

## **NHA Codes and Standards General Priorities - excerpted**

The National Hydrogen Association (NHA), in conjunction with others, is defining and moving down the path to a hydrogen future along with many companies engaged in the development and commercial application of hydrogen-related products and services. In addition to developing and demonstrating new hydrogen energy components and systems, this path includes the identification and removal of barriers to deployment such as the lack of adequate codes and standards. Progress in the development of consensus codes and standards will be faster and more efficient by coordinating efforts with DOE, NREL, the US Fuel Cell Council, and national and international codes and standards development organizations to accelerate the adoption of new hydrogen energy technologies.

The adoption of these new technologies allows the United States to reduce its reliance on foreign oil, thereby increasing its energy security. In addition, hydrogen will lead to a cleaner environment by “fueling” a variety of clean energy technologies including zero emission fuel cell transportation and power generation.

### **The Challenge**

Hydrogen has been used safely in industrial applications for decades. These safety practices, as appropriate for commercial applications, must be incorporated into national and international standards and model building codes. In addition, it is critical that codes and standards be system-level and performance-based to enable technology innovation. As most hydrogen energy technologies are not yet optimized or in their final form, the task of coordinating this effort is huge - much larger than the NHA can support on its own – and in constant flux.

The leadership of the NHA Codes & Standards Steering Committee can go a long way toward prioritizing efforts to ensure the NHA focuses its resources on the activities with most critical needs. In addition, the roles of trade associations such as the NHA, USFCC, CGA, SAE and API can be coordinated better. The NHA proposes to conduct C&S strategy summits between the technical staff and industry leaders for hydrogen and fuel-cell related codes & standards activities from these groups. The purpose will be to determine what issues are most important to the members of these organizations, what are the most appropriate roles for each organization, and how the associations can better support the objectives of the overall codes and standards effort. Through this coordination, each organization will be able to focus in the appropriate areas leverage each other’s efforts.

Many technologies are all required to be in place for a hydrogen energy economy to develop. For example, we could not support the standards for hydrogen cars only without supporting standards for refueling stations, vehicle refueling connectors, hydrogen storage and dispensing, interconnections, fuel quality, etc. In addition, hydrogen production technologies are varied and pre-commercial. These include new reformer technologies to meet the needs for infrastructure build-up, electrolyzers, and methods to convert many unconventional types of energy feedstocks to hydrogen.

### *Many activities...*

There are activities currently underway for a significant portion of the technologies necessary to meet the US government goals. In fact, there are more C&S activities than can be reasonably supported by

industry experts. Small companies in particular, like those involved in the development of electrolysers, reformer, metal hydrides, high-pressure hydrogen storage containers, etc., cannot afford to have an expert directly involved in all of the C&S efforts that impact their business. This is due to the fact that efforts are likely to include a national standard body, UL for listing, an international standard body, and two sets of model codes. An appropriate role of a trade association like the NHA is to research the activities, inform the hydrogen community of the activity and how to participate, develop consensus around technical issues, and follow up to put that consensus forward. As an example, this could entail participation with 5 working groups for each new technology involved in production, storage, and utilization.

## **Background**

The NHA has supported the National Hydrogen & Fuel Cell Codes and Standards Coordinating Committee since its inception. The NHA believes that safety isn't proprietary, and works to ensure that all stakeholders are informed of codes and standards activities that may impact their products and business. Companies can choose to participate directly or monitor activities through the NHA. In addition, through the National Hydrogen & Fuel Cell Codes and Standards Coordinating Committee, the NHA shares information on codes and standards that the USFCC and others are involved in, minimizing duplication of effort. The NHA focuses on codes and standards activities that are important to the deployment of hydrogen energy systems and require extensive hydrogen expertise or require a broad range of stakeholder input to be successful.

### *Structure....*

The NHA has formed a Codes & Standards Steering Committee, a focused, diverse group of hydrogen companies that have active interest in developing codes and standards. The Steering Committee facilitates candid information exchange and its diversity ensures a broad range of stakeholder input. This allows all interested parties to remain involved in the NHA's Codes & Standards activities, while providing a mechanism for a more manageable group of active participants to discuss issues and plan workshops on a more regular basis. This also reduces the number of activities that staff needs to participate in directly. Members are asked to provide information including status and key issues on a regular basis. This information will be shared with the hydrogen and fuel cell industry through various outreach mechanisms like the *Hydrogen and Fuel Cell Safety Report*.

There are times, however, when the broad array of stakeholders is not sufficiently represented on an SDO working group. This occurs for several reasons. Firstly, many SDOs have strict rules regarding composition of working groups. Secondly, with the large number of activities, schedule conflicts are occurring more frequently. And thirdly, often, the stakeholders are not properly identified, and therefore are often unaware of the effort or its impact on their products. It is during these times that the NHA needs to participate directly and communicate issues to the industry. A couple examples of this are the hydrogen quality specification and NFPA efforts.

### *Leveraging resources...*

The National Hydrogen Association continues to make progress on the hydrogen safety, codes and standards priorities as identified by members, and leverages its program significantly with support from member dues, sponsorship, and workshop revenues where applicable. In addition, the NHA desires to meet regularly with other stakeholder associations such as the USFCC and API to reaffirm each organization's priorities and roles, further reducing duplication of effort and providing

opportunities for leveraging. This may be accomplished through the National Hydrogen and Fuel Cell Codes and Standards Coordinating Committee meetings, or separately.

The NHA continues to provide consensus forums for the broadest range of stakeholders in the developing hydrogen energy economy. It continues to keep its Codes and Standards Workshops open to all interested parties and partnering with groups like the CaFCP to offer specific training when needed. Safety outreach efforts are expanding to include state initiatives. The NHA continues to hold workshops and publish the *Hydrogen and Fuel Cell Safety Report*.

Through technical activities, the NHA will continue to provide technical expertise and keep the hydrogen community and others informed of activities impacting hydrogen safety, codes and standards. The NHA works in five areas:

- Technical conferences for hydrogen codes and standards,
- Interdisciplinary Consensus Building,
- International Standards and Global Technical Regulations,
- Technical Support for State and Regional Hydrogen Programs, and
- US Model Code Support.

To determine the priorities, the NHA regularly takes flash-points, by asking members “what are the codes & standards issues that have the greatest impact”? This may include areas where an effort is needed or doesn’t exist, where an effort exists but lacks the required expertise, or where the effort is misdirected and could negatively impact the ability to site equipment necessary for the hydrogen economy. These flash-points will then be coordinated with other stakeholder associations to develop a path forward. In the case where an NHA working group is formed, other associations are welcome and encouraged to participate. The NHA’s C&S working groups have always been open to all interested stakeholders, regardless of membership status. Safety isn’t proprietary.

## **NHA Priorities**

The following are among the NHA’s current codes and standards priorities. These priorities are regularly discussed among the Steering Committee and the National Hydrogen & Fuel Cell Codes & Standards Coordinating Committee. When new activities are proposed, they may be added to the priorities, based on industry need for the activity, timing necessary to support deployment, and an appropriate role for the NHA. ***These priorities are not yet ranked in order, as the resources available affect the level of NHA involvement in these efforts.***

### Hydrogen Quality

In 2004, ISO TC 197 and SAE each began efforts to create a technical specification for hydrogen fuel quality in order to limit impurities in hydrogen fuel for PEM fuel cells in road transport applications. Automobile manufacturers in conjunction with fuel cell developers initiated both the ISO and SAE efforts. By their nature, these efforts will lead to stringent impurity limits on hydrogen for fuel cell vehicles, which may not be necessary for other applications, including ICEs. As there are serious technical and economic ramifications to the developing hydrogen energy economy, the NHA has become involved to ensure technical consistency, develop a U.S. position on these issues, and most of all, ensure that all key stakeholders have a voice in the development of these specifications. The NHA participates directly in these activities, and reports on the developing issues and decisions in the Hydrogen Safety Report. In addition, NHA staff contacts member companies directly when their sector

is not adequately represented in the decisions taking place. There is definitely a need for more involvement from the hydrogen suppliers in these activities. The NHA will continue to participate in developing broad consensus on this key issue.

#### US Model Codes Support

The NHA will continue to support the International Code Council and NFPA in their efforts to review, develop and promulgate new codes for the use of hydrogen. This includes providing experts, technical reports, data and other information needed by the Code Officials to complete the development of these new codes. In addition, Karen Hall on NHA staff has been accepted as a member of the NFPA Alternative Vehicular Fuels Committee at NFPA, which is responsible for NFPA52. The NHA would like to facilitate an open dialog between NFPA and hydrogen and fuel cell industry to discuss alternatives to resolving the problems in the NFPA documents regarding hydrogen energy technologies. The NHA will continue to lead the process to pull hydrogen industry expertise together to create code proposals, documents, and training materials to facilitate permitting of hydrogen energy projects.

#### International Standards and Global Technical Regulations

NHA will continue to support ISO TC 197 plenary meetings and relevant working groups. NHA will continue to serve on the ISO TC 197 permanent editing committee, and participate in the US TAG for ISO TC 197. NHA also includes GTRs in its workshops and technical sessions, and works with stakeholders to gain an understanding of the implications of GTRs.

US TAG TEAM Meetings provide an opportunity to discuss issues impacting US interests in the ISO and IEC standards-development working groups, as well as UN activities on regulations for hydrogen energy systems. By discussing issues US TAGs face individually, the NHA can discover where these issues impact other areas and try to build US consensus in a broader context.

The National Hydrogen Association supports the development of international standards so that industry can commercialize technologies internationally, without trade barriers. The NHA also supports US efforts to develop the broadest US consensus possible. Issues faced by the US TAGs include technical issues, political issues, issues of timing of the need for a standard, and scope of new work items, as well as compatibility with existing and developing US model codes, standards, and regulations.

The NHA works with the USFCC to conduct these meetings, twice per year. The NHA C&S Steering Committee is encouraged to participate.

#### Identifying Lessons Learned

The NHA provides forums at workshops and annual conferences to identify lessons learned from related industries, such as the natural gas industry, to speed development of hydrogen energy safety activities. One such forum was held at the NHA's Annual Hydrogen Conference 2005. This type of activity will be continued.