for the PowerTitan 2.0 BESS container states that plastic (specifically, PVDF - a thermoplastic fluoropolymer) comprises only 0.8% of the total weight; therefore, ESRG is mistaken in claiming that a "large portion" of a BESS unit consists of "plastics and other common building materials". The materials which do comprise a "large portion" (more than 30%) of the PowerTitan 2.0 BESS are the electrolyte and the fluorinated salt dissolved in the electrolyte. Neither of these constituents are typically found in "common building materials" or present in "residential and commercial structure fires". Nothing that ESRG claims regarding similarities between BESS fires and "residential and commercial structure fires" is accurate or honest.

Next, ESRG argues "all fires emit toxic smoke, and standard practices such as avoiding downwind plumes apply universally, not uniquely to BESS". This stunningly dismissive remark suggests that exposure occurs simply because individuals fail to implement "standard practices" such as "avoiding downwind plumes". Are we then to conclude that exposed individuals have only themselves to blame because they did not implement "standard practices" and avoid "downwind plumes"? This statement also reveals a lack of understanding regarding the circumstances surrounding the proposed BESS project. For example, when a BESS ignites, the Acton residents who are adjacent to the BESS yard will not know about the BESS fire until long after it initiates; therefore, they will not know that they are supposed to initiate "standard practices" and avoid "downwind plumes". Furthermore, the area surrounding the proposed BESS yard consists of agricultural properties which have horses and other animals that cannot be quickly evacuated in the timeframe needed to implement "standard practices" and avoid "downwind plumes". Furthermore, winds can shift direction very quickly, and under such circumstances, it can be difficult to ascertain precisely where "downwind" is. This was clearly demonstrated by the Tesla vehicle fire in Sacramento which severely injured first responders when the winds shifted and carried a toxic white mist more than 200 feet to their location. Furthermore, there is always a significant delay between the time a BESS ignites and the time that evacuation directives are issued[43]; after all, evacuation orders were not issued for the Vistra BESS fire until hours after the fire ignited. During such time delays, exposure is likely. Should Acton residents have to remain ever mindful of prevailing wind patterns to ensure that they are able to initiate "standard practices" and avoid the "downwind plume" of a BESS fire? ESRG's dismissive remarks must be given no weight.

Next, ESRG cites a 2023 study performed at the University of Texas, Austin[44] to assert that a safe standoff distance for a BESS fire is "approximately 50 meters" and a safe distance for an electric vehicle (EV) fire is 6 meters. Unfortunately, copyright protections preclude SORT from attaching a copy of the study to these comments; however, it can be purchased[45]. SORT has reviewed this study and notes Figure 13 reports that the HF "safety distance" in 20 mph winds is between 50 and 60 meters (164 - 197 feet). However, the study defines "safety distance" to mean the distance at which

[43] The time delay occurs because first responders must first travel to the site, assess the situation, and establish evacuation parameters before they can issue evacuation orders.
[44] J. I. Franqueville, E. J. Archibald and O. A. Ezekoye, "Data-driven modeling of downwind toxic gas dispersion in lithium-ion battery failures using computational fluid dynamics," Journal of Loss Prevention in the Process Industries, vol. 86, no. 105201, 2023.
[45] The cost is $35.95 [https://www.sciencedirect.com/science/article/abs/pii/S0950423023002310].

toxic gas concentrations "fell below their respective IDLH values" (page 6). IDLH is the acronym for "Immediately Dangerous to Life and Health", and the IDLH for HF is 30 ppm[46]; this is 30 times greater than the 1 ppm AEGL for HF, and it is more than 100 times greater than the HF Acute REL reported in the developer's AERMOD analysis[47]. In other words, the study cited by ESRG affirms ***everything*** that SORT has expressed regarding the danger posed by HF emissions from BESS fires because it concludes that, at more than 50 meters (or 164 feet) from a burning BESS, HF concentrations can be immediately dangerous to life and health and exceed AEGL values and Acute REL values *by orders of magnitude*.

SORT also notes that ESRG grossly misrepresents the study in claiming that "safe distances for EVs and ICE vehicles are similar". Contrary to what ESRG asserts, the study actually shows that HF emissions from a burning EV are 80 times higher than HF emissions from a burning IC vehicle (Table 5). It also shows that HF concentrations exceed 30 ppm (24,560 μg/m3) at 4 meters from a burning EV and 10 ppm (8,186 μg/m3) at 8 meters from a burning EV; in contrast, HF emissions from a burning IC vehicle never even exceed 5 ppm at one meter away (figure 19). Perhaps this explains how firefighters located more than 200 feet from a burning EV in Sacramento experienced substantial health effects (as explained above).

Next, ESRG criticizes initial HF estimates reported by SORT using EPA's "Areal Locations of Hazardous Atmospheres" (ALOHA) modeling platform which assesses toxic threat zones for large airborne toxic releases. Notably, these initial estimates were included in our very first comments submitted to the Docket to address the alarming paucity of air toxic modeling in the developer's application. As we stated on page 46, the toxic emissions that are released during a BESS fire "exceed IDLH standards"; this statement is affirmed by the University of Texas Study cited by ESRG which reports that IDLH concentrations can occur more than 50 meters (164 feet) from a BESS fire. Moreover, since SORT submitted these initial estimates in August, the developer has provided more refined air toxic dispersion modeling results which demonstrate that HF emissions during a BESS fire will substantially exceed established Acute REL thresholds in the residential neighborhood surrounding the proposed BESS yard (as discussed above). Therefore, the ALOHA results are no longer germane.

[46] https://www.osha.gov/chemicaldata/622

[47] According to page 1 of Attachment A of the developers response to Data Request #5, the HF Acute REL is 0.293 ppm or 240 μg/m3.

Finally, ESRG criticizes evidence provided by SORT which demonstrates that emissions generated by burning lithium batteries are highly toxic. Specifically, ESRG asserts that the evidence was "technically inappropriate" because the micro batteries which caused the toxic releases that killed people in New York were "low-cost, uncertified, unlisted" aftermarket batteries. ESRG fails to grasp that the sole purpose of the evidence was to show that lithium battery fires emit toxic compounds that can kill; this is true whether the batteries are cheap, uncertified, unlisted, and aftermarket or they are expensive, certified, listed, and OEM. Nothing in ESRG's criticism disturbs this unequivocal fact. ESRG then argues that these "incidents" occurred in small enclosed residential spaces where "lethal conditions can develop" and that these conditions are nothing like the conditions presented by outdoor containerized BESS installations. Again, ESRG misunderstands. SORT's comment does not equate a micro battery fire with a BESS container fire; that would be absurd because BESS container fires obviously generate far more toxic emissions than micro battery fires. More importantly, ESRG's premise (that outdoor BESS container fires cannot create "lethal conditions") is directly controverted by the University of Texas study cited by ESRG which demonstrates that "lethal conditions" can occur within 50 meters (164 feet) or more of a burning BESS container. And, given that there are residential properties within 164 feet of the proposed BESS yard, the proposed BESS project does indeed pose a life-endangering threat to Acton residents.

Note: in preparing this rebuttal to ESRG's comments, SORT reviewed Attachment 9 of the Scoping Comments we filed in the Prairie Song Docket on March 4, 2026 and found a typographical error on page 9-6 which states the Vistra BESS fire began on January 14; it should state January 16.

Conclusion.

SORT respectfully requests that the Commission consider the comments provided above, and recognize that the proposed BESS project poses very real and very significant public safety concerns and that it lacks sufficient water resources to ensure that a single BESS container fire does not spread to other BESS containers and further endanger Acton residents.

Respectfully submitted;

/S/Jacqueline Ayer
Jacqueline Ayer, Director
Save Our Rural Town

ATTACHMENT 1.

THE "GREEN SHEET" FROM THE TESLA DEFLAGRATION EVENT ON APRIL 11, 2025 THAT SERIOUSLY INJURED FIVE FIREFIGHTERS.

Sacramento Fire Department Preliminary Summary Report of Serious or Near Serious Injuries

GREEN SHEET

Electric Vehicle MVA and ensuing fire—causing respiratory injuries to responding firefighters.

April 11, 2025

Tesla Fire

6520 Riverside Bl, Sacramento

(CA-SCR-25-029878)

A Board of Review has not approved this Summary Report. It is intended as a safety and training tool, an aid to preventing future occurrences, and to inform interested parties. Because it is published on a short time frame, the information contained herein is subject to revision as further investigation is conducted and additional information is developed.

Incident Overview:

- April 11th, 2025 @ 22:04. MVA with electric vehicle (EV) lithium-ion battery (LIB) Fire Involvement.
    - Initial dispatch for MVA with major injury.
    - Upon arrival, crews discovered a single Tesla Model S had struck a tree.
- **Weather:**
    - Clear skies, temperature approx. 63°F, light winds from the south/southwest at 4-13 mph.
        - As of this writing, exact weather data for the closest weather station is no longer available.
- The vehicle's battery pack was compromised and had over 400 scattered battery cells across the roadway. A typical Tesla Model S LIB pack contains ~7,500 cells.
- E11 initiated patient care and identified battery cell ignition risk.
- The patient was transported to the ER in a Medic unit.
- E11 upgraded the incident to Level II Hazmat.
- Hazmat 30, Hazmat 7 and Special Ops (2293) were called to the scene.
- The main EV LIB pack reignited when the vehicle was moved for tow operations.
- Five firefighters exposed to smoke plume during tow operations were injured.
    - As of this writing, four firefighters are still unable to return to work from the injuries they sustained.

FACTORS TO CONSIDER

- **Victim Profile:**
  - Initially, a solo vehicle occupant was trapped.
    - The victim was successfully treated and transported.
  - Afterwards, the only threats were from potential EV LIB vapors.
- **Hazmat Considerations:**
  - Lithium-ion battery (LIB) battery pack of a Tesla EV compromised and intermittently in thermal runaway with thick white persistent vapor being produced.
  - Intermittent spontaneous ignition of individual ejected battery cells, white vapor being produced from individual cells.
- **Incident Priority:**
  - Life Priority initially.
  - After the occupant was successfully extricated and transported, the incident priority was environmental protection.
- **Incident Mode:**
  - Offensive initially.
  - Defensive later, after victim removal and transport to the ER.

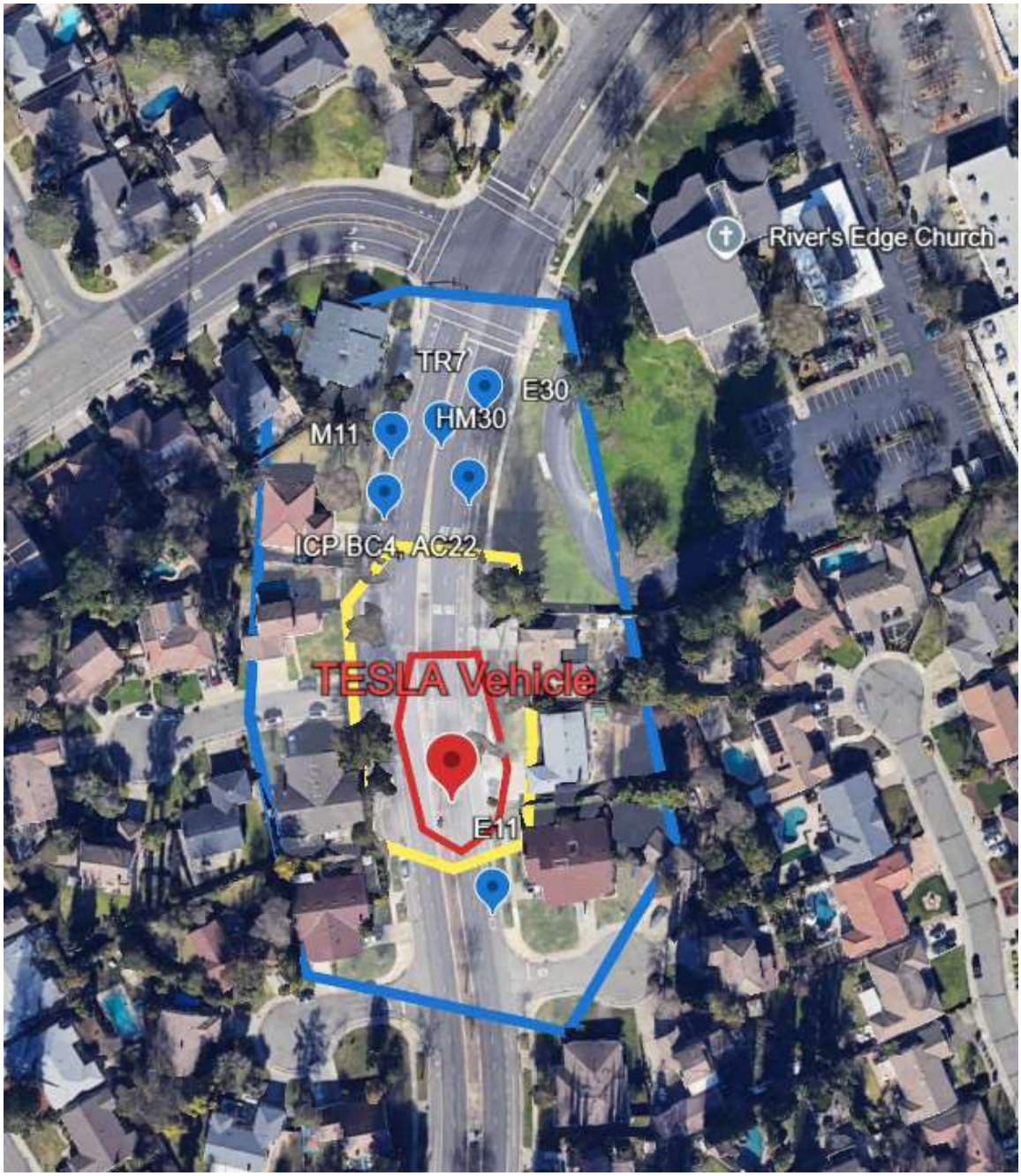
Sequence of Events:

SIN (Safety, Isolate, Notify)

- Crews found one occupant from a heavily damaged Tesla.
  - The patient was removed from the vehicle prior to the arrival of E11.
- After extrication and transport, crews recognized signs of battery compromise, including scattered lithium-ion cells intermittently and spontaneously entering thermal runaway.
- A Level II Hazmat response was initiated.

CIA (Command, Identification, Hazard Assessment)

  - Hazmat crews arrived later and positioned at the previously established command post location.
  - Lacking noticeable winds and unaware of wind direction, command and hazmat units positioned themselves approximately 200' to the north of the incident.
- Technical Reference position was established to look up best practices for the hazards presented by EV LIB.
- Hazmat Group Supervisor, Hazmat Assistant Safety Officer (ASO), Entry Team, and Back-Up Team were established.



PCP (PPE, Containment and Control, Protective Actions)

- E11 was left in place with a protection line.
    - E11 personnel were operating about 100’ upwind of the EV.
    - E11 personnel were not adversely affected by the LIB vapors, likely due to personnel remaining out of the vapor plume.
        - The importance of understanding the wind direction and its effects on operations cannot be overstated.

- Hazmat Entry Team entered the area to safely gather the ejected LIB cells for mitigation, storage, and disposal.
- The first responder cut loop was cut by the Entry Team at the direction of the Incident Commander.
    - Current guidance advises against cutting first responder cut loops in this situation.
        - However, with the level of destruction of this Tesla, we cannot say whether this action had any effect on the subsequent events.
        - It is unknown whether the battery management system (BMS) was functioning at all.
- Later, as the tow truck operator began to move the vehicle, a thermal runaway event occurred within the main EV LIB pack.
    - This event produced a large volume of white gas.
    - E11 was positioned nearby, and water was promptly applied to the battery pack.
        - A significant vapor plume was produced by the event.
            - The gases produced may resemble steam or smoke, but they contain highly toxic chemicals and metals. Unlike typical smoke, these vapor clouds may behave unpredictably, lingering low to the ground and dissipating slowly, depending on humidity, temperature, and wind conditions.
        - The vapor plume soon exposed support zone personnel approximately 200 feet away in what was now clearly the downwind direction.
- Crews attempted to disconnect their hoses and evacuate the area but were overcome by the vapor plume prior to being able to clear the area.
    - We know now that aggressive utilization of fog streams can be effective in these situations to protect crews and populations from the effects of these toxic vapor plumes.
    - When the crews were overcome by the vapor plume, they immediately began complaining about the noxious smell and taste of the vapors.
    - Crews then fled the area in their apparatus.
        - The vapor plume continued with the wind as the crew escaped its path.
        - The vapor plume then dissipated.

DDD – (Decontamination, Disposal and Documentation)

- Crews returned to the area and later escorted the vehicle and ejected cells to the planned disposal sites.
    - Approved disposal practices and sites are still being worked out at the time of this writing.
- While escorting the tow truck to the tow yard, three out of the four firefighters in the engine complained of feeling ill.
    - One of the four firefighters began vomiting out of their window.
    - The company called a medic and had the firefighter that was vomiting transported in an ambulance.
    - The engine company followed the ambulance to the hospital.
    - Another engine was dispatched to replace the initial engine.
        - The replacement engine finished escorting the damaged Tesla and the ejected cells to the planned disposal sites.
    - At the hospital, the two additional personnel that were symptomatic agreed to seek treatment for their injuries.
    - By the end of the night, two additional firefighters that were overcome by the vapor plume felt ill and sought treatment.

Overview of injuries

- *Ongoing testing indicates that toxic vapor plume composition can vary significantly throughout the plume.*
- *Symptoms and injuries from exposure can vary significantly because of the varied composition of chemicals found in the different areas of these toxic vapor plumes.*
    - Firefighter #1 was nauseous and vomiting. Transported to the ER in a Medic.
        - Within a week they felt recovered and returned to work.
    - Firefighter #2 felt nauseated and had flu-like symptoms for several days.
        - Flu-like symptoms persisted, but they felt well enough to return to work after a couple of weeks. They were able to work for 3 weeks.
        - Placed back off-duty with a constant decrease in exercise tolerance. 20% decrease in lung function. They have remained off work since then.
    - Firefighter #3 has significant respiratory and renal symptoms, as well as low exercise tolerance, persistent hypertension, tachycardia, and fatigue.
        - Two months later, they are still unable to work.
    - Firefighter #4 has severe persistent fatigue, low exercise tolerance and persistent respiratory symptoms.

        - Two months later, they are still unable to return to work.
    - Firefighter #5 has severe persistent respiratory symptoms with a 20% decrease in lung function, symptoms of fatigue, significant cardiac symptoms, and symptoms of renal compromise.
        - Two months later, they are still unable to work.

LESSONS REINFORCED BY THIS INCIDENT

Things that went well:

- Prompt extrication and treatment of the patient.
- Rapid identification of EV LIB risk and escalation to Level II Hazmat.

Other Recommendations not mentioned above:

- Establish Hot, Warm, and Cold zones early. The following distances are initial recommendations and are subject to change based on plume modeling by Hazmat teams.
    - Hot/Exclusion Zone- All personnel within 75 feet of a compromised EV must be on air.
    - Warm/Contamination Reduction Zone – Apparatus should be placed outside 150 feet, upwind if possible.
        - If not feasible, assess risk vs. gain and apply controls to limit exposure.
    - Cold/Support Zone- Upwind, 330’.
- Post-incident PPE procedures: If you operated in the vapors—gross decon **before** going off air and doffing PPE.
- Tow truck operators should be briefed, and their work should be coordinated with Command or Hazmat Group Supervisor due to risk of exposure and reignition.
    - A charged and staffed hose line needs to be in place during this process.
- Utilize fog streams as needed, when possible, to protect populations and personnel.
- Monitor for signs of thermal runaway at least 45 minutes post-extinguishment before attempting to relocate vehicle.
    - The return of thermal activity and vapor production resets this clock.
- Coordinate the containment and disposal of the vehicle, battery cells and runoff in consultation with Hazmat best practices.

Best recommended EV LIB practices at the time of this writing:

Purpose and Scope

This guideline provides strategies and tactics for suppression personnel to utilize during electric vehicle (EV) fires involving lithium-ion battery (LIB)-electric or hybrid vehicle battery packs.

Key Considerations

Hazards of lithium-ion / EV LIB Fires

- The incident priorities remain the same: Minimize risks to life, stabilize the incident, protect property, and protect the environment.
- A Level II Hazmat should be declared early, and appropriate actions may be taken prior to Hazmat team arrival to control hazards and improve overall scene safety.
- LIB thermal runaway can release highly toxic substances, including hydrogen fluoride (HF) and metal nanoparticles, both of which present severe acute and long-term health risks:
    - LIB thermal runaway vapors may look like steam but are often highly toxic aerosols.
- Full PPE and SCBA (on air) are required for all operations within the **75-foot exclusion (hot) zone** of confirmed LIB fires.
- Attempt to respond from an upwind direction. Attempt to place all apparatus, initiate operations, and establish the command post upwind of the incident.
    - Apparatus should be positioned outside of the **150 ft isolation (warm) zone**.
        - If not feasible, assess risk vs. gain and apply controls to limit exposure.
- A **330' support and evacuation (cold) zone** should be established.
    - If there is no threat to life or need for evacuation within 330 feet in any direction, it may be appropriate to allow the vehicle to burn to completion.
    - Evacuations, along with fire suppression tactics will allow us to mitigate the toxic plume's impact on populations.
- EV or hybrid LIB fires within structures or parking garages present unique challenges. Aggressive water applications and ventilation need to be utilized to protect life and property.

Tools and Equipment Covered

- Fire attack hose lines
    - Firefighters should deploy a minimum of two 150+ GPM hose streams to suppress thermal runaway and protect exposures.
    - Approach from offset positions upwind, alternate between fog and straight streams, and push the fire and vapors away from suppression personnel as you approach.

        - Consider utilization of positive pressure ventilation (PPV) fans.
    - The Captain should request additional resources as indicated and use available monitoring tools (e.g., 4-gas meters, TICs) to assess ongoing risk.
        - The Captain should prioritize stretching an additional line with a fog nozzle to have available for toxic plume mitigation and personnel protection.
    - The Engineer should establish a water supply and ready a booster line for gross decon.

<u>Recommended Procedural Guidelines</u> SIN –
(Safety, Isolate, Notify)

- Confirm vehicle is an EV or hybrid.
    - Evaluate fire behavior and potential for battery pack involvement and thermal runaway.
- If the high-voltage battery pack is not involved, proceed with standard vehicle fire tactics.
    - Up to 60% of fires in EVs do not involve thermal runaway of the LIB pack.
        - On these fires, standard vehicle fire tactics can prevent EV LIB packs from entering thermal runaway.
- If the LIB is involved in thermal runaway, declare a Level II Hazmat.
    - Request other additional resources as needed.
- Establish clear hazard zones as described above.
    - Adjust based upon HMRT recommendations.

CIA - (Command, Identification and Hazard Assessment)

- Assume Command.
- Identify exposures and threatened populations.
- Formulate an incident action plan.

PCP – (PPE, Containment and Control, Protective Actions)

- Full PPE, with SCBA (on air), is required for **any operations within 75 feet.**
    - Avoid approaching directly in front of or behind an EV with suspected battery fire — these are common jet-flame ejection paths.
    - Do not attempt to access or open battery compartments.

DDD – (Decontamination, Disposal and Documentation)

- Decontaminate all personnel that were potentially exposed to toxic smoke.
    - Use a booster line to gross decon any personnel who operated in vapors.
        - Gross decon should occur **before** personnel doff PPE and SCBA.
    - Anyone who is handling PPE should use medical gloves. PPE should be double bagged.
        - Bagged PPE should be routed to SSC and then left outside the utility shop.
    - Exposed personnel should follow-up with exposure reporting.

- Utilize the TIC, 4-gas monitor, and observation to confirm the absence of fire, smoke, audible popping/hissing, or increasing temperatures present in the high- voltage battery for at least 45 minutes before releasing to law enforcement, tow companies, etc.
    - Hazmat personnel should brief secondary responders on potential hazards.
    - Disposal plans should be coordinated with the Hazmat Group Supervisor and County Hazmat.
- Runoff water may be contaminated and require Hazmat evaluation.
    - The Hazmat team should evaluate runoff for potential contaminants.
    - Any significant findings or environmental impacts must be addressed, documented, and reported in accordance with standard Hazmat protocols.

First Responder Cut-Loop Guidance

The first responder cut loop is designed to disable high-voltage systems in EVs to reduce risks to first responders during rescue efforts. However, cutting the loop also depowers the battery management system (BMS), which may disable critical safety functions, including active cooling. Timing is crucial. Cutting the loop too early, particularly during early battery distress (e.g., smoke without flame), may accelerate thermal runaway.

Do not cut the loop if:

- The battery pack is smoking or showing signs of early thermal instability.
    - The BMS may still be actively cooling the battery and preventing escalation.
- Cutting the loop in this phase may disable pumps or fans and worsen the situation.

Cut the loop only if:

- The action supports life safety or rescue and can be performed safely.

Summary

- Lithium-ion/EV fires are an evolving threat. This document is intended to remain dynamic. Initiate operations from upwind and attempt to establish zones: **Exclusion / Hot Zone: 75 ft, Isolation / Warm Zone: 150 ft, Support / Evacuation / Cold Zone: 330 ft** prior to initiating operations to protect both responders and the public.

ATTACHMENT 2.

RELEVANT PORTIONS OF THE U.S. DEPARTMENT OF TRANSPORTATION'S "LITHIUM BATTERY GUIDE FOR SHIPPERS".

LITHIUM BATTERY GUIDE FOR SHIPPERS

A Compliance Tool for All Modes of Transportation

Revised June 2023

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

WWW.PHMSA.DOT.GOV

INTRODUCTION

This compliance resource was prepared to assist a shipper to safely package lithium cells and batteries for transport by all modes of transportation according to the latest (May 11, 2020; HM-215O) regulatory requirements. This guide provides scenario-based situations that outline the applicable requirements that a shipper must follow to ship packages of lithium cells and batteries in various configurations. Each distinct shipping guide in this document refers to the regulatory requirements for a specific lithium cell/battery type, configuration, and size. In this way, a shipper will easily find the applicable provisions that they must follow depending on the scenario they encounter as a shipper.

Please note that these shipping guides are based on the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) and can be used as a compliance tool to help outline applicable scenario-based regulatory requirements; this document is not a substitute for the HMR. While every effort has been made to provide a simplified compliance resource consistent with the HMR, if there is any instance in which this document is inconsistent with the HMR, then the HMR requirements supersede this guide. The regulations themselves are the final authority for proper shipping procedures.

The HMR includes provisions for the classification, packaging, hazard communication (e.g., package marking, labeling, shipping papers), stowage, and handling of all hazardous materials. The purpose of these regulations is to protect the safety of people, property, and the environment when hazardous materials such as lithium batteries and battery-powered devices are shipped. If the applicable minimum regulatory requirements are not followed, lithium cell or battery shipments may be more likely to contribute to fires, injuries, or other incidents during transport.

Whether shipping a single battery, a palletized load of batteries, or a battery-powered device, the safety of the package, and those who handle it along its journey, depends on compliance with the HMR. Failure to comply with the applicable regulations may result in fines or even criminal prosecution.

For any questions about regulatory requirements, please contact our Hazardous Materials Information Center at **1-800-467-4922/202- 366-4488** or **infocntr@dot.gov**. The information center can answer any regulatory questions and provide additional compliance resources.

WHY LITHIUM BATTERIES ARE REGULATED IN TRANSPORTATION

Lithium cells and batteries power countless items that support everyday life from portable computers, cordless tools, mobile telephones, watches, to wheelchairs and motor vehicles. Our society has come to depend on lithium cells and batteries for an increasingly mobile lifestyle. Today's lithium cells and batteries are more energy dense than ever, bringing a steadily growing number of higher-powered devices to market. With the increased energy density comes greater risk and the need to manage it. Shippers play an important role in reducing this risk and preventing incidents—including fires aboard aircraft or other transport vehicles.

The risks posed by lithium cells and batteries are generally a function of type, size, and chemistry. Lithium cells and batteries can present both chemical (e.g., corrosive or flammable electrolytes) and electrical hazards. Unlike standard alkaline batteries, most lithium batteries manufactured today contain a flammable electrolyte and have an incredibly high energy density. They can overheat and ignite under certain conditions, such as a short circuit or improper design or assembly. Once ignited, lithium cell and battery fires can be difficult to extinguish. Additional, although infrequent, events can result in lithium cells and batteries experiencing thermal runaway, a chain reaction leading to a violent release of stored energy and flammable gas. This thermal runaway can propagate to other batteries or conductive materials nearby, potentially resulting in large scale thermal events with severe consequences.

The Federal Aviation Administration (FAA) Technical Center issued a series of test reports in 2004, 2006, 2010, and 2014 that characterized the hazards posed by lithium cells and batteries transported as cargo on aircraft and the effectiveness of certain aircraft fire suppression agents and packaging configurations in mitigating the associated risks. The FAA Technical Center testing shows that oxygen starvation through depressurization in the case of cargo aircraft, common shipping containers (e.g., unit load devices), or aircraft fire suppression systems are not effective in containing or suppressing many potential lithium cell or battery fires.

CELL VS. BATTERY

CELL: A cell is a single encased electrochemical unit.

BATTERY: A battery is made up of multiple electrically connected component cells such as in a laptop computer battery. A battery can also only be made up of a single cell such as the common AA, C, or a coin cell. A single cell battery is considered a "cell" and must be offered for transportation in accordance with the requirements for cells.

Lithium cells and batteries can become dangerous and cause fires, and electrical shocks if not safely packaged and handled when transported. Misused, mishandled, modified, improperly packaged, improperly stored, overcharged, damaged, or defective lithium cells or batteries can short circuit, overheat, and sometimes cause fire. The heat from a single cell in thermal runaway can propagate from cell to cell and package to package until the entire shipment has been consumed. Temperatures experienced involving lithium cells or batteries in thermal runaway are sufficient to ignite typical fiberboard packaging and nearby materials.

Always remember that ALL lithium cells and batteries are hazardous materials when being transported, no matter the size or quantity. However, there may be certain exceptions from the regulations depending on certain conditions and limitations. Shippers may be relieved of certain regulatory requirements—if cells and batteries meet specific:

- Size limitations
- Packaging requirements
- Hazard communication requirements
- Additional requirements for air transportation

THE HMR, INTERNATIONAL, AND MODAL REQUIREMENTS

This document provides generalized guidance on the requirements for proper packaging and hazard communication of shipments of lithium cells and batteries and lithium battery-powered equipment by all modes of transportation. Shipments to, from, or within the United States are subject to the HMR. For international transport, PHMSA authorizes the use of the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions) and the International Maritime Dangerous Goods Code (IMDG Code) subject to the additional conditions and limitations of the HMR specified in subpart C of part 171 of the HMR (§§ 171.22-26).

VESSEL TRANSPORTATION

Lithium batteries and battery-powered equipment may be transported within the United States by vessel and by motor vehicle or rail either before or after being transported by vessel in accordance with the IMDG Code. We recommend that shippers consult the most recent edition of the IMDG Code, issued by the International Maritime Organization (IMO) for additional requirements. Publications and regulations issued by IMO can be found at: www.imo.org.

AIR TRANSPORTATION

Lithium batteries and battery-powered equipment may be transported within the United States by aircraft and by motor vehicle or rail either before or after being transported by aircraft in accordance with the ICAO TI. We recommend that shippers consult the most recent edition of the ICAO TI for additional requirements, along with any applicable origin/destination State Variations. State Variations are additional conditions and limitations imposed by the country of origin and destination. For example, US State Variations contain the additional HMR requirements that apply when shipping to, from, or within the US by air under the ICAO TI. Publications and regulations issued by ICAO can be found at: www.icao.int.

For both international and domestic shipments, we also recommend checking with the air carrier for any additional requirements. Many air carriers have supplemental policies and/or limitations with respect to lithium battery shipments. These requirements can often be found by consulting directly with the air carrier or International Air Transport Association (IATA) publications. Air carriers, working closely with the FAA, use their Safety Management Systems (SMS) to evaluate their ability to safely carry lithium batteries and determine safety mitigation strategies. FAA resources can be found at: www.faa.gov/hazmat.

In summary, when shipping batteries for air transportation, shippers should always consult their air carrier or ICAO/IATA publications for both country-specific and carrier-specific policies/limitations.

LITHIUM BATTERY TYPES

There are many different chemistries of lithium cells and batteries, but for transportation purposes, all lithium cells and batteries fall into one of two basic types: lithium ion and lithium metal. Both battery types are characterized by a higher energy and a longer operating life than alkaline, nickel cadmium, and nickel metal hydride chemistries.

- Lithium ion (Li-ion), including lithium polymer (Li-Po):
  - are generally rechargeable (secondary) batteries
  - are found in a wide range of electronic devices such as laptop and tablet computers, cellular telephones, hybrid vehicles, etc.



- Lithium metal (LiM)
  - are generally non-rechargeable (primary, one-time use).
  - have a longer life than standard alkaline batteries
  - are commonly used in hearing aids, wristwatches, smoke detectors, cameras, key fobs, children's toys, etc.


LITHIUM CELLS AND BATTERY TESTING REQUIREMENTS

Shippers are responsible for ensuring that lithium cells and batteries offered for transportation have passed the design tests found in the United Nations (UN) Manual of Tests and Criteria, Section 38.3. The UN 38.3 testing accounts for transportation impacts such as:

- Altitude
- Forced discharge
- Overcharge
- Thermal test
- External short circuit
- Impact/crush
- Shock
- Vibration

Effective January 1, 2022, lithium cell and battery manufacturers and subsequent distributors of lithium cells and batteries manufactured after January 1, 2008 must make a lithium battery test summary available to others in the supply chain. The test summary includes a standardized set of elements that provide traceability and accountability to ensure that lithium cell and battery designs offered for transport meet UN 38.3 test requirements. We recommend the shipper check with the battery manufacturer or distributor to determine if a battery design has passed these tests, or obtain, if possible, the test summary. For additional information on test summaries, refer to PHMSA's "Announcing New UN Requirement for Lithium Battery Test Summaries" outreach publication.

Any change or modification to a lithium battery that would lead to a failure of any of the UN 38.3 tests must be considered a new type and subjected to the required tests. See the UN Manual for the types of changes that may be considered sufficiently different from a tested type and that may lead to a failure of a lithium battery test result.

See § 173.185(a) for all testing and test summary requirements. Refer to §§ 173.185(d)(1) and (e), respectively, for exceptions from the testing requirements for lithium cells or batteries shipped for disposal or recycling and for low production runs and prototype lithium cells or batteries

HOW ARE LITHIUM BATTERIES REGULATED?

Lithium cells and batteries are Class 9 (miscellaneous) hazardous materials. There are eight possible descriptions for lithium cells and batteries, depending on the battery chemistry. These descriptions, or proper shipping names, are found in the Hazardous Materials Table (HMT) in § 172.101 of the HMR. They are as follows:

- **Stand-alone**—Package contains only the cells/batteries—no equipment:
  - UN3090, Lithium metal batteries *including lithium alloy batteries*
  - UN3480, Lithium ion batteries *including lithium ion polymer batteries*
- **Packed with**—Package contains not only the equipment, but also cells/batteries that are not installed in the equipment:
  - UN3091, Lithium metal batteries packed with equipment *including lithium alloy batteries*
  - UN3481, Lithium ion batteries packed with equipment *including lithium ion polymer batteries*
- **Contained in**—Package contains equipment with cells/batteries installed:
  - UN3091, Lithium metal batteries contained in equipment *including lithium alloy batteries*
  - UN3481, Lithium ion batteries contained in equipment *including lithium ion polymer batteries*
- **Vehicles**—Package or shipment contains a vehicle powered by lithium batteries:
  - UN3171, Battery-powered vehicle
- **Cargo Transport Unit**—Lithium batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit.
  - UN3536, Lithium batteries installed in cargo transport unit lithium ion batteries or lithium metal batteries

What are considered "Vehicles" or "Equipment" in the HMR?

Vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are electrically-powered cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with an electric motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), lawn tractors, self-propelled farming and construction equipment, boats, aircraft, wheelchairs and other mobility aids.

Equipment means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation.

BATTERY SIZE – SMALLER BATTERY THRESHOLDS

It is important to remember that the size of the cell or battery has important implications for shipping requirements. Size refers not only to physical dimensions and weight, but also the energy capacity of the battery. For lithium ion cells and batteries, size is measured by Watt-hour (Wh) ratings. For lithium metal cells and batteries, size is measured by lithium content in grams (g). The Wh rating is often marked on the outside case of the lithium ion cell or battery.

The size of a lithium cell or battery is an important aspect of classification because "smaller" cells and batteries qualify for certain exceptions from regulatory requirements when packed in certain quantities. For the purposes of DOT regulations, a "smaller" cell or battery is as follows:

- **Lithium Ion:** Cells equal to or less than 20Wh; and Batteries equal to or less than 100Wh
  - For highway and rail ONLY: Cells not exceeding 60Wh; and Batteries not exceeding 300Wh
- **Lithium Metal:** Cells equal to or less than 1g; and Batteries equal to or less than 2g
  - For highway and rail ONLY: Cells not exceeding 5g; and Batteries not exceeding 25g

Note: For a single cell battery, such as a typical coin cell or standard AA or AAA replacement battery, refer to the size for cells.

Cells and batteries that exceed these "smaller" cell or battery size thresholds must be shipped as fully regulated Class 9 hazardous material. The shipping requirements for these fully regulated cells and batteries are more stringent. The shipping guides outlined on page 7 and the flowcharts on pages 8 and 9 make the distinction between size thresholds, when applicable, for shipping purposes.

GUIDE 10 UN3536 Cargo Transport Units

This guide only applies to lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit.

UN ID Number: UN3536

Proper Shipping Name: Lithium batteries installed in cargo transport unit *lithium ion batteries* or *lithium metal batteries*

Hazard Class Label: N/A (see Required Hazard Communication for additional details)

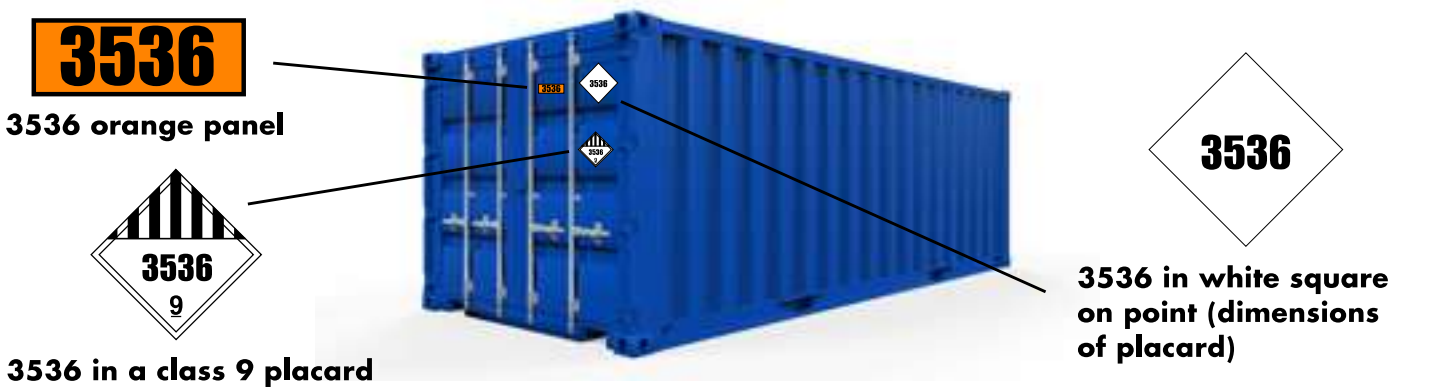
Transport Requirements - § 172.102, Special Provision 389:

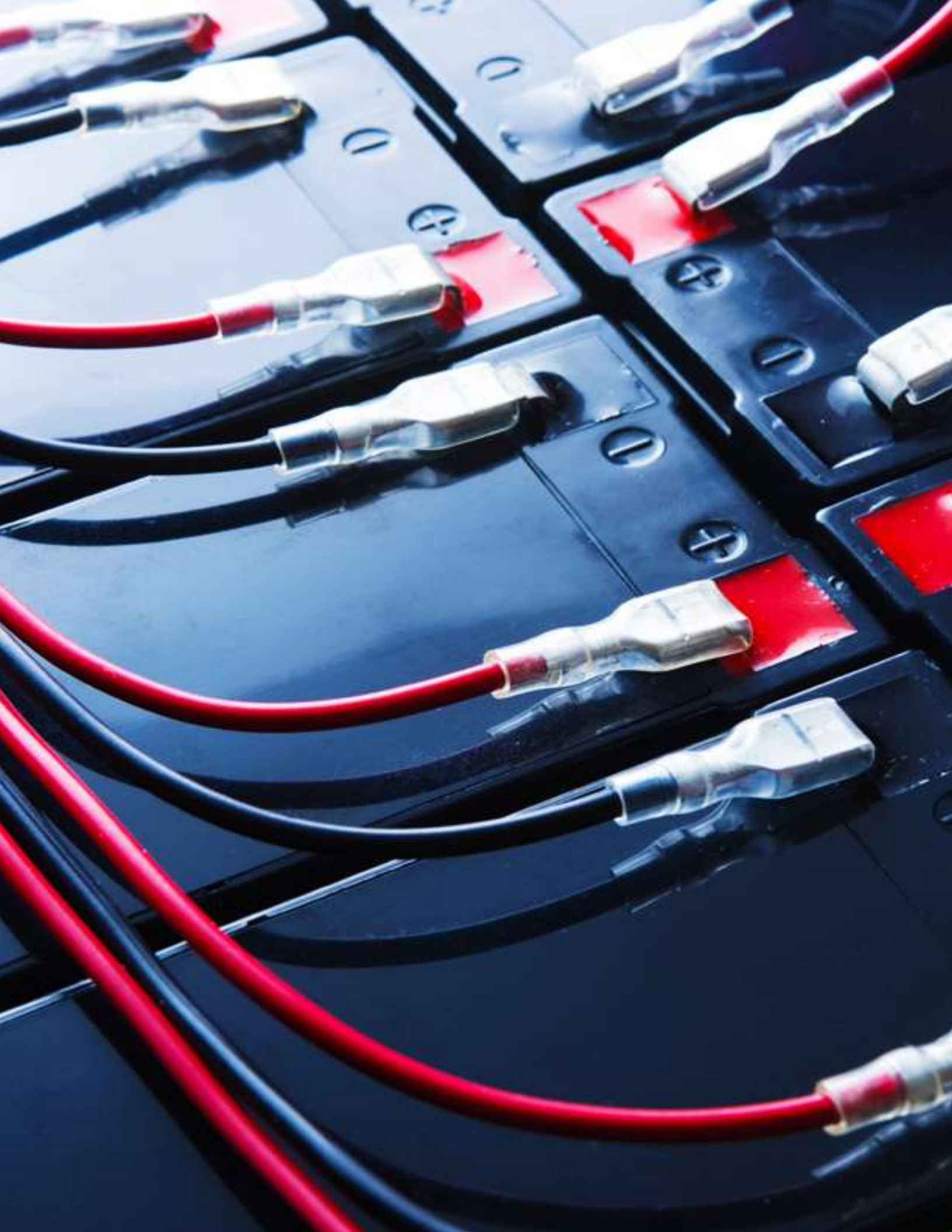
- The lithium batteries must be of a type that have successfully passed the UN38.3 tests and contain the necessary systems to prevent overcharge and over discharge between the batteries.
- The lithium batteries must be securely attached to the interior structure of the cargo transport unit (e.g., by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and significant movement relative to the cargo transport unit under the shocks, loadings, and vibrations normally incident to transport.
- Hazardous materials necessary for the safe and proper operation of the cargo transport unit (e.g., fire extinguishing systems and air conditioning systems), must be properly secured to or installed in the cargo transport unit and are not otherwise subject to the requirements of the HMR.
- Hazardous materials not necessary for the safe and proper operation of the cargo transport unit must not be transported within the cargo transport unit.

Required Hazard Communication - § 172.102, Special Provision 389 (see Guide 10 diagram for additional details):

- The batteries inside the cargo transport unit are not subject any marking or labeling requirements.
- The cargo transport unit must display the UN ID number (3536) on an orange panel, white square on point, or a Class 9 placard. The three options for displaying the UN ID number are displayed in the diagram below.
- The cargo transport unit must be placarded on two opposing sides with the Class 9 placard.
- Transportation by aircraft is forbidden, unless approved by the Associate Administrator.

PACKAGING AND HAZARD COMMUNICATION DIAGRAM





For additional information contact:

PHMSA's Hazardous Materials Info Center

1-800-HMR-4922

(1-800-467-4922)

Email: infocntr@dot.gov

http://hazmat.dot.gov

Pipeline and Hazardous Materials Safety Administration

Outreach, Engagement, and Grants Division

East Building, 2nd Floor

1200 New Jersey Ave., SE

Washington, DC 20590

Email: training@dot.gov

202-366-4900

202-366-7342 (Fax)

U.S. Department of Transportation

Pipeline and Hazardous Materials Safety Administration

PHH50-0186-0921

ATTACHMENT 3.

BESS QUALITY RISKS PUBLISHED BY CEA (NOW INTERTEK) IN 2025.

CEA
Clean Energy Associates
INSIGHTS

BESS Quality Risks

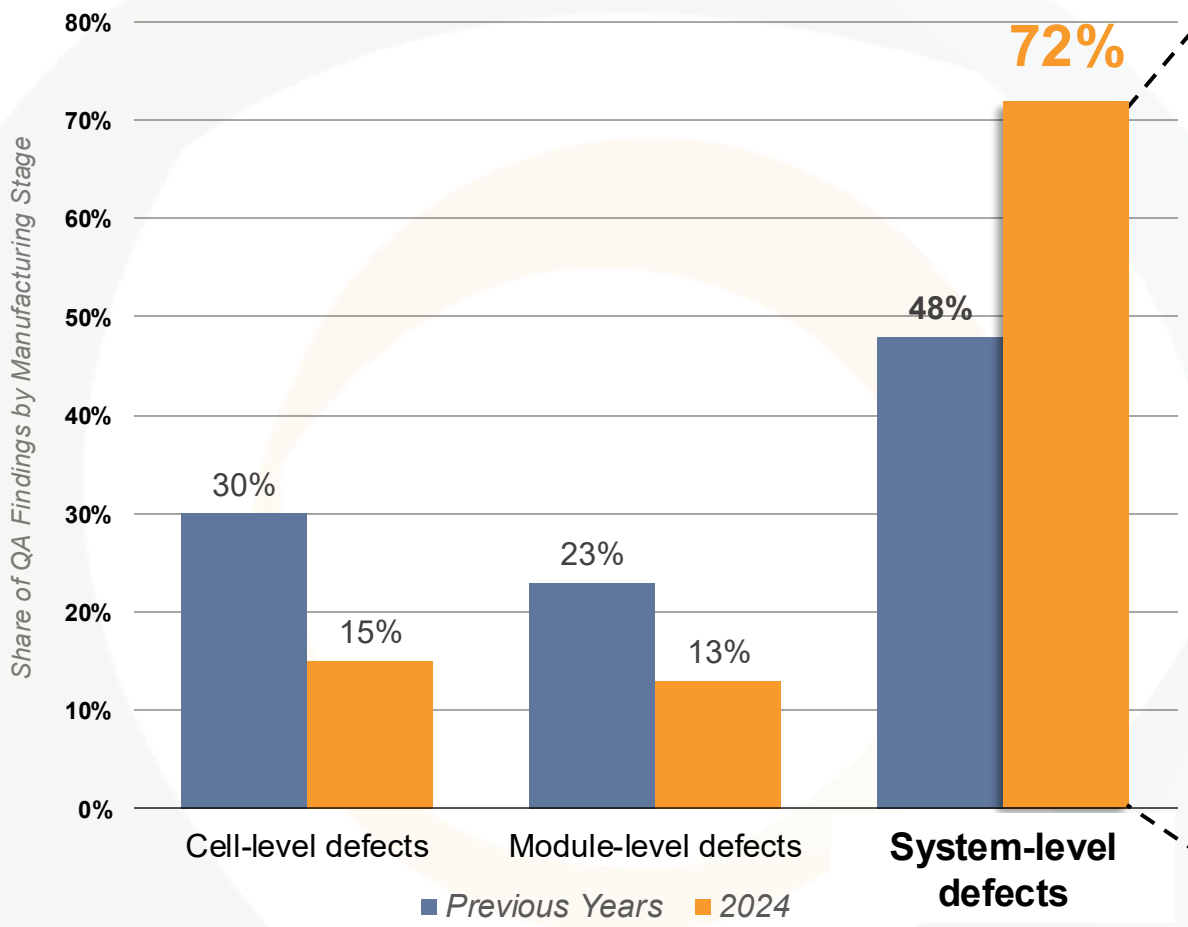
A summary of the most common Battery Energy Storage System manufacturing defects of 2024

May 2025

In 2024 the Vast Majority of Identified Quality Issues Were at the System Level

System-level defects accounted for 72% of all defects identified in 2024, up from 48%.

Many of these defects pose serious risks to BESS safety, reliability, and performance.



Safety-critical failures:

28% of systems had defects in **fire detection and suppression**, which are critical for preventing runaway fires.

19% of systems had faulty **auxiliary circuit panels**, increasing the risk of control system failure.

15% of systems had **thermal management defects,** raising the risk of overheating and accelerated degradation.

Performance failures:

6% of systems failed capacity tests — directly impacting energy delivery and project performance.

This report outlines the causes, consequences, and resolutions for these and other BESS quality risks.

CEA Has Conducted Factory Quality Audits On Over 65 GWh of Lithium-Ion Energy Storage Projects Since 2018

- 680+ inspections in 70+ Battery Energy Storage System (BESS) factories
- 64% of tier 1* BESS cell manufacturers audited worldwide
- 2600+ total manufacturing issues identified

Locations of CEA factory audits

Here are our key findings from our 2024 inspections...

*Tier 1: definition is based on BMI (Benchmark Mineral Intelligence)

Our Audit Process: CEA Assigns a Severity to Each Finding Depending On the Risk Level of the Issue

A **finding** is an issue identified during inspection that indicates deviation from standard best practices, processes or product specifications.

Finding Severity	Definition
Critical	Findings that may result in severe safety risks and hazardous conditions. Critical findings are likely to cause damage to other products or property, trigger non-compliance regulatory issues, and generally constitute a breach of mandatory regulations.
Major	Findings that may reduce the battery's functionality or impact safety in either short or long term.
Minor	Findings which do not pose a clear risk of production failure, but rather fall outside the quality requirements.

What Happens When We Find a Critical or Major Issue

CEA's Defect Resolution Protocol

1. Notification:

We alert the buyer and describe the issue and risks

2. Escalation:

In conjunction with the buyer, we bring the issue to the manufacturer and require that the issue is fixed prior to shipping

3. Corrective Action:

The manufacturer either fixes the problem or makes a new item entirely

4. Verification & Re-inspection:

We re-inspect and confirm that the problem has been addressed.

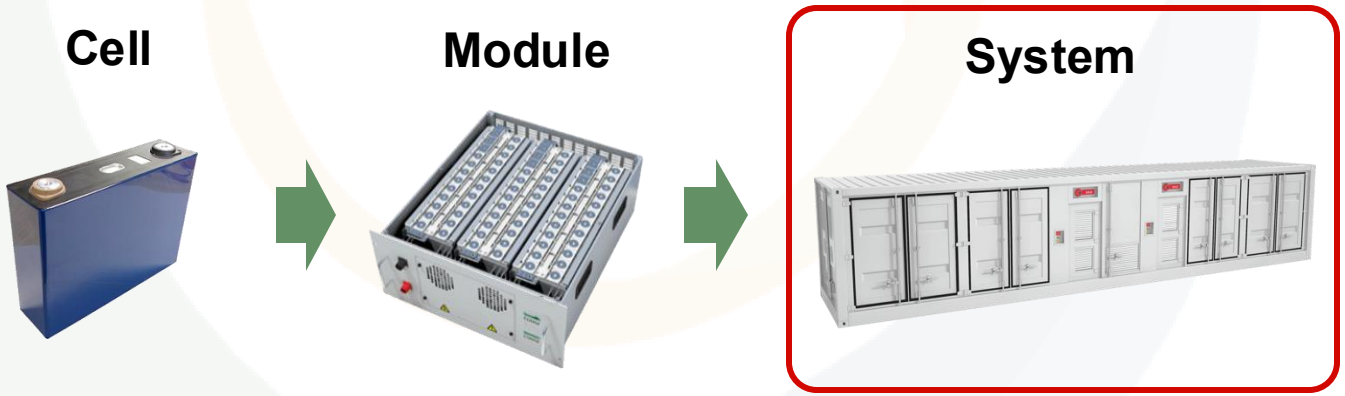
Outcome: None of the systems we inspected were shipped with unresolved thermal management or fire detection/suppression defects.

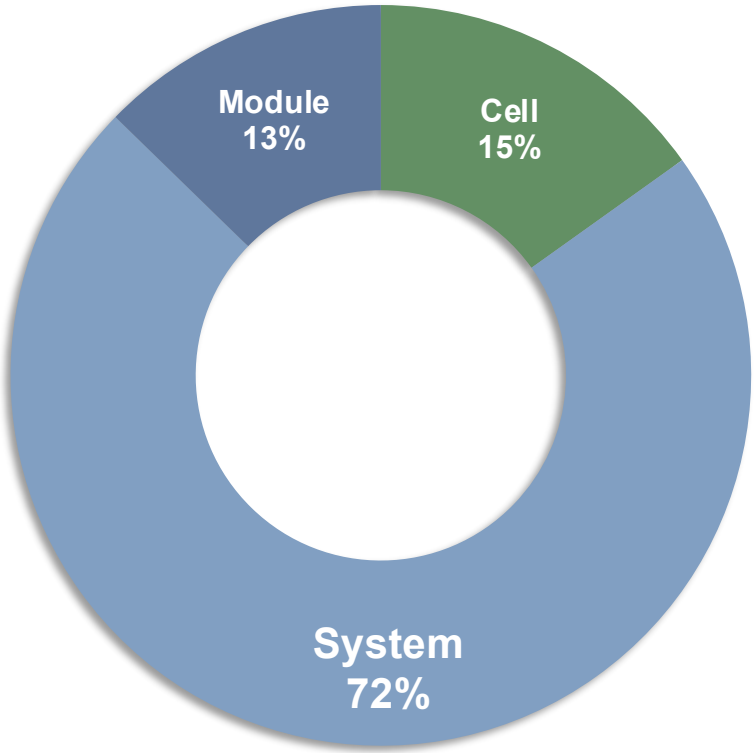
Distribution of Total Findings

As the industry continues to scale, quality problems at the integration stage continue to be challenging to fix. **System-level defects accounted for nearly 72% of our QA findings.**

The large number of system-level issues is mainly caused by the following contributors:

- The BESS integration process is **highly manual** and labor-intensive, with weaker quality control often carried out by outsourced integration companies who have little incentive to ensure long-term performance.
- The rapid product iteration puts **time constraints** on the development of mature production practices.
- Systems are **very complex** and are vulnerable to underlying problems originating from defects in upstream components that were not caught during earlier quality checks.

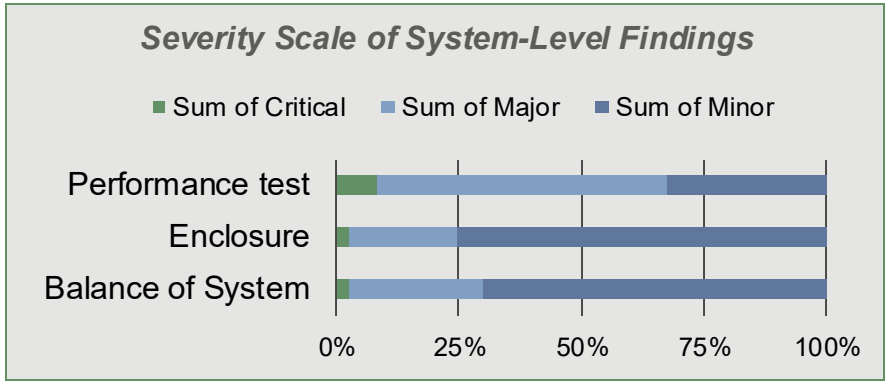




Distribution of all BESS Findings

Breakdown of System-level Findings

The majority of system-level findings occurred in the **Balance of System** and **enclosure**. **Performance test** findings usually indicate larger or more complex problems.



64% of system-level findings are Balance of System related

Why/How Does It Happen

Component defects and improper system integration procedures.

Example

- Liquid coolant leakage due to deformed flange plates, defective valves, loose pipe connections within the coolant circulation system
- Malfunctioning temperature, smoke, gas sensors, audible and visual alarms due to internal mis-wiring
- Live conductor exposed within the AC/DC distribution

30% of system-level findings are enclosure related

Why/How Does It Happen

Defects from enclosure manufacturing process and mishandling during transportation.

Example

- Poor strength and rigidity: lifting provision test, structural deformation, etc.
- Poor wiring and cabling arrangement
- Grounding mechanism defects
- Water ingress issue
- Appearance defects: painting specifications, markings, nameplate, openings, etc.

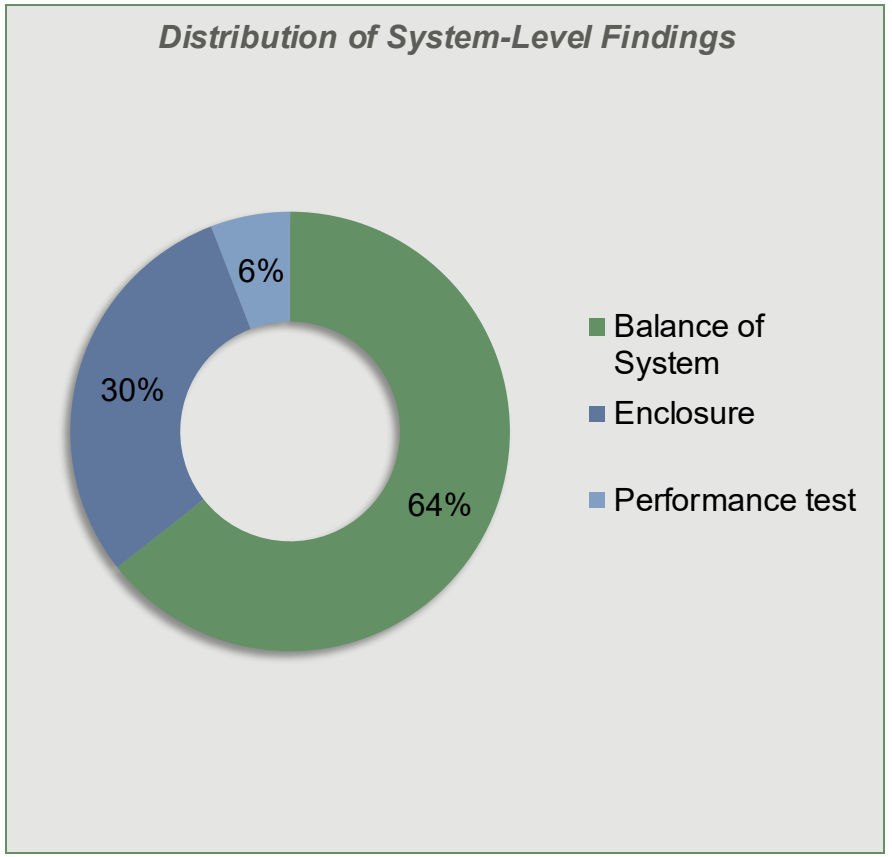
6% of system-level findings are performance test related

Why/How Does It Happen

A wide variety of manufacturing defects and/or improper system integration.

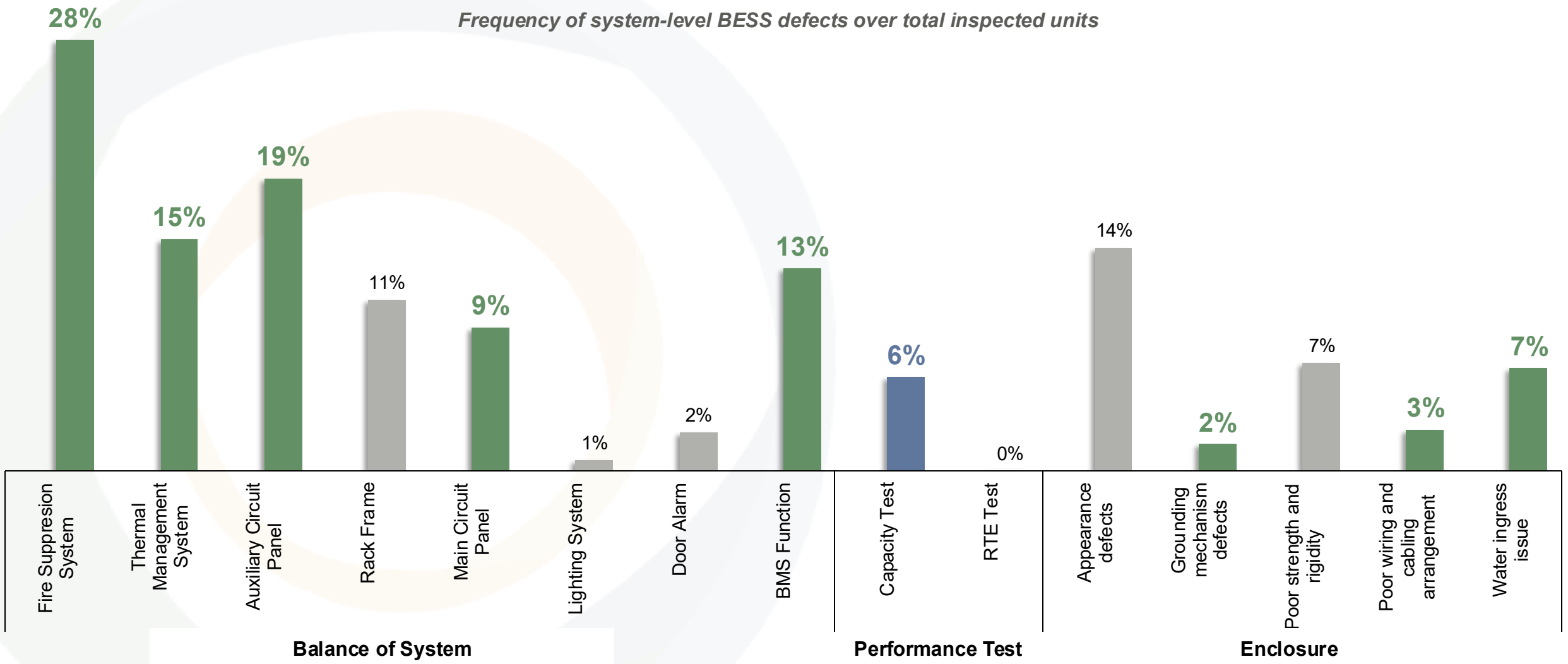
Example

- Underachieving capacity and Round Trip Efficiency results from abnormally large temperature and voltage variations among battery cells within a module, due to high impedance from poorly welded wiring connections
- Charging/discharging failure due to wiring issues in battery rack's high voltage boxes



Most System-Level Defect Types Have a Safety Impact; 6% Failed Performance Tests

Failures in these systems can lead to fires, system shutdowns, or energy shortfalls — all with serious safety and financial consequences.



Case Study – Common Fire Detection and Suppression System Findings

28% of inspected BESS units had fire detection and suppression system defects

Non-responding release actuator for the fire extinguishing agent

Why/How Does It Happen

Faulty diode within the actuator.

Risk

A malfunctioning actuator will not respond to the command of releasing a fire extinguishing agent, potentially allowing the fire to further propagate.

Example

Fire alarm abort button was not functional

Why/How Does It Happen

The fire alarm abort button was not responding to the user commands due to incorrect wiring.

Risk

The abort button allows user to deactivate an improperly triggered fire alarm; failure to deactivate can lead to unwanted fire extinguishing agent or sprinkler system activation which can cause serious damage to equipment.

Example

Non-responding smoke & temperature sensors

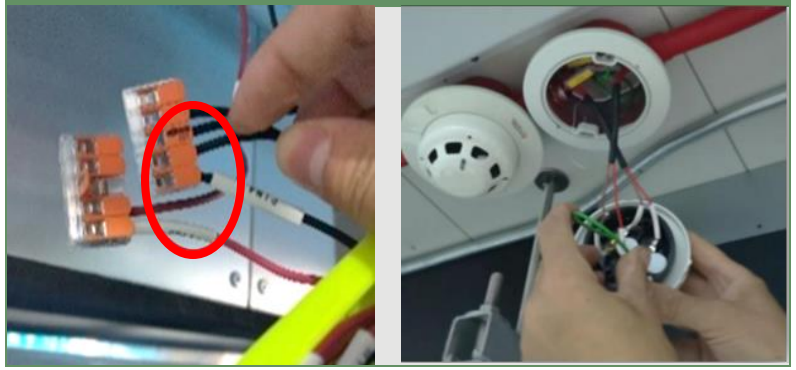
Why/How Does It Happen

The smoke sensor was incorrectly wired, and a temperature sensor was reversely connected to power source.

Risk

An incorrectly wired smoke sensor cannot detect the presence of smoke. A reversely connected temperature sensor can have a false reading. Malfunctioning sensors risks fire and explosion or inadvertent activation of fire suppression system.

Example



Case Study – Common Thermal Management System Findings

15% of inspected BESS units had thermal management system defects

Circulation System Components Failure

Why/How Does It Happen		
1. Flange plates are deformed from overtightening due to a loosely defined screw mounting Standard Operating Procedure (SOP).	2. Loose pipe connection: the fastener was not fastened from operator's mis-installation and not following SOP.	3. Defective incoming material: the valve produced with a loose stem.
Risk		
1. Internal short circuiting and thermal runaway initiation from continuous coolant leakage.	2. Severe short-circuiting events and thermal runaway initiation from potential massive coolant leakage.	3. Faster battery degradation from insufficient coolant flow control and internal short circuiting and thermal runaway initiation from continuous coolant leakage.

Example

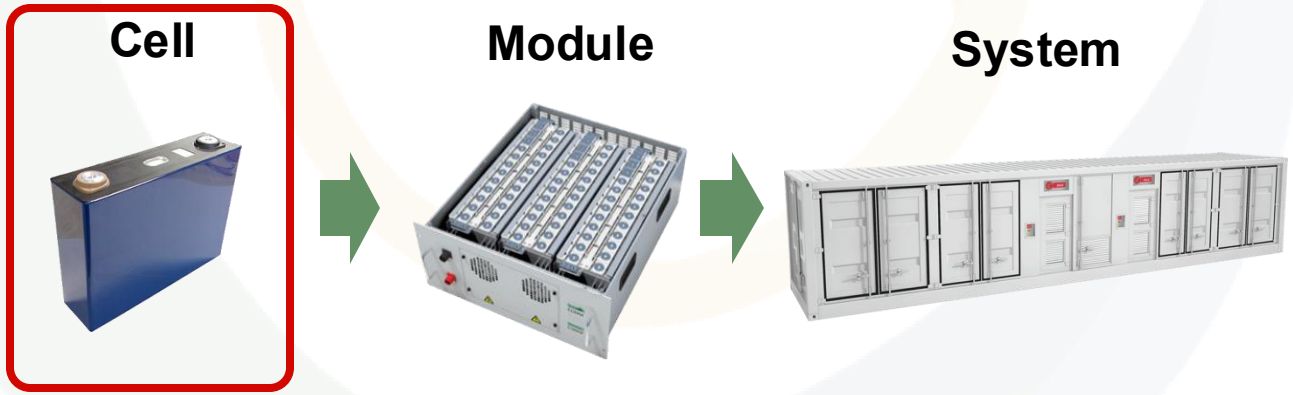
Compressor mainboard short circuiting

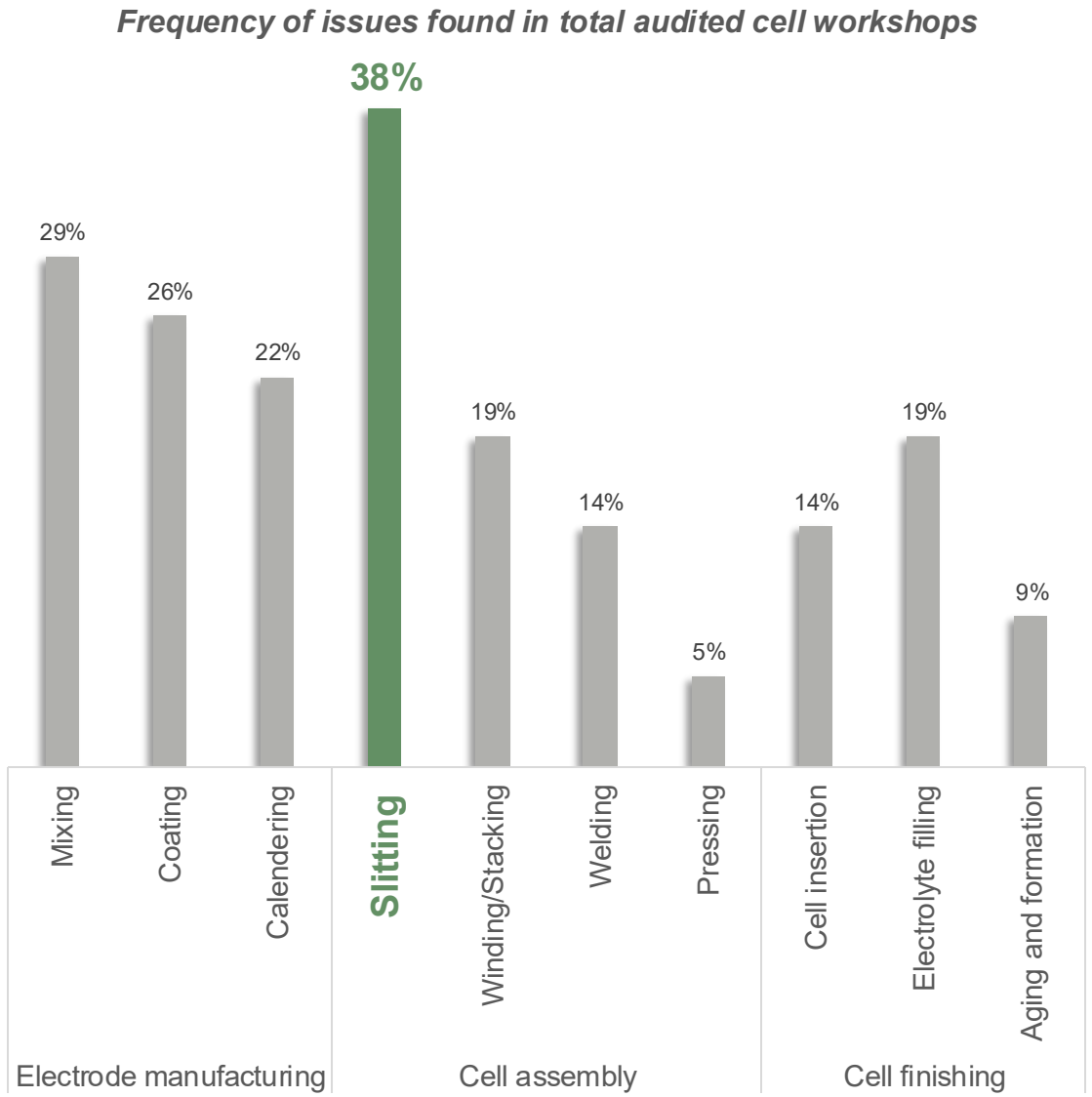
Why/How Does It Happen
Defective mainboard with a burned MOS (Metal Oxide Semiconductor) tube for compressor control.
Risk
1. Faster battery degradation from dysfunctional liquid cooling system. 2. Initiating thermal runaway or explosion with sparking from burned components.

Example

15% of the Total Findings Occurred During Battery Cell Manufacturing

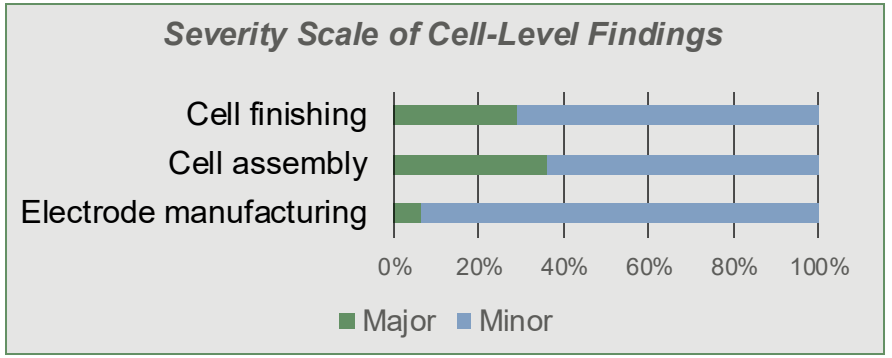
- Although battery cell factories have the highest level of automation, they make up a larger number of findings (compared to battery modules) due to their lengthy production processes and higher precision requirements, leading to more room for error.
- Audit findings on cells typically have a higher severity rating as cells are the building blocks of the energy storage system, and defects can be detrimental to system performance and safety.
- **Slitting** carries a high risk of burrs on electrodes, which can pierce the separator and trigger thermal runaway. Even minor deviations from SOPs or limitations in detection equipment are recorded as findings, contributing to the high frequency.





Breakdown of Battery Cell-Level Findings

The majority of battery cell-level findings occurred during **electrode manufacturing** and **cell assembly** due to poor process control and measurement issues.



40% of cell findings occur during electrode manufacturing

Why/How Does It Happen

Improper measurement system analysis and process control

Example

- Mixing: out-of-calibration viscosity meter, lack of expiration control record over the mixed active material
- Coating: missing key coating quality measurements such as surface density, coating thickness, and moisture content.
- Calendaring: deformed electrode sheets due to roller misalignment

39% of cell findings occur during cell assembly

Why/How Does It Happen

Improper process and quality control execution

Example

- Slitting: lack of burr size control, lack of monitoring on the cutter status and remaining life
- Stacking/winding: lack of inline electrode alignment inspection
- Welding: uncalibrated welding strength test that are conducted manually without well-defined pass/fail criteria

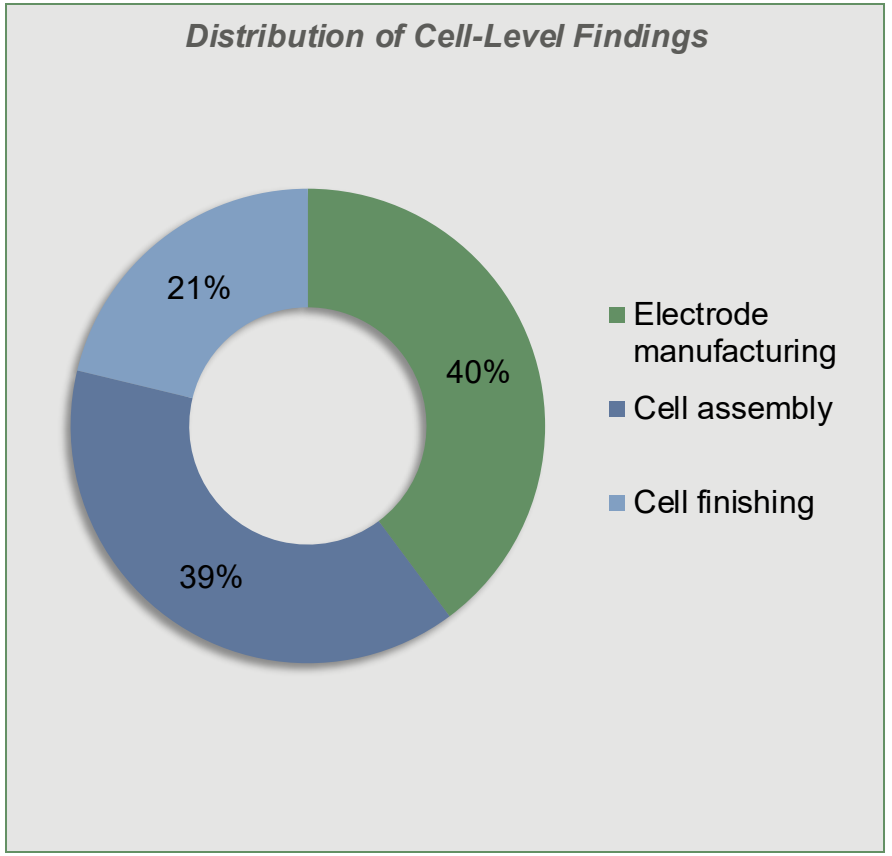
21% of cell findings occur during cell finishing

Why/How Does It Happen

Improper process and quality control execution

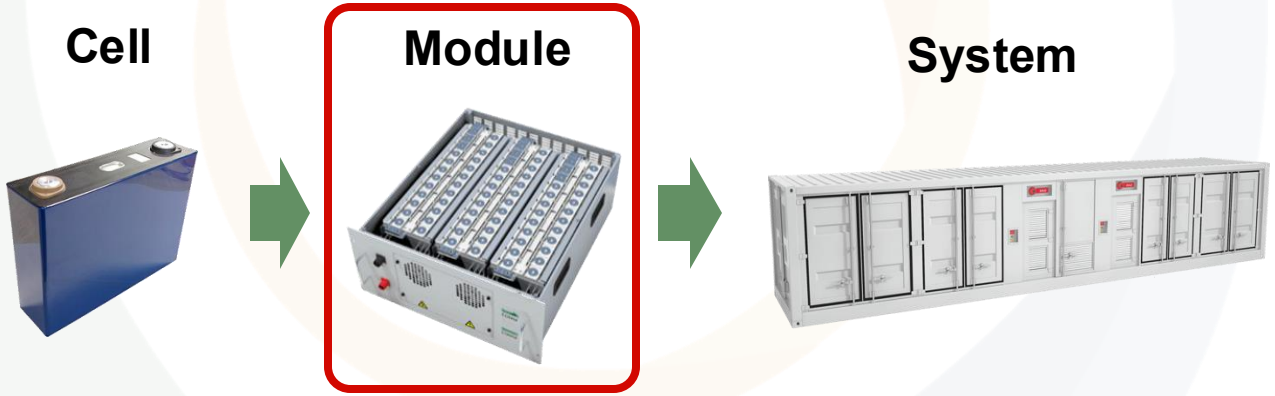
Example

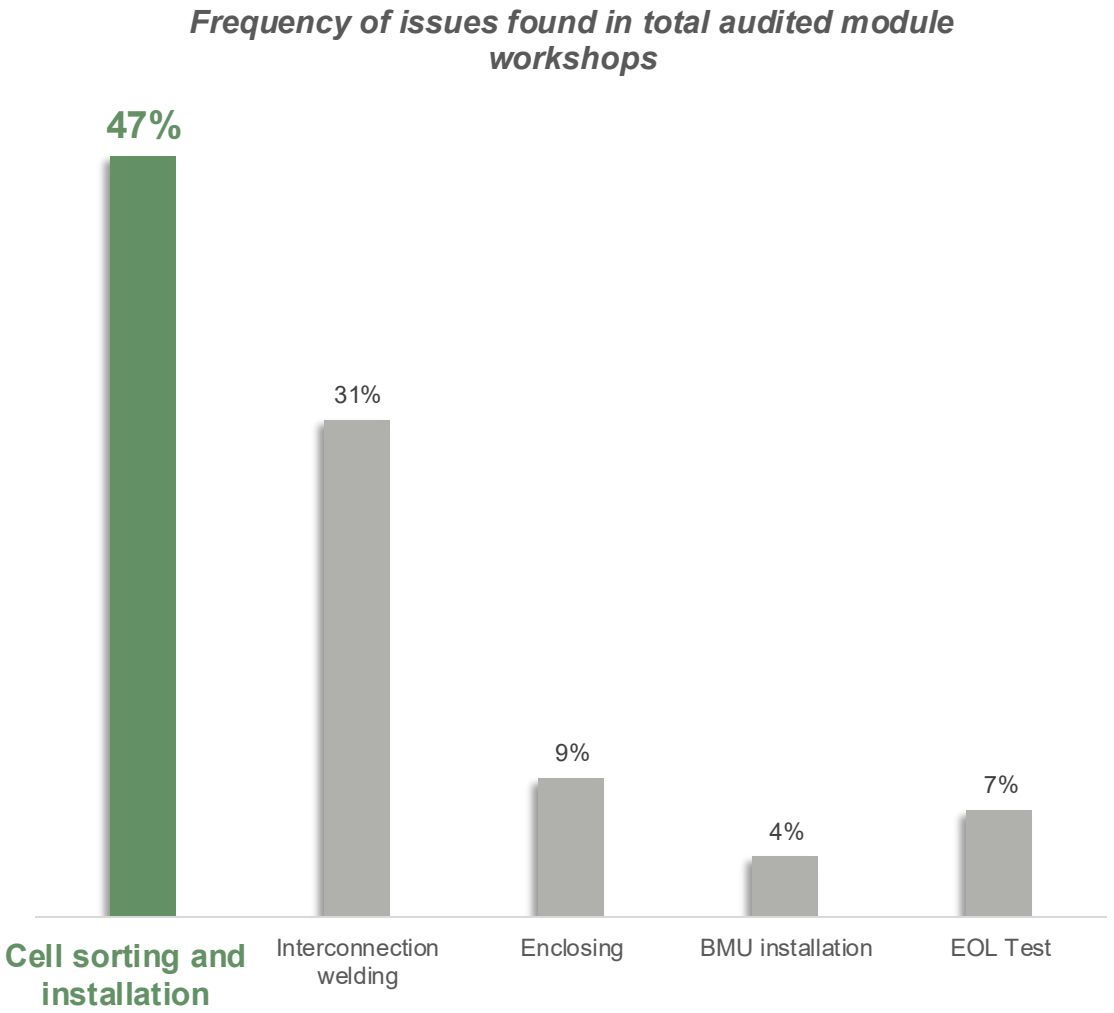
- Cell (jelly-roll/stack) insertion: lack of laser welding parameter verification, lack of inline alignment and clearance inspection after the aluminum cap is welded on
- Electrolyte filling: Loose control of environmental conditions (temperature and humidity), lack of sealing quality inspection which can lead to electrolyte leakage



13% of the Findings Occurred During Module Manufacturing

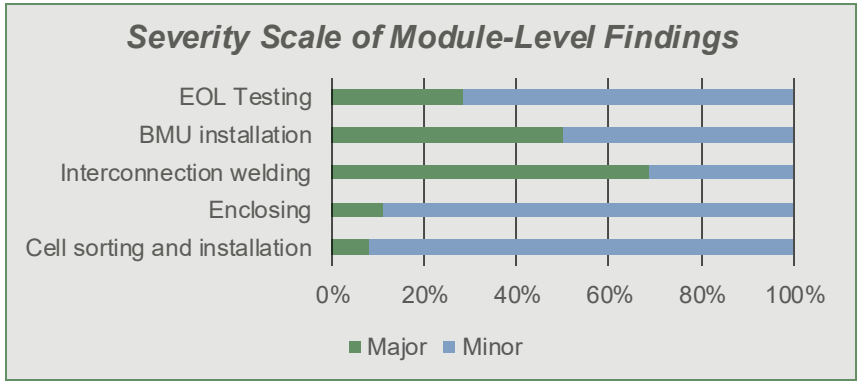
- Module manufacturing issues often occur because lines are less automated (compared to cell manufacturing), which creates room for imprecision in material handling and inferior welding quality.
- **Cell sorting and installation** involve key assembly steps, including manual and visual checks for appearance, cleanliness, gluing, and fixturing. Most issues occur in the gluing process, such as uneven gluing area or weight deviations from SOP.



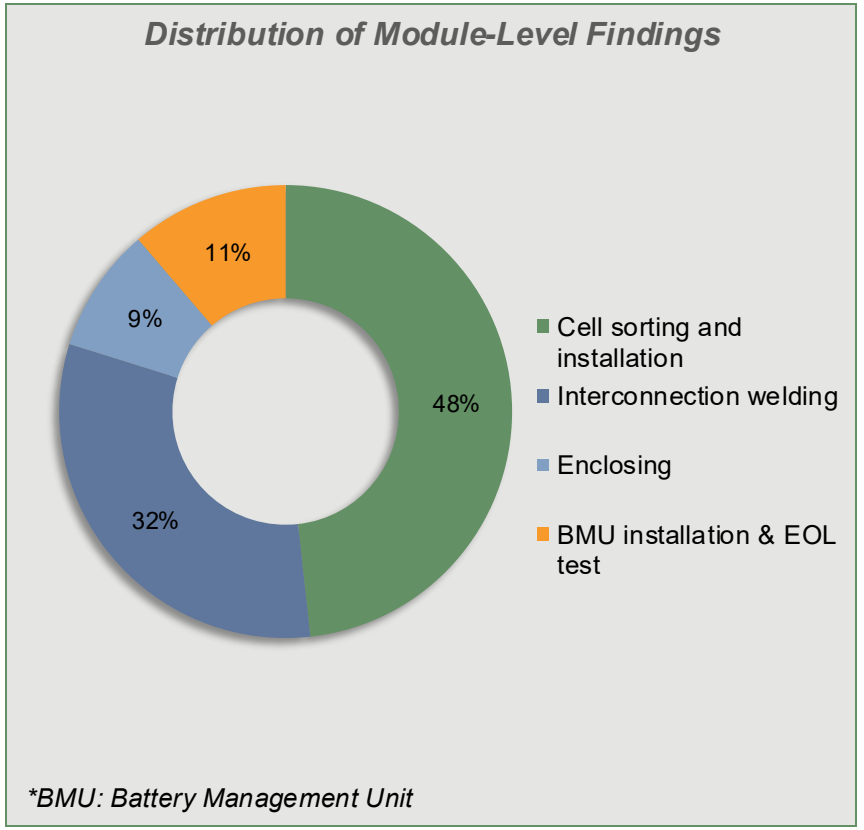


Breakdown of Module-Level Findings

The automation level of module production varies among manufacturers. **Welding quality issues** and environmental control pitfalls can lead to end-of-line (EOL) test failures.



48% of module findings occur at cell sorting and installation	**32% of module findings occur during interconnection welding**	**9% of module findings occur during enclosing**	**11% of module findings occur during electircal testing and integration (EOL& BMU*)**
Why/How Does It Happen	**Why/How Does It Happen**	**Why/How Does It Happen**	**Why/How Does It Happen**
Manufacturing inconsistency due to manual operation and improper quality control protocols	Lack of efficient quality control procedures and mis-operation risks due to a highly manual process	Lack of efficient quality control procedures and mis-operation risks due to a highly manual process	Cell manufacturing inconsistency and mis-wiring from highly manual processes
Example	**Example**	**Example**	**Example**
• Lack of error-proofing measures to ensure cells are assembled with the right orientation • Inconsistent glue usage and position • Unqualified BOM (Bill of Materials) change on insulation layers within the module.	• Mislocated welding position • Non-calibrated welding strength test • Lack of procedure of cleaning up welding slags.	• Inconsistent cell group placement • Mechanical damages to fixtures and cooling plates.	• Failed dielectric withstand voltage test due to poor internal wiring insulation and wiring arrangement • Abnormal cell voltage difference due to defective cells.



BMU: Battery Management Unit

What Can You Do To Ensure the Long-term Financial Health of Your BESS Assets?

Golden FAT

- **Closing the Gaps**: We review your procurement contract, project requirements, and FAT checklist to ensure your energy system is safe and performs well, preventing any surprises.
- **Early Detection**: We identify risks in the supplier's checklists early to save costs and extend your system's operational life.
- **Expert Check-Up**: Our experts verify adherence to key safety and performance standards for a reliable energy system.
- **Negotiation Support**: We support you in negotiating and adjusting the FAT checklist deviations.

Factory QA

- **Factory Audit (FA):** Quality control engineers (QCEs) check factories with a 300+ point checklist, assess risks, and recommend fixes.
- **Inline Production Monitoring (IPM)**: QCEs monitor production in real-time, ensure quality, spot issues, and suggest corrections.
- **Pre-Shipment Inspection (PSI):** QCEs inspect and test a random sample of finished products, record findings, and advise on improvements.
- **Factory Acceptance Test (FAT):** QCEs inspect and test finished products for performance and suggest corrective actions.

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ATTACHMENT 4.

ARTICLE ON THE VISTRA BESS FIRE AT MOSS LANDING, JANUARY, 2025.

Just before 5pm on April 19, 2019, an alarm was triggered by smoke at a small battery energy storage facility in Surprise, Arizona. Firefighters responded to the scene after a call came over dispatch at 5:42pm reporting smoke near a major highway.

The firefighters were expecting a brushfire, but once it became clear they were dealing with a lithium-ion battery storage facility, the captain called in a team of firefighters trained and equipped to respond to hazardous materials.

After arriving on the scene and gathering information, the four-member hazmat team donned their turnout gear at about 6:37pm. Low-lying smoke was emanating from the facility, and the team's equipment registered toxic gases in the vapor. After waiting it out for about 80 minutes, the gases decreased to a safe enough threshold, and the team approached the building. At around 8:01pm, they opened a door, unaware the facility lacked adequate ventilation.

The inrush of oxygen created a backdraft, and as the team stood outside the door measuring gases and sizing things up, the gases ignited just before 8:04pm, causing an explosion that shot out the door about 75 feet horizontally and 20 feet vertically. All four firefighters were blown back and knocked unconscious – the team's captain, who was standing in the doorway, was launched 73 feet, landing under a bush. The four were quickly transported to a hospital, two by helicopter.

ABOUT THREE WEEKS LATER AND 700 MILES AWAY, the Monterey County Planning Commission, on May 8, considered approving a project unlike anything ever seen in the county, or anywhere: The project would amend the Moss Landing Power Plant Master Plan to include the use of renewable energy storage, and Vistra, a Texas-based energy company that acquired the property in 2018 when it merged with Dynegy, would reuse an old turbine building to establish a 300-megawatt Battery Energy Storage System, aka BESS.

Though it wasn't highlighted at the time, it would be the biggest BESS in the world, all under one roof.

By the time the project came before the commissioners around 11:30am, they had just spent over 90 minutes discussing a second cannabis dispensary in unincorporated Carmel. The commissioners had already been acquainted with Vistra's project when it was first presented to them in March, but they had decided to delay voting on it until concerns from the California Department of Fish and Wildlife could be addressed.

Rehashing the project took just a few minutes – energy comes off the grid and is stored in racks of batteries inside the 96,411-square-foot building, and when needed, is sent back out to the grid to supply energy.

There was no comment from the public outside of previous letters from CDFW and Caltrans, nor was there discussion among commissioners. If anyone in the room was aware of the explosion in Surprise, Arizona, they didn't mention it.

This despite that, the environmental documents the commissioners were being asked to approve included a section reading, in part: "With any battery storage system, there is a risk of fire resulting from overheating or electrically faulty conditions in the battery energy storage… A range of active fire protection features would be installed in the battery storage building in the unlikely event that the passive source features were to fail."

Seemingly surprised at the lack of discussion, Chair Paul Getzelman turned to Commissioner Martha Diehl, who had been vocal in the March meeting in support of the project's renewable energy goals.

"Commissioner Diehl, do you have thoughts?" Getzelman said. "You always have thoughts… no?"

"Look at me not having any thoughts," Diehl said.

"Can we get that on the record?" Getzelman said, as he turned to county staff. "I guess we just did."

In Vistra's 2018 application to the county for the Moss 300 project, it stated that the structure that would house the batteries – a disused, former turbine building – was "robust concrete with steel columns, girders and beams and will be considered non-combustible." DANIEL DREIFUSS

MORE THAN FIVE YEARS LATER, AROUND 3PM ON THURSDAY, JAN. 16, 2025, Joel Mendoza, chief of the North County Fire Protection District, was at his department's station in Castroville when a call came in about a structure fire along Highway 1 in Moss Landing. Mendoza and his colleagues immediately recognized the address – Vistra's Moss Landing Power Plant. On the way there, reports over dispatch made clear it was at Moss 300, a battery energy storage facility the firefighters were intimately familiar with. They had toured it, inspected it, and in 2021, responded to an incident at the building when some batteries started to smoke.

As Mendoza and other firefighters arrived on the scene about 10 minutes later, he could see smoke rising from the roof as they approached. "We had a good sense something was escalating," he says. "We knew there was probably a fire inside the building."

After ensuring everyone onsite was safely accounted for, Mendoza and his team gathered as much information as they could from the plant manager and others. "Once we confirmed through their CCTV that [battery] racks were actively burning and spreading from rack to rack, we knew this was going to be a large-scale incident," he says.

So they notified county officials – the Department of Emergency Management, the Sheriff's Office and Environmental Health – around 3:30pm, and by 5pm, the County advised nearby residents to close their windows, doors and shut off their air systems until further notice.

At around the same time, as North County firefighters were laying hoses to douse a wall of the building, that wall and the roof started to collapse. That was when the decision was made to

relocate the incident's command post from an adjacent building to off the property, at the Power Plant Cafe's parking lot across Highway 1.

As responders gathered there, Mendoza says one of his engines reported seeing flames shoot from the roof around 5:30pm. It was then, he says, that discussions began about evacuation orders.

At that point, it was clear to any onlooker with a basic understanding of battery fires that the impacted batteries had entered "thermal runaway," a rapidly escalating chain reaction in lithium-ion batteries that can potentially lead to a fire or explosion. When it reaches this stage, there is so much heat it's impossible to extinguish using water, as was the case at Moss 300. Additionally, applying water could put undamaged batteries at risk by causing them to short out; Mendoza and his colleagues could not fight the fire, only monitor it.

The county issued evacuation orders for the Moss Landing area at 6:30pm. The fire burned, then smoldered, into the night and the next morning. County officials held an online emergency meeting at 8:30am the next day, then another at 2pm after the fire flared up again that afternoon. The county lifted its evacuation order at 6pm on Friday, Jan. 17, after officials from the U.S. Environmental Protection Agency deemed that the air did not pose a threat to human health.

Some locals remained unconvinced.

SOCIAL MEDIA WAS ABUZZ with residents reporting symptoms they attributed to exposure to the Vistra fire's smoke plume – headaches, sore throats, metallic taste, etc. There were questions, but no answers.

The Monterey County Board of Supervisors held an emergency meeting at 8:30am on Friday, Jan. 17, the day after the Vistra fire ignited. All five supervisors (in background) attended a press conference in Castroville immediately afterward, where Kelsey Scanlon, the county's director of Emergency Management, provided updates. DANIEL DREIFUSS

Then, on Jan. 27, San Jose State University issued a report that landed like a bombshell. Ivano Aiello, a geoscientist at SJSU's Moss Landing Marine Labs who'd been studying soil sediments in the Elkhorn Slough for a decade, found that samples he and his team had taken around the slough in the days after the fire showed a "hundreds to thousand-fold" increase in nickel, manganese and cobalt, heavy metals found in the types of batteries used at Moss 300.

That raised even more questions, because EPA officials had only been testing the air for gases, not the constituent particulates within the plume. And while officials from the state Department of Toxic Substances Control had run scans and collected soil and water samples Jan. 24, they hadn't yet been analyzed. It wasn't until Feb. 12 that Toxic Substances officials announced they had found "there are not elevated metals associated with the fire in soil."

But that announcement came with no data. On Feb. 24, the department came out with the data, but no analysis. A Feb. 14 letter the state Office of Environmental Health Hazard Assessment sent to Monterey County Environmental Health did provide analysis: Out of the eight sites the Department of Toxic Substances Control sampled, only two registered as out of the ordinary. One site had elevated levels of cobalt – 60-percent higher than normal for the region – and another had hydrocarbons believed to be carcinogenic, and more soil testing of that site was recommended.

The fire wasn't done just yet: On Feb. 18 at around 6:30pm, nearly a month after the original incident, Moss 300 flared up in a previously burnt part of the facility, creating smoke and flames. Nearby residents were told to keep their windows and doors shut for the night as a precaution, and the fire didn't peter out until around 2am.

Vistra, meanwhile, had been working to neutralize the site's inherent volatility, and on Feb. 22, a Vistra-trained team, under the supervision of U.S. EPA, started a process to "de-link" any accessible, undamaged batteries so that they were no longer connected to each other, a process that was expected to take a few weeks.

On Feb. 27, six weeks after the fire broke out, Vistra hosted its fourth quarter 2024 earnings call. At about 10 minutes in, CEO Jim Burke mentioned the fire, expressing thanks there were no injuries and appreciation to the community for handling the event safely. He noted Vistra's other two battery facilities on the site – Moss 100 and Moss 350 – were undamaged, as was Vistra's nearby 1,060-megawatt natural gas plant, and said the battery systems would remain offline until the company learned what had happened.

There was no further discussion of the fire until the very end of the hour-long call, when an analyst asked about Vistra's insurance policy for the Moss 300 facility. A Vistra representative said it was insured up to $500 million, and the company expected to collect the full amount.

IN 1949, AS THE COUNTRY AND THE WORLD BEGAN ITS POST-WWII TRANSFORMATION, PG&E constructed the Moss Landing Power Plant, which became operational in May 1950. The plant was expanded in the decades following, and in 1998, PG&E sold it to Duke Energy, while PG&E retained ownership of the electric transmission facilities just north of the plant.

Much of the burnt Moss 300 building is unstable and unsafe for crews to enter. Its demolition will be a lengthy, complicated process in order to be done safely. DANIEL DREIFUSS

Duke made some modernization improvements until 2005, and in 2006, sold the plant to LS Power Equity Partners, which a year later sold it to Dynegy, which became a subsidiary of Vistra when they merged in April 2018.

That's when things started heating up: In October 2018, PG&E got approval from the California Public Utilities Commission to purchase the energy capacity of a 300-megawatt BESS that Vistra was planning to build on its Moss Landing property. (At the same time, the CPUC approved an agreement between PG&E and Tesla that allowed them to move forward with a 182.5-megawatt BESS on PG&E's adjacent property to the north.)

Just under a year after the Planning Commission approved Vistra's Moss 300 project in 2019, it unanimously approved PG&E and Tesla's 182.5-megawatt Elkhorn BESS in February 2020. Then in June 2020, the Board of Supervisors approved a BESS with 85 Tesla Megapacks – a 60-megawatt project – for Apple at the California Flats solar project, near Parkfield in South Monterey County.

In July 2020, the Planning Commission approved another application from Vistra to build more battery storage on its Moss Landing property, this one for four different facilities totaling 1,200

megawatts. Vistra started the first phase of that project, what would become Moss 100, in September.

Vistra's Moss 300 came online in December 2020, making it the world's largest BESS at the time and capable of powering about 225,000 homes. "A battery system of this size and scale has never been built before," said Vistra's then-CEO Curt Morgan in a January 2021 statement. "As our country transitions to a clean energy future, batteries will play a pivotal role and the Vistra Moss Landing project will serve as the model for utility-scale battery storage for years to come."

Moss 100 came online amid fanfare on Aug. 19, 2021 with a ribbon-cutting celebration.

Just two weeks later, Sept. 4, 2021, a smoke incident at Moss 300 led to the temporary shutdown, while Moss 100 remained online. In January 2022, Vistra announced its findings from an investigation into the incident: The water-based suppression system became armed in response to low levels of smoke, and "because of failures of a small number of couplings on flexible hoses and pipes, improperly sprayed water on battery racks… The water damaged the batteries and caused some to overheat, thus creating more smoke which, in turn, resulted in the release of more water and caused damage to additional batteries. In total, roughly 7 percent of the facility's battery modules were damaged."

On Feb. 13, 2022, a similar incident occurred at Vistra's Moss 100 facility, and this time, both Vistra facilities were taken offline.

Meanwhile, PG&E's 182.5-megawatt Elkhorn facility came online in April 2022. Unlike both Vistra facilities, the Elkhorn's batteries were not in buildings – they were in an array of 256 Tesla Megapacks on 33 concrete slabs.

In the early morning of Sept. 20 of that year, just over five months later, a fire broke out in one of the Tesla Megapacks at the facility, prompting the closure of Highway 1 and a shelter-in-place order for nearby residents. Though the fire only burned for six hours, the orders remained in effect until just before 7pm due to the risk of toxic smoke inhalation.

In the infancy of battery energy storage in Monterey County, three incidents, each at a separate facility, occurred in just over a year.

IN 2023, NEWLY ELECTED DISTRICT 2 COUNTY SUPERVISOR GLENN CHURCH, whose district includes Moss Landing, organized a meeting at the North County Recreation Center in Castroville on Sept. 20, the one-year anniversary of the Elkhorn battery fire. About seven weeks earlier, on Aug. 1, Vistra's 350-megawatt facility in Moss Landing went online, but unlike the first two Vistra facilities, this one was outdoors, with 122 separate

containers housing more than 110,000 battery modules, bringing Vistra's Moss Landing battery storage complex to 750 megawatts total.

At a March 3 meeting in Salinas organized by Never Again Moss Landing, concerned residents looked for answers about how to move forward from here. DANIEL DREIFUSS

The meeting began at 6pm, and about 100 people showed up to attend. Various county officials sat behind tables on the stage, along with multiple representatives from Vistra and PG&E.

Kelsey Scanlon, the county's director of Emergency Management, moderated the meeting, and after Church gave an overview of Moss Landing's industrial history, the discussion turned to the recent incidents and what had been learned from them.

Vistra's Brad Masek explained the cause of the smoke incidents at Vistra's Moss Landing facilities, and that failed couplings attached to hoses were partly to blame – they had caused water to leak on the batteries. Vistra had since replaced all the couplings, he said, making sure they were all double-threaded, and reengineered its water suppression system so that it would not just be triggered by smoke, but also by a loss of air pressure in the lines.

PG&E's Dave Gabbard said that in the one Megapack that had burned a year before, PG&E subsequently discovered that a ventilation shield on the unit had been improperly installed, dislodging valves that allowed water into the unit, causing batteries to overheat. He said PG&E identified 88 other Megapacks with a similar flaw, and quickly repaired all of them.

The meeting lasted two hours. When the public was invited to ask questions, Scanlon read some aloud: "What types of hazardous chemicals may be in the air that could impact the community beyond the fence?"

A representative from Vistra said based on the company's modeling, only hydrogen fluoride could be of concern. There was no mention of heavy metals.

As the meeting was wrapping up near 8pm, Scanlon announced that she was reading the last question, a "doozy": "Based on the expansive lists presented here tonight regarding emergency backup plans, acute exposure guidelines, and customer communication guidelines, I get the feeling this battery storage system has enormous potential for grand-scale catastrophic failure with far-reaching, long-lasting impact. Is this the case?"

Masek responded first, saying Vistra's forecasts didn't show that to be the case. Gabbard echoed that, adding that PG&E is always trying to improve its safety procedures at the Elkhorn facility.

Vistra spokesperson Brad Watson chimed in last. "I have one more thing, to give you a high-level perspective," he said, noting that a year earlier, there were 4,000 megawatts of battery storage in California, and that now there were 6,800 megawatts, enough power for 5.1 million homes. "How many incidents do you hear of the tens of thousands of megawatt hours that are being released to your grid of clean energy? It's just important to look at a high level at how well they are operating overall. Are they perfect? No, but no system created by humanity is perfect."

ON FEB. 26, ABOUT SIX WEEKS AFTER THE FIRE, Bay Nature Institute, a Berkeley-based nonprofit nature magazine and website, hosted an online forum about the potential impacts the Vistra fire's fallout might have on nearby ecosystems. Moss Landing Marine Labs' Aiello, who'd been studying marsh sediments in Elkhorn Slough for a decade, fielded questions.

Aiello said that when he first went out to the slough a few days after the fire, he could see black pieces of debris scattered on the ground. Since his bombshell Jan. 27 announcement, he said rain had dissipated the metals on the surface, adding that they weren't going away, they were just going somewhere else – in this case, the slough.

A colleague described their work on a new project, authorized by an expedited permit in the wake of the fire, to collect mussels from Montaña de Oro State Park in San Luis Obispo County, acclimate them in the lab to Elkhorn Slough waters, then deploy them in nylon bags hanging off the Highway 1 bridge at Elkhorn Slough and at Moro Cojo Slough. The plan is to cycle them out every two months to see how much nickel and cobalt they accumulate.

They're trying to get a picture – and have the unique opportunity to do so – of how the metals travel and transform through the aquatic ecosystem.

Aiello emphasized that the area he'd been studying was a tiny fraction of the fire's fallout zone, and speculated the plume could have contained more than a million pounds of heavy metals.

In the days after the fire, Brian Roeder founded Never Again Moss Landing, a community group for residents to share information and resources. DANIEL DREIFUSS

Angie Roeder, who lived in Prunedale at the time of the fire, experienced symptoms from exposure to its smoke and fallout. Her family has since moved. DANIEL DREIFUSS

FALLOUT FROM THE FIRE WAS THE CENTRAL THEME of an event on Monday night, March 3 at the Salinas Valley Community Church. It was organized by Never Again Moss Landing, a citizen group formed in response to the fire to share

information and resources. About 60 people were in attendance, and the stage was tabled with the night's speakers.

Prunedale resident Angie Roeder, whose husband Brian started NAML, spoke first. Angie said that, perhaps because of time she spent deployed in the Air Force, she had heightened sensitivity to toxins. The Roeders packed up the night of the fire to get out for the weekend, and figured when they got back everything would be fine. But Angie started experiencing symptoms the following day, and did every time she returned to their five-acre Prunedale property. Seeing others on social media reporting their symptoms, she started the Moss Landing Power Plant/Vistra Fire Symptoms page on Facebook. It gained traction so quickly, she said, that she soon made it private.

"I could feel things coming on, and I've had lots of frustration over the years with having symptoms and reactions to chemicals and having doctors not listen to me," she said.

She said her family had been staying at two different AirBnB's in Carmel since the fire, and that many could not be so lucky.

Prunedale resident Shiree Goins was likewise laid out by the fire. On Jan. 21, her birthday, she woke up feeling dizzy and lightheaded, and had a splitting headache. She told her husband they had to leave the house the next day – they did, she said, staying at an AirBnB for two weeks before finding a new home.

Goins said she'd been to numerous doctors, and that tests showed all her organs were functioning normally. To find out what was causing the symptoms, she was told, she'd need to see a toxicologist.

"We are the canaries in the coal mine," Goins said of herself and others with heightened sensitivity. "We are here with our symptoms, screaming out, but unfortunately, we've felt time and time again that nobody is listening, no one is hearing our cries."

On March 10, the Roeders and 50 other plaintiffs, including Goins, filed a lawsuit in Alameda County Superior Court against a number of defendants including Vistra, PG&E and LG Energy Solution, the manufacturer of the batteries at Moss 300.

That followed a Feb. 4 lawsuit filed by four local residents against an identical group of defendants.

On Feb. 27, Moss Landing residents Kim and Luis Solano, owners and proprietors of the Haute Enchilada restaurant in Moss Landing, which has shuttered in the wake of the fire, filed a federal lawsuit against a similar group of defendants, excluding PG&E. Moss Landing residents Sofia and Jonathan Vitale – Sofia is the Solanos' daughter – filed a federal suit against the same defendants March 12.

Vistra has declined to comment on the litigation.

IN THE DAYS AFTER THE FIRE, Church often referred to it as a "Three-Mile Island" type of event for the battery energy storage industry, one that would wake people up to its potential dangers. Given the reach the fire had in the media – it made news internationally – that may prove to be true, but the Moss 300 facility was hardly a reflection of the industry as a whole.

Nick Warner, a battery safety expert, says less than 1 percent of battery storage facilities worldwide are in dedicated-use buildings – an indoor structure designed to house large-scale utility battery systems – and that Moss 300 was "globally unique in every way." He bristles at the "Three-Mile Island" comparison, and believes a more apt one is the Hindenburg, as airships were already on their way out to make way for better, safer technology – airplanes.

Indoor battery storage facilities are going the same way, he says, adding that Moss 300 was the only one that reused an existing building. Worldwide, "it had far and away the most capacity under one roof. It was an antiquated design and concept already being replaced by a newer and better way of doing things."

All the battery storage facilities in Moss Landing have been offline since the fire broke out, and there's no clear timeline for when any of them will go back online. The focus now is to safely clean up the mess.

De-linking the accessible batteries in Moss 300 was completed March 13; the remaining batteries in the structure are unsafe to access, so the risk for a re-ignition remains.

On March 18, Scanlon, the county's director of Emergency Services, presented an update to the Board of Supervisors about the progress on the site, and said the county was transitioning from the response phase into the recovery phase.

"Debris removal of this quantity and complexity has never been done before," she said. Cleanup of the site could take years.

Already, the regulatory environment surrounding battery storage facilities in the state is starting to shift. On March 13, the five commissioners on the CPUC unanimously passed a resolution requiring all battery energy storage facilities to work with local authorities to create emergency response plans, or else face financial penalties.

Much of the burnt Moss 300 building is unstable and unsafe for crews to enter. Its demolition will be a lengthy, complicated process in order to be done safely. Daniel Dreifuss

Assemblymember Dawn Addis, D-Morro Bay, introduced AB 303, which would bolster safety standards by creating environmental setbacks from sensitive sites like schools, as well as to restore local control in approving battery storage facilities – since AB 205 passed in 2022, those proposing new battery storage can opt to have the California Energy Commission take jurisdiction over the approval process.

Vistra currently has a 600-megawatt BESS proposed in Morro Bay, and Vistra notified the city last October that it would be opting to have the Energy Commission consider approval of the project's draft environmental impact report, not the city. (Also in Addis' district is a potential 200-megawatt battery storage facility near Watsonville.)

State Sen. John Laird, D-Santa Cruz, whose SB 38 was signed into law a year after the Elkhorn fire, had similar requirements to those the CPUC commissioners passed a few weeks ago, but it lacked the enforcement teeth.

He put out a statement Feb. 4, noting that the CPUC was leading the investigation into the causes of the fire, while also emphasizing the critical importance battery energy storage has for the state's transition toward renewable energy. "California battery storage produced 500 megawatts in 2019, growing to 13,300 megawatts now, with the goal of 52,000 megawatts by 2045," he wrote. "In September 2022, when the electrical grid was on the verge of a blackout, battery storage put more energy online than Diablo Canyon's nuclear power during a few key hours – and the power stayed on."

On March 20, Laird introduced SB 283, which would prevent the development of battery energy storage facilities in combustible buildings.

Looking back at how Vistra's Moss Landing projects were approved, it's easy to poke holes at what was missed or not contemplated during the process. But the projects, in a rapidly evolving industry, had no precedent locally, and the planning commissioners were given nothing but assurances.

At a Jan. 29, 2025 Planning Commission meeting, about two weeks after the fire, Diehl spoke about her vote back in 2019. "I just want to say one thing about the recent fire in Moss Landing, which is that as a person who voted for that facility, I was wrong," she said.

At the time, she had felt the safety discussions were extensive and the facility was safe. "I just want to put that on the record, because sometimes you're wrong," she said.

When Goins, at the Never Again Moss Landing meeting, referred to people like herself as “canaries in the coal mine,” that was, in another sense, true for the entire Central Coast – it seems doubtful another indoor battery project like Moss 300 will ever again get approved, locally or anywhere else. And for an energy company, safer designs are also a safer investment.

But whether the public likes it or not, battery energy storage is likely not going away – our demand for energy is only growing. And the alternatives to renewable – nuclear or fossil fuels – are untenable.

Not to mention, Vistra got approval from the county in 2020 to build 1,200 more megawatts of storage in Moss Landing. And after Moss 100 and Moss 350, it still has approval to build 750 more megawatts. Since the fire, however, the company is waiting to see what the investigation finds.

Whether Vistra follows through with its plan or not, battery energy storage facilities are likely the future – they store renewable energy, then feed it to the grid when the sun’s not shining or the wind’s not blowing. They are the missing link, and as the transition toward renewable energy continues to gain traction – in California and elsewhere – batteries will be leading the charge.

David Schmalz

Staff Writer

Link to this story: https://www.montereycountynow.com/news/cover/the-vistra-fire-in-moss-landing-caught-everyone-by-surprise-what-can-we-learn-from/article_7c3112af-73d0-4ca5-a599-05e77d09963b.htmlb

ATTACHMENT 5.

EXCERPT FROM A MONTEREY COUNTY WEBSITE PERTAINING TO EPA AIR SAMPLING AT THE VISTRA BESS FIRE SITE IN JANUARY, 2025.

Current Emergency Information

US Environmental Protection Agency (EPA), the Monterey Bay Air Resources District (MBARD), and Vistra air quality monitoring updates

Webpage updated 10/07/2025 06:26 PM

The US Environmental Protection Agency (EPA), the Monterey Bay Air Resources District (MBARD), and Vistra monitored the air quality in and around the fire perimeter and across Monterey County. The County of Monterey has received raw air quality data from the US EPA, which is being analyzed with assistance from the California Office of Environmental Health Hazard Assessment (OEHHA). Air monitoring results indicate that no levels of Hydrogen Fluoride (HF) exceeded OEHHA's acute Reference Exposure Level (REL) of 300 parts per billion (ppb) in the community, at Vistra's fence line, or at the site of the fire. The acute REL is the highest concentration of a chemical that a person can safely be exposed to for one hour without an increased risk of serious, non-cancer health impacts, including for children and sensitive individuals. No PM 2.5 levels exceeded the National Ambient Air Quality Standard (NAAQS) of 35 micrograms per cubic meter.

The County is committed to transparency and will continue to post raw data and additional information as it becomes available. The raw data collected by the US EPA will be made accessible through this webpage in downloadable spreadsheet format for public review.

La Agencia de Protección Ambiental de los Estados Unidos (EPA), el Distrito de Recursos del Aire de la Bahía de Monterey (MBARD) y Vistra monitorearon la calidad del aire dentro y alrededor del perímetro del incendio y en todo el Condado de Monterey. El Condado de Monterey ha recibido datos preliminares de la calidad de aire de la EPA de EE.UU, los cuales están siendo analizados con la ayuda de la Oficina de Evaluación de Riesgos para la Salud Ambiental de California (OEHHA). Los resultados de el monitoreo de aire indican que ningún nivel de fluoruro de hidrógeno (HF) superó el Nivel de Exposición de Referencia (REL) agudo de la OEHHA de 300 partes por billón (ppb) en la comunidad, en el perímetro de Vistra o en el sitio del incendio. El REL agudo es la concentración más alta de un químico a la que una persona puede estar expuesta de manera segura durante una hora sin un mayor riesgo de efectos graves en la salud no relacionados con el cáncer, incluyendo a niños y personas sensibles. Ningún nivel de PM 2.5 superó el estándar nacional de Calidad del Aire Ambiental (NAAQS) de 35 microgramos por metro cúbico.

El Condado está comprometido con la transparencia y continuará publicando datos preliminares e información adicional a medida que esté disponible. Los datos preliminares recopilados por la EPA de EE.UU estarán disponibles en esta página web en formato de hoja de cálculo descargable para revisión pública.

EPA Air Quality Monitoring Results:

(https://www.countyofmonterey.gov/emergency/2025-moss-landing-vistra-power-plant-fire/-loadingmode-EditContent/=)Data Summary Moss Landing 1-20-25 12pm-5pm (https://www.countyofmonterey.gov/home/showdocument?id=137883)

Data Summary Moss Landing 1-20-25 6am-11am (https://www.countyofmonterey.gov/home/showdocument?id=137877)

Data Summary Moss Landing 1-19-25 11pm-5am (https://www.countyofmonterey.gov/home/showdocument?id=137869)

Data Summary Moss Landing 1-19-25 6pm-11pm (https://www.countyofmonterey.gov/home/showdocument?id=137873)

Data Summary Moss Landing 1-19-25 12pm-5pm (https://www.countyofmonterey.gov/home/showdocument?id=137871)

Data Summary Moss Landing 1-19-25 6am-11am (https://www.countyofmonterey.gov/home/showdocument?id=137875)

Data Summary Moss Landing 1-19-25 12am-5am (https://www.countyofmonterey.gov/home/showdocument?id=137867)

Data Summary Moss Landing 1-18-25 6pm-11pm (https://www.countyofmonterey.gov/home/showdocument?id=137865)

Data Summary Moss Landing 1-18-25 12pm-5pm (https://www.countyofmonterey.gov/home/showdocument?id=137863)

Data Summary Moss Landing 1-18-25 12AM-11am*
(https://www.readymontereycounty.org/home/showpublisheddocument/142906/638954577850930000)

ATTACHMENT 6.

AIR QUALITY REPORT FROM THE SDGE BESS FIRE IN ESCONDIDO, CALIFORNIA IN SEPTEMBER, 2024.

Air Quality Report

This report has been compiled utilizing data provided by San Diego County HAZMAT/ San Diego City Fire Rescue HAZMAT and Haley & Aldrich, Inc.

The information obtained from these sources has been carefully analyzed and incorporated to ensure the accuracy and reliability of the findings.

SDG&E Battery Fire
571 Enterprise Street
Start 9/5/2024 12:09
Repopulate 9/7/2024 12:00

Air quality monitored by San Diego County HAZMAT

- Three types of monitoring units
- First reading taken at 14:30 on 9/5/2024
- Final reading taken at 18:32 on 9/6/2024

Air monitoring equipment (SD HAZMAT)

1. EAGLE 2 CGI
   Last calibrated on 8/30/2024 and was “zeroed” prior to use on incident.
   Standard 4 gas monitor which measures:
   Lower Explosive Limit -**LEL**
   Oxygen -**O2**
   Hydrogen Sulfide-**H2S**
   Carbon Monoxide-**CO**

2. RedWave XplorIR
   Self-Calibrates at device startup.
   Identifies over 5,500 gases at low part per million (ppm) concentrations

3. MultiRAE Pro
   Last calibrated on 8/30/2024 and “zeroed” prior to use on the incident.
   Monitors both chemical threats and gamma radiation and is the only multi-threat monitor with parts per billion

Gases monitored

1. **PH3 (Phosphine)**
2. **Cl2 (Chlorine)**
3. **H2S (Hydrogen Sulfide)**
4. **CO2 (Carbon Dioxide)**
5. **HCN (Hydrogen Cyanide)**
6. **CO (Carbon Monoxide)**
7. **HF (Hydrofluoric Acid)**

Hazmat Exposure Terms

1. TWA (Time-Weighted Average)

- **Definition**: TWA refers to the average exposure to a hazardous substance (usually airborne) over a standard workday, typically 8 hours, and a 40-hour workweek.
- **Purpose**: It is used to assess the cumulative exposure a person may experience and is compared against permissible limits to ensure safety over long-term exposure.

2. STEL (Short-Term Exposure Limit)

- **Definition**: STEL is the maximum concentration to which a person can be exposed to a chemical substance for a short period, typically **15 minutes**, without suffering adverse effects like irritation, chronic or irreversible tissue damage, or narcosis.
- **Purpose**: It helps control exposure to hazardous substances during short bursts of high exposure within a workday.

3. PEL (Permissible Exposure Limit)

- **Definition**: PEL is the maximum amount or concentration of a substance that a person can be exposed to under OSHA (Occupational Safety and Health Administration) regulations over an 8-hour work shift (TWA) or a 40-hour workweek.
- **Purpose**: These are legally enforceable limits to protect workers from the harmful effects of hazardous chemicals and substances in the workplace.

4. REL (Recommended Exposure Limit)

- **Definition**: REL is a recommended exposure limit set by NIOSH (National Institute for Occupational Safety and Health) that suggests maximum allowable concentrations for exposure to substances over a workday or workweek.
- **Purpose**: These limits are non-enforceable but serve as guidelines for employers and regulators to ensure worker safety. They are typically more stringent than PELs.

5. IDLH (Immediately Dangerous to Life or Health)

- **Definition:** the maximum concentration of a chemical in the air to which a person can be exposed for **30 minutes** without suffering life-threatening health effects or death.
- **Purpose:** Determines when workers need to wear protective equipment, such as respirators, and **when emergency evacuation is necessary**. It is critical for ensuring worker safety in hazardous environments.

Summary:

- **TWA** refers to the average exposure over time.
- **STEL** refers to the limit for short-term exposures.
- **PEL** is a legally enforceable limit by OSHA.
- **REL** is a recommended limit by NIOSH (often more conservative than PEL).
- **IDLH** refers to the maximum level of a toxic substance in the air that a person can be exposed to for 30 minutes without experiencing life-threatening effects or being unable to escape.

OSHA and NIOSH exposure limits

1. **Phosphine (PH_3):**
    - **OSHA PEL: 0.3 ppm (TWA)**
    - **NIOSH REL: 0.3 ppm (TWA) / 1 ppm (STEL)**
    - **IDLH 50 ppm**

2. **Chlorine (Cl_2):**
    - **OSHA PEL: 1 ppm (TWA) 3 ppm (STEL)**
    - **NIOSH REL: 0.5 ppm (TWA) / 1 ppm (STEL)**
    - **IDLH 10 ppm**

3. **Hydrogen Sulfide (H_2S):**
    - **OSHA PEL: 20 ppm (TWA) / 50 ppm (STEL)**
    - **NIOSH REL: 10 ppm (TWA) / 15 ppm (STEL)**
    - **IDLH 100 PPM**

4. **Carbon Dioxide (CO_2):**
    - **OSHA PEL: 5,000 ppm**
    - **NIOSH REL: 5,000 ppm (TWA) / 30,000 ppm (STEL)**
    - **IDLH 40,000 ppm**

5. **Hydrogen Cyanide (HCN):**
    - **OSHA PEL: 10 ppm (TWA)**
    - **NIOSH REL: 4.7 ppm (not to be exceeded)**
    - **IDLH 50 ppm**

6. **Carbon Monoxide (CO):**
    - **OSHA PEL: 50 ppm (TWA)**
    - **NIOSH REL: 35 ppm (TWA) / 200 ppm (STEL)**
    - **IDLH 1,200 ppm**

7. **Hydrofluoric Acid (HF):**
    - **OSHA PEL: 3 ppm (TWA) 6 ppm (STEL)**
    - **NIOSH REL: 3 ppm (TWA) 6 ppm (STEL)**
    - **IDLH 30 ppm**

SD County Hazmat Readings in Parts Per Million (PPM)

Location	Distance from Incident (ft)	Time	PH3	CL2	H2S	CO2	HCN	CO
Main Gate	315	14:30	0	0	0	0	0	0
Venture and Simpson	784	14:35	0	0	0	0	0	0
State St (All	1447	14:36	0	0	0	0	0	0
Enterprise and Auto Park	776	18:15	0	0	0	0	0.5	0
Enterprise Gate	262	18:16	0	0	0	18	2	0
Venture and Simpson	784	18:21	0	0	0	0	0.5	0
Venture and State	1108	18:22	0	0	0	0	0.5	0
Market and Auto Park	2227	18:25	0	0	0	0	0	0
Vinewood and Industrial	2280	18:27	0	0	0	0	0.5	0
Andreasen and Simpson	2522	18:29	0	0	0	0	0.5	0
1287 Simpson	3943	18:32	0	0	0	0	0.5	0

Above readings are the peak (highest detected) readings during the entire incident*

*** CO2 sensors are calibrated to account for typical atmospheric CO2 levels, which generally range between 400-420ppm. This ensures that variations above normal levels are easily detectable****

****Negative reading on Fluoride paper at all locations. Non detect for Hydrofluoric Acid (HF) at all sites****

*** All readings taken were well below acceptable exposure limits and considered expected readings during a routine structure fire****

Air quality monitored by SDG&E

- Via 3rd party contractor; Haley & Aldrich, INC.
- Two types of monitoring units
- First reading taken at 20:30 on 9/5/2024
- Final reading taken at 21:36 on9/6/2024

Air monitoring equipment

1. RAE Systems MultiRAE with P2P
   Calibrated on 9/5/2024.
   Multi-threat chemical detector and gas monitor

2. TSI 7575-x Indoor air quality monitor utilizing the TSI 982 Sensor probe
   Monitor calibrated on 8/29/2024.
   Probe calibrated on 3/11/2024.
   Used to monitor indoor air quality

Gases Monitored

- **LEL (Lower Explosive Limit)**
- **HCN (Hydrogen Cyanide)**
- **CO (Carbon Monoxide)**
- **H2S (Hydrogen Sulfide)**
- **O2 (Oxygen)**

***** Only Carbon Monoxide (CO) levels were detected and had readings above 0 but remained well below acceptable exposure limits. Elevated CO readings are expected result during a structure fire*****

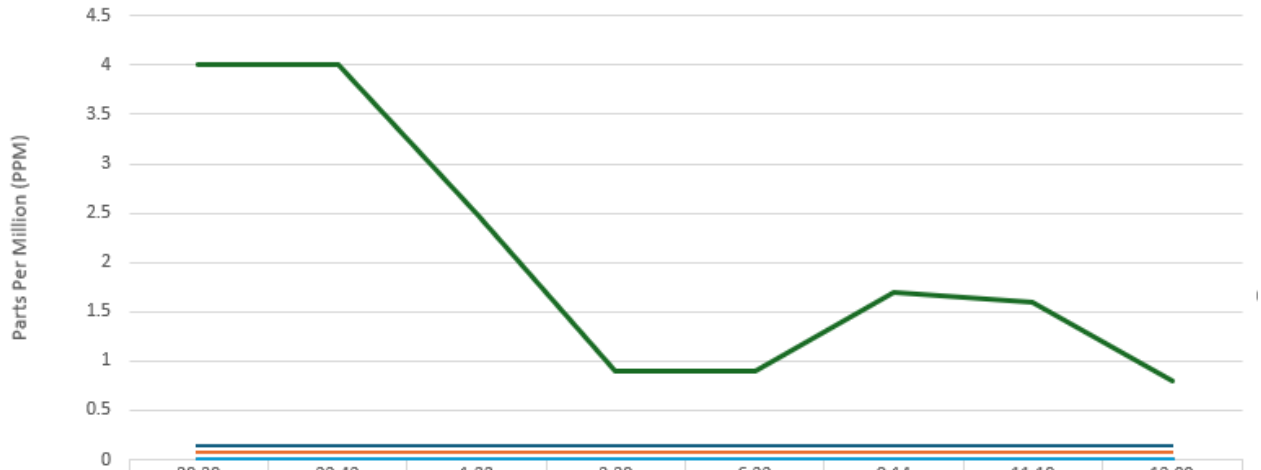
*****Carbon monoxide (CO) levels may be detected in the environment due to various sources of incomplete combustion, including vehicle emissions*****

Haley & Aldrich, INC (SDG&E) Monitoring locations denoted in blue

Monitoring Locations

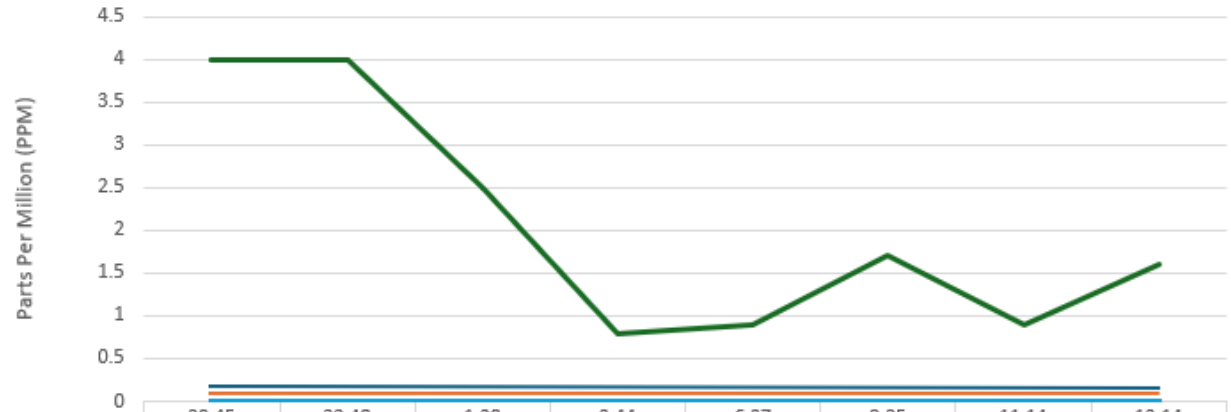
1. **Incident location**: 571 Enterprise St South side of property
2. 571 Enterprise St: Stop sign in equipment yard
3. 571 Enterprise St: Breakroom
4. 571 Enterprise St: Substation
5. 1564 Mission Rd
6. 1856 Commercial St
7. 440 Venture
8. 446 Enterprise St
9. 555 Enterprise St
10. 630 Alpine Wy
11. Alpine Wy and Don Lee
12. Auto Park and Mission Rd
13. Auto Park and Alpine Wy
14. Auto Park and Enterprise
15. Auto Park and Citracado
16. Auto Park and Country Club Dr
17. Enterprise St and Mission Rd
18. Simpson Wy and Ventrure St

1. Air monitoring at SDG&E site location



	20:30 9/5/2024	22:42 9/5/2024	1:32 9/6/2024	3:39 9/6/2024	6:32 9/6/2024	9:14 9/6/2024	11:10 9/6/2024	13:09 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	4	4	2.5	0.9	0.9	1.7	1.6	0.8
H2S	0	0	0	0	0	0	0	0

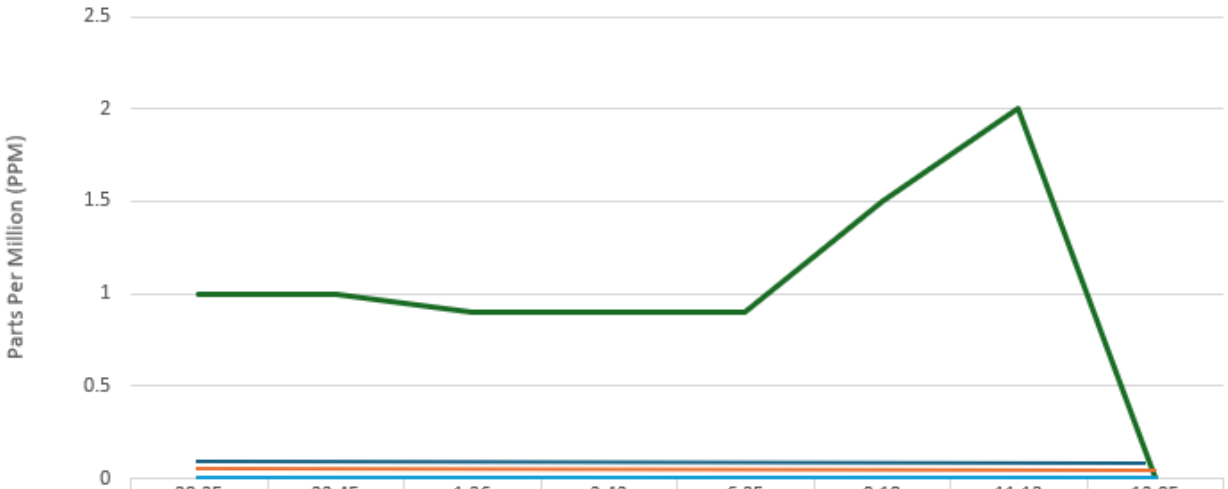
2. Air monitoring at Stop Sign NE corner of Equipment Storage yard



	20:45 9/5/2024	22:48 9/5/2024	1:38 9/6/2024	3:44 9/6/2024	6:37 9/6/2024	9:25 9/6/2024	11:14 9/6/2024	13:14 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	4	4	2.5	0.8	0.9	1.7	0.9	1.6
H2S	0	0	0	0	0	0	0	0

****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

3. Air monitoring at SDG&E Breakroom



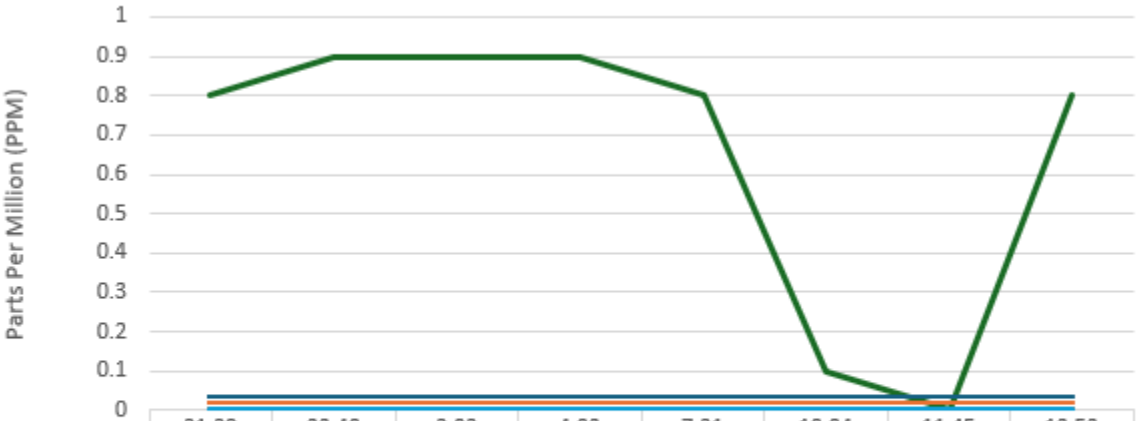
	20:35 9/5/2024	22:45 9/5/2024	1:36 9/6/2024	3:42 9/6/2024	6:35 9/6/2024	9:18 9/6/2024	11:12 9/6/2024	13:05 9/6/2024
LEL(%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	1	1	0.9	0.9	0.9	1.5	2	0
H2S	0	0	0	0	0	0	0	0

4. Air Monitoring at North SDG&E substation

	20:47 9/5/2024	22:52 9/5/2024	1:43 9/6/2024	3:49 9/6/2024	7:16 9/6/2024	9:26 9/6/2024	11:17 9/6/2024	13:22 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	1	1	2.5	0.9	0.9	0.9	0.8	3
H2S	0	0	0	0	0	0	0	0

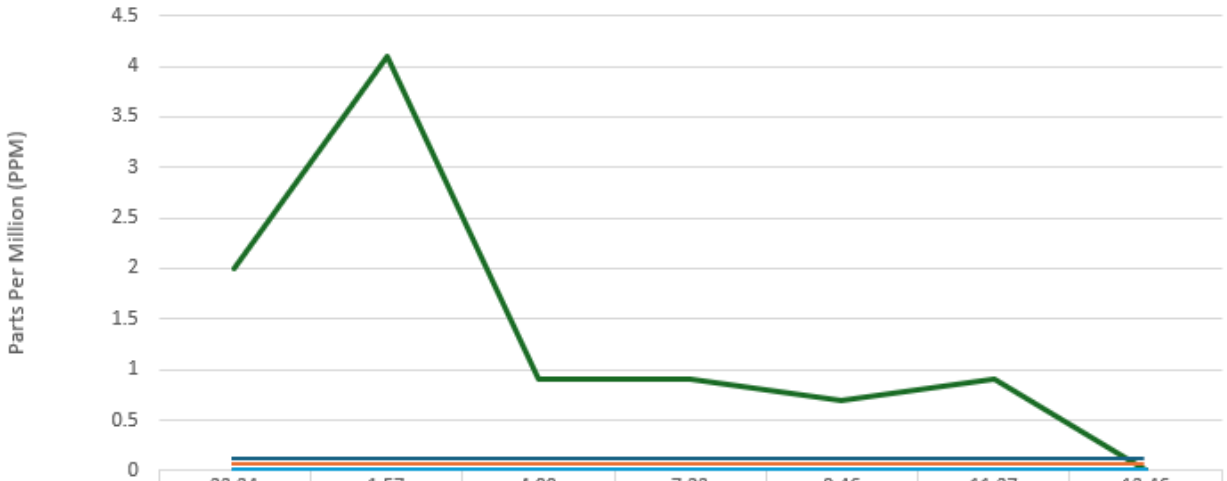
****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

5. Air monitoring at 1564 Mission Rd



	21:29 9/5/2024	23:40 9/5/2024	2:03 9/6/2024	4:03 9/6/2024	7:31 9/6/2024	10:04 9/6/2024	11:45 9/6/2024	13:53 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	0.8	0.9	0.9	0.9	0.8	0.1	0	0.8
H2S	0	0	0	0	0	0	0	0

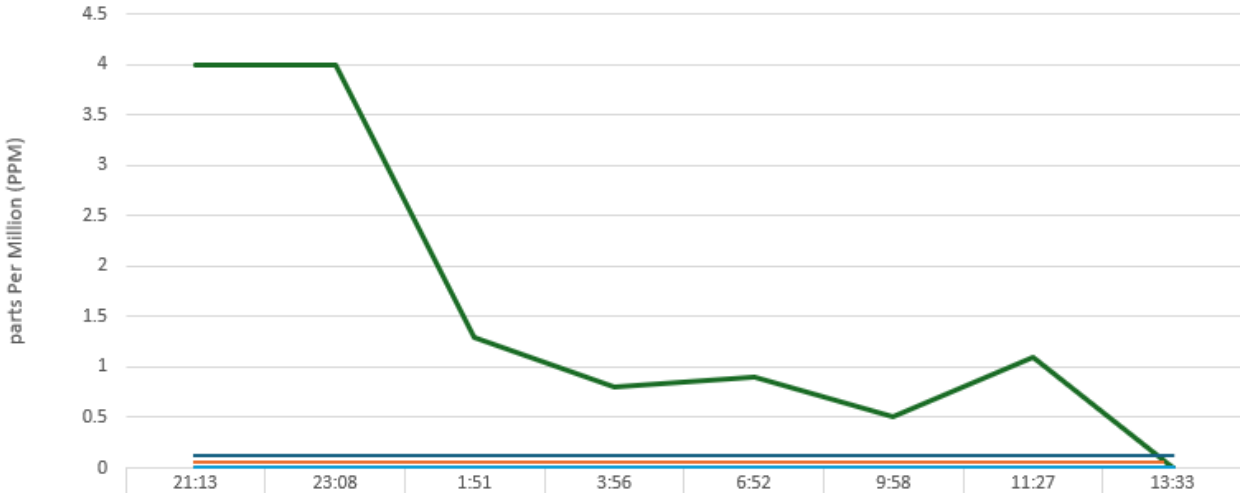
6. Air monitoring at 1856 Commercial St



	23:34 9/5/2024	1:57 9/6/2024	4:00 9/6/2024	7:23 9/6/2024	9:46 9/6/2024	11:37 9/6/2024	13:46 9/6/2024
LEL(%)	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0
CO (PPM)	2	4.1	0.9	0.9	0.7	0.9	0
H2S	0	0	0	0	0	0	0

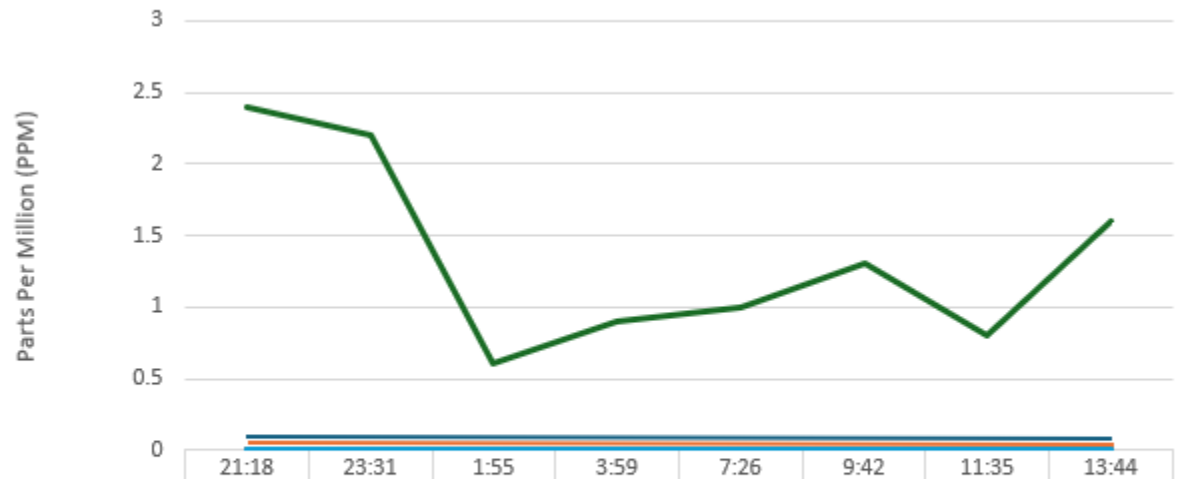
****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

7. Air monitoring at 440 Venture Rd



	21:13 9/5/2024	23:08 9/5/2024	1:51 9/6/2024	3:56 9/6/2024	6:52 9/6/2024	9:58 9/6/2024	11:27 9/6/2024	13:33 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	4	4	1.3	0.8	0.9	0.5	1.1	0
H2S	0	0	0	0	0	0	0	0

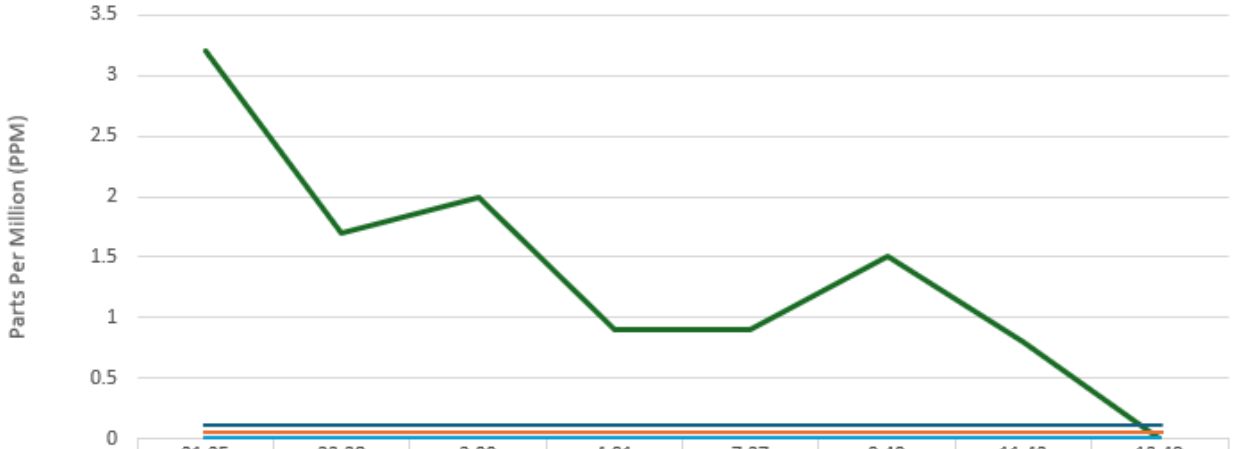
8. Air monitoring at 446 Enterprise



	21:18 9/5/2024	23:31 9/5/2024	1:55 9/6/2024	3:59 9/6/2024	7:26 9/6/2024	9:42 9/6/2024	11:35 9/6/2024	13:44 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO (PPM)	2.4	2.2	0.6	0.9	1	1.3	0.8	1.6
H2S	0	0	0	0	0	0	0	0

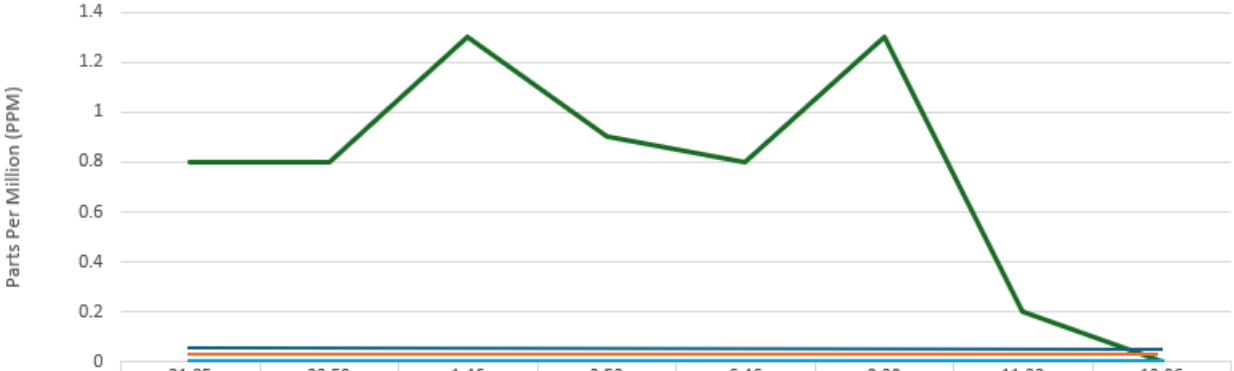
****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

9. Air monitoring at 555 Enterprise St



	21:25 9/5/2024	23:38 9/5/2024	2:00 9/6/2024	4:01 9/6/2024	7:27 9/6/2024	9:49 9/6/2024	11:42 9/6/2024	13:49 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	3.2	1.7	2	0.9	0.9	1.5	0.8	0
H2S	0	0	0	0	0	0	0	0

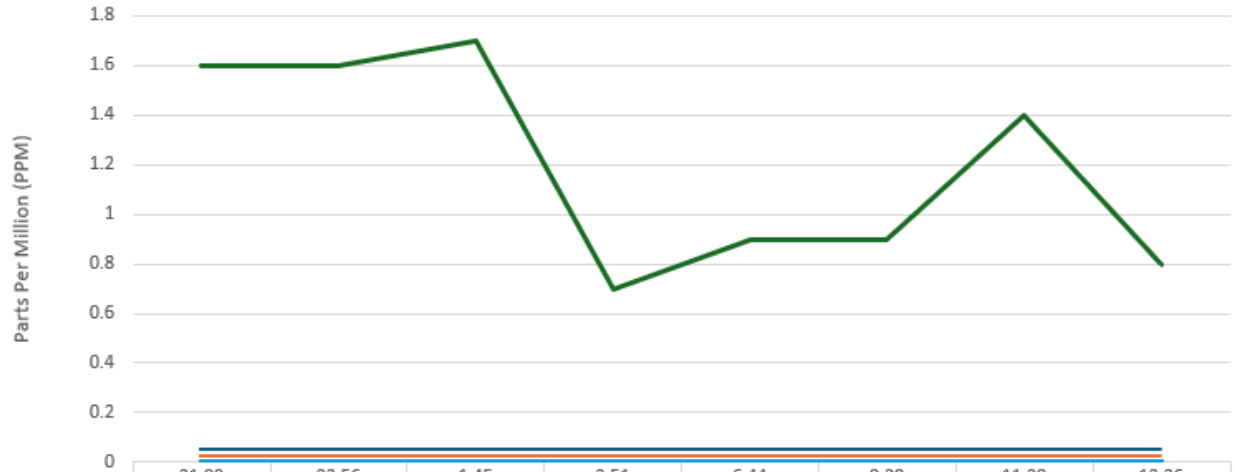
10. Air monitoring at 630 Alpine Wy



	21:05 9/5/2024	22:59 9/5/2024	1:46 9/6/2024	3:52 9/6/2024	6:46 9/6/2024	9:30 9/6/2024	11:23 9/6/2024	13:26 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	0.8	0.8	1.3	0.9	0.8	1.3	0.2	0
H2S	0	0	0	0	0	0	0	0

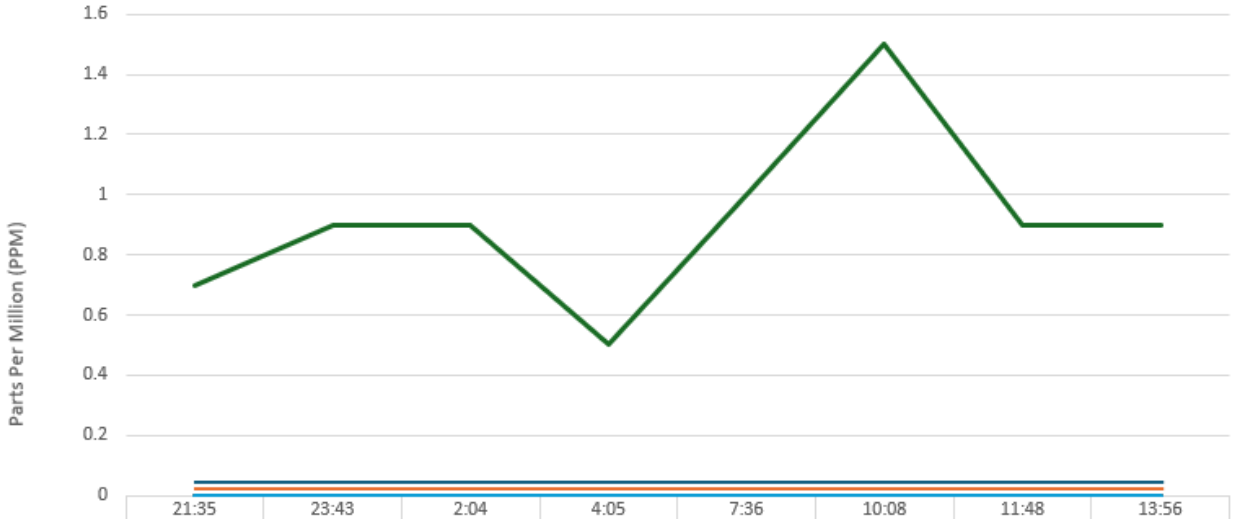
****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

11. Air monitoring at Alpine Wy and Don Lee



	21:00 9/5/2024	22:56 9/5/2024	1:45 9/6/2024	3:51 9/6/2024	6:44 9/6/2024	9:29 9/6/2024	11:20 9/6/2024	13:26 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	1.6	1.6	1.7	0.7	0.9	0.9	1.4	0.8
H2S	0	0	0	0	0	0	0	0

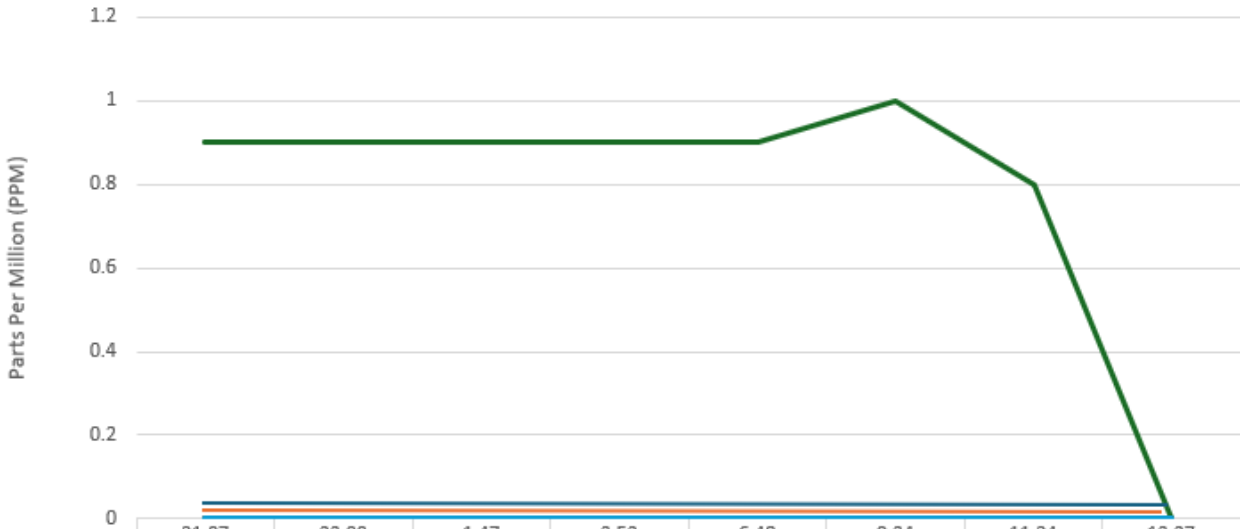
12. Air monitoring at Auto Park Way and Mission Rd



	21:35 9/5/2024	23:43 9/5/2024	2:04 9/6/2024	4:05 9/6/2024	7:36 9/6/2024	10:08 9/6/2024	11:48 9/6/2024	13:56 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	0.7	0.9	0.9	0.5	1	1.5	0.9	0.9
H2S	0	0	0	0	0	0	0	0

****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

13. Air monitoring at Auto Park and Alpine Wy



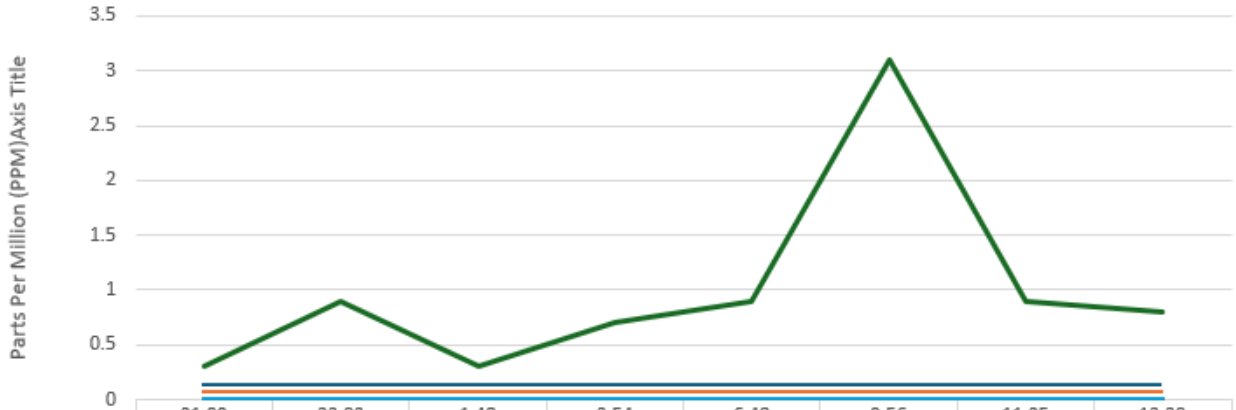
	21:07 9/5/2024	23:00 9/5/2024	1:47 9/6/2024	3:52 9/6/2024	6:48 9/6/2024	9:34 9/6/2024	11:24 9/6/2024	13:27 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	0.9	0.9	0.9	0.9	0.9	1	0.8	0
H2S	0	0	0	0	0	0	0	0

14. Air monitoring at Auto Park and Enterprise St

	21:10 9/5/2024	23:05 9/5/2024	1:49 9/6/2024	3:55 9/6/2024	7:21 9/6/2024	9:41 9/6/2024	11:34 9/6/2024	13:32 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	1.2	1.2	0.9	0.6	1.4	1.7	0.4	0.8
H2S	0	0	0	0	0	0	0	0

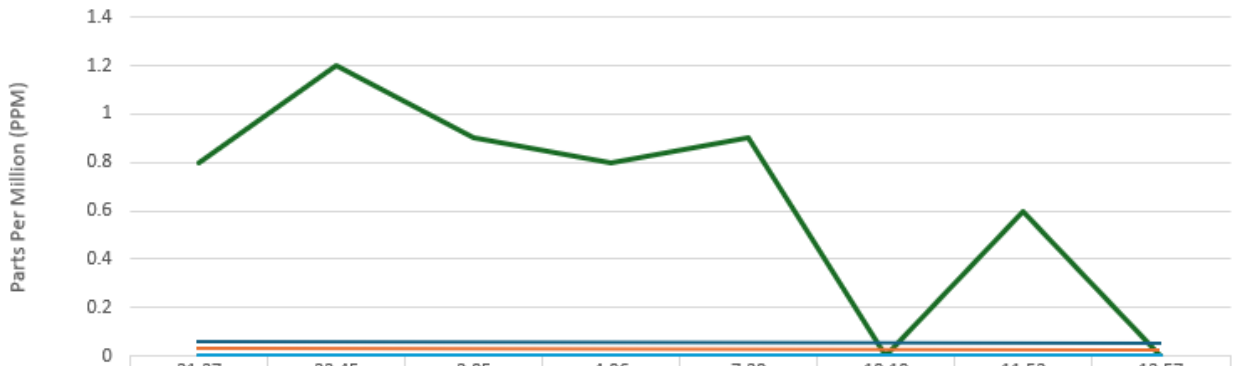
****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

15. Air monitoring at Auto Park and Citracado



	21:09 9/5/2024	23:03 9/5/2024	1:48 9/6/2024	3:54 9/6/2024	6:48 9/6/2024	9:56 9/6/2024	11:25 9/6/2024	13:30 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	0.3	0.9	0.3	0.7	0.9	3.1	0.9	0.8
H2S	0	0	0	0	0	0	0	0

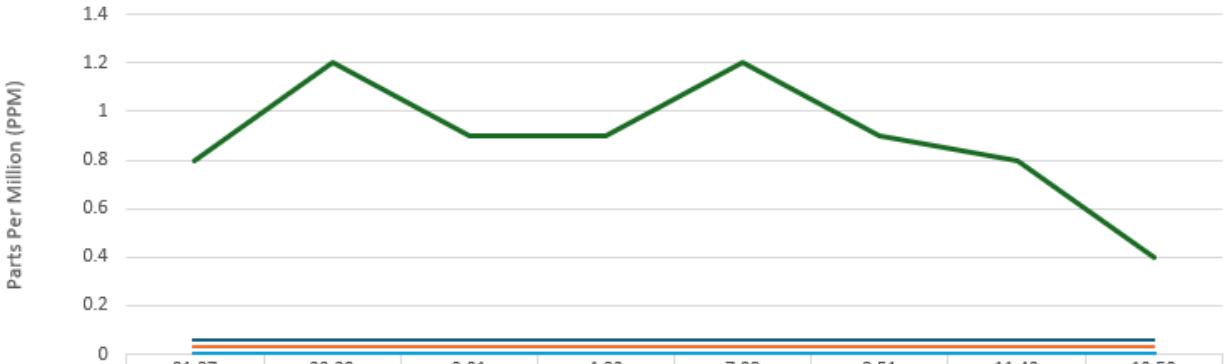
16. Air monitoring at Auto Park Way/Country Club Dr



	21:37 9/5/2024	23:45 9/5/2024	2:05 9/6/2024	4:06 9/6/2024	7:39 9/6/2024	10:10 9/6/2024	11:52 9/6/2024	13:57 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	0.8	1.2	0.9	0.8	0.9	0	0.6	0
H2S	0	0	0	0	0	0	0	0

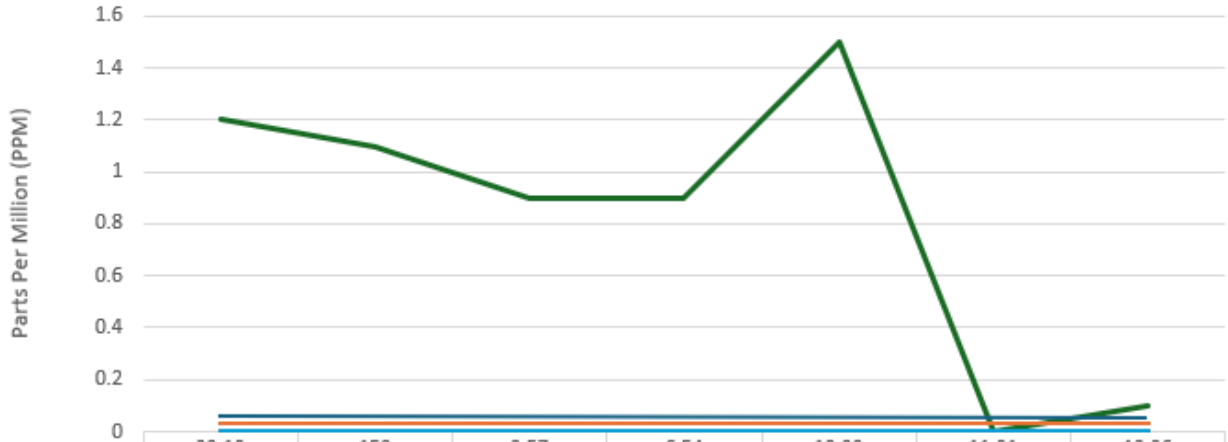
****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

17. Air monitoring at Enterprise and Mission



	21:27 9/5/2024	23:39 9/5/2024	2:01 9/6/2024	4:02 9/6/2024	7:29 9/6/2024	9:51 9/6/2024	11:43 9/6/2024	13:50 9/6/2024
LEL (%)	0	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0	0
CO	0.8	1.2	0.9	0.9	1.2	0.9	0.8	0.4
H2S	0	0	0	0	0	0	0	0

18. Air monitoring at Simpson and Venture



	23:10 9/5/2024	152 9/6/2024	3:57 9/6/2024	6:54 9/6/2024	10:00 9/6/2024	11:31 9/6/2024	13:36 9/6/2024
LEL (%)	0	0	0	0	0	0	0
HCN	0	0	0	0	0	0	0
CO	1.2	1.1	0.9	0.9	1.5	0	0.1
H2S	0	0	0	0	0	0	0

****Urban CO levels are typically higher than in rural areas due to vehicle emissions and industrial processes. Although average concentrations are low (0.5 to 5 ppm), they can increase near heavy traffic or industrial sites, especially during rush hours. The concentrations shown on the graphs remained significantly below harmful thresholds and do not pose any significant health risks ****

Findings:

On September 5 at 12:09, units from the Escondido Fire Department responded to a fire at the SDG&E battery storage facility at 571 Enterprise Street. Upon arrival, crews found an active fire in a Lithium-Ion battery bank. Due to the specific hazards of such fires, a defensive strategy was employed, focusing on protecting adjacent structures containing additional batteries by applying water to those adjacent structures. Evacuations of the surrounding area began at approximately 13:00 on September 5 and remained in effect until September 7. San Diego County Hazmat arrived to conduct air monitoring from 14:30 to 18:30 at which time only normal products combustion of a structure fire were detected and at levels considered by NIOSH and OSHA to be well below exposure thresholds. Haley & Aldrich Inc., SDG&E's third-party contractor, began air quality monitoring later that evening and concluded on September 7. The fire was fully extinguished at 01:10 on September 6, with precautionary air monitoring continuing for an additional 12 hours into the afternoon of September 7. At no time during the incident did the levels of Oxygen deviate from 20.9 percent which is considered normal atmospheric level. Any decrease in the percentage of Oxygen would indicate that there was some unknown gas in the atmosphere that was not able to be detected by monitoring equipment. Fortunately, no such deviation was detected. The use of Fluoride reactive test strips was negative at all locations. Additionally, Hydrofluoric acid was not detected at any of the sampling locations.

Information Requests:

San Diego County HAZMAT/ San Diego City Fire Department HAZMAT
(619) 595-4633

San Diego Gas & Electric/ Haley & Aldrich INC
(877) 866-20266

ATTACHMENT 7.

OHIO EPA AIR QUALITY IMPACT ANALYSIS OF THE ESRG BATTERY BURN SITE IN PIQUA, OHIO AND METHODOLOGY DESCRIBING HOW DISTANCES WERE ASCERTAINED.

Environmental Protection Agency

Air Quality Impact Evaluation for Piqua, ESRG Battery Burning

Background

In 2018, the Regional Air Pollution Control Agency (RAPCA) approved an open burning request from the city of Piqua for the burning of lithium-ion batteries for fire training and research. Most recently, the Energy Safety Response Group (ESRG) was conducting the testing and training activities. In September 2023, RAPCA and Ohio EPA conducted an inspection and determined that ESRG's activities were not consistent with an open burning authorization. After meeting with Ohio EPA and RAPCA, ESRG stopped the open burning. Ohio EPA then formally revoked the burn permission after discussions with the City. Neighbors of the burn site are concerned about the environmental and health impacts of the unsupervised burns. To gain a better understanding of the burns' impacts on air quality, Ohio EPA conducted computer modeling of select burn events to provide specifics about the estimated quantity of emissions and predicted ground-level concentrations.

Modeling Overview

Lithium-ion battery technology is relatively new and there is limited published research about the emissions to expect when these batteries burn. There is ongoing active research into this issue, and we anticipate additional credible and tested information to emerge about the batteries that will help guide agencies reviewing these types of fires in the future.

The emissions data that ESRG provided to Ohio EPA did not contain sufficient information to develop the model, so Ohio EPA used available data on the largest burns and published documents on emissions for these types of operations to inform the model. Because of limited research and incomplete emission data, Ohio EPA's Division of Air Pollution Control (DAPC) took a conservative approach and looked at worst-case scenarios with its modeling. DAPC used U.S. EPA's preferred model to assess potential ground-level impacts for the three largest burns conducted on the site. These burns happened on Apr. 6, Jul. 27, and Aug. 8, 2023. After reviewing available information on typical emissions from the batteries, DAPC focused on hydrogen fluoride because it was the most harmful of potential emissions.

Air Emission Modeling Results

Ohio EPA mapped out potential contaminant plumes based on meteorological conditions reported at the Dayton International Airport for the select burn dates. The model consisted of all known circumstances of the burns including weather, wind direction, burn duration, and mass of battery combusted. The modeling showed all potential areas of emissions exposure were within 1,000 feet of the facility's fence line.

None of the modeled days showed the possibility of serious and/or long-term health effects from emissions exposure during the burn events.

Two of the modeled days (April 6 and July 27) showed there was a potential for exposures that could lead to short-term, mild health symptoms. On those days it was possible that neighbors to the northeast and southeast of the burn site, including the dog park, could have experienced eye irritation, throat burning, headache, shortness of breath, chest pain, and nausea. Again, our modeling and health impact evaluation was conservative and took into consideration the most harmful of potential emissions and how they may have affected the most vulnerable in the vicinity (children, the elderly, and compromised health conditions, like asthma).

What should residents concerned about health impacts do?

Anyone who believes they may have been affected when the burns occurred should talk with their doctor. Ohio EPA does not anticipate long-term chronic health effects from emissions produced at the site.

Contact

Several parties are looking into the environmental impacts of this open burning violation.

For more information on air impacts, contact Mary McCarron at Ohio EPA's Communications and Outreach Office at ***mary.mccarron@epa.ohio.gov***, or 614.644.2160.

For more information on drinking water testing, soil impacts, and work of the city of Piqua, please visit ***https://piquaoh.org/1587/Public-Safety-Training-Center***.

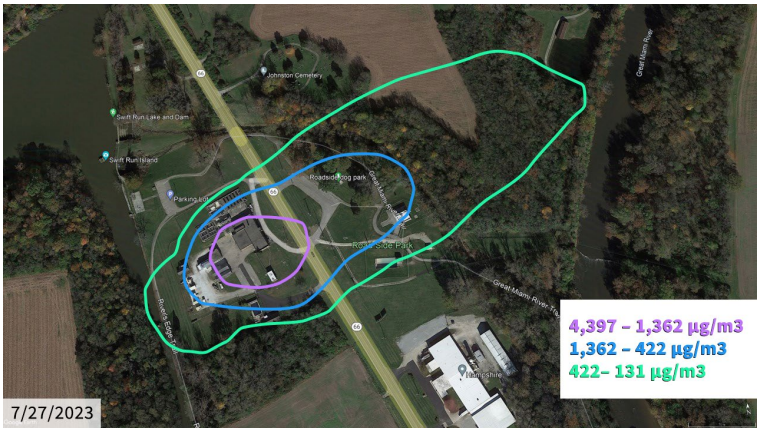
Air Quality Impact Evaluation for Piqua

Air Emission Modeling Maps (Click to Enlarge)

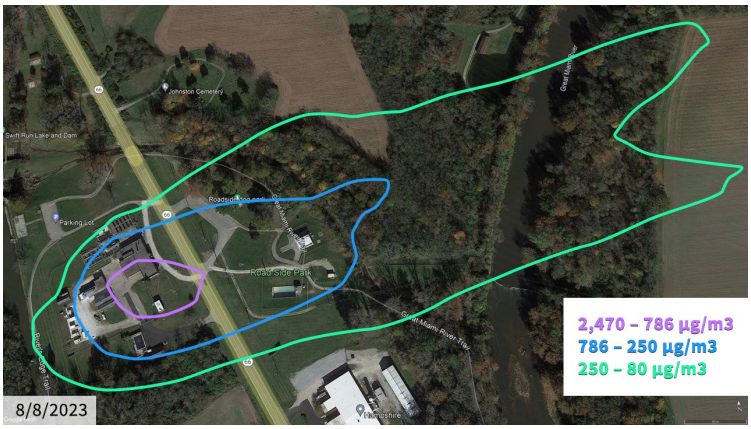
Hydrogen Fluoride (HF) is a colorless gas at room temperature that can readily mix with water to form hydrofluoric acid; both compounds are considered highly toxic. The modeled data was evaluated against the Acute Exposure Guideline Level (AEGL) established by U.S. EPA due to the applicability of exposure times and health outcomes.

- AEGL-1 (820µg/m^3, 1hr exposure) – Relates to mild symptoms (eye irritation, throat burning, headache, shortness of breath, chest pain, cough, and nausea) – Highest level of potential exposure in Piqua.
- AEGL-2 (20,000 µg/m^3, 1hr exposure) - relates to moderate and/or long-term symptoms.
- AEGL-3 (44,000 µg/m^3, 1hr exposure) - potentially fatal.

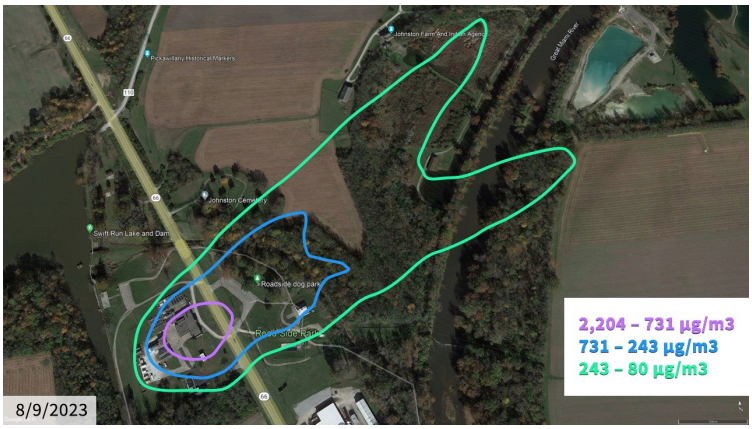
Predicted ground-level impacts on Apr. 6, 2023. Potential for short-term, mild health symptoms.



Predicted ground-level impacts on Jul. 27, 2023. Potential for short-term, mild health symptoms.



Predicted ground-level impacts Aug. 8, 2023. Low risk of potential health symptoms.



Predicted ground-level impacts on Aug. 9, 2023. Low risk of potential health symptoms.

Plotted Isoconcentration Boundary Points for ESRG Burn Test Conducted July 27, 2023

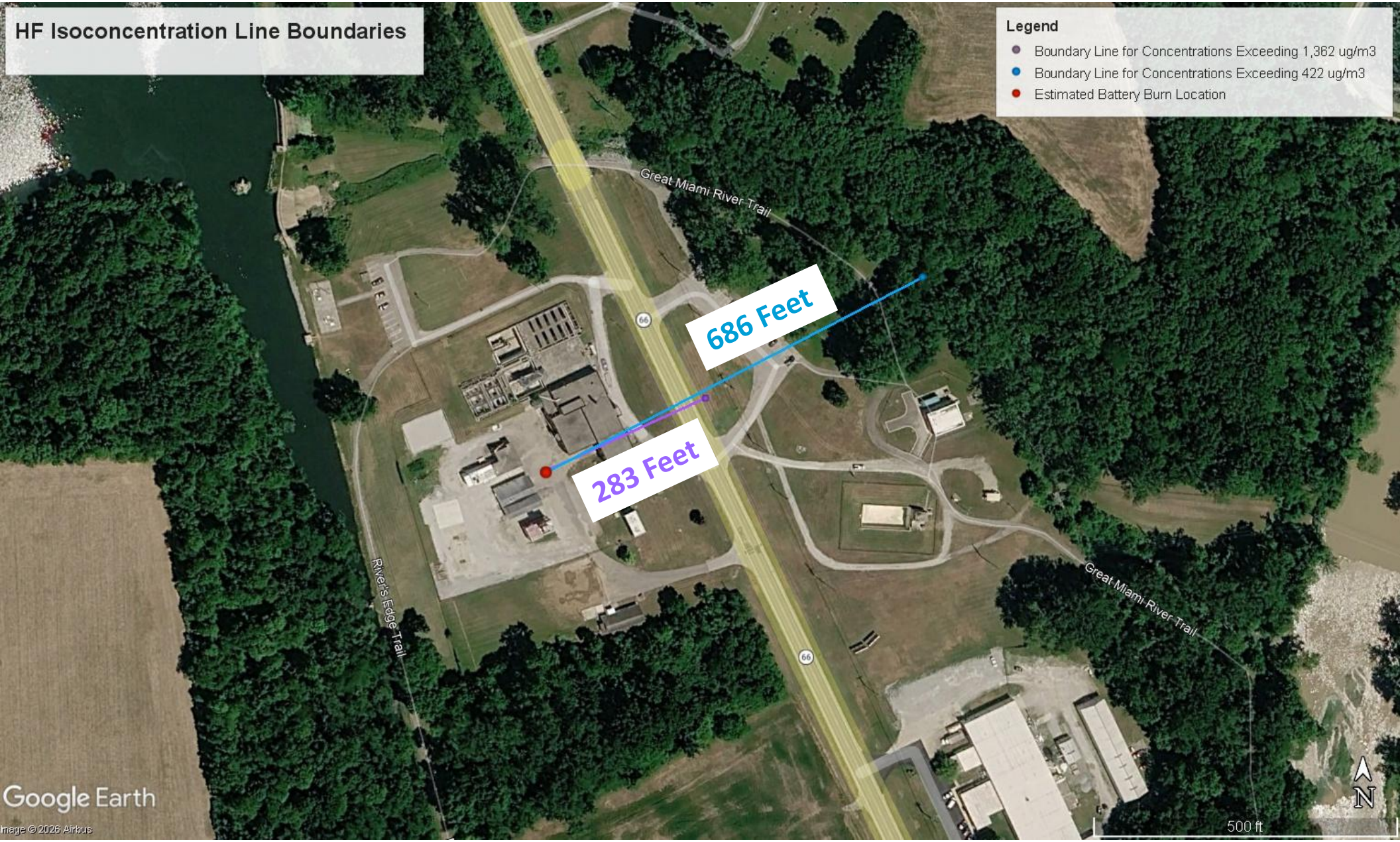


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Image and measurements were derived using Google Earth Tools