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Comments on Staff Assessment Appendix D Dispersion and Frequency Analysis

See Attached Comment Letter

Additional submitted attachment is included below.

California Energy Commission
Corby Battery Energy Storage System Project
Docket No. 24-OPT-05

Comments on Appendix D
Dispersion and Frequency Analysis

Commissioners:

I submit these comments regarding Appendix D of the Staff Assessment, Dispersion and Frequency Analysis.

Appendix D is important because it provides the technical modeling Staff relies upon to evaluate off-site exposure from battery thermal runaway, off-gassing, fire, and related upset conditions.

The Appendix contains substantial technical work. It identifies nearby residences as sensitive receptors, uses AERMOD dispersion modeling, evaluates both fire and non-fire scenarios, develops pollutant source terms, and attempts to estimate the frequency of BESS incidents.

My concern is not that Staff failed to perform modeling. My concern is that some of the modeling results themselves raise important questions that should be resolved before the Commission concludes that public-health and emergency-response impacts are less than significant.

1. Staff's Own Modeling Predicts an Acute Exposure Guideline Exceedance at Nearby Residences

The most important result in Appendix D appears in the non-fire off-gassing scenario.

Staff calculates maximum non-fire impact distances for multiple pollutants and reports that NO₂ exceeds the one-hour AEGL-1 threshold out to approximately 2,029 feet.

The receptor concentration table then shows a modeled NO₂ concentration of approximately 2,587.5 µg/m³ at the North 1 receptor, compared with a one-hour AEGL-1 value of approximately 941 µg/m³. The same table shows NO₂ concentrations above that AEGL-1 value at five identified residences: North 1, North 2, North 3, South 1, and West 1. Appendix D identifies those receptors at approximately 860, 1,650, 1,650, 960, and 2,925 feet, respectively, from the closest battery unit.

That is not a trivial result.

AEGL-1 is not a lethality threshold, and an exceedance does not mean irreversible injury is expected. But Staff uses AEGLs because they identify concentrations above which members of the general population, including susceptible individuals, could experience notable discomfort, irritation, or other effects.

Accordingly, the Commission should clearly explain:

How does a modeled exceedance of the selected acute public-health guideline at nearby residences support a less-than-significant public-health conclusion?

The answer should identify the mitigation, operational controls, notification procedures, monitoring, or other measures that prevent or materially reduce the modeled exposure.

2. The Non-Fire Off-Gassing Scenario May Create the Largest Off-Site Toxic Exposure

Appendix D distinguishes between a fire scenario and a non-fire battery malfunction scenario.

The fire scenario involves a hot, buoyant plume. Because the heated gases rise, modeled ground-level toxic exposure distances are generally relatively short. Staff reports approximate fire-case AEGL-1 distances of 297 feet for HF, 125 feet for acrolein, and 16 feet for NO₂.

The non-fire case behaves differently. The gases are cooler and therefore have much less buoyancy. As a result, Appendix D calculates the approximately 2,029-foot NO₂ AEGL-1 impact distance discussed above.

A battery malfunction does not have to involve visible flames to create a meaningful off-site exposure concern. Under Staff's own modeling assumptions, the non-fire off-gassing event produces the larger modeled public-health footprint.

The Commission should therefore ensure that emergency planning, detection, notification, shelter-in-place, and monitoring procedures address non-fire off-gassing events with the same seriousness as fire events.

3. Staff Should More Clearly Explain the Scale-Up From Cell-Level Testing to the Modeled Multi-Rack Event

The non-fire source term relies in part on LG cell-level UL9540A test data. Appendix D then scales those results to a much larger event involving 3,360 cells, two racks, a 10-hour event duration, approximately 243,232 liters of gas, and a gas production rate of approximately 6.8 liters per second.

That may be a reasonable conservative modeling approach, but it is a major analytical step.

The Commission should understand the project-specific basis for assuming:

- the number of cells participating in the event;
- the number of affected racks;
- the propagation sequence;
- the duration of off-gassing;
- the assumed ventilation or release rate;
- battery state of charge; and
- whether alternative failure sequences would produce materially different receptor concentrations.

Because the resulting source term drives the modeled residential exposure, that analytical bridge should be transparent.

4. The Incident-Frequency Analysis Shows Substantial Uncertainty

Appendix D attempts to estimate how often a battery incident might occur at a facility the size of Corby using recent U.S. BESS incident data together with installed MW-years.

The results vary substantially depending upon the period selected. Using the most recent five years of data, Staff calculates a Corby-wide expected interval of approximately 11.06 years between incidents. Using the most recent three years, the estimate becomes approximately 67.20 years between incidents.

That range should not be treated as a precise prediction. Appendix D itself recognizes that only one incident was identified among facilities installed within the most recent three-year period and that one incident is not sufficient to establish a trend.

The Commission should describe the frequency analysis as an estimate with substantial uncertainty and explain how that uncertainty is incorporated into emergency planning, facility layout, responder training, monitoring requirements, public notification, and the ultimate significance determination.

5. Staff's 0.7 Percent Figure Is an Hourly Meteorological Frequency, Not a Demonstrated Ten-Hour Event Probability

The Public Health analysis states that NO₂ exceeded AEGL-1 at the nearest receptor during 301 of 43,824 modeled meteorological hours, or approximately 0.7 percent of the modeled hours. Staff then states that, even if a BESS event occurs, the probability that nearby residents would experience notable but temporary symptoms is only 0.7 percent.

Those are not necessarily the same statistic. Appendix D's non-fire source term assumes two racks, 3,360 cells, and a ten-hour off-gassing event. A ten-hour event encounters a sequence of meteorological hours. Dividing 301 qualifying hours by 43,824 total hours establishes the fraction of individual modeled hours that produce an AEGL-1 exceedance while emissions are occurring; by itself, it does not establish the probability that a ten-hour incident beginning at an arbitrary time will overlap at least one qualifying meteorological hour.

For illustration only, if the qualifying hours were statistically independent, a ten-hour event would have approximately a 6.7 percent probability of encountering at least one qualifying hour, rather than 0.7 percent. Actual meteorological hours are not independent and qualifying conditions may be temporally clustered. That is precisely why the hourly sequence matters. I am not asserting that 6.7 percent is the correct event-level probability. I am asking Staff to perform and disclose the appropriate temporal analysis rather than equating an hourly frequency with a ten-hour event probability.

This distinction is material because Staff uses the 0.7 percent characterization to support its conclusion that a BESS incident exposing sensitive receptors to substantial pollutant concentrations would be very unlikely. The Commission should identify the methodology used to convert 301 qualifying individual hours into an event-level probability for the modeled ten-hour release, including how consecutive meteorological hours and possible clustering were treated.

6. Staff Should Reconcile the 1,200-MWh Corby Input With the Installed-MWh Exposure Metric Used in the Frequency Analysis

Appendix D calculates incident frequency using historical operating exposure expressed in installed MWh-years and then applies that rate to what Table 16 identifies as 1,200 MWh of Corby 'installed MWh.' The project, however, is described as having a 300-MW/1,200-MWh delivery capability while the battery configuration includes approximately 303 enclosures initially and up to 341 enclosures at full buildout. Appendix D identifies the modeled LG unit at approximately 5.11 MWh.

At approximately 5.11 MWh per enclosure, 303 enclosures correspond to roughly 1,548 MWh of physical battery capacity and 341 enclosures to roughly 1,743 MWh. Those figures are materially greater than 1,200 MWh. I do not assume that enclosure nameplate capacity must necessarily be the correct exposure metric. The issue is whether the historical MWh-year denominator and the Corby project input use the same definition of installed capacity.

Because a larger project-exposure input produces a higher expected incident rate under Staff's own methodology, the Commission should identify the capacity metric used in the historical dataset, explain why 1,200 MWh is the comparable Corby value, and recalculate Table 16 if the historical denominator instead reflects physical/nameplate installed battery capacity.

7. The Dispersion Results Should Be Connected Directly to Emergency Protective Actions

Appendix D identifies actual nearby residences as sensitive receptors and calculates pollutant concentrations at those locations. But dispersion modeling becomes operationally meaningful only when the modeled hazard is translated into protective action.

The record should clearly answer:

- At what concentration does the project initiate public notification?
- At what concentration or modeled condition is shelter-in-place appropriate?
- At what point would evacuation be considered?
- How quickly could the plume reach the nearest residence?
- Which roads would remain available for evacuation or emergency access under different wind directions?
- How would nearby residents receive instructions during an off-gassing event?
- What real-time monitoring data would be available to Dixon Fire Department and other responders?

Otherwise, the Commission knows where a plume may travel but has not fully established what will happen to protect the people living within that area.

8. Staff Should Explain How the Flammable-Gas Analysis Translates Into Facility Design and Emergency Planning

Appendix D recognizes that battery off-gas is not merely toxic. It is also flammable.

The flammability analysis for the LG JF2 LFP cell identifies hydrogen at approximately 59.3 mole percent and calculates a lower flammability limit for the mixture of approximately 5.47 percent.

Appendix D also acknowledges that AERMOD is not designed to evaluate explosion or deflagration consequences and therefore relies upon separate flammable-gas modeling.

I am not suggesting that the record establishes an off-site explosion hazard extending to neighboring residences. It does not.

But the Commission should clearly identify the flammable-gas consequence distances, assumptions concerning enclosure ventilation and confinement, relationship between those distances and battery-unit spacing, potential for ignition following accumulation of off-gas, and how those results are incorporated into facility design and emergency-response procedures.

9. Local Wind Conditions Require Evaluation Beyond the Predominant Wind Direction

Appendix D uses five years of hourly meteorological data from Nut Tree Airport, and its wind rose reflects the predominant southwest wind pattern experienced in this area.

However, local conditions are more variable than a single prevailing direction suggests. Based on my long-term observation of conditions in the immediate project area, residents also experience significantly warm, dry northerly winds during some spring and summer hot spells, as well as occasional easterly winds in spring.

Those less frequent wind regimes matter because they place different residences, agricultural properties, and roadways downwind of the project.

The issue is not that Nut Tree Airport data are necessarily inappropriate. The question is whether the five-year dataset adequately captures the full range of locally relevant meteorological conditions at this exposed agricultural site.

The Commission should therefore explain whether:

- warm, dry northerly wind events are adequately represented in the meteorological dataset;
- spring easterly wind events are adequately represented;
- the dispersion analysis identifies the worst-case receptor under each significant wind regime; and
- those changing plume directions are incorporated into emergency notification, shelter-in-place, evacuation, and responder-access planning.

Staff should also explain whether hot, dry northerly conditions could materially affect plume behavior, fire behavior, or emergency-response assumptions.

A prevailing southwest wind does not mean every reasonably foreseeable incident will send a plume in the same direction.

10. The Fire Scenario Uses a Substantial Failure Case, but the Assumptions Should Remain Transparent

Appendix D does not model only a minor fire. For the fire case, Staff assumes the entire 5.11-MWh LG unit participates in the event. The model uses a six-hour duration and estimates approximately 17,119 kilograms of total material emissions from the battery.

That is an important conservative feature of the analysis and should be acknowledged.

At the same time, the Commission should clearly distinguish the assumptions that are deliberately conservative, the assumptions derived from project-specific testing, and the assumptions derived from literature or experience with other BESS installations. Just as importantly, the Commission should explain what event the modeled single-unit fire is intended to bound and what happens analytically if fire or thermal effects propagate beyond one unit.

11. Agricultural and Groundwater Protection Requires Baseline and Long-Term Post-Incident Monitoring

Appendix D evaluates deposition of particulate material from a battery fire and discusses potential effects on surrounding agricultural land. That is particularly relevant because the project is surrounded by agricultural property and overlies groundwater resources.

Comparisons with other battery-fire incidents may provide useful context, but incidents elsewhere can involve different battery chemistries, facility configurations, fire sizes, soil conditions, and groundwater settings.

The Commission should therefore require a practical means of determining whether a Corby incident affects nearby land or water, including pre-project baseline sampling, immediate post-incident sampling, identification of battery-specific contaminants of concern, and continued monitoring when circumstances indicate that contaminants may migrate through soil or groundwater.

Without an adequate baseline, it may be difficult after an incident to determine whether detected contaminants originated from Corby or from historical agricultural or other activity.

12. The 2023 East Hampton BESS Fire Demonstrates Why Monitoring Cannot End With Immediate Post-Incident Sampling

A recent real-world example illustrates why this issue deserves particular attention.

A May 31, 2023 fire occurred at the East Hampton Energy Storage Center in New York, a BESS facility associated with NextEra. In May 2026, the Suffolk County Water Authority filed federal litigation against East Hampton Energy Storage Center, LLC and LG-related defendants concerning PFPrA detected in drinking-water wells near the facility.

The Water Authority alleges that fire-suppression water from the 2023 incident transported battery-related contamination into the environment and ultimately groundwater. The litigation remains pending, and the alleged causal connection should not be treated as a finally adjudicated fact.

The significance for Corby is not dependent upon the ultimate outcome of that lawsuit.

The East Hampton experience demonstrates a practical problem: contaminants associated with a BESS incident may not necessarily be identified through immediate post-fire sampling, and potential groundwater effects may emerge or be detected substantially later.

The Corby record should therefore establish, before operation, what will happen following an incident involving substantial fire-suppression water, runoff, or deposition. At minimum, the Commission should require:

- pre-operation baseline groundwater and soil sampling at appropriate locations;
- a battery-chemistry-specific list of contaminants to be tested following an incident;
- immediate post-incident sampling of soil, runoff, surface water, and groundwater where appropriate;
- follow-up groundwater monitoring over a period sufficient to detect delayed migration;
- notification of nearby well owners and agricultural operators when an incident creates a plausible contamination pathway; and
- clear responsibility for investigation, remediation, replacement water, and long-term monitoring if contamination is detected.

The lesson is straightforward: a finding that contamination was not detected immediately after a fire does not necessarily establish that groundwater will remain unaffected years later.

That is especially important at Corby because Staff is evaluating a project surrounded by agricultural land and nearby residences, where groundwater and water supply are not abstract environmental resources but resources used by the surrounding community.

13. Staff's Own Incident Database Shows Why a Single-Unit Modeled Fire Should Not Be Treated as the Outer Bound of Consequence

Appendix D's incident database is useful because it documents that real BESS incidents do not all remain confined to one unit or follow one duration. The database includes, among other examples, a 2025 LFP event at Townsite Solar in which fire propagated from one Megapack to a second; a 2025 California Flats LFP event that damaged four of 84 Megapacks and resulted in evacuation of five residences within two miles; and the 2025 Moss Landing event in which Staff's database reports that approximately 80 percent of the batteries in the affected 300-MW/1,200-MWh facility burned.

The database also shows why duration and responder posture matter. It identifies an LFP fire at Melba, Idaho that was contained and allowed to burn out over approximately three days, and a Gateway Energy Storage incident in which a 600-foot safety barrier was maintained for more than 22 hours, shelter-in-place and evacuation warnings were issued, the fire reignited repeatedly, and fire personnel remained involved for nearly 17 days.

Those examples do not establish that the same events will occur at Corby, and several involve different manufacturers, configurations, or battery chemistries. They do establish that the incident record used by Staff itself includes propagation, multi-unit damage, long-duration events, road or evacuation consequences, and extended monitoring. The Commission should therefore state clearly whether Appendix D's modeled fire involving one 5.11-MWh LG unit is intended only as a representative design-basis event or as the maximum reasonably foreseeable release used for the public-health significance determination.

If the single-unit fire is not intended to bound a larger propagation event, the record should explain how a larger event is addressed in the Hazards, Worker Safety and Fire Protection, Public Health, emergency-response, and contaminated-firewater analyses. If it is intended to be the bounding event, the Commission should identify the project-specific evidence supporting that conclusion, including the relationship between UL 9540A/large-scale testing, unit spacing, thermal exposure, suppression strategy, and the possibility of propagation to an adjacent unit.

14. Requested Action

I respectfully request that the Commission supplement or clarify Appendix D and the related Public Health, Hazards, Fire Protection, Soil and Water, and emergency-response findings before certification.

Specifically, the Commission should:

1. Recalculate or otherwise demonstrate the event-level probability that the modeled ten-hour non-fire off-gassing event would overlap meteorological conditions producing an NO₂ AEGL-1 exceedance, rather than treating 301 qualifying individual hours out of 43,824 modeled hours as the probability of exposure from an entire ten-hour event;
2. Identify the installed-capacity metric used in the historical MWh-year denominator, demonstrate that the same metric is used for Corby's 1,200-MWh input, and recalculate the frequency estimate if physical/nameplate installed battery capacity is the comparable exposure measure;
3. Explain how the modeled NO₂ AEGL-1 exceedances at nearby residences are reconciled with the conclusion that public-health impacts are less than significant;
4. Identify the enforceable measures that prevent, reduce, monitor, or respond to those modeled exceedances;
5. Provide a clearer project-specific explanation of how cell-level UL9540A testing was scaled to the assumed two-rack, 3,360-cell, ten-hour non-fire off-gassing event;
6. Present the incident-frequency results as uncertain estimates and explain how that uncertainty affects emergency planning and risk-management decisions;
7. Cross-reference modeled plume concentrations and impact distances directly to notification, shelter-in-place, evacuation, responder-protection, and air-monitoring criteria;
8. Clearly identify the flammable-gas consequence analysis and explain how it affects battery spacing, ventilation, ignition control, facility design, and emergency procedures;
9. Demonstrate that the meteorological analysis adequately represents predominant southwest winds as well as foreseeable warm, dry northerly and spring easterly wind regimes, and incorporate changing plume directions into emergency planning;
10. Clearly distinguish project-specific test data from literature-derived and conservative assumptions used in the fire and non-fire scenarios;
11. Explain whether the modeled single-unit fire is a representative design-basis event or a bounding reasonably foreseeable release, and address the larger propagation and long-duration events documented in Staff's own incident database;
12. Establish pre-operation baseline soil and groundwater sampling and appropriate immediate post-incident testing; and
13. Require multi-year groundwater monitoring following an incident involving substantial fire-suppression water, contaminated runoff, or another plausible groundwater-contamination pathway, together with clear responsibility for investigation and remediation.

Appendix D contains useful technical analysis. But one of its own results deserves particular attention: a foreseeable non-fire battery malfunction is modeled to produce an NO₂ concentration above the selected acute-exposure guideline at nearby residences.

That result should not be buried in a technical appendix. It should directly inform the Commission's public-health finding and the protective measures imposed as Conditions of Certification.

The East Hampton experience adds another practical warning: environmental consequences of a BESS incident may not end when the fire is extinguished, and contamination may not be detected immediately.

The fundamental question is simple:

When Staff's own model predicts that a foreseeable battery malfunction can exceed an acute public-health guideline at nearby residences, the Commission should explain not merely how far the plume travels, but what will be done to protect the people living inside that plume—and how their land and water will be protected after the immediate emergency has ended.

In addition to these comments, I formally incorporate by reference and fully support the technical comment letter submitted by Keep Vacaville Safe.

Respectfully submitted,

Michael Geller