

January 4, 2024

To: Mayor and Members of City Council 202400018
From: Sheryl M.M. Long, City Manager
Subject: CFD's Preparedness to Treat Electric Vehicle (EV) Fires

Reference Document #202301910

The Public Safety and Governance Committee, at its session on October 3, 2023, referred to the following item for review and report:

MOTION, submitted by Vice Mayor Kearney, **WE MOVE** that the Administration provide a report within 60 days on our Cincinnati Fire Department's preparedness to treat electric vehicle fires. The report should include whether we can transport sufficient amounts of water and what alternative treatments we have, as well as what we need to acquire. (STATEMENT ATTACHED).

The Cincinnati Fire Department (CFD) received reference document #202301910 on October 3, 2023, requesting that we provide a report regarding our preparedness to fight electric vehicle (EV) and hybrid electric vehicle (HEV) fires as well as our ability to transport the large amounts of water needed to extinguish these fires. Additionally, we recognize the need for specialized equipment for these types of fires and are in the process of testing, examining, and procuring this equipment.

Challenges Faced with Electric Vehicle Fires

All fires are dangerous, however fires involving lithium-ion batteries can be extremely dangerous, particularly those in electric and hybrid electric vehicles. When vehicles with lithium-ion batteries catch fire, they burn hotter, faster and require extraordinary amounts of water to reach final extinguishment.

The CFD has established procedures for securing water sources at structure fires from multiple hydrants and would do the same for any EV fire. Accessing adequate water could become a major challenge depending on where the vehicle is located at the time of the fire. On a highway or undeveloped roadway, the CFD may have to let

the vehicle burn and simply seek to protect and limit exposures. If copious amounts of water are not readily available, this would be the likely course of action to mitigate the hazard.

Current Response

CFD fire engines carry 500 gallons of water. The department has three apparatus that carry larger quantities of water for airport operations consisting of Tanker 18 (1250 gallons), ARFF 18 (1585 gallons), and ARFF 218 (3000 gallons). With approval from Lunken airport, these resources could be used where there is no water source available.

According to the Cincinnati Fire Prevention Code, hydrants for firefighting purposes shall be located anywhere from 300 – 500 feet from the structure. On our fire engines we carry 1200 feet of 5” supply hose to connect hydrants to pumpers, ensuring an uninterrupted supply of water in areas serviced by hydrants. If extended distances are required, an additional fire engine can be added to relay water. **In short, the CFD has procedures and sufficient hydrants throughout the city to establish water supplies to provide copious amounts of water for EV fires.**

Future Planning and Education

In addition to extinguishing EV fires with water, the CFD is in the process of purchasing EV fire blankets that will be carried on both of our Heavy Rescue units if an EV fire is in an area not easily accessed by a fire engine (e.g., in a parking garage). These will assist in containing the fire and will help to extinguish the materials that do require oxygen to burn (interior finishing products of the vehicle). Studies have shown that these blankets can be draped over a burning electric vehicle, thereby reducing the amount of oxygen available for combustion which in turn helps extinguish the fire.

There are various resources that recommend actions in response to EV vehicle fires, like submerging the vehicle, burying the vehicle, or even letting it burn and focus on protecting exposures. While these are all things to consider, the surrounding environment and conditions will determine if any of these are viable courses of action for extinguishment.

The CFD will continue to research the development of technologies regarding EV fires. There are several nozzles designed to penetrate battery compartments and flood them with water. However, they are currently very costly and there is opposing research regarding their effectiveness. CFD will continue to evaluate best practices, so we can be best prepared to fight these types of fires. An EV fire class is being offered by the county to the CFD on December 12, 2023, in which we will be sending members.

If beneficial, the Cincinnati Fire Department is committed to further explaining these new procedures and technology to any requesting body, including Council's Public Safety and Governance Committee.

cc: Frank C. McKinley, Fire Chief
Virginia Tallent, Assistant City Manager