National Hydrogen and Fuel Cell Codes and Standards Coordinating Committee (NHFCCSCC)

Wednesday, January 9, 2013
TIME: 3:00 – 4:30 pm (Eastern Daylight Time)

Minutes

Attendees

Andrea Zajac	**John Grimes**	**Norman Ingram**
Anna Stukas	**Juana Williams**	**Norm Newhouse**
Bob Boyd	**Julie Weis**	**Robert Sale**
Bob Davidson	**Karen Hall**	**Spencer Quong**
Connor Dolan	**Kelvin Hecht**	**Steve Tucky**
Daniel Dedrick	**Ken Lowenthal**	**Susan Bershad**
Jacquelyn Birdsall	**Larry Moulthrop**	**Tommy Rockwood**
Jay Keller	**Laurie Florence**	**Ron Nies**
Jennifer Hamilton	**Marc Buttler**	**Will James**
Jesse Schneider	**Mike Steele**	
Jill Thompson	**Nha Nguyen**	

1 Welcome and Housekeeping Items

Review of anti-trust guidelines

http://www.fchea.org/core/import/PDFs/ANTITRUST_GUIDELINES.pdf

Review of or corrections to draft meeting agenda

Agenda approved.

Review of or corrections to December draft minutes

December meeting minutes approved.

2 DOE/HQ Update Nha Nguyen

Nha Nguyen - The funding is still under the CR which will end at the end of March. We hope to achieve the same as requested. The second week of December 2012 the GTR was passed for fuel cell vehicles. It will be up for final vote in June of this year. The status of the round-robin testing under the IPHE will be discussed.

Jay Keller – The IPHE has two standing committees, one of which is RCS. We have undertaken a number of projects, the most active is the tank measurement round robin (RR) and has been under way for a year and a half to 2. The purpose of this RR is to understand how to make measurements of the relevant physics needed to execute a test (cycle fatigue test for example). We will be performing test campaigns for both pneumatic and hydraulic configurations. We have finished phase one of three through a hydraulic test campaign with the Chinese. This campaign tested two tanks, both

donated by Lincoln Composites, both of which passed the tests. We learned a lot about how to improve and make appropriate temperature measurements. Goal is to learn how to make the appropriate measurements, the actual testing is not the focus of this excersize. We are not writing testing, just learning how to make the measurements. The RR will harmonize the measurement protocol around the world and ensure that a testing laboratory can execute the appropriate test (SAE 2579, GTR …) with confidence and without the need of a multi-million dollar research facility. The second phase will be doing these tests pneumatically. Testing is currently stalled due to funding issues.

3 C&S Events and Fuel Cell Safety Information

http://www.fuelcellstandards.com/calendar_new.html — Kelvin Hecht

http://www.hydrogenandfuelcellsafety.info/meetings.asp — Karen Hall

4 Codes and Standards Organization Updates

IEC TC 105 — Kelvin Hecht

Active Working Groups

WG#1 (IEC 62282-1 Ed.3 – *Definitions*)
- Publication expected 1st half of 2013.

WG#4 (IEC 62282-3-201 Ed.1 – *Stationary Fuel Cells – Performance for small fuel cells*
- FDIS approved. Publication expected by April 2013.

WG#6 (IEC 62282-4-100 – *Fuel Cell Systems for Forklift Applications – Safety)*
- CD in progress.

WG#8 (IEC 62282-6-101 – *Micro Fuel Cells – Safety*)
- 2nd edition in progress

WG#9 (IEC 62282-6-200 Ed.2 – *Micro Fuel Cells – Performance)*
- FDIS approved. Publication expected by March 2013.

WG#10 (IEC 62282-6-400 - *Micro Fuel Cells – Power & Data Interchangeability*)
- CD in progress.

WG#11 (IEC TS 62282-7-2 *Single Cell –Test Methods For Solid Oxide Fuel Cells)*
- CD in progress.

WG#12 (IEC 62282-3-400 – *Small Stationary Fuel Cells with Combined Heat and Power Output*)
- CD in progress.
- Next meeting February 21-22, Paradise Hotel, Busan, Korea.

Working Groups with no activity at this time

WG#2 (IEC 62282-2:2012-03 Ed.2 – *Fuel Cell Modules)*

WG#3 (IEC 62282-3-100:2012-02 Ed.2 – *Stationary Fuel Cell Power Systems – Safety)*

WG#4 (IEC 62282-3-200:2012-10 Ed.2 – *Stationary Fuel Cell Power Systems – Performance)*

WG#5 (IEC 62282-3-300:2012-06 Ed.2 – *Stationary Fuel Cell Power Systems – Installation*)

WG#7 (IEC 62282-5-1:2012-09 Ed.2 – *Portable Fuel Cells – Safety)*

WG#10 (IEC 62282-6-300:2012-12 Ed.2 – *Micro Fuel Cells – Fuel Cartridge Interchangeability)*

WG#11 (IEC TS 62282-7-1:2010-04 – *Single Cell – Test Methods for PEM Fuel Cells*)

ISO TC 197 Jill Thompson

Pending ballots

N563, vote on cancellation of ISO 15869, *Gaseous hydrogen and hydrogen blends — Land vehicle fuel tanks*

TAG votes are due January 11; ISO ballot ends January 22

N564, vote on cancellation of ISO 20100, *Gaseous hydrogen — Fuelling stations*

TAG votes are due January 11; ISO ballot ends January 22

Upcoming meetings

TAG webconference scheduled for Wednesday, January 23, from 2:00 PM to 5:00 PM EST, to prepare for the ISO/TC 197 plenary

Plenary, February 28, in Montreal

Working group meetings in conjunction with plenary:

- WG 16, *Basic considerations for the safety of hydrogen systems*, February 26
- WG 17, *Pressure swing adsorption system for hydrogen separation and purification*, February 27

NFPA Martin Gresho

Susan Bershad – Public input deadline closed on January 4th. 200 – 300 public inputs were received on NFPA 2. Next step will be to review and vote at the first draft meeting in June.

Bob Davidson – From my understanding of the NFPA Committees, the public will not have access to the public comments received until after the committee meeting to prepare the Report on Comments. The committee is very free to edit public comment and make it their own.

Susan Bershad –Public input that has been received is not available to be reviewed prior to the first draft meeting by the public. The committee is required to act on all public input that is received, and to respond to the submitter. The outcome of the first draft meeting will be available to the public. There is an opportunity to comment of the first draft as part of the second draft process.

ICC Robert Sale

Hearings in Dallas are still scheduled for April 21st - 30th. The agenda has not yet been set for this meeting, but that information will be posted on the ICC website prior to the meeting and an update will be provided to the Committee when available. The schedule is typically posted in March.

Robert Davidson sent via email the code change proposals for ICC to the Committee members. Committee members are encouraged to take a look at those and any questions can be sent to Bob Davidson (rjd@davidsoncodeconcepts.com).

The proposals are primarily for cleanup. For instance in the IBC, hydrogen cut off room, make it a hydrogen gas room, and correlate with NFPA. In the IFC an example will be to adjust language requiring a vehicle to be defueled when it is being worked on.

Much of the work is to try and transition language to NFPA 2 as the reference standard. In several of the proposals you will find references to NFPA 2 added.

Bruce Johnson is still working with NYC to update their fire code and include hydrogen language in that updated fire code to allow storage and fueling of hydrogen in the city. The codes that NYC is currently using is the 2003 codes, ICC is working on both including hydrogen language into those codes now, as well as trying to update the codes to match with at least the 2009 versions across the board. Some of the topics are 2012 versions, for instance for alternative energy (hydrogen and solar). They are in the process of finishing their internal process; public input will likely be in the next few months. They typically shoot for council action by July.

Spencer Quong / Toyota Jesse Schneider / BMW indicated they would be very interested in exploring any avenues to allow hydrogen fueling within NYC and asked to be included in any discussions.

CSA Julie Weis

CSA PowerPoint Report available at http://www.fchea.org/core/import/NHFCCSCC/CSA-Group-Update-2013.01.04.pdf.

HDTA Status Update Ken Loewenthal

The production of the 6kg tank for the HDTA was produced in December and waiting for status confirmation.

The current status of the HDTA is on hold pending additional funding to conduct its evaluation to the J2601 tables for design verification.

CSA is also looking for letters of support from the stakeholders as to their need and acceptance for an HDTA device deployed in service.

UL Laurie Florence

UL PowerPoint Report available at http://www.fchea.org/core/import/NHFCCSCC/UL-LLC-Updates-Jan-2013.pdf.

SAE Mike Steele
Jesse Schneider

Mike Steele – Safety Working Group: since the last meeting in November, SAE J2579 has passed the 28-day approval ballot. Several editorial comments were received after the vote deadline, and the document sponsor has decided to include these comments in the final version. Acceptance of these comments will require an additional 14 day affirmation ballot. It is anticipated that this ballot will be concluded before the March meetings.

The SWG has initiated a new document in conjunction with the Hybrid-EV WG, J2990-1. Jennifer is the sponsor of this activity. The title, scope, and rationale have been submitted to SAE Staff. The purpose is to be a sister document to J2990, Hybrid and EV First and Second Responder Recommended Practice. It was specifically called out in that original document that FCEVs were not included. This document will belong to the FCSC SWG but provisions have been made to allow the Hybrid-EV group to vote on the final document.

The Interface Working Group has two activities, J2601 and J2601-3.

Jesse Schneider – J2601 light-duty vehicle fueling is looking to have final draft by March 2013. This has necessitated weekly meetings. There is an effort to start the simulation for the sensitivity study and later the tables by February 2013. There is a plan to have a test at a laboratory and a hydrogen station before publishing. BMW has volunteered to help fund a portion of the simulation effort for the final tables and testing effort. More will be reported next month, appears that we are on track.

Bob Boyd – The Task Group has put together a draft standard for forklift fueling, J2601-3. There will be a meeting tomorrow (11:00 Eastern, 8:00 Pacific) for final review of pre-ballot draft. This will be posted for ballot after the meeting. If all goes well it is possible we could be ready for approval at the March meeting. Ballot will be up for 28 days.

ASTM Tommy Rockward

ASTM D03.14 Hydrogen and Fuel Cells Update

Work Item	Title	Constituents (DL)	Update
Published	Standard Test Method for Determination of Trace Carbon Dioxide, Argon, Nitrogen, Oxygen and Water in Hydrogen Fuel by Jet Pulse Injection and Gas Chromatography/Mass Spectrometer Analysis	CO2 (0.5 ppm), nitrogen (5 ppm), argon (1 ppm), oxygen (2 ppm), and water (1 ppm)	*Published official item: D7649-10* Awaiting test samples
Published	Standard Practice for Sampling of High Pressure Hydrogen and Related Fuel Cell Feed Gases	Gaseous sampling	*Published official item: D7606-11*
Published	Standard Test Method for Determination of Ammonium, Alkali and Alkaline Earth Metals in Hydrogen and Other Cell Feed Gases by Ion Chromatography	Formic Acid (low ppb to ppm)	*Published official item: D7550-09*
Published	Standard Test Method for Sampling of Particulate Matter in High Pressure Hydrogen used as a Gaseous Fuel with an In Stream Filter	Particulate sampling	*Published official item: D7650-10* Addressed
Published	Standard Test Method for Determination of Trace Gaseous Contaminants in Hydrogen Fuel by Fourier Transform Infrared (FTIR) Spectroscopy	Ammonia,CO2, CO, formaldehyde, formic acid, and water (defined by EPA 40 CFR part 136 Appendix A "meet detection limits of SAE TIR J2719")	*Published official item: D7653-10* ILS complete, collecting data on going
21162	Standard Test Method for the Characterization of Particles from Hydrogen Fuel Streams by Scanning Electron Microscope	Particulates	N/A
Published	Standard Test Method for Visualizing Particulate Sizes and Morphology of Particles Contained in Hydrogen Fuel by Microscopy	Particulates	*Published official item: D7634-10*
Published	Standard Test Method for Gravimetric Measurement of Particulate Concentration of Hydrogen Fuel	Particulates	*Published official item: D7651-10*
Published	Standard Test Method for Test Method for the Determination of Total Hydrocarbons in Hydrogen by FID Based Total Hydrocarbon (THC) Analyzer	Total hydrocarbons (0.1 ppm)	*Published official item: D7675-11* Editorial changes

23815	Determination of Total Halocarbons contained in Hydrogen and other gaseous fuels	Total halogenated compounds ("halocarbon determination requirements contained in SAE J2719" 0.1 ppb)	Editorial changes address, negatives need resolution(D.Bartel)
Published	Standard Test Method for Determination of Trace Hydrogen Sulfide, Carbonyl Sulfide, Methyl Mercaptan, Carbon Disulfide and Total Sulfur in Hydrogen Fuel by Gas Chromatography and Sulfur Chemiluminescence Detection	Total sulfur (0.02 ppb)	*Published official item: D7652-11*
34574	Standard Test Method for Determination of Trace Hydrogen Bromide, Hydrogen Chloride, Chlorine and organic halides in Hydrogen Fuel by Gas Chromatography with Electrolytic Conductivity Detector and Mass Spectrometer	Trace Hydrogen Bromide, Hydrogen Chloride, Chlorine and organic halides	Ballot closed Dec 12, New Standard

5 Discussion Topics

Regulatory Matrix Review and Comment Karen Hall

http://www.fchea.org/core/import/PDFs/FCHEA-Regulatory-Matrix-11-14-2012.pdf

Comments can be sent to Karen Hall at khall@fchea.org. A detailed update will be provided at the February NHFCCSCC meeting.

Permitting and Installation of Hydrogen Fueling Stations

Ca FCP Station Implementation Team **Jennifer Hamilton**

This project has been broken out into a station timeline, performance, hydrogen readiness, etc.

The CEC has released their proposal, this is now due on the 24th/25th of January. This is for 30 million in funding in station development, as well as O&M costs.

We are getting updates from the CEC on existing and funded stations in development during the Working Group calls and in person meetings, as part of the station timeline project. If you have specific questions, please send them to Jennifer Hamilton at jjhamilton@cafcp.org.

The CAFCP OEM work group has submitted proposals to NFPA on fueling – BMW was also listed on that proposal as well.

As a part of the station development and hydrogen readiness projects, and part of the Governor's ZEV Executive Order on education efforts, we are coordinating with CARB,

the Governor's Office of Planning and Research and the CA Office of the State Fire Marshal to develop toolkits. (See www.cafcp.org)

Ca DMS Metrology **Norman Ingram**

Norm Ingram - Either this week of next week, NREL will begin some 35 MPa dispensing so that we can begin collecting validation data. The 70 MPa dispensing is delayed until the high volume stationary tank is delivered in March or April.

Jesse Schneider – There was talk a few months ago on the question of the capability of metrology in terms of flow meters, is there an effort to determine the capability of the present technology.

Norm Ingram – we have made some proposals to make some minor changes to the tolerances at this point. I believe that there may have been a draft recently on the proposal from DMS to relax the tolerance on the minimum measured quantity. It seems that there was also something on the overall tolerance of acceptance at least in the interim.

Jesse Schneider – There is a lot of data available from Germany's Clean Energy Partnership. It would be a good sign that the best of the current state of technology be accepted.

Ron Nies – We would like to see any data that Germany has.

Marc Buttler – I would also be interested on behalf of NIST.

Jay Keller – I would also like to be included on behalf of DOE.

Jesse Schneider – We have also included this in J2601 fueling. We have only been able to test at certain temperatures, though we know in the field it is larger. In Germany only type A, 70 MPA is allowed.

Bob Boyd – Getting the data to the NIST team is very important.

Jesse Schneider – An exchange of data would be a great selling point. Would it be possible to share current data to Germany?

NREL is working with us to build a standard to meet the specification. [Note: This standard is a tracable standard – a piece of hardware – like a ruler – not a code standard like SAE 2601]

Jesse Schneider – There are two devices in Germany, one developed by Linde and one by Opel.

Juana Williams – Is the Linde test device using gravimetric testing?

Jesse Schneider – Yes, it is gravimetric.

I would like to help production of FCEVs through easing the fueling station standards. The current show stopped is the accuracy of flow meters, this is the highest priority.

The Weights and Measures folks want reasonable standards, the rationale is to have reasonable expectations. They need data to do this.

JS – My suggestion is to talk to PowerTek as well. Mark McDuggal.

Ron Nies – Let's put it in a nutshell, yes we will share data. We make a distinction between flow meter and device; we can't share proprietary information on who builds the device. Ken do you want me to forward our new proposals to the NIST team?

Ken Lowenthal – Yes.

Ca DMS Fuel Quality **Ron Nies**

We are plugging along and getting closer.

SAE J2601 Dispenser Validation **Jesse Schneider**

The CSA HDTA is being used as the reference to the US, such as solicitations from the CEC and draft proposals to NFPA.

FYI, A test device is being planned in Germany with the intention of the validation of the 50 stations.

It is important to have a finalized test device in both markets to implement the infrastructure dispensers according to J2601.

- Boyd Question: The test device from Germany will use tanks from 4.3?

- J.S. Can't confirm this yet.

Hydrogen Fuel Quality and Measurement

NIST **Juana Williams & Marc Buttler**

U.S. Weights and Measures Standards Development Process

Device Test Procedures Update

Field Trials of Hydrogen Dispenser Test Apparatus

NIST OWM is moving forward with its plans to conduct field trials of the gravimetric and alternative test methods currently recognized in NIST Handbook 44. This additional data will be collected to refine uncertainty analyses of these test methods. Procurement of some of the necessary equipment continues to prove challenging. NIST would appreciate any information regarding potential

sources of suppliers that could provide fully assembled certified tanks with fittings necessary for use in gravimetric testing.

Please contact Marc Buttler by email at: marc.buttler@nist.gov, if you have questions or wish to discuss field test equipment and/or test procedures used to determine the metrological performance of commercial hydrogen dispensing equipment.

International Hydrogen Device Standards

OIML R 139 "Compressed gaseous fuel measuring systems for vehicles"
The Secretariat (the Netherlands) has forwarded the second committee draft (2CD) of part 1 and part 2 of OIML R 139 for comment and vote of Technical Committee 8/Subcommittee 7 (TC 8/SC 7) for Project 4 by its March 2013 deadline. Part 1 the "Metrological and Technical Requirements" and Part 2 the "Metrological Controls and Performance Tests" will be combined. Part 3 the "Test Report" will be developed after the TC 8/SC 7 reaches a consensus on Parts 1 and 2.

The 2CD of OIML R 139 is a revision of the first committee draft (February 2012) and a compilation of comments the Secretariat received in May 2012 and December 2012 as well as points the International Working Group (IWG) agreed on at the IWG November 2012 meeting in Delft, the Netherlands.

On January 11, 2013, NIST OWM will distribute the 2 CD of OIML R 139-1 and -2 to the OIML R 139 U.S. National Work Group for comment to develop a U.S. position and vote by the March 2013 deadline

Please contact Juana Williams by email at: juana.williams@nist.gov, if you have questions or wish to discuss international hydrogen device standards.

6 Open Discussion & Other Issues

Requested by Chad Blake at NREL to include domestic hydrogen standards focus on the next call.

Next meeting to be Wednesday, February 6, 2013 at 3:00 PM Eastern.