

**National Hydrogen and Fuel Cell Codes and Standards Coordinating Committee
(NHFCSCC)**

**Wednesday, May 11, 2022
TIME: 2:00 – 3:00 pm (Eastern Standard Time)**

Minutes

Attendees

**Mark Luth
Jay Keller
Karen Quackenbush
Kelvin Hecht
Heath Robert Plagmann
Rob Early
Norman Newhouse
Christine Watson**

**Mike Steele
Sara Marxen
Juana Williams
Joe Brady
Eric Prause
Antonio Ruiz
Ian MacIntire
Kelly O’Connell**

**Mark Siira
Douglas Olenick
Jennifer Gangi
Connor Dolan
Rino Pinti
Eric Nelson
Jennifer Hamilton
Amy Ryan**

I. Welcome and Housekeeping Items

The committee reviewed FCHEA’s anti-trust guidelines.

The meeting agenda was approved.

The previous meeting minutes were approved.

II. DOE/HQ Update

Laura Hill/Christine Watson

HFTO Annual Merit Review will be held June 6-9, register here:

<https://www.annualmeritreview.energy.gov/>

HFTO is actively looking for Hydrogen Shot Fellows, more information available online:

<https://www.zintellect.com/Opportunity/Details/DOE-EERE-STP-HFTO-2021-1801>

III. Codes & Standards Events and Fuel Cell Safety Information

<http://www.hydrogenandfuelcellsafety.info/events/>

Karen Quackenbush

Request: technical resource updates for the Hydrogen and Fuel Cell Safety website. Any committee members who have materials they would like hosted on the website can send them to Karen Quackenbush (kquackenbush@fchea.org) or Connor Dolan (cdolan@fchea.org).

IV. Global Technical Regulations

Ian MacIntire

GTR 13 Phase 2 informal document was submitted to GRSP last week (5/3) and is under consideration at their meeting this week. At some point in late June, the working group will be meeting to consider any comments that come back from GRSP and other items.

Once GRSP feedback is incorporated, a formal document will be prepared and submitted to GRSP later this year, in preparation for vote and conditional subsequent publication in March 2023.

V. Codes and Standards Organization Updates

Institute of Electrical and Electronics Engineers

Mark Siira

Mark presented an update on IEEE standards under development.

Interconnection

- IEEE P1547.2 - Application Guide for IEEE Std 1547(TM), IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems
 - Guidance for application of IEEE 1547-2018 for all DER technologies. Covers details for a wide variety of applications and technologies.
- IEEE P1547.9 - Guide to Using IEEE Std 1547(TM) for Interconnection of Energy Storage Distributed Energy Resources with Electric Power Systems
 - Guidance for application of IEEE 1547-2018 for battery and other storage technologies.
- IEEE P1547.3 - Guide for Cybersecurity of Distributed Energy Resources Interconnected with Electric Power Systems
 - Guidance for cybersecurity of DER and associated communications systems.
- IEEE P2800—IEEE Interconnection Standard for Large-Scale Solar, Wind, and Energy Storage Plants (Inverter Based Resources) [IEEE PES EDPG]
 - Harmonizes Interconnection Requirements for Large Plants connected at High Voltage
 - Performance and functional settings, Reference Point of Measurement
 - IEEE P2800.1&2 type of tests, plant-level evaluations, and other verifications means

Interconnection – Recent Projects

- IEEE P1547 Revision (of 1547-2018) - Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces
 - Incorporates updates from previous errata, amendment and on industry feedback
 - Approved on March 24, 2022 – Working group announcements Expected May, 2022
- IEEE P1547.10 - Recommended Practice for Distributed Energy Resources (DER) Gateway Platforms
 - Enable direct integration of DER with the monitoring and control systems of grid operators
 - Approved by NESCOC on April 27

Interconnection BPS – Recently Started

- IEEE P2800.2—Recommended Practice for Test and Verification Procedures for Inverter-based Resources (IBRs) Interconnecting with Bulk Power Systems [IEEE PES EDPG]

- Test and verification procedures to confirm plant-level conformance of inverter-based resources (IBRs) interconnecting with bulk power systems in compliance with IEEE Std 2800.

IEEE PES ESSB

- Battery Related Standards
 - P2688 – Recommended Practice for Energy Storage Management Systems (ESMS) in Energy Storage Applications.
- Batteries in cycling service is
 - IEEE 2836 – Recommended Practice for Performance Testing of Electrical Energy Storage (EES) Systems in Electric Charging Stations in Combination with Photovoltaic (PV)
 - Battery Energy Storage Systems IEEE 1679 – Recommended Practice for the Characterization and Evaluation of Emerging Energy Storage Technologies in Stationary Applications
- Stand-Alone (Off-Grid Solar PV)

International Electrotechnical Commission IEC TC 105

Kelvin Hecht

No updates at this time.

International Standards Organization ISO/TC 197

Karen Quackenbush/Jay Keller

WG 22 working on dispensing hoses and hose assemblies is working on the next revision to address issues that were not including in the 2019 version. Medium and heavy-duty vehicle needs are among those to be addressed. The working group is looking for experts on the technical side of this area.

The ballot process for a scope clarification on ISO 19880-6 – Fittings, has been completed. We are waiting for the results to be notified.

WG 29 is working on an updated version of ISO TR 15196 – Basic Considerations for the Safety of Hydrogen Systems. The document should be ready for review soon.

WG 24 – Taskforce 1 has a draft document available, which is now out for voting. Next meeting is June 9th/10th, with an in-person/hybrid meeting in the fall. The focus will shift to task 2 on communications.

National Fire Protection Association NFPA 2

Chris LaFleur

Rob Early provided a report that NFPA 55 is anticipated to be published in August 2023, a draft is available for review. NFPA 2 has slipped a cycle, and the 2023 edition is expected to be published late 2022. The next step is for the Second Draft ballot to be sent to NFPA 2 Technical Committee members.

International Codes Council (ICC)

Spencer Quong

No updates at this time.

Society of Automotive Engineers (SAE)

Mike Steele

An interface taskforce meeting will occur this afternoon.

SAE will need to review impact on emerging heavy-duty systems under consideration in ISO/TC 197 WG 24.

There are also additional concerns with changing existing standards based on light-duty vehicles.

CSA

Sara Marxen

Technical Committee Activity – Meeting Announcement		
Fuel Cell Technical Committee: The next meeting is planned for May 16, 2022 from 1-4 pm Eastern. Please contact Mark Duda (mark.duda@csagroup.org) for more details.		
Active / Recently Published Projects		
TSC	Designation/Title	Status
HGV 5	HGV 5.2, Compact hydrogen fueling systems	This project is to develop a NEW standard for Compact Hydrogen Fueling Systems (HGV 5.2). The TSC completed content development and public review comment disposition was finalized in early May. The TSC will be reviewing the draft for consideration of TC Ballot.
HGV 3	HGV 3.1, Onboard vehicle components for hydrogen gas vehicles	This project is a revision of an existing standard for technology updates, as well as inclusion of the on-board vehicle hose requirements (transferred from HGV 4.2). This draft is being prepared for ballot by the Technical Committee .
HGV 2	HGV 2, Compressed hydrogen gas vehicle fuel containers	This project is a revision of an existing standard. Content development meetings have concluded and this draft will be available for public review in May.
HGV 4.1	HGV 4.5, Priority and sequencing equipment for hydrogen vehicle fueling	This project is to develop a standard to REINSTATE an updated edition of a Priority and Sequencing standard. A seed document draft has been prepared and a kickoff meeting with the HGV 4.1 TSC is being scheduled for early/mid 2022.
C22.2 No. 22734	Hydrogen generators using water electrolysis	The CSA technical subcommittee continues to work on a binational adoption of ISO 22734. Contact Mark Duda (mark.duda@csagroup.org) with questions or for additional information.

Compressed Gas Association (CGA)

Rob Early

Status of current and future publications:

Standard	Current edition	Status
CGA G-5, <i>Hydrogen</i>	8 th (2017)	Deadline to submit proposed changes for next edition is 7/7/2022. CGA has started the process of designating this as an ANSI standard. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-019
CGA G-5.3, <i>Commodity specification for hydrogen</i>	7 th (2017)	Deadline to submit proposed changes for next edition is 6/4/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-013
CGA G-5.4, <i>Standard for hydrogen piping systems at user locations</i>	6 th (2019)	Deadline to submit proposed changes for next edition is 12/22/2024. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=24-54
CGA G-5.5, <i>Hydrogen vent systems</i>	3 rd (2014)	The 5 th edition has been published and can be found at https://portal.cganet.com/Publication/Details.aspx?id=G-5.5 Deadline to submit proposed changes for next edition is 03/04/2026. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=26-3 Heat radiation testing at Chart Industries in New Prague, MN date is ongoing. The goal is for the task force to review test results as soon as they are completed.
CGA G-5.6, <i>Hydrogen pipeline systems</i>	1 st (2005 – reaffirmed 2013)	Deadline to submit proposed changes for next edition is 8/1/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=19-018
CGA H-1, <i>Service conditions for portable, reversible metal hydride systems</i>	2 nd (2011)	Deadline to submit proposed changes for next edition is 2/3/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-033
CGA H-2, <i>Guideline for classification and labeling of hydrogen storage systems with hydrogen absorbed in reversible metal hydrides</i>	2 nd (2018)	Deadline to submit proposed changes for next edition is 6/4/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-012
CGA H-3, <i>Standard for cryogenic hydrogen storage</i>	3 rd (2019)	Deadline to submit proposed changes for next edition is 12/1/2023. CGA has started the process of designating this as an ANSI standard.

Standard	Current edition	Status
		https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-036
CGA H-4, <i>Terminology associated with hydrogen fuel technologies</i>	3 rd (2020)	Deadline to submit proposed changes for next edition is 12/1/2024. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=24-59
ANSI/CGA H-5, <i>Standard for bulk hydrogen supply systems</i>	3 rd (2020)	The deadline to submit proposed changes for the next edition is 2/26/2024. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=24-010
CGA H-10, <i>Combustion safety for steam reformer operation</i>	2 nd (2018)	Deadline to submit proposed changes for next edition is 12/1/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-038
CGA H-11, <i>Safe start-up and shutdown practices for steam reformers</i>	2 nd (2020)	Deadline to submit proposed changes for next edition is 8/11/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-30
CGA H-12, <i>Mechanical integrity of syngas outlet systems</i>	1 st (2016)	Deadline to submit proposed changes for next edition is 3/1/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=21-016
CGA H-13, <i>Hydrogen pressure swing adsorber (PSA) mechanical integrity requirements</i>	1 st (2017)	Deadline to submit proposed changes for next edition is 8/1/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-027
CGA H-14, <i>HYCO plant gas leak detection and response practices</i>	1 st (2018)	Deadline to submit proposed changes for next edition is 12/8/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-045
CGA H-15, <i>Safe catalyst handling in HYCO plants</i>	1 st (2020)	Deadline to submit proposed changes for next edition is 9/1/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-59
CGA H-XXX (TBD), <i>Small scale hydrogen production and delivery</i>	New publication not released yet	Task force has created the first draft that will then go to the CGA membership for review.
CGA P-28, <i>OSHA process safety management and EPA risk management plan guidance document for bulk liquid hydrogen supply systems</i>	4 th (2014)	The draft publication has been sent to Standards Council for review, where an issue with calculations has been found. The publication will be corrected and sent back to Standards Council.

Standard	Current edition	Status
CGA PS-31, <i>Position statement on cleanliness for proton exchange membranes hydrogen piping / components</i>	1 st (2007 – reaffirmed 2019)	Deadline to submit proposed changes for next edition is 6/12/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-16
CGA PS-33, <i>Position statement on the use of LPG or propane tanks as compressed hydrogen storage buffers</i>	1 st (2008 – reaffirmed 2020)	Deadline to submit proposed changes for next edition is 12/10/2026. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-41
CGA PS-46, <i>Position statement on roofs over hydrogen storage systems</i>	1 st (2017)	Deadline to submit proposed changes for next edition is 3/6/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-012
CGA P-48, <i>Position statement on clarification of existing hydrogen setback distances and development of new hydrogen setback distances in NFPA 55</i>	1 st (2016)	Deadline to submit proposed changes for next edition is 2/12/2021. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=21-062
CGA work item 21-126, <i>Hydrogen system siting and personnel exposures distances</i>		CGA is developing a position statement pointing users to the new liquid hydrogen system distances that will be in NFPA 2:2024 and are not yet released. The position statement will cover the process of requesting a variance to use the numbers from the NFPA 2 section of the NFPA web site.
CGA work item 21-127, <i>Transfer and unloading of hydrogen at near-consumer use points</i>	New publication not released yet	Develop new standard to update traditional hydrogen delivery practices for industrial users to improve practices for retail applications.
CGA work item 21-128, <i>Noise from hydrogen venting and hydrogen systems operations</i>	New publication not released yet	Develop new standard to reduce the noise from hydrogen system operations, including venting, particularly at retail applications where hydrogen system noise is greater than ambient noise

Upcoming events:

- CGA Hydrogen Seminar – fall of 2023 (2 days planned)

American Society for Testing & Materials (ASTM)

Jennifer Hamilton

ASTM is preparing for committee week meetings in June in Seattle.

No other updates at this time.

American Society of Mechanical Engineers (ASME)

Ray Rahaman

No updates at this time.

VI. Discussion Topics

Facilitating Deployment

All

Center for Hydrogen Safety

Nick Barilo

No updates at this time.

Regulatory Matrix Review and Comment

Karen Quackenbush

Please direct any updates, questions, or comments to Karen Quackenbush by email at kquackenbush@fchea.org.

Permitting and Installation of Hydrogen Fueling Stations

California Station Implementation

Jennifer Hamilton

California is now at 53 operating stations, and 3 with step-up dates scheduled.

California Div. of Measurement Standards/Fuel Quality / Metrology **Christina Daniels**

No updates at this time.

**Legal Metrology Standards Hydrogen Fuel
Quality and Measurement**

Juana Williams/Ralph Richter

No updates at this time.

VII. Open Discussion & Other Issues

Kelvin Hecht brought a discussion point about drones and UAVs. As this sector grows, the applications for hydrogen and fuel cells will also grow. Kelvin is considering recommending CSA consider a U.S. fuel cell standard for safety for fuel cell drones. ISO/TC 105 has an existing international performance standard for unmanned aircraft, ASTM has a U.S. standard (F38.1) on design of fuel cells for use in unmanned systems.

There was discussion of the appropriate standards organization and task force for this activity.

Is there an existing U.S. agency covering drone safety standards?

SAE has an aerospace sector, may be one potential group that has touched this activity.

VIII. Next Meeting – Wednesday, June 15th at 2:00 PM Eastern