

VI.0 Safety, Codes and Standards Sub-Program Overview

Introduction

The Safety, Codes and Standards activity assesses current practices and the status of technical standards development efforts, both nationally and internationally. It develops and implements the practices and procedures that will ensure safety in the operation, handling and use of hydrogen and hydrogen systems for all DOE-funded Hydrogen Program projects. It also facilitates the creation and adoption of model building codes and equipment standards for hydrogen systems in commercial, residential, and transportation applications.

The safety activity involves a large degree of external stakeholder input. Expertise is gathered from hydrogen manufacturers, the energy industry, the insurance industry, fire protection, academia, aerospace, and others to provide the widest possible range of perspectives on safety. Input is obtained through involvement in a variety of activities, as detailed under the FY 2004 Accomplishments section.

Communication is also a principal emphasis for maximizing impact of safety activities. All of the data and information obtained (of a non-confidential nature), and recommendations developed through activities of the Hydrogen Safety Review Panel are made widely available through public presentations and an eventual release of a best practices database. Training, testing and verification activities undertaken at the Hazardous Materials Management and Emergency Response (HAMMER) site are documented and made available through various media to the greatest number of recipients possible, including those that cannot travel to the HAMMER site. Open sharing of information is the primary purpose of the annual Hydrogen and Fuel Cells Summit meeting and the quarterly summit newsletter. Achieving the stated objectives requires a high degree of communication in all safety program activities.

Technology Status

The expertise of the DOE Hydrogen Safety Review Panel is being used for reviewing DOE-funded projects and safety plans utilizing a panel-developed protocol. Reviews provide recommendations for safety improvements and “lessons learned” that can be of broad benefit to the DOE program. The panel, its services, and its work products are assets to funded project teams who perform their own risk assessment and mitigation planning and are responsible for their own safe operating practices. In this manner, the panel helps bring safety best practices to bear on the Hydrogen Program as a whole.

The panel completed a review of Guidance for Safety Aspects of Proposed Hydrogen Projects, July 2003 Revision 1. The revised document (August 2004) is available on the DOE-HFCIT website and is used as a guideline for proposal and project teams to develop safety plans to meet solicitation and/or project deliverable requirements. The revision provides a more comprehensive number of techniques that could be selected for identifying safety vulnerabilities and includes descriptive text and referenced examples.

A hydrogen training capability is being added to HAMMER, and a number of planning meetings involving DOE, HAMMER, various national laboratories, and others took place in FY 2004 in anticipation of project startup in FY 2005. Training to be offered will include not only various testing and verification activities but also a number of “props” that offer hands-on experience for audiences such as emergency responders or permitting officials who will be asked to approve future installations of these technologies.

The annual Hydrogen and Fuel Cells Summit meeting brought together about 100 personnel involved in furthering codes and standards related to hydrogen and fuel cells, and focused on mutual sharing of information and experiences. Presentations, results and attendee lists from this and previous summit meetings are available from the program website at http://www.pnl.gov/fuelcells/summits/current_summit.stm.

In support of the Hydrogen Program codes and standards objectives, the “Regulators' Guide to Permitting Hydrogen Technologies” was developed through a collaborative effort involving the National Fire Protection Association, the International Code Council, Pacific Northwest National Laboratory, and the National Renewable Energy Laboratory. The guide is intended to provide an introduction to and relevant background on the subject technologies, to identify applicable codes and standards for permitting their installation, and to provide useful case study information.

The U.S. experience with hydrogen has led to interactions with other countries wishing to learn the nation’s experience. In May 2004, a U.S. delegation traveled to China to participate in a one-day “Vision” workshop intended to comprise the first step in development of a Hydrogen Roadmap for China, similar to the Hydrogen Roadmap developed for the U.S.

DOE supports participation of numerous organizations and individuals in the codes and standards development process. The Gas Technology Institute (GTI) has been involved in gaseous fuel pipeline safety issues for decades, and their perspective is invaluable in the deliberations of various standards development organizations. In FY 2004, the safety program supported GTI’s participation in various meetings of the American Society of Mechanical Engineers, the Society of Automotive Engineers, the International Codes Council, the Canadian Standards Association, and the International Electrochemical Commission Technical Committee 197 on Hydrogen.

FY 2004 Accomplishments

- Convened the DOE Hydrogen Safety Review Panel (11 members plus two direct support staff), held two panel meetings, and produced a draft charter.
- Revised and updated Guidance for Safety Aspects of Proposed Hydrogen Projects (August 2004), a safety planning resource and set of guidelines for DOE procurements and project deliverables.
- Completed the first six DOE project safety review site visits; submitted first safety evaluation report.
- Designed and initiated hydrogen emergency response training program at the Hazardous Materials Management and Emergency Response (HAMMER) training facility.
- Conducted a successful Hydrogen and Fuel Cells Summit VIII in Miami, Florida, focused on the sharing of safety, codes and standards information between government, industry and standards development organizations.
- Continued quarterly publication of the Summit newsletter, with circulation of more than 1,000.
- Published two modules of the “Regulators' Guide to Permitting Hydrogen Technologies” – one for fuel cell technologies and one for hydrogen vehicle refueling stations.

FY 2005 Plans

Compared to the FY 2004 appropriation of \$5.6 million for Safety, Codes and Standards in the early stages of the program, the FY 2005 request is \$17.9 million. In FY 2005, the activity includes research to support codes and standards development and also plans to conduct a total of 20-30 project reviews, including safety plan reviews for new project starts. Development of protocols for evaluating project safety on a consistent basis will be initiated. The design of training “burn props” at the HAMMER site will be finalized and construction initiated; at least two classes for audiences not requiring hands-on props for training will be conducted; HAMMER collaboration with external organizations such as the Department of Transportation, National Association of State Fire Marshals, California Fuel Cell Partnership, and the State of Florida will be finalized. Widespread sharing of data and information related to hydrogen safety will be continued through participation in industry meetings, publications, and compilation/documentation of safety best practices identified by the Hydrogen Safety Review Panel.