

**Draft Proceedings of the National Hydrogen and Fuel
Cell Codes & Standards Coordinating Committee
In-Person Meeting and
USFCC Transportation Working Group**

*March 19, 2007
San Antonio, TX
In conjunction with the
NHA Annual Hydrogen Conference 2007*

Hosted by

1.0 MEETING PARTICIPANTS

The listing of meeting participants (attending In-Person and via teleconferencing) is provided in [Attachment A](#).

2.0 REVIEW OF ANTI-TRUST POLICY

USFCC members were reminded to review and follow the anti-trust guidelines:

[Antitrust Guidelines](#) (27Kb PDF)

**3.0 REVIEW OF/CORRECTIONS TO DRAFT MINUTES
FROM FEBRUARY 2007 TELECONFERENCE MEETING**

Russ indicated he has received one correction to the draft minutes: An addition of ISO TC 22 to list of those involved in fuel quality by Andrei Tchouvelev.

**4.0 OPPORTUNITY FOR DOE/HQ REPRESENTATIVE
TO
PROVIDE LATEST INFORMATION ON WHAT'S GOING
ON
AT DOE**

Antonio Ruiz announced that Pat Davis is acting Program Manager at DOE HFCIT, and is unavailable for the call.

o FY07 Funding for the Safety, Codes and Standards Subprogram
DOE is looking at impact on existing projects to fund some new starts. \$9.5M has been allocated so far, and DOE is expecting the budget to be increased from there. The budget has not been officially approved yet.

Antonio reminded the group that the 2007 Annual Program Review is scheduled for May 15-18. Those planning to attend are encouraged to register.

Antonio also reminded the group of the April 4 sensors workshop in DC. Information is available in the minutes from February's telecon, as well as on the Hydrogen and Fuel Cell Safety Report.

**5.0 ORAL REPORT ON GLOBAL TECHNICAL
REGULATIONS (GTR) ACTIVITIES**

Nha Nguyen apologized for missing telecon last month due to illness. He is happy to report progress made last week. NHTSA represents the US in international community to develop GTR on hydrogen powered vehicles. Under 1998 agreement, the US would be a party – one of 3 co-sponsors with Japan and Germany. The group has spent the last 6 months negotiating an action plan to develop the GTR. Last week Geneva WP29 meeting action plan was agreed by the Executive Committee. Plans are to develop the GTR in 2 phases – Phase 1 – GTR for components, subsystems and whole vehicle – maximum allowable leakage after a crash. Phase 2 – any new technologies to be reviewed, determine how to harmonize requirements - Phase 1 - components, subsystems and whole vehicle – Components examples: where to place sensors, how to relieve containers in case of fire. Whole vehicle examples– electrical isolation, max allowable hydrogen leakage for fuel line/fuel system.

One goal of the GTR is to be performance-based to avoid restricting designs – need to be data-supported. The Chair is to be determined. The action plan is now available on the website – <http://www.unece.org/trans/doc/2007/wp29/WP29-141-19e.doc>

[GTR Action Plan \(99Kb PDF\)](#)

6.0 REPORT ON HYDROGEN INDUSTRY PANEL ON CODES (HIPOC) ACTIVITIES

Carl Rivkin gave a brief overview on the Hydrogen Industry Panel on Codes (HIPOC), a group of interested parties working to accomplish the coordination of requirements between ICC and NFPA codes that relate to hydrogen. Having some interested parties working in both ICC and NFPA facilitates harmonization of hydrogen requirements.

He described a new NFPA project (NFPA 2) to integrate NFPA requirements. HIPOC was started in January 2006, and typically meet via teleconference meetings. Representatives are familiar with processes for ICC and NFPA. Martin Gresho, Chair of NFPA 2 is on HIPOC. The HIPOC group initially worked on ICC codes due to timing of code cycle – now they are working on NFPA 52, which is in the revision phase. The closing date for comments is May 25. HIPOC staff includes Carl Rivkin (NFPA), Darren Meyers (ICC), Patrick Serfass (NHA), and Antonio Ruis (DOE). HIPOC exists to serve industry to assist in developing proposals.

HIPOC's website is:

<http://www.hydrogenandfuelcellsafety.info/hipoc/index.asp>

Instructions on how to submit a code proposal and other important information can be found at:

<http://www.hydrogenandfuelcellsafety.info/hipoc/proposals.asp>

7.0 OPPORTUNITY FOR JOHN MOUGH TO PROVIDE STATUS REPORT ON THE CALIFORNIA HYDROGEN FUELS PROJECT'S EFFORTS TO DEVELOP A HYDROGEN FUEL QUALITY STANDARDS

John Mough reported he met with CARB Friday. California is planning

to go ahead with the regulation with possibly small changes. SAE is working on the issue of helium content of hydrogen. CA is waiting till about Oct 1 before proposing the specifications as regulations in CA. California is looking at treating hydrogen as a developmental engine fuel. Producers can then apply for a variance from the proposed regulations. Background information must be supplied. CA expects to grant variances to avoid stifling the development of hydrogen fuel in California. A brief policy statement is to be part of the regulation package. Prentis Searles at API is trying to put together a telecom for interested parties next week, and will send details to SAE.

Chris Sloane asked for a clarification on the meaning of "sold" – does it mean any sales or general public? Does it apply to retail or wholesale? John Mough responded that a variance does not apply to public sales. Variance is for fleet sales – "fleet" is vague by intent. Tony Estrada asked if this is similar to how CNG is handled? John Mough confirmed this is the case. Data must be collected – but not necessarily kept. Loopholes exist to facilitate the process.

Variance shall cease upon publication of standard – so when NIST or ASTM publishes their standard, the variances go out the door – this may warrant reconsideration on the timing of publication of standards.

8.0 OPPORTUNITY FOR GARY CASTRO TO PROVIDE STATUS REPORT ON THE CALIFORNIA HYDROGEN FUELS PROJECT'S EFFORTS TO DEVELOP A HYDROGEN FUEL DISPENSER STANDARD

Norman Engram (California Dept. of Agriculture, Division of Measurement Standards) reviewed requirements. California has in place regulations and codes for retail dispensers. Basic displays will remain the same. No method of verification is currently in place for hydrogen. Mass flow meters tend to be used for gaseous hydrogen. Kilograms are used as units typically. Mr. Engram asked how hydrogen delivery uncertainty is done currently. Bob Boyd of The Linde Group indicated that a mass flow meter is typically used on compressed gas – either a vein type flow meter or coriolis type flow meter. There is a measuring device in the dispenser. Delivery uncertainty is determined by pressure volume in the receiving container. Gary Castro indicated that California is looking to develop a broader tolerance, and asked what tolerances industry allows. Bob Boyd indicated acceptable tolerances are less than 10%. Mr. Castro suggested a temporary allowance – perhaps -3% to +7%, might be appropriate. Then as technology improves, California is planning to bring in requirements typically used. Jesse Schneider asked if we aren't a bit early trying to do this before fixing the standards. Mr. Castro agreed, and indicated California wants to keep our options open, but lead the process. Mr. Engram indicated concern that the public may not accept +/- 10%.

Juana Williams made a comment on NIST work, indicating NIST is developing standards for commercial weighing and measuring operations. NIST has a draft which was out for comments a year ago and received little feedback. The requirements were taken from existing NIST codes. A major comment received is the issue of meeting tolerance requirements. The standard requires 1.5% for new

devices and type evaluation devices. The comment they are hearing is that that is too high. Type evaluation criteria are tighter than criteria applied by a field official. A second draft is coming soon, and NIST is looking for more feedback. NIST will develop test procedures for field official to verify hydrogen dispensers. Draft 1 is included below. It is also available on www.fuelcellstandards.com. Juana Williams is the point of contact from NIST on the draft.

[NIST Draft 1](#) (58Kb PDF)

9.0 REPORT ON ISO/TC197 ACTIVITIES AND DOCUMENTS IN THE "COMMENTS" STAGE

Debbie Angerman prepared a report, included below.

[ISO/TC197 Report](#) (94Kb PDF)

WG10 – Hydrides met in February in Japan – plan to meet in April in Vancouver – goal to provide final draft International Standard to be considered by UN ECE Dec 2008. Work is progressing, continuing to get a few more people involved.

The next US TAG meeting for ISO TC 197 will be May 3 in Chantilly, VA at CGA.

CD 26142 is WG13 draft – out for comments – Hydrogen Detection Apparatus. 10 countries voted in favor of NWIP, started in 2005. Canada and Germany voted against, US abstained. US felt the WI belonged in ISO TC 31. Karen Hall has been most active in WG13. Karen Hall indicated that IEC TC 31 has indicated interest in taking over the WG13 activity on hydrogen sensors. The US TAG for ISO TC 197 originally abstained on this new work item from Japan, and indicated an interest in IEC TC 31 leadership, or at least significant involvement. IEC TC 31 involvement has been very light. The issue of the future of the activity is being addressed by the Chairs of ISO TC 197 and IEC TC 31.

Cathy Padro announced April 4 sensors workshop in DC. Will update Tech Specs and targets set a few years ago at similar workshop and will look at some national and international requirements. Visit www.lanl.gov/orgs/mpa/mpa11/sensor.html for more information.

Following the meeting, Debbie Angerman reported an "update": The ISO/TC 197 US TAG meeting will not be May 3. It has been postponed, and a date has not yet been set.

10.0 REPORT ON IEC/TC105 ACTIVITIES AND DOCUMENTS IN THE "COMMENTS" STAGE

Kelvin's written report is included below.

[IEC/TC105 Report](#) (133Kb PDF)

Mr. Hecht reported recent actions taken by the US TAG – accepted scope change to include microfuelcells. Accepted FDIS on Stationary fuel cells. Accepted Corrigendum on micro fuel cell safety. The US

voted to reject a New Work Item Proposal (NWIP) on single cell test methods for PEM FCs because they felt an International Standard is premature, although the US anticipates the NWIP will pass. The US is proposing a Secretary for activity if it passes. No items open for comments. The IEC TC 105 Plenary will be held in October in Paris.

Russ Hewett asked for statistics on the website and database to be provided at the next telecom.

11.0 OPPORTUNITY FOR CDOS AND SDOS TO REPORT ON THEIR ACTIVITIES (AS APPROPRIATE)

Jim Ohi announced the National Association of State Fire Marshals (NASFM) offered to provide DOE an opportunity to conduct workshop and speak July 10 Atlanta at NASFM and National Conference of State Building Code officials conference. NREL is developing a web-based information repository for hydrogen fueling stations. Jim thanked energy industry, auto industry and code officials for their support/input.

Workshop proceedings from the NREL workshop are available on the NHA HFCSR website at: <http://www.hydrogenandfuelcellsafety.info/resources/workshops/07feb>

Paul Williams of the University of Montana stated that Montana is working with DOE and DOT on similar work – and offered to share this information with Russ Hewett for distribution to the group.

SAE – Mike Steele reported that the SAE Fuel Cell Vehicles working groups met last week. There is not enough data to vote on a change to the Hydrogen Fuel Quality specification. The group will meet again in April or May.

Jesse Schneider reported that TIR J2799 will soon be available to assist in near term demo interoperability – interface hardware. Nozzle selection passed subcommittee vote – a few comments on the drawing being completed. The document is expected to be released in about a month. Optional Infrared data communication protocol and hardware is included.

Glen Scheffler – SAE Safety WG met last week. J2578 H2/FC vehicle standard is going through revision – upgrading for performance-based flammability test for exhaust.

The WG is adjusting guidance for hydrogen releases. Hydrogen is to be added as option for test gas in addition to helium, which is currently specified. The group is also updating the electrical section to harmonize with ISO/IEC docs. The WG is hoping J2579 – Hydrogen system standard will be ready for ballot this summer.

CSA – Julie Cairns reported that next week the pressure relief TAG meets in Cleveland. Public review and comment (for a period of 6 weeks) is expected in May. They will then meet in September to review comments. The HGV2 TAG balloted component-level for the container. Recommendations made – public review and comment will take place in May. HGV4 series – compressors, valves, etc – CSA is

working with SAE on breakaway hose issues.

Debbie Angerman reported CGA is holding a hydrogen seminar at end of NHA meeting, on March 22 and 23 in San Antonio.

Carl Rivkin reported NFPA 2 – the new integrated hydrogen safety code, is to be issued in 2010. NFPA is looking at offset distances and other siting requirements. The new TC is making progress on new requirements with a well-documented technical basis, and is looking to incorporate risk into the document to provide some flexibility. The TC will meet April 17-19 at NextEnergy in Detroit. It is an open meeting.

12.0 NEXT TELECONFERENCE MEETING

- April 4th? Conflict with sensors workshop – polled participants – limited conflict. But April 4 is only a couple weeks away. SAE world Congress is Apr 16-19. April 10 is C&S Tech Team. Tentatively assume telecon April 11.

Enersol – Russ encouraged participants to read their letter, below, and keep the meetings the open forum we all want it to be.

[Enersol Letter](#) (66Kb PDF)

13.0 PROPOSED NEXT IN-PERSON MEETING

- Timing and Site?
- Topics for Focused Discussion?

This topic was deferred due to time constraints.

Bob Boyd offered for group to see the Linde hydrogen vehicle refuelling following this meeting.

14.0 US FUEL CELL COUNCIL TRANSPORTATION WORKING GROUP MEETING

US Fuel Cell Council Transportation Working Group Priorities

1. *Codes & Standards Prioritization/ Focus Draft*
The USFCC has budget and staff that sits on committees. Jesse Schneider showed the current draft USFCC prioritization matrix, and USFCC members discussed proposed revisions. The matrix covers transportation applications, portable, stationary, etc., so there is some overlap in prioritization. All proposed changes will be reviewed by the USFCC Strategy Committee.
2. *State H2 Highway Projects – California* (Rick Margolin – Energy Independence Now)

1. What can be done to assist in California State Permitting
2. I-Code Adoption in California (announcement)
3. Gap Analysis?

Rick Margolin presented at NREL permitting workshop – his presentation is available below.

[State H2 Highway Projects](#) (99Kb PDF)

CA has adopted I-Codes and NFPA 52. No state-level adoption in CA. Michigan has a state-wide regulation to address this for Michigan. Uniform requirements across the state. NREL to meet with RM and CARB next Friday to see what each is doing and whether activities can support each other. EIN is working with CARB to develop templates (guidebooks) on permitting and installation of hydrogen fueling stations in California. PowerPoint presentation from RM available.

3. *Task Forces/Focus groups*
 - a. Joint Hydrogen Quality Task Force Update (Bill Collins)
 - i. JARI update
 - ii. Status of US Single Cell Testing (Mitchell)

Feb 22 met – Mar 29 meeting planned. CA SB 76 was discussed. DOE H2cQuality mtg and SAE activities discussed. Jim Ohi stated ISO doc was approved and should be published soon. Early June Seoul Korea next WG 13 mtg. Test matrix, data reporting format and test protocols by US to be proposed for adoption. Coordinated effort to do the testing – international effort. WG12 is closer to SAE now, common membership, harmonized in most part. WG12 NA team to meet tomorrow 12:30 – 2pm to address next steps.

Jesse stated the USFCC and API are now in agreement that the position is that it is too early to regulate, although the USFCC hasn't made a position final. Want a single presentation – want to coordinate. Position developed at SAE is to be shared with the USFCC. Mike, Prentis, and Jesse to ensure NHA is included. API, CAFCP or USFCC or Auto Alliance needs to be small as initial discussion. Prentis to look over SAE presentation and share with NHFCCSCC. Include orgs and a member from each in meeting. Pre-meeting possible on Friday (23rd).

4. *International Standards Reports (other than previously mentioned)*
 - a. ISO TC22 SC21 (Walter Newgeon)
 - b. Other?Walter Newgeon provided a report on ISO TC 22 SC 21, available below.

[ISO/TC22 Report](#) (56Kb PDF)

ISO TC 22 SC 21 has previously addressed battery electric vehicles. They are in the process of extending the scope to also include fuel cell vehicles and hydrogen electric vehicles.

5. *Domestic Standards Reports*
 - a. SAE Fuel Cell Vehicle Standards Committee (Mike Steele)
 - b. CSA (Cairns)

Already covered earlier in the day.

6. *Update on NASFM*
HELP met 2 months ago. E85 is an issue. Meeting in Atlanta to continue H2 issues.

Jim Ohi announced a NASFM workshop July 10 in Atlanta to present case studies on permitting facilitation. This will be an opportunity to get input from NASFM on the DOE effort.

Jesse Schneider stated the USFCC Transportation Working Group telecoms typically take place on the 3rd Tuesday of each month – next meeting April 17.

ATTACHMENT A: PARTICIPANTS IN THE MARCH 2007 IN-PERSON MEETING OF THE NATIONAL HYDROGEN AND FUEL CELLS CODES & STANDARDS COORDINATING COMMITTEE

NAME	ORGANIZATION	PRESENT AT MEETING (Yes/No)
Adam Gromis	California Fuel Cell Partnership	Yes
Andrei Tchouvelev	A. V. Tchouvelev & Associates, Inc.	Yes
Anna Stukas	Angstrom Power	
Antonio Ruiz	USDOE/Hydrogen, Fuel Cell and Infrastructure Technologies Program	Yes
Bill Chernicoff	USDOT/Research and Innovative Technologies Administration(RITA)/Washington	
Bill Collins	UTC Fuel Cells	Yes
Bill Hoagland	Hoagland and Associates	
Bob Mauro	Consultant to NREL	
Brad Smith	Shell Hydrogen	
Carl Rivkin	National Fire Protection Association (NFPA)	Yes
Carolyn Elam	DOE Golden Field Office	

Cathy Gregoire-Padro	Los Alamos National Laboratory (LANL)	Yes
Chris Sloane	General Motors	Yes
Christina Zhang-Tillman	California Fuel Cell Partnership	
Christopher Moen	Sandia National Laboratories/Livermore	Yes
Dan Casey	ChevronTexaco	
Darren Meyers	International Code Council (ICC)	Yes
David McClosky	USDOC/NIST	
Debbie Angerman	Compressed Gas Association (CGA)	Yes
Doug Horne	Clean Vehicle Education Foundation	
Gary Nakarada	Regulatory Logic	Yes
Greg Milewski	Shell Oil Products	Yes
Glen Schleffler	Consultant to NREL	Yes
Hank Seiff	Clean Vehicle Education Foundation	
Jesse Schneider	DaimlerChrysler	
Jim McGetrick	BP	
John Koehr	American Society of Mechanical Engineers (ASME)	Yes
John Mough	California Division of Measurement Standards	Yes
John Muntez	USDOE/Hydrogen, Fuel Cell and Infrastructure Technologies Program	Yes
Jonathan Otero	BP	Yes
Juana Williams	NIST	Yes
Julie Cairns	CSA America	Yes

Karen Hall	National Hydrogen Association (NHA)	Yes
Kelvin Hecht	ANSI, IEC and Consultant to NREL	Yes
Ken Krastins	Plug Power	
Larry Moulthrop	Proton Energy Systems	Yes
Laurie Florence	Underwriter Laboratories	Yes
Lesley Crowell	California Air Resources Board	
Mark Richards	Versa Power Systems	Yes
Michael Sprague	Enersol, Inc.	
Michael Steele	General Motors Advanced Technology Vehicles	Yes
Nha Nguyen	NHTSA/Office of International Policy and Harmonization	Yes
Nick Burkhead	Shell Hydrogen	
Pat Davis	USDOE/Hydrogen, Fuel Cell and Infrastructure Technologies Program	
Patrick Flynn	Enersol, Inc.	
Patrick Serfass	National Hydrogen Association (NHA)	
Paul Bouchard	Energy Conversion Devices	
Paul Buehler	Plug Power, Inc.	
Prentiss Searles	American Petroleum Institute (API)	Yes
Robert Wichert	US Fuel Cell Council (USFCC)	
Rhoads Stephenson	Motor Vehicle Fire Research Institute	
Roger Smith	Compressed Gas Association (CGA)	
Ron Coiner	CSA America	Yes
Sam Sprik	National Renewable Energy Laboratory (NREL)	
Samuel Lam	British Columbia Ministry of Transportation	

Sheral Arbuckle	Ford Motor Company	
Sondra Ullman	Plug Power	
Terry Conrad	Concurrent Technologies Corp.	
Thad Adams	Savannah River National Laboratory	
Tom Joseph	Air Products and Chemicals	
Tony Androsky	US Fuel Cell Council (USFCC)	
Jim Ohi	National Renewable Energy Laboratory (NREL)	Yes
Russ Hewett	National Renewable Energy Laboratory	Yes

GUEST PARTICIPANTS

1. Abbas Akhil (Sandia National Laboratories/Albuquerque)
2. Gerhard Achtelik (California Air Resources Board)
3. Howard Anderson (TrueLite)
4. Bob Boyd (The BOC Group/Linde)
5. Gary Castro (California Dept. of Agriculture, Division of Measurement Standards)
6. Tom Elzey (Air Products & Chemicals)
7. Tony Estrada (Pacific Gas & Electric)
8. Marty Gresho (Sandia National Laboratories/Livermore)
9. Jonathan Hardiss (National Institute of Standards and Technology)
10. Barbara Hennessy (National Highway Transportation Safety Administration)
11. Norman Ingram (California Dept. of Agriculture, Division of Measurement Standards)
12. Harry Jones (Underwriter Laboratories)
13. Jeff Lachanch (Sandia National Laboratories/Albuquerque)
14. Aka Mapsu
15. Rick Margolin (Energy Independence Now)
16. Dr. Pan Mu (Wuhan University of Technology)
17. Walter Newgeon (USFCC Transportation Working Group)
18. Liz Pfeiffer (BMW)
19. Tom Sheehan (NREL)
20. Tom Siewert (National Institute of Standards and Technology)
21. Paul Williamson (University of Montana)
22. Steve Woods (NASA)