



Permitting Hydrogen Fueling Stations and Hydrogen Fuel Cell Backup Power for Wireless Telecommunication Sites Workshop

**CUMULATIVE REPORT
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As the United States begins a transition to a cleaner and more sustainable energy future, the U.S. Department of Energy (DOE), Office of Hydrogen, Fuel Cells and Infrastructure Technologies and the National Renewable Energy Laboratory (NREL) through the National Association of State Fire Marshals has implemented a series of two-day workshops to address the critical issue of permitting hydrogen fueling stations (HFS) and hydrogen fuel cells for back-up power at wireless telecommunication sites (WTS). During this decade and the one following, major automotive companies plan to introduce hydrogen vehicles in significant numbers and major energy companies plan to build the Hydrogen fueling stations that are needed to fuel these vehicles. In addition, the telecommunications industry is deploying hundreds of hydrogen fuel cells as back-up power for wireless telecommunications sites.

Through these efforts, Hydrogen Permitting Workshops have been held in New Jersey, California and Michigan where public hydrogen motor fueling stations and the use of stationary hydrogen fuel cells as back-up power for telecommunications antenna sites are present or are expected to be located in the near future. There have been approximately 125 total participants. Of that number, 38 were carefully selected building, fire and electrical code enforcement officials, inspectors, and emergency responders. Other participants included senior policy-level officials at state and local level as well as representatives from the automobile and stationary fuel cell industries. Based upon the input and advice of all the stakeholders NASFM led the process in identifying and selecting a diverse group of participants which was vetted by NREL, allowing code officials and industry experts to work together to identify areas for improvement in the process of plan review and permitting of these installations. Additionally, NASFM assigned individuals who are both code experts and expert facilitators to moderate the workshop and guide participants through the permitting process.

The primary objective of the workshops was to demonstrate how existing codes and standards, or engineering solutions based on the latest codes ("alternative methods"), have been or can be applied to permit construction of a hydrogen motor-fueling

station or a back-up power facility at a telecommunications site in a rigorous but timely manner. A second objective was to gain input from key state and local fire and building code officials on how the permitting process for HFS and hydrogen fuel cells for WTS can be made more cost-effective for code officials, HFS developers and the telecommunications industry. In order to achieve these objectives, participants were asked to review and vet case studies that exemplified the permitting process, relevant codes and standards, and engineering solutions. As the workshops evolved and we applied lessons learned the workshop objectives were expanded to include the development by participants of a permitting tool for use in their respective jurisdictions. This new objective was a valuable addition to the case studies and actual permitting exercise.

The following are overviews of the New Jersey, California and Michigan workshops.

To view the complete final action reports, please visit:

http://www.hydrogen.energy.gov/permitting/stations_related.cfm.

Teaneck, New Jersey - May 15-16, 2008

The two-day Teaneck workshop was attended by 44 people which included 25 building and fire code officials with previous experience permitting HFS as well as emergency responders within New York City, New York State and New Jersey. Other participants included the mayor of Teaneck, NJ, General Motors, and hydrogen/telecommunications industry representatives.

Day one provided participants with various presentations on the background on the workshop/objectives, hydrogen and its chemical properties and uses with comparisons to other flammable gases, examples of hydrogen motor fueling station projects and telecommunication back up power installations that have been implemented in the United States. Participants were also familiarized with the codes and standards and the processes that have been utilized by their local/state officials to permit the hydrogen fueling projects.

Moving into day two, participants were separated into three teams of approximately seven and assigned a primary and a secondary plan involving a service station and a primary and a secondary plan involving telecommunications sites. They were then given the opportunity to conduct "Virtual Permittings" of projects that have already been permitted to get a handle on how they would do the permitting, given available information about the projects and available codes and standards. The teams were also asked to identify critical issues associated with the permitting process that need to be addressed by the Department of Energy, in order to facilitate the permitting process. The overall goal was to raise the comfort level of the code official should they be presented with an application to construct a hydrogen motor fueling station in their jurisdiction and provide them with the opportunity to articulate codes and standards gaps or conflicts (if any) that need to be addressed.

At the end of the workshop participants were asked to complete an evaluation form. The evaluation asked the participants to rank their responses to four questions concerning expectations, increase in comfort level, increased understanding and whether or not they would recommend others to attend a similar workshop. In addition they were asked to share what they liked or disliked about the workshop and to provide recommendations for improvements.

(A full listing of the responses and comments provided by the participants is included on the final action report)

Los Angeles, CA - August 26-27, 2008

The two day California workshop was held in cooperation with the California Fuel Cell Partnership (CaFCP) and California State University, Los Angeles. Participants were identified by CaFCP with additional guidance provided by NASFM. There were 47 participants in attendance. Of those participants, 8 were building/fire/electrical code officials, and industry representatives within targeted counties in Los Angeles. Also in attendance were representatives from Honda, GM, Toyota, and hydrogen/telecommunications industry.

Presentations were given on the workshop's background, objectives and structure as well as on hydrogen fueling stations and wireless telecommunications sites. Additional presentations dealt with emergency responder safety and the ICC and NFPA pathways. To address feedback from the New Jersey workshop, participants were given an extended overview of hydrogen fuel, hydrogen safety, and fuel cells. Like the New Jersey workshop, participants were divided equally into teams and asked to review plans of HFS and WTS that have been or are likely to be proposed in the near future. They were asked to develop a permitting guide for their own jurisdiction that identified the approving agencies, the order in which the application would move through those agencies and what codes and standards would be applied in that process. The purpose was to provide the participants with a tool to take back to their jurisdictions and implement should an application be made for the use of hydrogen as a fuel.

Ultimately, the teams did an excellent job of reviewing the assigned plans in a collaborative manner. Only minimal guidance was provided by the workshop facilitators. The reporting of results was thorough and well documented by all five teams.

(A full summary of the workshop and participants evaluations is included in the final actions report)

Detroit, MI - September 17-18, 2008

The two day Michigan workshop was held in cooperation with the Michigan State Department of Environmental Quality (DEQ) and NextEnergy. Attendees were invited based upon targeted areas provided by DEQ. These invitees yielded a total of 32 participants which included five code and fire officials from the cities of Detroit, Dearborn and Lansing as well as several inspectors from DEQ. Also in attendance were representatives from Honda, GM and the hydrogen/telecommunication industries.

The Michigan workshop began with presentations from the US Department of Energy, US Fuel Cell Council, NextEnergy, NASFM and General Motors. Following the opening presentations, NextEnergy provided participants the opportunity to tour their hydrogen motor fuel and stationary hydrogen fuel cell installations.

Unlike previous workshops, participants were not assigned to teams to review project plans. The focus was to provide an overview of Michigan's hydrogen installation rules and permitting process. Key areas discussed were:

- What's Regulated, What's Not
- Michigan Regulations
- Permit Application
- Permitting Hydrogen Facilities & Responsibilities

(A full summary of the workshop is included in the final actions report)

Moving forward, as the transition into alternatives fuels continues to emerge as our nation's largest energy and environmental need, NASFM has shown its unique ability to engage fire and building code officials as well as emergency responders in the permitting process of hydrogen fueling stations and wireless telecommunication sites. Through these workshops, participants have gained a better understanding of how to apply the codes and referenced standards to a hydrogen motor-fueling facility permit application and have indicated an increased level of comfort with the topic. In addition, feedback from the participants has provided guidance on what content to include in future workshops along with areas within the existing code language that may need modification to clarify technical requirements. Overall, these workshops have proved to be of value to all attendees in giving them an opportunity to learn more about Hydrogen fueling stations, wireless telecommunications sites, hydrogen fuel cells, and the informational tools that are under development to facilitate the permitting process.