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DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

[Docket No. PHMSA-2025-0678 (Notice No. 2025-06)]

Hazardous Materials: Request for Feedback on Hazmat Transportation Risks: Heavy-Duty Electric Vehicles Versus Internal Combustion Engine Motor Carriers

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT).

ACTION: Notice; request for information.

SUMMARY: The Pipeline and Hazardous Materials Safety Administration (PHMSA) seeks public input on the safety risks, operational challenges, and regulatory considerations associated with transporting hazardous materials (hazmat) using heavy-duty electric vehicles (EVs) compared to internal combustion engine (ICE) motor carriers (*i.e.*, gas or diesel). PHMSA aims to understand what impact the transition from ICE to EV motor carriers may have on hazmat packaging integrity, transportation safety, emergency response protocols, regulatory compliance, and overall vehicle risk. PHMSA may use the information gathered to develop a statement of work for further research into the safety of transporting hazardous materials in EVs.

DATES: Interested parties are invited to submit comments on or before **[INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Comments received after this date will be considered to the extent possible.

ADDRESSES: Submit comments identified by Docket Number PHMSA-2025-0678 by one of the following methods:

- *Federal eRulemaking Portal*: http://www.regulations.gov. Follow the instructions for submitting comments.
- *Fax*: 1-202-493-2251.

- *Mail*: Docket Management System, U.S. Department of Transportation, West Building, Ground Floor, Room W12–140, Routing Symbol M–30, 1200 New Jersey Avenue, SE, Washington, D.C. 20590.
- *Hand Delivery*: Docket Management System, Room W12-140 on the ground floor of the West Building, 1200 New Jersey Avenue, SE, Washington, D.C. 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

Instructions: All submissions must include the agency name and Docket Number [PHMSA-2025-0678] for this notice. To avoid duplication, please use only one of these four methods. All comments received will be posted without change to the Federal Docket Management System (FDMS) and will include any personal information you provide.

Docket: For access to the dockets to read background documents or comments received, go to http://www.regulations.gov or DOT's Docket Operations Office (see **ADDRESSES**).

Privacy Act: In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public. DOT posts these comments, without edit, including any personal information the commenter provides, to http://www.regulations.gov, as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at http://www.dot.gov/privacy.

Confidential Business Information: Confidential Business Information (CBI) is commercial or financial information that is treated both customarily and actually as private by its owner. Under the Freedom of Information Act (FOIA, 5 U.S.C. § 552), CBI is exempt from public disclosure. It is important that you clearly designate the comments submitted as CBI if your comments responsive to this document contain commercial or financial information that customarily is treated as private; you actually treat as private; and is relevant or responsive to this notice. Pursuant to 49 Code of Federal Regulations (CFR) § 105.30, you may ask PHMSA to provide confidential treatment to information you give the Agency by taking the following steps: (1) mark each page of the original document submission containing CBI as "Confidential"; (2) send PHMSA, along with the original document, a second copy of the original document with

the CBI deleted; and (3) explain why the information you are submitting is CBI. Submissions containing CBI should be sent by mail to Andrew Leyder, Pipeline and Hazardous Materials Safety Administration, 2nd Floor, 1200 New Jersey Avenue SE, Washington, D.C. 20590-0001, or by e-mail to Andrew.Leyder@dot.gov. Any information PHMSA receives that is not designated specifically as CBI will be placed in the public docket.

FOR FURTHER INFORMATION CONTACT: Office of Hazardous Materials Safety, Research, Development & Technology, by e-mail at Hazmatresearch@Dot.gov, or by mail at Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue, SE, Washington, D.C. 20590-0001.

SUPPLEMENTARY INFORMATION:

I. Purpose

PHMSA requests feedback on the potential safety risks, operational challenges, and regulatory implications of using heavy-duty electric vehicles (EVs) compared to internal combustion engine (ICE) motor carriers (*i.e.*, gas or diesel) for the transportation of hazardous materials (hazmat). PHMSA is interested particularly in understanding how this change may impact hazmat packaging integrity, transportation safety, emergency response procedures, regulatory compliance, and overall vehicle-related risk.

THIS IS A REQUEST FOR INFORMATION (RFI) ONLY. This RFI is issued solely for information and planning purposes. It does not constitute a Request for Proposal (RFP) nor a promise to issue an RFP or other solicitation in the future. This RFI does not commit the Federal Government to contract for any supply or service. Further, the Federal Government is not seeking proposals and will not accept unsolicited proposals. Respondents are advised that the U.S. Government will not pay for any information or administrative costs incurred in response to this RFI. All costs associated with responding to this RFI will be solely at the interested party's expense. Not responding to this RFI does not preclude participation in any future RFP, if any is issued.

II. Background

Hazmat transportation historically has depended on gasoline and diesel-powered motor carriers, which operate under established safety regulations, containment protocols, and response procedures. As the use of heavy-duty EV technology becomes more prevalent in the market, new factors—such as battery chemistry, powertrain design differences, charging infrastructure, and vehicle weight distribution—may introduce distinct safety risks compared to ICE motor carriers. Potential factors include:

- Battery hazards: Lithium-ion batteries pose unique risks, including thermal runaway, fire propagation, and flammable/toxic gas emissions that differ from the hazards associated with conventional fuel sources.
- Charging station vulnerabilities: Transporting hazmat via EVs requires charging infrastructure, which may influence cargo exposure risks, spill ignition potential, and emergency shutdown procedures.
- Weight distribution and cargo stability: EV batteries add additional weight that may impact hazmat containment strategies differently than ICE motor carriers, and potentially may influence vehicle stability, packaging requirements, and load distribution.
- Emergency response adaptations: Fires, leaks, or mechanical failures in heavy-duty EVs require specialized response measures, which differ from those needed for ICE-powered motor carriers.

PHMSA is seeking input from industry experts, fleet operators, manufacturers, emergency responders, regulatory agencies, and other stakeholders to help identify safety gaps, emerging safety innovations in transportation technology (or next-generation safety solutions), and potential regulatory adaptations related to hazmat transportation across various motor carrier technologies.

III. Request for Feedback

Responses should compare the risks between heavy-duty EVs and ICE motor carriers, with a focus on hazmat packaging and product safety, as well as risks to the vehicles. Submissions should also identify knowledge gaps and recommend areas for future research.

1. **Hazmat Packaging and Containment Risks**
    - What, if any, differences exist in containment failure risks resulting from heat generated by EV batteries compared to fuel-based (ICE) systems?
    - How does the weight distribution and the increase in total powertrain weight of EV batteries affect cargo safety compared to ICE motor carriers?
    - Are there certain types or classes of hazardous materials (*e.g.*, flammables, corrosives, or explosives) that pose an increased risk when transported by EVs versus ICE motor carriers?
    - What additional testing methods or materials research could enhance hazmat packaging performance for use in both EV and ICE transportation applications?
    - Is it possible for an EV battery or battery system to produce or emit wireless signals (*i.e.*, radiofrequency signals) that could interfere with cargo or onboard communications (*i.e.*, packaging tracking and monitoring systems), or cause harm to sensitive materials, such as electronic detonators?
    - What concerns or risks do you believe might be associated with transporting bulk hazardous materials—such as propane—in cargo tanks on EV chassis compared to traditional ICE trucks, including both permanently attached and portable (non-attached) tanks? Please include perspectives on safety, reliability, and any other challenges this configuration might present.
2. **Vehicle-Specific Safety and Performance Risks**
    - How do hazmat cargo risks differ based on the interaction with heavy-duty EV powertrains versus ICE systems?

- What, if any, potential vulnerabilities exist in vehicle electronics, cooling systems, or containment barriers that are unique to EV hazmat transportation? Please include vulnerabilities in loading and unloading operations.
- Is there a need for additional studies to support engineering standards for cyber and functional safety for hazmat EVs?
- How do the fire risks (such as heat flux, maximum burn temperature, or burn time) associated with thermal runaway in EV batteries differ from an ICE vehicle involved in equivalent incidents? Additionally, how can further research help to refine prevention and mitigation strategies for these risks?
- What studies or data collection efforts could improve the understanding of long-term vehicle wear due to hazmat exposure (*e.g.*, radioactive material transportation) in EV versus ICE transportation? Is there a need for additional studies to support engineering standards for post-crash requirements (*e.g.*, electric shock protection, battery pack retention, electrolyte leakage, or fire safety) for hazmat EVs?

3. Infrastructure and Charging Considerations

- What risks arise from charging heavy-duty EVs carrying hazardous materials, compared to refueling ICE motor carriers?
- Do the physical locations of charging stations (*i.e.*, spacing between stations and proximity to buildings) or the location of a charging port on the vehicle pose a unique risk for hazmat carriers? How might infrastructure design be improved to enhance safety in these contexts?
- How do emergency shutdown measures at charging stations compare to existing fuel safety protocols for hazmat carriers?

- What types of operational studies or pilot programs could help assess real-world risks of hazmat charging station interactions compared to traditional fueling locations?
- What risks are there for an EV fire in a tunnel? How would the issues change or be added for hazmat carriers?

4. Regulatory Compliance and Standards

- Do existing hazmat transportation regulations effectively address the safety and operational considerations of both heavy-duty EVs and ICE motor carriers, including for purposes of loading and unloading hazardous materials, or are regulatory updates needed to account for the unique challenges posed by EV technology?
- Is emergency response guidance (Emergency Response Guidance/Rescue Sheets ISO–17840, ‘‘Road vehicles—Information for first and second responders,’’) submitted as part of 49 CFR 561.6 sufficient, and what additional information, if any, should be required for hazmat EVs?
- Should hazmat packaging, containment protocols, or safety certifications be revised or updated to meet EV-specific risks?
- How do battery disposal, maintenance, and lifespan considerations for EV fleets impact hazmat compliance particularly when compared to sustainability and compliance challenges associated with ICE vehicles?
- What research initiatives would be most valuable in guiding the evolution of hazardous materials regulations for EV hazmat transportation?

5. Emergency Response and Incident Mitigation

- How do fire suppression strategies differ between hazmat emergencies involving heavy-duty EV battery fires versus ICE fuel fires?

- Should fire response tactics be modified when a heavy-duty EV is transporting hazardous materials versus a standard consumer EV? Are emergency responders adequately trained to handle electrical system risks, battery failures, and toxic emissions associated with EV-based hazmat transportation? What training currently exists, and what additional training should be developed, to better prepare responders for these unique hazards? Should additional vehicle badging be required to identify EV versus ICE for hazmat?
- Do the risks from a hazmat spill change based on whether the motor carrier is an EV or ICE powered vehicle?
- How will EV battery fires affect hazmat packaging of any type compared to an ICE fire? For instance, would there be a difference in fire temperature, length of the event, damages caused, etc.? Please provide examples of the types of packaging that would have differences in impact.
- How can further research improve emergency responder safety protocols in responding to an incident involving hazardous materials when EVs are involved?

6. **Economic and Operational Feasibility**
    - How do total operating costs for ICE motor carriers versus heavy-duty EVs affect hazmat transportation decisions?
    - Are there differences in cargo capacity, range limitations, or route planning between EV and ICE-based hazmat transportation?
    - Are there technological barriers preventing widespread adoption of heavy-duty EVs for hazmat shipments compared to ICE motor carriers?
    - What long-term economic studies could assess whether transitioning hazmat transportation fleets to heavy-duty EVs is economically feasible?
    - What is the economic impact on an area when there is an EV fire versus an ICE fire?

7. **Future Research Considerations**

- What unknown risks still require research regarding hazmat transportation via EVs versus ICE motor carriers?
- Are there emerging technologies that could improve safety or reduce risk exposure for hazmat transportation across motor carrier types?
- What gaps exist in current research, and what interagency collaborations could strengthen future studies in EV and ICE vehicles carrying hazmat?
- Which of the identified areas have the highest safety priority based on anticipated impacts?
- What types of battery chemistries and sizes are used currently in standard EVs and heavy duty EVs? Which types are most common? Are some more dangerous than others?

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