



**DOCKET ITEM**

**For the**

**SPECIAL INVESTIGATION REPORT**

**Safety Risks to Emergency Responders from Lithium-Ion Battery Fires in Electric Vehicles**

**NFPA ALTERNATIVE FUEL VEHICLE RESPONDER TRAINING**

**Final Project Summary**

**July 2017**

(10 pages)



**RESEARCH FOUNDATION**

RESEARCH FOR THE NFPA MISSION

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**TECHNICAL NOTES**

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# Alternative Fuel Vehicle Responder Training

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**FINAL REPORT BY:**

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## FOREWORD

Alternative Fuel Vehicles are growing in popularity, with over 47 million of these vehicles on the road today. With even more coming in the close future, it is essential that responders have a solid understanding of the concepts associated with these vehicles.

To close this gap in knowledge, this project has developed comprehensive awareness training programs equipped with safety videos, animations, and reference material to train our nation's first and second responder communities with the knowledge and skills necessary to work safely with these new technologies. Part of this effort included an earlier workshop titled "[Alternative Fuel Vehicle Safety Summit](#)", and the Proceedings are available on the Research Foundation's website.

The Fire Protection Research Foundation expresses gratitude to the project research team and report authors Michael Gorin and Andrew Klock, who are with the National Fire Protection Association located in Quincy, Massachusetts. The Research Foundation appreciates the guidance provided by the Project Technical Panelists, the funding provided by the U.S. Department of Energy (DOE), and all others that contributed to this research effort.

The content, opinions and conclusions contained in this report are solely those of the authors and do not necessarily represent the views of the Fire Protection Research Foundation, NFPA, Technical Panel or Sponsors. The Foundation makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

### **About the Fire Protection Research Foundation**

The [Fire Protection Research Foundation](#) plans, manages, and communicates research on a broad range of fire safety issues in collaboration with scientists and laboratories around the world. The Foundation is an affiliate of NFPA.



### **About the National Fire Protection Association (NFPA)**

Founded in 1896, NFPA is a global, nonprofit organization devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards. The association delivers information and knowledge through more than 300 consensus codes and standards, research, training, education, outreach and advocacy; and by partnering with others who share an interest in furthering the NFPA mission. [All NFPA codes and standards can be viewed online for free.](#) NFPA's [membership](#) totals more than 55,000 individuals around the world.



**Keywords:** Alternative Fuel Vehicle, AFV, Hybrid/Electric Car, Fuel Cell, Gaseous Fuel, First Responder Training, Extrication Procedures, Vehicle/Battery Fires, HAZMAT, Hydrogen Leaks, Charging and Refueling Stations, Lithium-Ion and NiMH Battery re-ignition, Towing, EV Storage

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## PROJECT SPONSORS

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# Alternative Fuel Vehicle Responder Training

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**ALTERNATIVE  
FUEL VEHICLES**  
SAFETY TRAINING PROGRAM

[AFVTechSafety.org](http://AFVTechSafety.org)





**ALTERNATIVE  
FUEL VEHICLES**  
SAFETY TRAINING PROGRAM

## Emergency Responder Safety Training for Alternative Fuel Vehicles


NFPA’s Alternative Fuel Vehicles (AFV) Safety Training is designed to help first & second responders across the U.S. prepare for the growing number of hybrid/electric, fuel cell, and gaseous fuel trucks, buses, commercial fleets, and passenger vehicles. With over 15 million of these vehicles on the road today, it is essential that responders have a solid understanding of safety concepts associated with this new technology.



Today the program offers a wide array of training materials including instructor-led classroom training, self-paced online training utilizing highly-interactive learning modules which include videos, graphics, 3D animations, simulations, and data review exercises, educational video series, interactive 3D learning models, and quick reference materials.

Over the past seven years, the program has been supported by all the major North American fire service organizations (IAFF, IAFC, NVFC, IFMA, NASFM, the Metro Fire Chiefs, USFA, and NAFTD), twelve respected electric/hybrid/fuel cell vehicle fire and-rescue subject matter experts, the Fire Protection Research Foundation, the US Department of Energy, Federal Emergency Management Agency, Pacific Northwest National Labs, Argonne National Laboratories, two major law enforcement associations (IACP and NSA), New York State Police, the Society of Automotive Engineers, the US Department of Transportation, the National Highway Traffic Safety Administration, the American National Standards Institute, and the Towing and Recovery Association of America. Thanks to these partnerships, the AFV Safety Training Program has reached more than 220,000 emergency responders to date.

### Training Offerings

	Fire Service	Fire Investigation	Crash Reconstruction	EMS	Tow & Salvage
Online Training	X			X	
Interactive 3D Models	X	X	X	X	
Classroom Training	X	X			
Educational Training Videos	X	X	X	X	X
Quick Reference Materials	X	X	X	X	X

For More Information on This Program or to Access These Products, Visit:

[AFVTechSafety.org](http://AFVTechSafety.org)



**ALTERNATIVE  
FUEL VEHICLES**  
SAFETY TRAINING PROGRAM

# How little you know might **SHOCK** you.

**FREE AFV emergency response training.**



**Start today!**

Stranded high voltage in damaged batteries, nearly invisible hydrogen flames, and using water on certain gaseous fuel cylinders can have serious consequences. Alternative fuel vehicles (AFV) are a safety game changer for emergency responders. Twelve million AFV's are projected to be on U.S. roads in three years. Are you prepared to respond?

Get the tools and training to safely handle accidents involving electric, hybrid, fuel cell and gaseous fuel vehicles with our free self-paced online course. Visit NFPA's training site today at [evsafetytraining.org/training](http://evsafetytraining.org/training).



**ALTERNATIVE  
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