

# LOS ANGELES FIRE DEPARTMENT

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BOARD OF FIRE COMMISSIONERS  
FILE NO. 25-069

TO: Board of Fire Commissioners

FROM: *RV* Ronnie R. Villanueva, Interim Fire Chief

SUBJECT: STATUS REPORT ON ALTERNATIVE FUELS TRAINING

FINAL ACTION:	<input type="checkbox"/> Approved	<input type="checkbox"/> Approved w/Corrections	<input type="checkbox"/> Withdrawn
	<input type="checkbox"/> Denied	<input type="checkbox"/> Received & Filed	<input type="checkbox"/> Other

## SUMMARY

As requested by the Los Angeles City Fire Department (LAFD) Board of Fire Commissioners, the LAFD Hazardous Materials (HazMat)/Joint Hazardous Assessment Team (JHAT) Unit presents a comprehensive update on current initiatives concerning lithium-ion battery and alternative-fuel hazards, ongoing challenges for the past three months, and newly identified recommendations.

## RECOMMENDATIONS

That the Board:  
Receive and file.

## DISCUSSION

The City of Los Angeles continues to experience rapid growth in the use of alternative-fuel vehicles and lithium-ion battery technologies across both public and private sectors. Over the past year, there has been a measurable increase in electric vehicles (EVs), the installation of energy storage systems (ESS) in commercial and multi-residential occupancies, and the deployment of compressed natural gas (CNG), liquefied natural gas (LNG), and hydrogen-powered fleets within municipal and private operations. Departments such as LADOT, LA Sanitation, and LADWP have expanded the use of alternative-fueled vehicles, while new EV charging infrastructure is being constructed citywide to meet consumer demand and state-mandated clean energy goals.

This transition toward electrification and the adoption of alternative fuels has concurrently increased the number of battery-related fires, off-gassing events, and incidents related to recycling or disposal within the city. The LAFD HazMat/JHAT Units have responded to several vehicle, micro mobility, and energy-storage fires involving lithium-ion batteries, creating prolonged suppression and atmospheric monitoring challenges. As these technologies continue to advance rapidly, the Department faces

growing operational complexity, underscoring the need for expanded responder training, updated operational guidance, and continued interagency coordination to ensure the safe and effective management of these evolving hazards.

## Updates on Previous Ongoing Challenges

### Regulatory Improvements

The state and national focus on lithium-ion and alternative-fuel safety continues to expand, with several new and pending legislative measures directly impacting local emergency response operations and regulatory coordination across California.

- **Assembly Bill 588 (2025)** directs the Office of the State Fire Marshal (OSFM) to convene a *Lithium Battery Working Group* tasked with developing statewide safety and training standards for both emergency responders and industry stakeholders. The working group will evaluate existing regulations for lithium battery storage and handling, identify gaps in responder training, and recommend best practices for preventing, responding to, and mitigating battery-related incidents.
- **Assembly Bill 696 (2025)** requires Cal OES to establish a *Lithium-Ion Vehicle Battery Advisory Group* responsible for creating best practices for the handling, transport, and disposal of damaged or burning electric-vehicle (EV) batteries. The group's objectives include improving responder safety, establishing statewide disposal procedures, and developing a coordinated approach for managing the growing number of EV battery-related emergencies.
- **Senate Bill 283 (2025)**, known as the *Clean Energy Safety Act*, mandates enhanced fire safety and inspection standards for hydrogen, CNG/LNG, and energy storage installations, while strengthening coordination between local and state authorities. The bill reinforces the need for uniform fire-code enforcement and the integration of NFPA 855 and NFPA 70 standards into California's regulatory framework governing alternative-fuel infrastructure and storage systems.
- **Assembly Bill 1285 (2025)** was signed into law, directing the Office of the State Fire Marshal (OSFM), in coordination with Cal OES, to develop statewide guidance and best practices for fire prevention, response, and recovery at utility-scale lithium-ion battery storage facilities. The legislation mandates formal coordination between facility operators and local emergency response agencies to ensure information sharing, pre-incident planning, and post-incident recovery support. This law will directly impact how local jurisdictions, including the LAFD, interact with energy-storage operators to improve inspection practices, safety protocols, and readiness for large-scale lithium-ion incidents.
- **Assembly Bill 855 (2025)** remains under legislative review and seeks to require the California Office of Emergency Services (Cal OES) and the California

Highway Patrol (CHP) to develop a comprehensive action plan for electric commercial-vehicle battery fires by January 1, 2027. The plan will address suppression tactics, isolation distances, reignition hazards, and mitigation of toxic gas exposure, as well as strategies for protecting roadway infrastructure and facilitating incident recovery. This measure reflects the state's growing awareness of the risks associated with heavy-vehicle electrification. It will establish standardized guidance beneficial to fire departments such as the LAFD, which frequently respond to EV and alternative-fuel transportation emergencies.

- **Senate Bill 234 (2025)**, currently under committee review, proposes the creation of a multi-agency workgroup, led by Cal Fire, Cal OES, and the Department of Toxic Substances Control (DTSC), to examine toxic heavy-metal exposure and environmental contamination following wildfires. The workgroup would include scientific experts, environmental regulators, and first-responder representatives to develop recommendations for debris management, exposure reduction, and community protection. While not specific to lithium-ion technology, this legislation addresses post-incident environmental hazards that overlap with LAFD HazMat and Chemical, Biological, Radiation, Nuclear, and Explosive (CBRNE) operations, particularly concerning cleanup, monitoring, and long-term remediation involving metals and combustion byproducts.
- Fire-code changes accompany these bills. The 2022 California Fire Code (Title 24, Part 9) remains the governing document for lithium-ion and ESS installations, primarily under Section 322, while the 2025 Code revision - expected to adopt updates from NFPA 855, NFPA 800, and NFPA 70 - will add new provisions for thermal-runaway prevention, gas detection, ventilation, and signage. These updates will inform future revisions to LAFD inspection checklists, training bulletins, and pre-incident planning procedures.
- JHAT is currently collaborating with the Office of Councilmember Traci Park to review existing Underwriters Laboratories (UL) standards and related regulatory frameworks governing lithium-ion batteries, energy storage systems, and alternative-fuel technologies for the City of Los Angeles. This partnership aims to identify regulatory gaps, strengthen product compliance requirements, and align local ordinances with national safety standards such as UL 1642, UL 1973, and UL 9540A. JHAT is preparing a comprehensive report of recommendations that will be presented to the City Council's Public Safety Committee, outlining proposed strategies for improved enforcement, product certification oversight, and responder safety in relation to emerging energy technologies.
- **Disposal and Cost Recovery**  
The Department continues to collaborate with the Certified Unified Program Agency (CUPA) to evaluate the establishment of an Environmental Response Team (ERT) capable of conducting post-incident hazardous materials cleanup, lithium-ion battery debris removal, and cost-recovery documentation. This capability would fill a gap in city entity management of large-scale alternative-fuel

incidents, aligning with Cal EPA and Cal OES priorities for environmental resilience.

- **Hazardous Materials Unit Staffing**

For FY 2026-27, staffing for HazMat 87 and HazMat 48 is now incorporated into the LAFD budget, rather than relying on unpredictable certified staffing. This aims to ensure consistent 24-hour coverage and compliance with hazardous materials operational requirements. The CBRNE/HazMat Response Unit and all key JHAT Captain positions, which UASI grants have long supported, are included to ensure sustained program continuity and regional coordination, even if grant funds diminish.

Staffing for HazMat 87 and HazMat 48 has been a key focus within the LAFD's budget and operational planning, particularly in light of fiscal constraints during economic recessions. Historically, these HazMat units have faced significant staffing challenges, including periods when HazMat 87 and HazMat 48 staffing were reduced or eliminated due to budget cuts during the recession, which led to flex-staffing models and frequent apparatus closures—resulting in delayed response times and increased safety concerns.

During previous economic downturns, such as the late-2000s recession and subsequent city budget cuts, LAFD was forced to delete or reduce staffing for critical specialized units, including HazMat 87 and HazMat 48. This deletion meant that these teams often operated with flex-staffing, requiring reassignment of available personnel from other apparatus at their respective stations. Between 2021 and 2023, there were approximately 143 shifts per year when an apparatus was already closed and the necessary resource was unavailable to fully staff the HazMat units, resulting in a third of the time when HazMat functions were compromised.

- **JHAT Captain Positions**

The inclusion of these JHAT Captain positions ensures that LAFD retains regional leadership in hazardous materials response and homeland security compatibility. Benefits provided include:

- Continuous development and implementation of advanced training and simulation, enhancing responder safety and operational consistency.
- Specialized expertise for alternative fuel emergencies, improving risk assessments, and community safety during technological transitions.
- Integration of robotics and drone technology for emergency incidents, facilitating improved situational awareness, command, and data-driven response strategies.
- 24-hour specialized coverage and operational continuity regardless of fluctuations in grant funding, maintaining compliance with regulatory standards.

The following JHAT Captain roles are vital to this program:

- JHAT Training Captains
- JHAT Alternative Fuels Captain
- JHAT UAS/Robotics Captain

Each of these captains provides specific expertise and operational support for the LAFD:

- **JHAT Training Captains (2 positions)**  
These captains are responsible for designing, developing, and delivering specialized all-risk and hazardous-materials training for LAFD personnel and partner agencies. Their work enhances readiness by standardizing response protocols, running simulation exercises, and ensuring regulatory compliance.
- **JHAT Alternative Fuels Captain**  
This position focuses on assessment, mitigation, and response strategies for incidents involving alternative fuels, such as hydrogen, compressed natural gas, and lithium-ion batteries. The captain provides technical guidance, ensures the department is compliant with new safety standards, and educates both field responders and the public about the risks and best practices with emerging energy technologies.
- **JHAT UAS/Robotics Captain**  
The Drone/Robotics Captain oversees the deployment and use of robotics and UAS (Unmanned Aerial Systems) support for hazardous materials and large-scale incidents. This role facilitates real-time situational awareness, risk assessment, and tactical planning through aerial mapping, plume modeling, and data collection, significantly improving incident stabilization and firefighter/public safety.

This strategic staffing ensures the LAFD remains prepared and resilient, especially amid budget challenges or grant reductions, safeguarding Los Angeles communities against hazardous material threats.

- **Public Education**  
During Fire Prevention Month, the LAFD launched a targeted social media awareness campaign focused on the growing hazards associated with lithium-ion batteries. This campaign was coordinated through the Public Information Division to educate the public on safe charging, storage, and disposal practices for e-mobility devices, electric vehicles (EVs), and household energy-storage systems.

Educational content was disseminated through multiple platforms - Instagram and Facebook, using infographics, short-form videos, and public service announcements. Posts highlighted topics such as the proper use of UL-certified chargers, recognizing early warning signs of thermal runaway, safe disposal and

recycling options, and what to do if a lithium-ion battery begins to overheat or off-gas.

- **Training**

Recently, LAFD JHAT Captains attended the Alternative Fuels and Flammable Liquids Response and Management (AFFIRM) course at the Security and Emergency Response Training Center (SERTC) in Pueblo, Colorado. This advanced program offers a hands-on, scenario-based curriculum that focuses on the chemical, physical, and fire behavior properties of alternative fuels, including hydrogen, propane, natural gas (CNG/LNG), ethanol, and lithium-ion batteries. The AFFIRM course emphasizes the decision-making of firefighters and incident commanders, including risk-based response strategies, ignition control, vapor suppression, and emergency shutdown procedures for high-pressure fuel systems.

Students engage in full-scale live-burn evolutions involving railcars, cargo tankers, and compressed-gas systems, simulating real-world emergency conditions. In addition to tactical operations, the course also covers incident command integration, public safety isolation zones, and environmental considerations following the release or combustion of fuel.

JHAT members are leveraging this experience to develop a department-specific alternative-fuels curriculum tailored to Los Angeles's unique infrastructure and transportation environment. The goal is to deliver an internal LAFD training program that combines AFFIRM's best practices with regional hazards, such as EV and hybrid vehicle storage, CNG fleet depots, hydrogen-powered vehicles, and on-site storage facilities, as well as large-scale energy-storage systems (ESS), to prepare all operational members for incidents involving emerging fuel technologies. To facilitate practical training, JHAT is partnering with industry leaders to acquire donated alternative fuel systems, including a recently donated CNG sanitation truck. This equipment will be incorporated into the training courses.

- **Conferences/Symposium**

In addition to formal training, members of the JHAT actively participated in two major professional development events since the last report: the LAFD Lithium-Ion Battery Symposium and the Continuing Challenge Hazardous Materials Emergency Response Conference.

Recently, the HazMat/CBRNE/JHAT Unit and In-Service Training Section, hosted a local Lithium-Ion Battery Symposium. This event united fire departments nationwide, regulatory bodies, and private-sector entities to tackle the growing number and complexity of lithium-ion battery incidents. The symposium featured technical presentations from subject-matter experts representing the fire service, Fire Safety Research Institute, and Tesla emergency technicians. Discussion topics included battery design and failure modes, thermal runaway behavior, air

monitoring and off-gas characterization, strategies and tactics, case studies, and post-fire best practices.

JHAT members presented on several operational case studies, highlighting lessons learned from recent energy storage system (ESS) fires, electric vehicle incidents, and micro mobility-related ignitions throughout Los Angeles and the State. The event served as both an information exchange and an opportunity to showcase LAFD's advancements in air-monitoring integration and tactical adaptation to evolving energy hazards. Feedback from regional partners emphasized the value of continuing these multi-agency symposiums to foster standardization in response protocols and data collection.

Separately, JHAT personnel attended and participated in the Continuing Challenge Hazardous Materials Emergency Response Conference in Sacramento. The event provided access to advanced workshops, incident debriefs, and national research presentations covering a broad spectrum of hazardous materials and CBRNE topics. JHAT's involvement included attending sessions focused on alternative-fuel vehicle fires, hydrogen safety, battery chemistry, and suppression tactics, as well as emerging detection technologies.

JHAT represented the Department as a presenter, delivering a session on the Joint Hazard Assessment Team concept and Lithium-Ion Battery Response in Wildland Environments. The session demonstrated how LAFD integrates UAS platforms, real-time atmospheric monitoring, and field analytics to support multi-agency coordination. The presentation was well received, reinforcing LAFD's leadership in bridging traditional HazMat operations with modern detection and drone-based reconnaissance.

Attendance at these events has strengthened JHAT's operational knowledge, expanded interagency networks, and provided valuable insight for developing future Department training materials, including the proposed Alternative Fuels Operations Course.

### **Newly Identified Recommendations**

The HazMat/CBRNE/JHAT Response Unit recommends the following items to continue making progress on the challenges the City of Los Angeles and the LAFD will face moving forward:

1. The LAFD and the BOFC recognize and support the critical operational priorities identified in the FY 2026–27 LAFD Budget Proposal, specifically those related to hazardous materials and alternative-fuel response readiness. While these items have already been submitted for budget consideration, they remain essential needs that require continued advocacy and prioritization to sustain the Department's operational capability and future preparedness.
2. Need to identify a funding source to equip each front-line suppression apparatus with an mPower POLI MP400S 5-gas meter. These multi-sensor instruments

detect Methane, Hydrogen Fluoride, Carbon Monoxide, and Oxygen gases commonly present in lithium-ion battery, hydrogen, and alternative-fuel incidents. Widespread deployment will allow company officers and initial-attack crews to rapidly identify hazardous atmospheres, improving scene safety and reducing exposure before specialized HazMat units arrive.

3. Develop a flex-staffed Alternative-Fuel Response Vehicle (AFRV) program for each Battalion. These units will serve as a platform equipped with specialized extinguishing agents, portable detection instruments, recovery tools, and specialized thermal imaging equipment to manage incidents involving electric vehicles, CNG/LNG systems, and hydrogen fueling facilities. Decentralizing this capability will enhance response coverage, reduce citywide response times, and improve operational coordination across Battalions.
4. The need to locate and construct a permanent HazMat training facility remains a high priority for the HazMat/CBRNE/JHAT Response Unit. A purpose-built site will enable live-fire and gas-release simulations, decontamination training, and alternative-fuel evolutions that cannot be effectively conducted at existing training venues. This facility will support annual certification requirements, advanced technician training, and regional joint exercises with partner agencies.

## **CONCLUSION**

The HazMat/CBRNE/JHAT Unit remains proactive in addressing emerging hazards associated with alternative fuel and energy storage technologies. Through legislative awareness, interagency collaboration, staffing advocacy, and public-facing education, the Department continues to strengthen operational readiness and community safety. These initiatives ensure that the LAFD maintains leadership within the region as energy systems evolve and the frequency of alternative-fuel incidents increases.

Board Report prepared by Captain II Richard Thompson, HazMat/CBRNE/JHAT Response Unit.