Resources for Permitting and Safety of Hydrogen Systems

Report prepared for the International Energy Agency (IEA) Hydrogen Implementing Agreement (HIA) Task 18: Evaluation of Integrated Hydrogen Demonstration Systems

by

Susan Schoenung
Longitude 122 West, Inc.

11/11/2009

Report prepared for IEA HIA Task 18
By Susan Schoenung, Longitude 122 West, Inc.
10/9/2009

Resources for permitting and safety of hydrogen systems

Published guidebooks or guidelines

Title	Organization / Country	Website
Permitting Stationary Fuel Cell Installations	Pacific Northwest Laboratories / USA	http://www.pnl.gov/fuelcells/permit_guide.stm
Permitting Hydrogen Motor Fuel Dispensing Facilities	Pacific Northwest Laboratories / USA	http://www.pnl.gov/fuelcells/permit_guide.stm
California Hydrogen Fueling Stations – Reference Materials	California Fuel Cell Partnership /USA	http://www.fuelcellpartnership.org/resources/print-materials; er.cafcp.org/pdf/070705%20H2%20Station%20Materials.pdf
Canadian Hydrogen Installation Code CAN/BNQ 1784-000	Bureau de normalisation du Québec (BNQ) / National Standards of Canada / Canada	http://www.fuelcellstandards.com/2.2.htm
The HyApproval Handbook	Europe	http://www.hyapproval.org/
HYPER Project Guide	Europe / US	http://www.hyperproject.eu
Fuel Cell System Installation Criteria	Petroleum Association of Japan / Japan	http://www.fuelcellstandards.com/paj.htm

Hydrogen and Fuel Cells Permitting Guide (2004)

What it covers:
The mission of the Hydrogen, Fuel Cells, and Infrastructure Technologies Program is to research, develop, and validate fuel cells and hydrogen production, delivery, and storage technologies for transportation and stationary applications.

Codes and standards are needed to ensure safety, as well as to commercialize hydrogen as a fuel. To accomplish its objectives, staff work with code development organizations, code officials, industry experts, and national laboratory scientists to draft new model

codes and equipment standards that cover emerging hydrogen technologies for consideration by the various code-enforcing jurisdictions.

In support of the program objectives, the following guide with overview and two modules (Permitting Stationary Fuel Cell Installations and Permitting Hydrogen Motor Fuel Dispensing Facilities) was developed through a collaborative effort involving the National Fire Protection Association (NFPA), the International Code Council (ICC), Pacific Northwest National Laboratory (PNNL), and the National Renewable Energy Laboratory (NREL).

California Hydrogen Fueling Stations – Reference Materials

What it covers

1. Common Acronyms for California H2 Fueling Station Reference Materials

2. Typical Hydrogen Fueling Station Elements

A high level diagram describing the components and assemblies comprising a typical hydrogen fueling station, including information regarding the roles those elements play, the safety systems employed, and a sample layout of station equipment using the CaFCP headquarters fueling station as an example.

3. Hydrogen Fueling Station Installation Worksheet – *for California local officials*

Overview of major California regulations, currently in place, that may apply to hydrogen stations (including pre-retail installations); recent updates to NFPA and ICC codes and standards relevant to hydrogen stations; typical permits and approvals for California hydrogen stations; links to additional resources.

4. Current California Laws and Regulations that May Apply to Hydrogen Fueling Stations

A detailed tabulation of California regulations that may apply to hydrogen stations (including pre-retail installations) with information on application, source, authorities having jurisdiction, enforcement, and codes and standards referenced.

Canadian Hydrogen Installation Code (2007)

What it covers:

The purpose of this code is to establish the installation requirements for hydrogen generating equipment, hydrogen utilizing equipment, hydrogen dispensing equipment, hydrogen storage containers, hydrogen piping systems and their related accessories.

As an example, the CHIC defines the installation requirements of hydrogen filling stations that dispense gaseous hydrogen, whether the hydrogen is produced by water electrolysis or natural gas reforming or delivered by truck in a liquid or gaseous form. It

also provides guidelines for the installation of fuel cell and internal combustion engines that provide emergency or back-up power to commercial buildings and residential homes.

The HyApproval Handbook (2008)

What it covers:
The Handbook provides recommendations for a EU27 uniform approval process for HRS. The Handbook is divided into two main parts:

- Part I: "Guidelines for design, operation & maintenance of a Hydrogen Refuelling Station" (HRS) provides technical guidelines and best practices related to construction and operation of a hydrogen refuelling station. It includes the properties of hydrogen, and the list of regulations, codes and standards related to HRS. It also presents the methodologies for a risk assessment in the framework of a HRS approval.

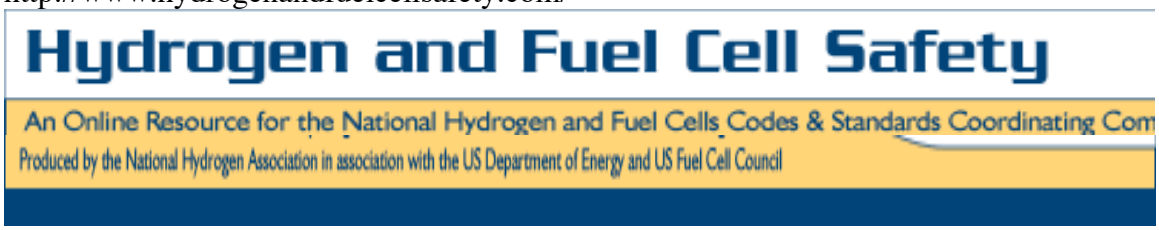
- Part II: "Permitting process" proposes an approval route, which could be applicable all over Europe. It also highlights the HRS approval process differences between France, Germany, Italy, Spain, The Netherlands and China. It identifies the gaps between the various national processes. A feedback from the authorities is also included.

- Six Appendices:
- APPENDIX I "Safety Data Sheets for hydrogen and refrigerated hydrogen"
- APPENDIX II "Approval requirements in five EU countries and the USA"
- APPENDIX III WP4 "Emergency Response Plan"
- APPENDIX IV WP4 Deliverable:"Quantitative Risk Assessment of Hydrogen Refuelling Station with on-site production"
- APPENDIX V HyApproval WP4 Deliverable"Consequence Assessment Summary Report"
- APPENDIX VI "Vehicle description and requirements"

Fuel Cell System Installation Criteria / Petroleum Association of Japan
What it covers ?

Newsletters

Hydrogen and Fuel Cell Safety
http://www.hydrogenandfuelcellsafety.com/



About this Newsletter:
"An Online Resource for the National Hydrogen and Fuel Cells Codes & Standards Coordinting Committee.Produced by the National Hydrogen Association in association with the US Department of Energy and US Fuel Cell Council." Published monthly / quarterly.

The National Hydrogen Association is pleased to announce an expansion of the *Hydrogen Safety Report* to include information Fuel Cell Safety, Codes and Standards. In addition, this new site will support the activities of the National Hydrogen and Fuel Cells Codes & Standards Coordinating Committee, an entity consisting of a large number of organizations involved in the development of codes and standards for hydrogen energy systems and fuel cells. The *Hydrogen Safety Report* will stay online, providing technical information and archives, but will not be updated. Please use this new site to access the latest information on hydrogen and fuel cell safety.

H2 Safety Snapshot Bulletin
http://www.hydrogen.energy.gov/newsletter.html

About this Newsletter:
H2 Safety Snapshot is a quarterly bulletin that highlights safety as an important element when working with hydrogen and hydrogen systems. Produced by Pacific Northwest National Laboratory, H2 Safety Snapshot promotes continued success in the safe operation of DOE hydrogen projects. The bulletin supports the hydrogen projects of Office of Energy Efficiency and Renewable Energy's Vehicle Technologies Program and Hydrogen, Fuel Cells and Infrastructure Technologies Program.

Websites

Canada
"Hydrogen Infrastructure" – all related codes
http://www.fuelcellstandards.com/hydrogenmatrix.htm

US DOE
"Permitting Hydrogen Facilities"
http://www.hydrogen.energy.gov/permitting/index.cfm

Europe
"HYPER Project: Installation Permitting Guidance for Hydrogen and Fuel Cells Stationary Applications"
www.hyperproject.eu

Inclusive
"Hydrogen Fuel Cell Codes and Standards"
http://www.fuelcellstandards.com/stationary_apps.html