NIST WMD Report on the
Development of Commercial Hydrogen Measurement Standards
to the NFCCSCC
April 9, 2008

U.S. National Work Group (USNWG) March 2008 Meeting

The U.S. National Work Group (USNWG) for the Development of Commercial Hydrogen Measurement Standards met March 4-6, 2008, at the California Fuel Cell Partnership (CaFCP) in West Sacramento, California. The U.S. Department of Energy and NIST were joint sponsors of the meeting. The USNWG expresses its thanks to the CaFCP for making the facility available for the meeting. In October 2007 the USNWG divided its work into two areas to be carried out by two separate subcommittees, one for device standards and test procedures and the other for fuel specifications. On March 5, meeting participants were given the opportunity to Ride and Drive fuel cell vehicles at the CaFCP and tour refueling operations at the Sacramento Municipal Utilities District.

Device Standards and Test Procedures Subcommittee

On March 4-5, the Device Standards and Test Procedures Subcommittee resumed work on a draft NIST Handbook 44 Hydrogen Gas Meters Code and corresponding field test procedures. The Subcommittee is on track with the WMD 2008-2012 plan for drafting device standards. The Subcommittee incorporated industry and weights and measures comments into the draft code to address: (1) marking temperature ranges, (2) pressurization of the hose, (3) units of measurement, (4) selection of the unit price, and (5) receipt requirements in retail applications. The Subcommittee will also develop additional language to clarify how product composition relates to meter technology and the terms "nonresettable totalizer" and flow rates when verifying the "minimum measured quantity". A third draft of the code will be made available for Subcommittee review and input in April 2008. Several dispenser OEMs are working to provide performance data to the Subcommittee for comparison with current accuracy requirements of ± 1.5 % in the draft code.

The Subcommittee is interested in H2 refueling equipment test procedures from OEMs, energy suppliers, research facilities, and other sources. The California Division of Measurement Standards (CA DMS) is nearing completion of a draft checklist of test procedures for type approving dispensers and is examining possible sources for test equipment and standards so that it can begin to gather data. CA DMS anticipates it will be the first state to receive a request for type evaluating and approving a H2 dispenser for commercial use. The Subcommittee discussed dispenser testing by either gravimetric, volumetric or transfer standard methods.

Fuel Specifications Subcommittee

On March 6, the USNWG Subcommittee for Hydrogen Fuel Specifications held its first meeting to address weights and measures requirements for product: (1) identity, (2) specifications, (3) method of sale, (4) labeling, (5) signage, and (6) sampling and laboratory test procedures.

The Subcommittee discussed the many similarities between the fuel specifications and guidelines developed by CA DMS, SAE, and ISO and reviewed a corresponding draft of NIST Handbook 130 developed by NIST WMD. The Subcommittee discussed which contaminant levels are acceptable based on the capability of test equipment and from a fuel specification standpoint. The Subcommittee witnessed the handoff of a first generation fuel quality test unit from a private test facility to CA DMS. Discussion of sampling procedures and laboratory practices will be carried over to next meeting.

The Subcommittee agreed that the conditions for sale such as operation pressure or product purity should be stated with the associated price in whole cents/kilogram in street signage and dispenser labeling. The draft method of sale requirements will be modified to reflect the Subcommittee's decision.

Next Meeting(s)

At its next meeting tentatively scheduled for June 2008, the USNWG Subcommittees will most likely focus on dispenser test procedures and fuel quality specifications, and laboratory and sampling procedures. The USNWG is considering Allentown, Pa, Des Plaines, IL, or California fueling sites based on logistical and technical needs of the project. It may be necessary to hold two separate meetings, one to finalize the draft device code and continue work to develop test procedures and a second to continue discussions on fuel specifications and method of sale requirements. The USNWG agreed that invitations should continue to be extended to auto OEMS and energy providers for their input and participating in anticipation of some resistance to requirements for specific uniform pricing units and fueling protocols.

International Hydrogen Standards Development

The International Committee on Legal Metrology approved a new project to revise International Recommendation 81 (R 81) "Dynamic measuring devices and systems for cryogenic liquids" to include:

(1) Electronic tests in accordance with the latest edition of OIML D 11 (2004) and/or the latest IEC and ISO standards,

(2) Technical requirements to include new developments in hydrogen measurements, and

(3) Current recommendations for density equations, and

As Secretariat for R 81, the country responsible for work on the international standards document, the U.S. plans to consider revising the format of existing sections into three distinct parts similar to the format of recently developed OIML recommendations. Manny of the requirements in this document correspond to NIST Handbook 44 Section 3.34 Cryogenic Liquid-Measuring Devices.

A first committee draft with all of the modifications listed above will be circulated to U.S. stakeholders for comment in April 2008.

U.S. National Outreach and Hydrogen Standards Development

NIST WMD encourages the weights and measures regulatory community at the state, local, and regional level to continue to participate in the development legal metrology standards for hydrogen and training opportunities on emerging hydrogen technology. Updates and links to reports and other related work on the development of commercial hydrogen measurement standards and a schedule of upcoming Hydrogen Workshops, Presentations, and Meetings will be posted on NIST WMD website, shortly. A presentation on the status of work to develop commercial hydrogen measurement standards is planned for the Northeastern Weights and Measures Association May 13, 2008 in Fishkill, New York.

To participate or observe in the USNWG or upcoming workshops or if you have questions about the work to develop commercial hydrogen standards, pleae contact Juana Williams by email at juana.williams@nist.gov, by telephone at 301-975-3989, or by fax at 301-975-8091.