Hydrogen Emergency Response Training for First Responders

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SCS015
Overview

Timeline
- Project start: October 2004
- Continuing

Partners
- Hanford Fire Department
- California Fuel Cell Partnership (CaFCP)
- Volpentest Hazardous Materials Management and Emergency Response (HAMMER) Training and Education Center

Budget
- Funding Received in FY11: $100K
- Planned Funding For FY12: $ 75K

Barriers*
A. Safety Data and Information: Limited Access and Availability
D. Lack of Hydrogen Knowledge by Authorities Having Jurisdiction (AHJs)
E. Lack of Hydrogen Training Materials and Facilities for Emergency Responders

* Technical Plan – Safety, Codes, and Standards, Section 3.7.5, Multi-Year Research, Development and Demonstration Plan, 2011
Relevance: Goals and Objectives

- Long-Term Goal
  - Support the successful implementation of hydrogen and fuel cell technologies by providing technically accurate hydrogen safety and emergency response information to first responders*

- Objectives for FY12
  - Offer the one-day operations-level course utilizing DOE’s fuel cell electric vehicle (FCEV) prop at appropriate fire training centers
  - Continue to support the web-based awareness-level course (launched in FY07)
  - Continue outreach activities by disseminating first-responder hydrogen safety educational materials at fire training conferences to raise awareness

* First responders (fire, law enforcement, and emergency medical personnel) must know how to respond to potential incidents. Their understanding can also facilitate local approval of hydrogen projects.
Approach

- **Introduction to Hydrogen Safety for First Responders**
  - Support and update as needed the web-based awareness-level course “Introduction to Hydrogen Safety for First Responders”

- **Hydrogen Emergency Response Training for First Responders**
  - Transport the FCEV prop offsite and deliver the course at training centers across the U.S.
  - Current focus is on California, where fuel cell vehicles and infrastructure are concentrated
Introduction to Hydrogen Safety for First Responders

Course Content
- Hydrogen Basics
- Transport and Storage
- Hydrogen Vehicles
- Hydrogen Dispensing
- Stationary Facilities
- Codes and Standards
- Emergency Response

The course is registered on the TRAIN* website for broader dissemination to first responders

http://hydrogen.pnl.gov/FirstResponders/

*TrainingFinder Realtime Affiliate Integrated Network (TRAIN) is a central repository for public health training courses. Almost 30,000 TRAIN users are emergency responders.
Accomplishments/Progress
Introduction to Hydrogen Safety for First Responders

Our website still averages ~200 to 300 unique visits per month after almost 6 years, from nearly every state and some foreign countries.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Visits</th>
</tr>
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<tbody>
<tr>
<td>2007</td>
<td>6192</td>
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<tr>
<td>2008</td>
<td>3984</td>
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<td>2009</td>
<td>4230</td>
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<tr>
<td>2010</td>
<td>3614</td>
</tr>
<tr>
<td>2011</td>
<td>2734</td>
</tr>
<tr>
<td>2012 (Feb)</td>
<td>911</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21,665</strong></td>
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</table>
Hydrogen Emergency Response Training for First Responders

- Classroom Content
  - Hydrogen and Fuel Cell Basics
  - Hydrogen Vehicles
  - Stationary Facilities
  - Emergency Response
  - Incident Scenarios

- Demonstrations/Hands-on Exercise with FCEV Prop
  - Demonstration of Hydrogen Flame Characteristics
  - Student Participation in Rescue Evolutions

Multiple instructors for classroom training

A “rescue” at Sunnyvale (CA) Department of Public Safety
Accomplishments/Progress

Hydrogen Emergency Response Training for First Responders

Since May 2011 (AMR)

- Held training sessions at four California fire training facilities
  - June 2011 – Defense Logistics Agency (DLA): San Joaquin (Sharpe and Tracy Sites)
  - January 2012 – Los Angeles City Fire Department
  - March 2012 – Los Angeles County Fire Department
- Presented paper at ICHS 2011 in San Francisco (International Conference on Hydrogen Safety)
## Accomplishments/Progress

<table>
<thead>
<tr>
<th>Agency</th>
<th>Location</th>
<th>Date</th>
<th>Number Trained</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAMMER</td>
<td>Richland, WA</td>
<td>2009 - 2010</td>
<td>66</td>
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<tr>
<td>Rio Hondo Comm. College</td>
<td>Santa Fe Springs, CA</td>
<td>August 2010</td>
<td>103</td>
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<td>Orange Co Fire Authority</td>
<td>Irvine, CA</td>
<td>August 2010</td>
<td>92</td>
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<td>Sunnyvale PSD</td>
<td>Sunnyvale, CA</td>
<td>September 2010</td>
<td>110</td>
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<td>San Joaquin DLA</td>
<td>Stockton, CA</td>
<td>June 2011</td>
<td>41</td>
</tr>
<tr>
<td>Los Angeles City Fire Dept</td>
<td>Los Angeles, CA</td>
<td>January 2012</td>
<td>128</td>
</tr>
<tr>
<td>Los Angeles Co Fire Dept</td>
<td>San Dimas, CA</td>
<td>March 2012</td>
<td>170</td>
</tr>
</tbody>
</table>

**Total to Date:** 710

Overheard from students at LA Co: “Great course! I’m not nearly as concerned about hydrogen now as I was before (the course).”
Collaborations

- California Fuel Cell Partnership
  - Jennifer Hamilton
- Hanford Fire Department
  - Captain James Bryan
- HAMMER Training and Education Center
  - Fire Fighter Scott Jones
- DLA Civilian Installation Support
- Kidde Fire Trainers
  - Design/Build/Maintain the FCEV Prop
- International Association of Fire Chiefs (IAFC) and US Department of Transportation (DOT)
  - Provided information/resources and reviewed course they are developing similar to our online course
Planning site visits by PNNL and CaFCP to facilities in California (San Francisco and Emeryville), possibly East Coast

Prepare collaborative agreements to provide training at these sites in FY13

Prop to be transported to sites in its trailer, stay at each site for one week

Anticipate three classes per site; ~100-150 first responders from each site
Future Work: The Possibilities for Enhancing and Expanding Training

- Enhancing course content
  - Develop virtual hydrogen incident scenarios and responses
  - Add content to reflect market potential: materials handling equipment; stationary, portable, and auxiliary power units
- Expanding the reach of this training opportunity
  - Explore collaboration with other agencies and organizations, e.g., DOT, IAFC
  - Train cadre of additional instructors
- Utilizing outreach to:
  - Be visible at fire-related conferences (e.g., FDIC, FRI) to disseminate educational materials (CDs, laminated posters, and other information), raising awareness of our hydrogen safety training courses with our target audience

Training reinforces need for first responders to utilize thermal imaging camera to see hydrogen flames
Summary

Introduction to Hydrogen Safety for First Responders
- Available online at:  http://hydrogen.pnl.gov/FirstResponders/
- Continues to be successfully utilized

Hydrogen Emergency Response Training for First Responders
- Course delivered three times at HAMMER to first responders from across the U.S.
- Successful offsite deployment in California at three locations in 2010, two locations in 2011, and two locations in 2012
- Planning to take course to San Francisco area and other sites in 2013

Outreach
- Return to fire-related conferences to disseminate materials and recruit students for future classes
My Thanks To:

► U.S. Department of Energy
  ■ Sunita Satyapal, Program Manager
  ■ Antonio Ruiz, Safety Codes and Standards Team Lead

► My Instructors
  ■ Jennifer Hamilton (CaFCP)
  ■ Capt. James Bryan (Hanford Fire)
  ■ Scott Jones (HAMMER)

► All our great hosts in the fire service