

Hydrogen Safety: First Responder Education

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Project ID: ED-2

Pacific Northwest National Laboratory Operated by Battelle for the U.S. Department of Energy

Overview

Timeline

- Project start date: 10/2004*
- On-going
- Percent complete, FY08: ~70%

Budget

- Funding in FY06: \$325K
- Funding in FY07: \$490K
- Funding in FY08: \$300K (100% DOE funded)
- * Pre-FY06 funding came from another part of the Safety, Codes and Standards program element.

Barriers Addressed

- Lack of Readily Available, Objective, and Technically Accurate Information
- Mixed Messages
- Disconnect Between Hydrogen Information and Dissemination Networks
- Lack of Educated Trainers and Training Opportunities

Partners

PNNL is working with the Volpentest Hazardous Materials Management and Emergency Response (HAMMER) Training and Education Center on education and outreach



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Objectives

Long-term Objective:

Support the successful implementation of hydrogen and fuel cell demonstration projects and market transformation by providing technically-accurate and objective information about hydrogen to first responders*

Objective for FY08:

Develop and disseminate first-responder hydrogen safety educational materials, including an update of the awareness-level course (first launched in FY07) and a more in-depth, one-day course

*Focus is on first responders (fire, law enforcement, and emergency medical personnel), who must know how to handle potential incidents; their understanding can also facilitate local project approval.

Approach in FY08

Task 1: Awareness-Level Course (95% complete)

Update the stand-alone, interactive, web-based "awareness-level" course --"Introduction to Hydrogen Safety for First Responders"

(This also creates an information set that others can draw from to supplement their ongoing or planned hydrogen/FCV education programs)

Task 2: Awareness-Level Outreach (60% complete)

Conduct outreach activities related to the "Introduction to Hydrogen Safety for First-Responders" course, and disseminate related materials

Task 3: Prop-Based Course (70% complete)

Develop and pilot a more advanced course that uses a mobile hydrogen fuel cell vehicle prop (developed in a companion project funded under the Hydrogen Safety, Codes and Standards program element)

Key Milestones & Deliverables

Task 1: Updates to Awareness-Level course complete Due: March 2008 Status: Complete

Task 2: Awareness-Level course webinar Due: November 2007 Status: June 2008

Task 3: First Pilot Test of Prop-Based Course Due: June 2008 Status: Awaiting completion of the prop and final curriculum

Pre-FY08 Accomplishments: Awareness-Level Course

- Awareness-level course developed, reviewed, piloted and launched in January 2007
 - <u>http://hydrogen.energy.gov/firstresponders.html</u>
- Reviewed by over 100 representatives from the hydrogen and emergency-response communities
- Initial announcements to a broad list of first-responder organizations (state firefighter training centers, IAFF, IAFC, etc.)





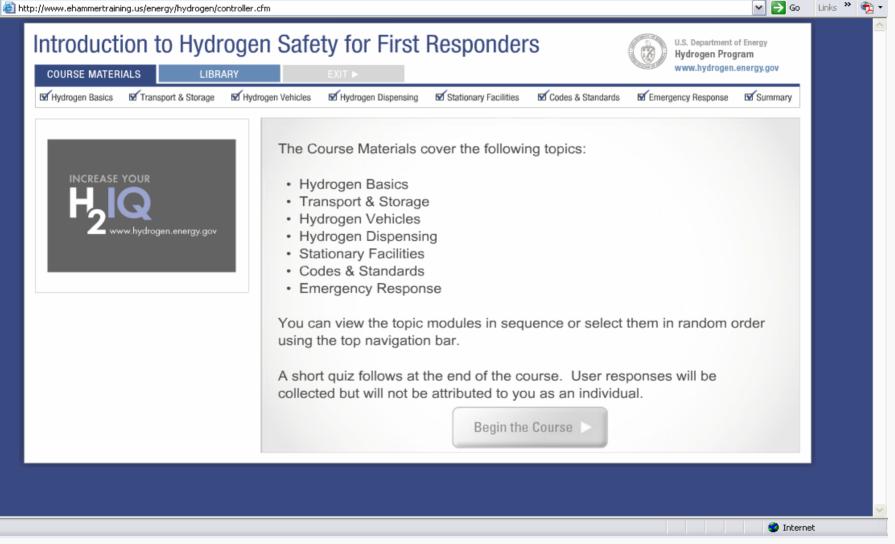
April 2006 pilot

Course Overview

Address 🙆 http://www.ehammertraining.us/energy/hydrogen/controller.cfm

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Accomplishments in FY08: Task 1 – Awareness-Level Course Update

Re-formatted course in Flash "Captivate" software

- Developed a new video on hydrogen properties
- Created oral voiceover of transcript, so viewers can listen instead of read
- Added randomly-generated quiz questions
- Addressed a few technical questions raised by industry experts
- Included a certificate of completion
- Launched new site, hosted on PNNL webserver

Awareness-Level Course: Usage and Feedback

- Total unique visitors from 04/01/07 to 03/31/08 (old version) = 3964 (Total since 01/24/07 launch = 6192)
- About 1700 repeat visitors (04/01/07 to 03/31/08)
- Visitors from almost every state and many foreign countries (from Argentina to Venezuela)
- Many government, industry and university viewers
- New version just launched

"Very informative presentation for the fire service! Good Job!" Don Godfrey E27C Sacramento Metropolitan Fire Protection District, California ""Excellent program!" Samuel A. Giordano Jr. Director of Training Roselle Fire Department Roselle, Illinois

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Accomplishments in FY08: Task 2 –Outreach

- Full version of *new* awareness-level course on CD available for free from DOE/EERE Information Center; approx. *1500* of the older version distributed in first half of FY08
 - 877-EERE-INFO or 877-337-3463

Web-cast of the new awareness-level course

- Three major first-responder conference events to raise awareness about hydrogen safety and about the DOE-sponsored courses
 - Fire Department Instructor's Conference, April 8-12, Indianapolis
 - Firehouse Expo, July 24-29, Baltimore
 - Fire Rescue International, August 14-16, Denver

Laminated poster and Firehouse Magazine article with critical response information for distribution to firefighters – about 2000 of each distributed in first half of FY08

Interviews of ten directors at selected regional firefighter training centers in CA, CT, FL, MI, NY, SC, and TX

✓ Do they send people to offsite training?

Most said yes, for specialty training

Have they had training on alternative vehicles?

60% said no; some had training on hybrid auto extrication, CNG, LNG

Are they familiar with DOE Hydrogen Program?

70% said no

Would they be interested in Hydrogen/FCV training?

100% said yes

- Are they willing to host live prop-based training at their facility?
 Almost all said yes
- ✓ Would they be interested in sending someone to a train-the-trainer course?

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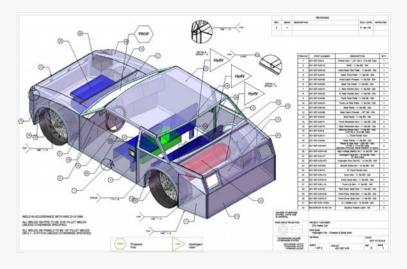
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Steering committee formed; met at HAMMER in October 2007. Includes:

- ✓ OEMs Ford and General Motors; Plug Power
- Energy companies Shell and Chevron
- Hydrogen/FCV organizations California Fuel Cell Partnership and NextEnergy
- Firefighting organizations Washington Fire Training Academy and local Washington State fire departments
- Experts from Los Alamos, Sandia and Lawrence Livermore National Labs

Steering committee, key input:

- Eight-hour course is appropriate, including five hours in the classroom and three hours of hands-on training with the mobile FCV prop
- Use existing, vetted materials as much as possible
- Integrate, within each module, information on technical issues (e.g., the components of a FCV) with instruction on the appropriate safety-related emergency responses
- Teach first responders what is the same and different about hydrogen and FCVs, compared to conventional fuels and vehicles



Prop will provide a life-size, hands-on demonstration of an emergency response to a FCV incident, including:

- Use of hydrogen gas and flame detectors
- Safe approach to a FCV
- Extinguishment of a compartment fire
- Extrication techniques
- Hydrogen venting and ignition

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Prop-Based Course currently being reviewed by steering committee

Modules:

- 1. Introduction and Course Overview
- 2. Hydrogen and Fuel Cell Basics
- 3. Hydrogen-Fueled Vehicle Systems
- 4. Hydrogen-Related Stationary Facilities
- 5. Standard Operating Procedures
- 6. Practical Exercise
- 7. Quiz
- 8. Hands-On Exercise with FCV Prop
- Work with Washington State Fire Marshal's office to pursue official endorsement through the National Fire Academy's State Fire Training Course Endorsement Program (or another endorsing organization)

Future Work

- Continue to address comments and to field questions on the Awareness-Level Course
- Complete planned outreach activities for Awareness-Level Course (conferences, distribution of materials)
- Pilot the Prop-Based Course and conduct train-the-trainer sessions at HAMMER
- Conduct Prop-Based Course in appropriate forums in FY09
- Produce video-taped version of the prop-based course to allow wider dissemination

Project Summary

Relevance – Education of first responders is a critical element of introducing hydrogen and fuel cell technology

- Approach Develop and disseminate education materials that pertain to hydrogen safety, aimed at the first-responder audience
- Accomplishments Web-based awareness-level course revised and new version launched. New hydrogen properties video developed. Webinar of awareness-level course (June 2008). Draft of prop-based, one-day course completed and under review.
- Future work Continue to maintain, refine, and disseminate awareness-level course and related materials. Complete prop-based course, secure endorsement, pilot the course, and begin giving the course to first responders nationwide.