U.S. National Work Group
for the
Development of Commercial Hydrogen Measurement Standards

June 17, 2010

Joint Device Standards Subcommittee (DSS) and Fuel Specifications Subcommittee (FSS)

Tele/Web Conference Meeting

MEETING SUMMARY

Time: Thursday, June 17, 2010/3:00 p.m. – 4:30 p.m. ET-USA & Canada (GMT - 05:00)

Meeting Name: H2 U.S. National Work Group, May 25, 2010 Tele/Web Conference Meeting

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This meeting is sponsored by the U.S. Department of Energy and U.S. Department of Commerce's National Institute of Standards and Technology.

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Purpose: The U.S. National Work Group (USNWG) met to continue its work to promote the establishment of a comprehensive set of (1) design, accuracy, installation, use, and method of sale requirements, (2) test procedures, and (3) quality standards for hydrogen fuel and equipment used in hydrogen measurements for vehicle and other refueling applications.

AGENDA ITEMS

Attachments List		
Appendix	**Related Agenda Item(s)**	Title
A	(2)(a)	Draft Summary of the May 2010 USNWG Meeting
B	(4)(a)	Preliminary USNWG's Responses to Input on the Draft Hydrogen Codes from the Fall 2009 Regional Weights and Measures Associations and USNWG (rev.4)
C	(4)(a)	Draft 5.1 of the NIST Handbook 44 Hydrogen Gas-Measuring Devices Code
D	(6)	Notice to Stakeholders - NCWM Vote on Hydrogen Codes
E	(4)(a)	Updates to Comment USNWG #1 [06JUN2010 Keilty]
F	(1)	Attendee List
*Device Standards Subcommittee (DSS)		
**Fuel Specifications Subcommittee (FSS)		

Glossary of Acronyms			
ASTM	American Society of Testing and Materials International	MPa	megapascal
CaFCP	California Fuel Cell Partnership	NGV	Natural Gas Vehicle
CDFA DMS (also CADMS)	California Department of Food and Agriculture, Division of Measurement Standards	NHA	National Hydrogen Association
CSA	Canadian Standards Association, Incorporated	NIST	National Institute of Standards and Technology
DSS	Device Standards Subcommittee	NTP	Normal Temperature and Pressure
EPO 29	Draft Hydrogen Gas Retail Motor-Fuel Dispenser Examination Procedure Outline (EPO) 29	OEM	Original Equipment Manufacturer
FSS	Fuel Specifications Subcommittee	OIML	International Organization of Legal Metrology
HB 44	NIST Handbook 44 Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices (2010)	OIML R 139	Recommendation for Compressed gaseous fuel measuring systems for vehicles
HB 130	NIST Handbook 130 Uniform Laws and Regulations in the Area of Legal Metrology and Engine Fuel Quality (2009)	RMFD	Retail Motor-Fuel Dispenser
HGV	Hydrogen Gas Vehicle	S&T	Specifications and Tolerances
ISO	International Organization for Standardization	SAE	Society of Automotive Engineers
MMQ	Minimum Measured Quantity	SI	International System of Units
MOS	Method of Sale	USNWG	U.S. National Work Group
L&R	Laws and Regulations		
This table is meant to assist the reader in the identification of acronyms used in this agenda and does not imply that these terms are used solely to identify these organizations or technical topics.			

AGENDA TOPICS

3:00 P.M. (ET)

(1) Welcome Current/New Members and Roll Call
Members of the USNWG and visitors were welcomed, the meeting was called to order, roll called, and the meeting's purpose was reviewed. The collaborative work by the meeting's sponsors was recognized.

(2) Administrative Business
The USNWG discussed and agreed on procedures for managing and documenting its technical work. The following item(s) were addressed:

(a) Approve the Summary of the May 25, 2010 USNWG Meeting
A draft summary (see Appendix A) of the May 25, 2010 tele/web conference meeting was emailed on June 16, 2010 to the group for review. The USNWG requires additional time to review the summary. Therefore, the Technical Advisor will ballot the USNWG for its approval of the summary on June 18th. The DSS Technical Advisor recommended a June 25, 2010 deadline for return of the ballot.

(b) Agenda Updates for June 2010
No additional items or other updates were included in the June agenda.

(3) Opportunity for Reports on Related Activities
The USNWG is working to harmonize, wherever possible, with related standards to encourage uniformity and to avoid contradictory requirements and trade barriers for U.S. industry. The USNWG Subcommittees will receive updates on work by organizations such as ASTM, CaFCP, DMS, NHA, OIML, SAE and other related activities as their work continues to progress.

No updates were provided to the USNWG during the June 2010 meeting.

(4) Development of Device Standards and Test Procedures for Commercial Hydrogen Measurement

(a) Remaining Comments on the Draft Hydrogen Codes/USNWG Input to the July 2010 National Conference on Weights and Measures (NCWM)

In preparation for input to the July 11-15, 2010 NCWM, the USNWG discussed finalizing its responses to comments (see Appendix B) received on the draft hydrogen codes (see Appendix C) from the U. S. regional weights and measures associations that met fall 2009 and USNWG members.

The DSS Technical Advisor was unable to distribute ballots for the 13 remaining comments in Groups [2], [3], [4], and [LOD] since the USNWG's last meeting on May 25. During its June 17, 2010 meeting, the USNWG was able to discuss 7 of those 13 comments on the draft hydrogen codes. Comments received from the Southern Weights and Measures Association (SWMA), but not addressed due to time constraints at the June 17 meeting were:

SWMA #10-S.3.3. Provision for Sealing
SWMA #11-S.3.6. Zero-Set-Back Interlock, Retail Vehicle Fuel Devices
SWMA #12-S.5. Markings
SWMA #13-S.6.1. Printed Receipt
SWMA #14-S.7. Totalizers for Vehicle Fuel Dispensers
SWMA #15-N.5. Minimum Measured Quantity

The DSS Technical Advisor will summarize decisions the USNWG made at the June 17 meeting and forward them to the USNWG in the June meeting summary on June 18, 2010.

Multiple paragraphs in Draft 5.1 of the NIST Handbook 44 (HB 44) Section 3.39 Hydrogen Gas-Measuring Devices Code were discussed by the USNWG in response to comments received from regional weights and measures associations and members of the USNWG. Paragraphs discussed and the rationale for the USNWG decision not to modify certain requirements are:

SWMA #1-S.1.2.: Hydrogen gas measuring systems used in vehicle and other related refueling applications have the technological capability to be designed and operate as computing type devices (see HB 44 Appendix D definition). Paragraph S.1.2. is intended to require all systems used in this application to be of the computing type.

SWMA #7-S.2.8. Indication of Delivery: This requirement specifies the display information that must be shown at the start of delivery (an initial zero) and end of the delivery (quantity up to nominal capacity). Whereas, paragraph S.2.1. Return to Zero specifies the device's indications or recording element must have a means to return to zero and not return beyond that point and paragraph S.2.2. Indicator Reset Mechanism places restriction on when the reset mechanism can be operable and specifies values which can be displayed during the zeroing operation. These are separate but necessary design requirements and similar to corresponding requirements in other measuring device codes. Therefore, no changes were made to group paragraph S.2.8. under either paragraphs S.2.1 or S.2.2.

SWMA #16-N.6.1.1. Repeatability Test: The USNWG acknowledged that the ability to control test conditions while conducting a field test are not the same as when performing a laboratory test of a measuring system. The repeatability test was developed with liquid products in mind. The physical properties of compressed gases at high pressure cannot be considered the same as those for liquid products. The USNWG agreed that the tolerances and the test requirements may require further refinement after multiple trials under field environment conditions.

Several paragraphs were modified by the USNWG during the June 2010 meeting. The modifications and the rationale for the USNWG's actions are shown in the Table A below.

Table A
June 2010 DSS Modifications to
Draft 5.1 of the NIST Handbook 44 Hydrogen Gas Measuring Devices Code

Change to Requirements:	**Requirement Title:** Numerical Value of Quantity-Value Division	**Reason for Change:** Term modified and examples added to clarify that the numerical values specified in the requirement apply to the difference between two successive mass units (indicated or recorded)
S.1.3.2. Numerical Value of Quantity-Value Divisions. - The value of a**n** ~~**scale**~~ interval **(i.e., increment or scale division)** shall be equal to: - 1, 2, or 5, or - a decimal multiple or submultiple of 1, 2, or 5. Examples: quantity-value divisions may be 10, 20, 50, 100; or 0.01, 0.02, 0.05; or 0.1, 0.2, or 0.5 etc.		

Change to Requirements: [SWMA #9] Add text to paragraph S.3.2.1.	**Requirement Title:** Discontinuous Adjusting Means	**Reason for Change:** Text added to clarify the manner in which these systems are changing the ratio of the indicated and measured quantity

S.3.2.1. Discontinuous Adjusting Means. - When the adjusting means changes ratio between the indicated quantity and the quantity of measured gas in a discontinuous manner **(i.e., a look-up table of indicated values instead of actual corrected values)**, the consecutive values of the ratio shall not differ by more than 0.1 %.

Change to Requirements: Deleted paragraph S.2.3.	**Requirement Title:** Nonresettable Indicator	**Reason for Change:** Deleted paragraph because of the confusion with paragraph S.7. which is the requirement for a nonresettable totalizer.

~~**S.2.3. Nonresettable Indicator. – A device may also be equipped with a nonresettable indicator if the indicated values cannot be construed to be the indicated values of the resettable indicator for a delivered quantity.**~~

Change to Requirements: [USNWG # 1] The USNWG added a new subparagraph (c) to the Application section A.2. of the proposed code	**Requirement Title:** No title specified for subparagraph (c)	**Reason for Change:** The USNWG recognizes that the factors that affect measurement accuracy vary across technologies. The USNWG also considered a proposal (Appendix E) to specify automatic corrections for volume measuring systems in paragraph S.3.4. Automatic Density Correction. However, hydrogen gas used for fuel cell vehicle refueling is limited to 300 ppm impurities. Similar to the Cryogenic Code, this code is intended to apply to homogeneous products. It should not be applied to deliveries of hydrogen blended products.

A.2. This code does not apply to:

(c) Devices used for dispensing a hydrogen gas with a hydrogen fuel index lower than 99.97 percent and concentrations of specified impurities that exceed level limits.

Change to Requirements: [USNWG #2] The USNWG added a new subparagraph (d) to the Application section A.2. of	**Requirement Title:** No title specified for subparagraph (d)	**Reason for Change:** The USNWG considered a proposed new specification and definition for Pressure-Volume-

the proposed code		Temperature (PVT) Systems to specify the use and origin of PVT values used to calculate the indicated mass. The USNWG agreed that the current draft code does not address the uncertainties associated with PVT systems achieving temperature equilibrium. Therefore, the draft code should be modified to clarify that it does not apply to PVT systems, but can at some point be revisited to recognize this technology when OEMs are ready to enter the marketplace and operate in commercial applications. In the interim period, until the code includes appropriate requirements for PVT systems, officials should consider General Code paragraph G-A.3. Special and Unclassified Equipment when testing these systems.
A.2. This code does not apply to: **(d) Systems that measure the mass of gas accumulated in or discharged from a tank of known volume.**		

The modifications to paragraphs UR.3.2. through UR.3.8 shown below are suggested editorial changes to the requirements for ticket printers used in vehicle-tank meter applications. This proposal was part of Appendix B-Table C on the June 17, 2010 Agenda. The modification was recommended to Draft 5.1 of the proposed hydrogen code to group like requirements under the same heading. These proposed changes required the USWNG's review and approval. Due to time constraints at the June 17 meeting, the USNWG did not discuss these recommended changes. The DSS Technical Advisor will ballot the USNWG on this editorial change the week of June 21.

Editorial Changes Recommended to HB44 H2 Codes		
Change to Requirements: Move like requirements in paragraphs UR.3.2. and UR.3.4. under the same heading and rework paragraph titles	**Requirement Title:** Ticket Printer; Customer Ticket and Ticket in Printing Device, Vehicle-Mounted Measuring Systems	**Reason for Change:** Editorial changes to group like requirements under the same heading.

UR.3. Use of Device.

UR.3.1. Unit Price and Product Identity for Retail Dispensers. - The unit price at which the dispenser is set to compute shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sale.

UR.3.2. ~~Ticket Printer; Customer Ticket. –~~ Vehicle-mounted ~~m~~Measuring ~~s~~Systems Ticket Printer.

UR.3.2.1. Customer Ticket. – Vehicle-mounted measuring systems shall be equipped with a ticket printer which shall be used for all sales where product is delivered through the device. A copy of the ticket issued by the device shall be left with the customer at the time of delivery or as otherwise specified by the customer.

UR.3.2.2. Ticket in Printing Device. - A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.

UR.3.3. Printed Ticket. - The total price, the total quantity of the delivery, and the price per unit shall be printed on any ticket issued by a device of the computing type and containing any one of these values.

~~UR.3.4. Ticket in Printing Device, Vehicle-Mounted Measuring Systems. - A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.~~

Renumber subsequent paragraph UR.3.5. through UR.3.8 to UR.3.4 through UR.3.7.

(5) Next Steps/Tasks

The USNWG discussions focused on its responses to (Appendix B) Comments on the Draft Hydrogen Codes/USNWG Input to the July 2010 NCWM. The next step in the standards development process is the NCWM voting session in July. As NCWM Committee Agenda Voting Items, the proposals for a new NIST Handbook 44 Section 3.39 Hydrogen Gas-Measuring Devices-Tentative Code and NIST Handbook 130 Method of Sale Regulation for Hydrogen are under the control of the NCWM S&T and L&R Committees. The USNWG was made aware that on July 12th each Committee will hear comments and possibly consider recommendations to modify the codes. These recommendations typically represent nonsubstantive changes to the requirements. Recommendations for changes may come from either the USNWG or any registered member of the NCWM.

The USNWG will hold one additional tele/web conference to review decisions made from December 2009 through June 2010 about the codes and finalize summaries of that work for the NCWM and the Northeastern and Southern Weights and Measures Associations to include reviews of:

(1) Final versions of the H2 Draft 6.0 HB 44 and Draft 3.1 HB 130 Codes (with a page noting what has changed in each code since Dec 2009)
(2) Summary of the USNWG's Responses to Comments on the Draft Hydrogen Codes (~19 of 25 were discussed since fall 2009)

Projects, strategies, and target dates identified to ensure that the USNWG meets its goals are listed in the table below:

Task List (based on the June 17, 2010 USNWG Meeting)			
Agenda Item	**Task**	**Responsible Parties**	**Deadline**
(4)(a)	Summarize the June 17, 2010 Tele/Web Conference Meeting decisions of the USNWG	Juana Williams	June 18, 2010
(4)(a) and (5)	Return Ballot 2010-04 on the Approval of the June 17, 2010 Meeting Summary	USNWG	June 28, 2010
(2)(a)	Ballot the USNWG for Approval of the May 25, 2010 Meeting Summary	Juana Williams	June 18, 2010
(2)(a)	Return Ballot 2010-03 on the Approval of the May 25, 2010 Meeting Summary	USNWG	June 28, 2010
(4)(a)	Ballot the USNWG for Approval of the April 27, 2010 position not to modify paragraphs S.2.5. Display of Unit Price and Product Identity and S.2.5.4. Agreement Between Indications	Juana Williams	Week of June 21
(4) (a)	Return Ballot on the Approval of the USNWG position on paragraphs S.2.5. and S.2.5.4.	USNWG	June 28, 2010
(4)(a)	Ballot the USNWG on the Approval of the June 17 Proposal to Editorially Modify paragraphs UR.3.2. through UR.3.5; Ticket Printer, Vehicle-Tank Meters	Juana Williams	Week of June 21
(4) (a)	Return Ballot on the Approval of Editorial Modifications to paragraphs UR.3.2. through UR.3.5	USNWG	June 28, 2010
(5) & (6)	Review Modifications to Codes and Responses to Comment on the Codes	USNWG	Next Meeting-Tentatively Scheduled for Either June 28 or July 2

(6) Next Meeting

A notice (Appendix D) was prepared and distributed to the USNWG on June 3, 2010 to alert all stakeholders about the upcoming NCWM vote on July 14th on the proposed hydrogen codes. Other recipients of the notice

include the National Hydrogen and Fuel Cells Codes & Standards Coordinating Committee (NHFCCSCC). The NHFCCSCC is a collaborative activity of the U.S. DOE, the National Hydrogen Association, the U.S. Fuel Cell Council, and National Renewable Energy Laboratory. All stakeholders in the hydrogen codes are encouraged to provide input to the NCWM before July 14th.

Future Meetings

Tentative Late June/July 2010 Tele/Web Conference

The USNWG has no additional in-person meetings scheduled for 2010, but should finalize any input to the NCWM by July 2, 2010. The USNWG has scheduled an additional tele/web conference to take one last look at a summary of decisions made by the USNWG from December 2009 through June 2010, before members travel to the July 11-15 hearings and voting sessions at the National Conference on Weights and Measures. The DSS Technical Advisor will poll the USNWG on the dates of either Monday, June 28, or Friday, July 2 for the next tele/web conference. The Technical Advisors will report to the USNWG on the outcome of both July 14, 2010 S&T and L&R voting sessions.

In-Person Meeting Sites

Chris Damiani (Energy & Environmental Research Center (EERC)) has extended an invitation for the USNWG to hold an in-person meeting at the EERC, Grand Forks, ND during the week of September 13th. Some of you may recall that during several past meetings, Dev Patel (Kraus Global) has recommended the USNWG include the center on its list of meeting locations. The timing coincides with several hydrogen events that week.

The EERC will host the "Hydrogen Economy Action Summit" (12 noon September 13 through 12 noon September 14). The EERC is also the site of the "Mountain States Hydrogen Business Council" (MSHBC) meetings (1:00pm September 14 through 12 noon September 15). Hydrogen production, purification, transportation, infrastructure, and utilization will be topics of discussion. The event is organized and hosted by the University of North Dakota Energy & Environmental Research Center's National Center for Hydrogen Technology in partnership with U.S. Senator Byron Dorgan's Red River Valley Research Corridor and the MSHBC. Registration for those events is $225 per person. The suggested time for the start of the USNWG meeting is 1:00 pm on September 15th to run through Friday September 17. The conference hotel room rate ($89) would also be available to the group for the entire week.

Please note that in addition to the Summit and Council meetings this site will have a hydrogen dispenser in operation.

5:15 P.M. (ET) Meeting Adjourned

Appendix F

Attendee List-June 17, 2010
Meetings of the USNWG Hydrogen Device Standards and Fuel Specifications Subcommittees

Name	Agency	Device Standards Subcommittee (DSS) Member Yes (Y)	Fuel Specifications Subcommittee (FSS) Member Yes (Y)	Attended Yes (Y)
Tina Butcher	NIST – TS WMD	Y	Y	Y
Joe Cohen	Air Products and Chemicals, Inc.	Y	Y	Y
Norm Ingram	CA – Food and Ag. Div. of Measurement Standards	Y	Y	Y
Diane Lee	NIST – TS WMD	Y	Y	Y
Kristin Macey Chair DSS	CA – Food and Agriculture, County/State Liaison Office	Y	Y	Y
Ken Ramsburg	MD Dept. of Ag.	Y	Y	Y
Dan Reiswig	CA – Food and Ag. Div. of Measurement Standards	Y	Y	Y
Lisa Warfield	NIST – TS WMD	Y	Y	Y
Curt Williams	C P Williams Energy Consulting, LLC	Y	Y	Y
Juana Williams	NIST – TS WMD	Y	Y	Y
John Wright	NIST-CSTL-PMD	Y	Y	Y
Guests				
John Mough	CA-Food and Ag. Div. of Measurement Standards			Y
Van Thompson	CA-Food and Ag. Div. of Measurement Standards			Y
Maurice Van Putten	Van Putten-Blue Energy Observatories, Inc.			Y
Ed Williams	CA-Food and Ag. Div. of Measurement Standards			Y