VIII.8 Fuel Cell & Hydrogen Energy Association Codes and Standards Support

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Project Start Date: November 16, 2011
Project End Date: October 31, 2016 - Project continuation and direction determined annually by DOE

Overall Objectives

Enhance and sustain industry participation to enable:

- Timely development of regulations, codes, and standards (RCS) deemed critical by industry for the commercial deployment of hydrogen and fuel cell technologies and the infrastructure needed to support them.
- Timely and coordinated industry participation in key forums for safety and RCS development for hydrogen energy and fuel cell technologies.
- Efficient, productive, and timely information exchange between the hydrogen and fuel cell industry, regulatory officials, codes and standards development organizations, and other interested parties by providing a common, current, and factual information base.

Fiscal Year (FY) 2016 Objectives

- Optimize technical consistency in national and international codes, standards, and regulations. The 2016 focus is on United States model codes and national and international standards on hydrogen fueling stations and components.
- Optimize industry participation in developing technical requirements.
- Develop and promulgate safety-related information resources and lessons learned with first responders, authorities having jurisdiction, and other key stakeholders.

Technical Barriers

This project addresses the following barriers identified in the DOE Fuel Cell Technologies Office Multi-Year Research, Development, and Demonstration (MYRDD) Plan, Section 3.7: Hydrogen Safety, Codes and Standards. This plan can be accessed at http://energy.gov/eere/fuelcells/downloads/fuel-cell-technologies-office-multi-year-research-development-and-22.

(F) Enabling National and International Markets Requires Consistent RCS

(H) Insufficient Synchronization of National Codes and Standards

(J) Limited Participation of Business in the Code Development Process

Contribution to Achievement of DOE Safety, Codes & Standards Milestones

This project will contribute to achievement of the following DOE milestones from the Hydrogen Safety, Codes and Standards section of the Fuel Cell Technologies Office MYRDD Plan.

- Milestone 2.17: Publication of updated international fuel quality standard to reflect fuel cell technology advancement. (3Q, 2018)
- Milestone 2.19: Validate inherently safe design for hydrogen fueling infrastructure. (4Q, 2019)
- Milestone 4.6: Completion of standards for critical infrastructure components and systems. (4Q, 2014)
- Milestone 4.8: Revision of NFPA 2 to incorporate advanced fueling and storage systems and specific requirements for infrastructure elements such as garages and vehicle maintenance facilities. (3Q, 2016)

FY 2016 Accomplishments

- Identified, raised awareness of, and began developing national and international support to fill in technical gaps for micro fuel cell power systems to facilitate national and international harmonization of shipping regulations.
- Managed the development of over 300 draft public inputs to National Fire Protection Association (NFPA) 2, NFPA 55, and the International Fire Code to address key industry needs for fuel cell electric vehicle repair booths and harmonized requirements for defueling, and

addressing inconsistencies or lack of clarity between model codes.

- Managed the development of industry comments to draft international standards for hydrogen fueling components to support harmonization of national and international requirements, and supported these comments in the U.S. Technical Advisory Group and International Organization for Standardization Working Group meetings.

INTRODUCTION

As the premiere trade association for the fuel cell and hydrogen energy industry, FCHEA utilizes a working group structure to facilitate focused effort in each of the three following applications: portable power, stationary power, and transportation, which includes vehicles and the infrastructure to support them.

FCHEA's project contributes directly to achievement of four of the seven objectives outlined in the Fuel Cell Technologies Office MYRDD Plan, Chapter 3.7, Hydrogen Safety, Codes and Standards by engaging industry to develop consistent technical requirements and harmonized national and international safety, codes, and standards.

APPROACH

FCHEA working groups and monthly facilitation of the National Hydrogen and Fuels Cells Codes & Standards Coordinating Committee provide regular opportunities to engage industry in developing RCS through discussion of priorities, opportunities to participate in technical committees and working groups directly, and opportunities to comment on draft standards. Industry priorities in codes and standards development are captured and tracked in FCHEA's regulatory matrix, which is updated regularly and published quarterly (see Figure 1).

Our bimonthly Hydrogen and Fuel Cell Safety Report, available online at www.hydrogenandfuelcellsafety.info (Figure 2), provides timely information on the progress of developing codes, standards, and regulations to stakeholders including authorities having jurisdiction, emergency responders, industry, researchers, and other interested parties.

RESULTS

Our Portable Power Working Group provided input during the Pipeline and Hazardous Materials Safety Administration Office of Hazardous Materials Safety R&D Forum on interest in classification for novel micro fuel cell systems and testing of modern cartridge designs. This effort supports the following barrier from the MYRDD Plan - *Enabling National and International Markets Requires Consistent RCS*, by ensuring national and international standards for micro fuel cell applications are harmonized, then adopted by international regulations.

Our Transportation Working Group Hydrogen Codes Task Group developed harmonized public inputs for the next development cycles of key model codes. The public inputs

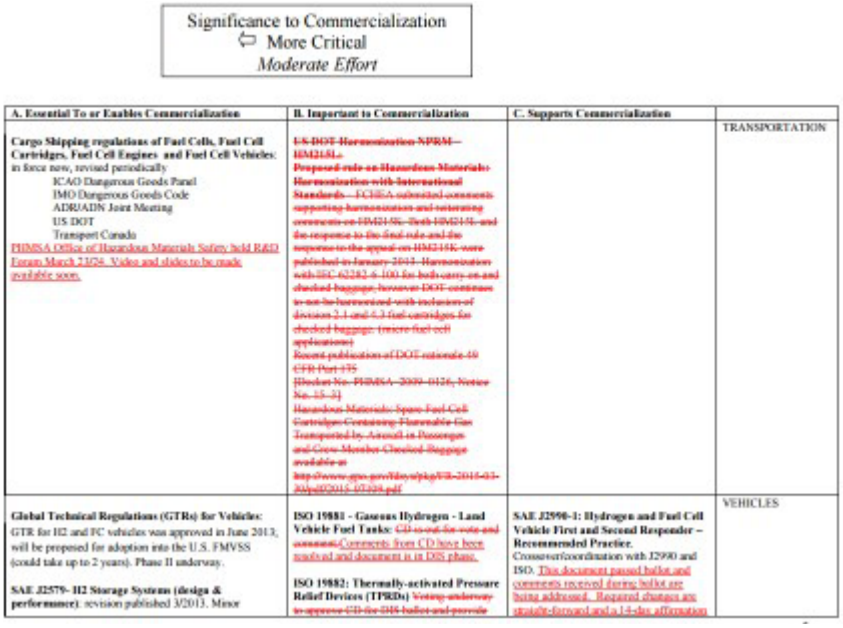

FIGURE 1. Sample page from FCHEA's Regulatory Matrix, showing progress in developing codes, standards, and regulations during the first half of 2016

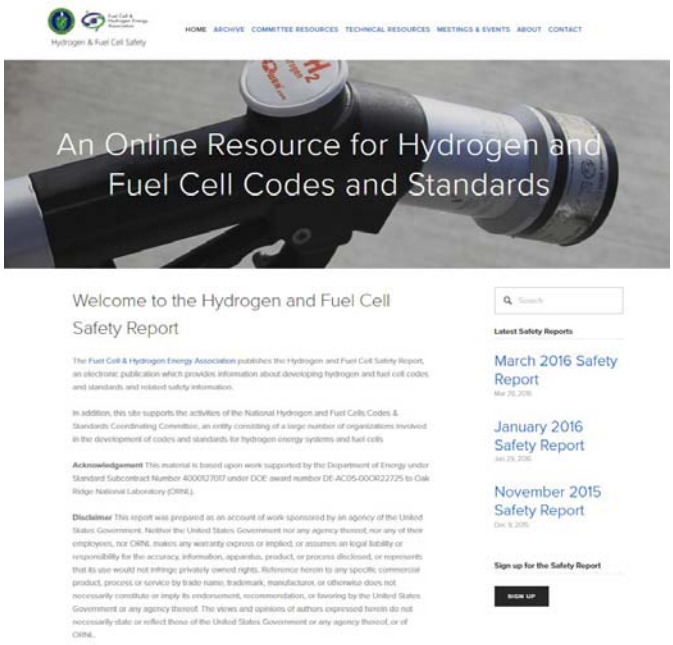

FIGURE 2. Typical Hydrogen and Fuel Cell Safety Report

were solicited from business and experts with operational experience, and focus on harmonizing requirements with other industry-accepted standards and codes. This effort supports the following objective from the MYRDD Plan – *Provides consistent RCS and synchronization of national codes and standards*.

Our Stationary Power Working Group completed a two-year effort to support a fuel cell focus group created by the Telecommunications Industry Association. The working group provided support and fuel cell experts, and assisted in populating a new draft guideline with relevant information from existing codes, standards, and guides. This effort supports the following objective from the MYRDD Plan – *Develop and enable widespread sharing of safety-related information resources and lessons learned with first responders, authorities having jurisdiction, and other key stakeholders*. Working closely with related industries provides consistency in requirements and reduces duplication of effort.

Publication of our Regulatory Matrix and the Hydrogen and Fuel Cell Safety Report keep stakeholders informed of the progress and issues encountered in the development of RCS. It has introduced industry to the many new working groups in the International Organization for Standardization Technical Committee 197 and the call for participation in United States standards committees. The integrated calendar of events aids in scheduling meetings. Facilitation of the monthly web-based meetings of the National Hydrogen and Fuel Cells Codes and Standards Coordinating Committee provides a regular forum to coordinate and align efforts in standards activities and harmonize requirements. This effort contributes to the DOE goal to *develop and enable widespread sharing of safety-related information resources and lessons learned with first responders, authorities having jurisdiction, and other key stakeholders*. These activities also increase participation of stakeholders in development of harmonized RCS.

CONCLUSIONS AND FUTURE DIRECTIONS

FCHEA's Portable Power Working Group will continue to develop international standards through International Techno-Electrical Commission/Technical Committee 105, and work through International Civil Aviation Organization and Department of Transportation to ensure harmonization with international standards for fuel cells as carry on and checked baggage. The Department of Transportation continues to not be harmonized with inclusion of Division 2.1 and 4.3 fuel cartridges for checked baggage (micro fuel cell applications). FCHEA is pursuing inquiry within the Department of Transportation Pipeline and Hazardous Materials Safety Administration to determine options to have these regulations harmonized.

FCHEA's Transportation Working Group will support public inputs in line with industry priorities through the next round of code revisions, and begin to predict potential future needs. FCHEA will continue dialog with component manufacturers to resolve issues in advance of infrastructure roll-out.

FCHEA's Stationary Power Working Group will continue to review international standards and in the United States as well as state regulations to ensure consistency with accepted United States requirements and best practices.

FCHEA will continue to administer the National Hydrogen & Fuel Cells Codes & Standards Coordinating Committee – identify key issues, and document discussions and outcomes. FCHEA will provide industry feedback to the Department of Energy Safety and Codes and Standards Subprogram on RCS development needs and priorities; outreach needs and priorities; and R&D needs and priorities to support RCS development activities.

FCHEA will continue to produce the Hydrogen and Fuel Cell Safety Report to report on the developing RCS to increase awareness of published and developing requirements, improve coordination of activities, and improve information transfer.

FY 2016 PUBLICATIONS/PRESENTATIONS

1. Markowitz, Quackenbush, and Dolan; "Fuel Cell & Hydrogen Energy Association Codes and Standards Support;" (project presented at the DOE Annual Merit Review; June 6–9, 2016, Washington, DC).