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

Wednesday, October 12, 2022
TIME: 2:00 PM EDT

Minutes

Raghukumar Bommenahalli
Shawn Cole
Christina Daniels
Brian Ehrhart
Jennifer Gangi
Jennifer Hamilton
Kelvin Hecht
Laura Hill
Rob Kaminsky
Chris LaFleur
Mark Luth
Ian MacIntire
Sara Marxen
Kevin McOsker
Norman Newhouse
Haboon Osmond
Stella Papasavva
Eric Prause
Jeff Puckett
Karen Quackenbush
Spencer Quong
Ray Rahaman
Antonio Ruiz
Amy Ryan
Mike Steele
Trey White
Juana Williams

I. Welcome and Housekeeping Items

a. The NHFCCSCC reviewed FCHEA's anti-trust guidelines, approved previous minutes, and approved the meeting agenda.

II. DOE/HQ Update — Christine Watson

- DOE announced a $7B Funding Opportunity for Regional Clean Hydrogen Hubs on September 22: https://www.energy.gov/articles/biden-harris-administration-announces-historic-7-billion-funding-opportunity-jump-start
  - Questions about the FOA can be directed to h2hubs@hq.doe.gov
- HFTO Webinar on Thursday, October 13 (12-1 pm eastern): Hydrogen 101: The Basics of Hydrogen and Fuel Cells for Buildings and Plants (https://www.energy.gov/eere/fuelcells/hydrogen-and-fuel-cell-technologies-office-webinars)

III. Codes & Standards Events and Fuel Cell Safety Information — Karen Quackenbush

- Calendar of events: https://www.hydrogenandfuelcellsafety.info/safety-report-calendar
- Any committee members with materials they would like hosted on the website can send them to Karen Quackenbush (kquackenbush@fchea.org) or Haboon Osmond (hosmond@fchea.org).

IV. Global Technical Regulations — Ian MacIntire

- All the technical discussions regarding GTR 13 are wrapped up. It is undergoing final processing as of now.
    - The informal document has been submitted to GRSP; it is expected to be approved by GSR P in their meeting in the first week of December 2022. Then, it would be boarded to WP 29 for consideration at their March 2023 meeting. If all goes well, then it is expected that WP 29 will vote on establishing the Phrase 2 document in their June 2023 meeting.

V. Codes and Standards Organization Updates

Institute of Electrical and Electronics Engineers **Mark Siira**

- IEEE 1547 will open for revision soon and is seeking IEEE members who want to help with the revision review. If interested in participating in the revision of IEEE 1547, please contact Karen Quackenbush via email at kquackenbush@fchea.org.

International Electrotechnical Commission IEC TC 105 **Kelvin Hecht**

- The TC 105 Plenary Meeting will be held in Seoul, South Korea, from October 17th to 20th, with an opportunity to virtually attend the meeting.

International Standards Organization ISO/TC 197 **Karen Quackenbush**

- In late September, WG 24 (Gaseous hydrogen – fueling protocols for hydrogen-fueled vehicles) met in Ulm, Germany.
    - WG 24 worked on ISO/CD 19885-1, ISO/AWI 19885-2, and ISO/AWI 19885-3 documents. -1 focuses on circulating and addressing high-level comments. -2 is progressing; a committee draft is in development. -3 (heavy-duty fueling protocol) is predominately being led by PRHYDE protocols/approaches.
    - The next virtual meeting will be held on October 20th .
- WG 5 also met in Ulm, Germany on the 29th of September.
    - WG 5 decided to split the documents into two: one for currently light-duty and one for heavy-duty. WG 5 will be proposing the new documents to ISO.
    - WG 5 has proposed nozzles for MDHD fueling with larger flows. Three prototypes were presented for discussion.
- WG 27 (hydrogen fuel quality), WG 28 (hydrogen quality control), and WG 33 (Sampling for fuel quality analysis) will meet in Paris, France, from November 2nd to November 4th.
- The ISO Technical Management Board has formally approved establishing ISO/TC 197/SC 1 (Hydrogen at Scale and Horizontal Energy Systems), a sub-committee in ISO/TC 197. The sub-committee will focus on applications' requirements of hydrogen technologies at large scales and in horizontal energy systems where hydrogen plays a central or significant role. It will also focus on overlaps or blending with other fuels, energy carriers, and systems.

National Fire Protection Association NFPA 2 **Chris LaFleur**

- On September 21, the second draft of NFPA 2 was posted and is now open for NITMAM (notice of intent to make a motion). All motions have passed. It will be published in 2023.
- A task group is being formed to resolve any hydrogen overlap between NFPA 2 and NFPA 55. NFPA 2 will own all of the scope for hydrogen, so instead of extracting

material from NFPA 55, it will be deleted from NFPA 55 and moved to NFPA 2. The task group is generating public input for the next version of NFPA 55 to make this change.

International Codes Council (ICC) **Gabriel Maser/Matt Sigler**

- The co-development process goes every three years and is currently in the final voting action for the 2024 version of international codes.
- The 2027 co-development process will start in late 2023.

Society of Automotive Engineers (SAE) **Mike Steele**

SAE FCSC status: Sept 2022

- The next Interface TF meeting (Webex) is scheduled for October 12, 2022, at 6 am Pacific time.
    - The main topics of the meeting included potential changes to J2601, the committee deciding to go forward with J2601/5, the stabilization of J2601/2 (heavy-duty), reaffirmation of J2572, and documents within the safety task force need reaffirmation (J2578 and J2579). After reaffirmation, the documents will be reopened to incorporate changes that may be necessary to incorporate GTR 13.
- The next Interface TF meeting is scheduled for November 9th.
- J1766 (jointly owned between the fuel cell standards committee and the hybrid committee) may be updated to harmonize with GTR 20.

CSA **Sara Marxen**

Technical Committee Meetings		
The Hydrogen Transportation Technical Committee met October 6 during CSA's U.S. Committee Week in Phoenix, Arizona.		
Active 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 Technical Committee Ballot closed on July 12 with negative votes and comments. Working with the TC and TSC Chairs to disposition. A TSC meeting is planned for October 17 to discuss the Ballot comments.
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). Published September 30.
HGV 2	HGV 2, Compressed hydrogen gas vehicle fuel containers	This project is a revision of an existing standard. The TSC is dispositioning comments and ballot to Technical Committee is being planned.
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 will be sent to the HGV 4.1 TSC members for review prior to a kickoff meeting. The TSC met and

		held a kickoff meeting as part of CSA's U.S. Committee Week in Phoenix in early October.
HGV 5	HGV 5.1, Residential Hydrogen Fueling Appliances	Work has begun on a new standard that will address safety requirements related to residential fueling appliances. The TSC met and held a kickoff meeting as part of CSA's U.S. Committee Week in Phoenix in early October.
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.
B107	Enclosed Hydrogen Equipment	Work has begun on a new standard that will address safety requirements related to hydrogen and its use inside an enclosure. Contact Mark Duda (mark.duda@csagroup.org) with questions or for additional information.
SPE-701	SPE-701 – Hydrogen fuel storage containers for aviation applications	The project is to develop a new document for requirements and recommendations for the material, design, manufacture, marking, and testing of serially produced, refillable hydrogen fuel storage containers intended only for the storage of compressed hydrogen gas or liquid hydrogen fuel for aviation applications.

Compressed Gas Association (CGA) **Rob Early**

Status of current and future publications:

Standard	**Current edition**	**Status**
CGA G-5, *Hydrogen*	8th (2017)	Deadline to submit proposed changes for next edition was 7/7/2022. CGA has started working on resolving the proposed changes and will issue G-5 as an ANSI standard. For updates on the work item progress see https://portal.cganet.com/WorkItem/Details.aspx?id=22-019
CGA G-5.3, *Commodity specification for hydrogen*	7th (2017)	Deadline to submit proposed changes for next edition is 5/1/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-013
CGA G-5.4, *Standard for hydrogen piping systems at user locations*	6th (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

Standard	Current edition	Status
CGA G-5.5, *Hydrogen vent systems*	3rd (2014)	The 5th 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, *Hydrogen pipeline systems*	1st (2005 – reaffirmed 2013)	Deadline to submit proposed changes for next edition is 8/1/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=19-018
CGA H-3, *Standard for cryogenic hydrogen storage*	3rd (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. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-036
CGA H-4, *Terminology associated with hydrogen fuel technologies*	3rd (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, *Standard for bulk hydrogen supply systems*	3rd (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, *Combustion safety for steam reformer operation*	2nd (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, *Safe start-up and shutdown practices for steam reformers*	2nd (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, *Mechanical integrity of syngas outlet systems*	1st (2016)	Deadline to submit proposed changes for next edition is 3/1/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=21-016
CGA H-13, *Hydrogen pressure swing*	1st (2017)	Deadline to submit proposed changes for next edition is 10/12/2022.

Standard	Current edition	Status
adsorber (PSA) mechanical integrity requirements		https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-027
CGA H-14, *HYCO plant gas leak detection and response practices*	1st (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, *Safe catalyst handling in HYCO plants*	1st (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-17, *Small scale hydrogen production and delivery*	New publication not released yet	Task force has created the first draft that is out for proposed changes; the deadline to submit proposed changes is 12/15/2022. https://portal.cganet.com/WorkItem/Details.aspx?id=18-093
CGA P-28, *OSHA process safety management and EPA risk management plan guidance document for bulk liquid hydrogen supply systems*	5th (2022)	Deadline to submit proposed changes for next edition is 08/01/2027 https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-49
CGA PS-31, *Position statement on cleanliness for proton exchange membranes hydrogen piping / components*	1st (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, *Position statement on the use of LPG or propane tanks as compressed hydrogen storage buffers*	1st (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, *Position statement on roofs over hydrogen storage systems*	1st (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, *Position statement on clarification of existing hydrogen setback*	1st (2016)	Deadline to submit proposed changes for next edition was 2/12/2021. Standard is on hold until NFPA 2:2023 has been issued. For updates see the link below:

Standard	Current edition	Status
distances and development of new hydrogen setback distances in NFPA 55		https://portal.cganet.com/WorkItem/Details.aspx?id=21-062
PS-69, *Liquid Hydrogen Supply Systems Separation Distances*	1st (2022)	CGA has developed a position statement pointing users to the new liquid hydrogen system distances that will be in NFPA 2:2023 and are not yet released. The position statement covers the process of requesting a variance to use the numbers from the NFPA 2 section of the NFPA web site. PS-69 is free for downloading at https://www.cganet.com/wp-content/uploads/PS-69_1.pdf
CGA work item 21-127, *Transfer and unloading of hydrogen at near-consumer use points*	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, *Noise from hydrogen venting and hydrogen systems operations*	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 will host a webinar titled Safely Accelerating the Future of Hydrogen on Friday, November 18 from 1:00-2:30 PM EST. Speakers will be from CGA and from CGA hydrogen partner organizations, including Frank Wolak of FCHEA.

American Society for Testing & Materials (ASTM) **Jennifer Hamilton**

- No updates.

American Society of Mechanical Engineers (ASME) **Ray Rahaman**

- B31.12 in the final balloting process; the deadline to process finalizing ballots has been extended to the end of October 2023.
- The B31.12 fall meeting took place on September 8th from 1 PM to 5 PM US Eastern Time.
- B31.12 European International Working Group is in the works for hydrogen piping and pipelines.

VI. Discussion Topics

Facilitating Deployment **All**

- This item aims to discuss separation distances for high or large-capacity storage.

- FCHEA will follow up on OSHA communications and set up a meeting.

Center for Hydrogen Safety **Jennifer Hamilton**

- The 2022 CHS Americas Conference occurred in Anaheim, California, from September 20-22.
    - A comprehensive summary of the conference is included in the September Safety Report (https://www.hydrogenandfuelcellsafety.info/september-2022#Update1)

Regulatory Matrix Review and Comment **Karen Quackenbush**

- This Matrix is updated quarterly and keeps FCHEA members up-to-date in the development of codes, standards, and regulations.
- As of September 30, 2022: https://static1.squarespace.com/static/5668416ddc5cb4375e2a9ef8/t/63403c21fb0b3712e9a91c86/1665154082484/FCHEA+Regulatory+Matrix+Markup+September+30+2022.pdf
- Please direct any updates, questions, or comments to Karen Quackenbush via email at kquackenbush@fchea.org or Haboon Osmond at hosmond@fchea.org.

Permitting and Installation of Hydrogen Fueling Stations

- No updates

California Station Implementation **Jennifer Hamilton**

- The current count of retail hydrogen stations:
    - 56 available
    - 9 in construction
    - 24 in permitting

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

- Pre-rulemaking efforts have been put on hold. Comments from the workshops have guided efforts to gather more dispenser testing prior to submission to a rule-making package.
- The Sacramento fuel quality lab is open now.

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

- **U.S. Weights and Measures Standards Development Process**
    - Three of four U.S. regional weight and measures associations have met this fall to consider proposals for commercial measurement standards. Industry proposals to modify legal metrology standards for hydrogen gas-measuring devices used to refuel vehicles are shown in the table below. S&T Committees will address a single proposal to modify the 2023 edition of NIST Handbook 44 *Specifications, Tolerances, and Other Technical Requirement for Weighing and Measuring Devices*, Section 3.39. L&R Committees will address two separate proposals to modify the 2023

edition of NIST Handbook 130 *Uniform Laws and Regulations in the Areas of Legal Metrology and Fuel Quality*, Section IV.G. Contact information for the remaining regional association which will consider and make recommendations in fall 2022 for addressing these proposals at the national level is shown below*. All three proposals under consideration are available in entirety (submitter, justification, links to associated materials, etc.) on the NEWMA regional weights and measures association's website. The hydrogen proposals are outlined in the table below:

Committee	Committee Agenda Item No.	Agenda Item Title	Submitter's Stated Purpose	Submitter's Proposed Modification to the Code
S&T (Specifications and Tolerances)	HGM-23.1	UR.3.8. Safety Requirement	Add safety requirement for hydrogen gas measuring devices.	Add a new user requirement paragraph UR3.8. to read: ***UR 3.8 Safety Requirement –All hydrogen gas-measuring devices subject to this code shall maintain verification of testing demonstrating conformance with the latest version of SAE J2601 Fuel Protocols for Light Duty Gaseous Hydrogen Surface Vehicles, as determined by the latest version of ANSI/CSA HGV 4.3 "Test Methods for Hydrogen Fueling Parameter Evaluation. (Nonretroactive as of January 1, 10XX)***
L&R (Laws and Regulations)	FLR-23.3	Section 2.20. Hydrogen Fuel	Add equivalent hydrogen quality standard, ISO 14687 to 2.20.	Modify Section 2 Standard Specification 2.20 as follows: **2.20. Hydrogen Fuel.** – Shall meet the latest version of SAE J2719, "Hydrogen Fuel Quality for Fuel Cell Vehicles." **or ISO 14687 "Hydrogen fuel quality — Product specification".**

				(Added 2012) **(Amended 20XX)**
L&R	FLR-23.4	Section 4.3. Dispenser Filters	Add a filter requirement for hydrogen commercials.	Modify Section 4.3.1 Engine Fuel Dispensers Filters to include a new subparagraph (c) as follows: 4.3. Dispenser Filters 4.3.1 Engine Fuel Dispensers **(c) All gaseous hydrogen dispensers shall have a 5 micron or smaller nominal pore-sized filter, and a filter to protect the vehicle from liquid contamination.** (Amended 2014 **and 20XX**)

- U.S. Regional Weights and Measures Association Contact:
  - Northeastern Weights and Measures Association Interim Meeting will be virtually held on October 25-26: https://newma.us/event-4918541
  - Input and recommendations from the regional associations for each proposal will be included in the January 2023 NCWM Interim Meeting Agendas. Interim Meeting Agendas for the NCWM S&T and L&R Committees will be available in mid-November 2022. The NCWM posts documents related to each agenda item (i.e., proposal) on the NCWM Meeting Documents website available at: https://www.ncwm.com/publication-15.
- At the conclusion of the January 8-11, 2023 NCWM Interim Meeting deliberations and open hearings to be held in Savannah, GA (https://www.ncwm.com/events-detail/2023-interim-GA) each proposal will be assigned a status. Agenda items intended for adoption during the July 2023 108th NCWM Annual Meeting must have achieved "V" voting status in January 2023.
- Comments on the proposals are encouraged early in the standards development process and welcomed up through July 2023. NIST OWM plans to prepare and submit comments in a technical analysis of the proposals. Members on NIST sponsored USNWG on the Development of Commercial Hydrogen Measurements will also be notified of the proposals' latest status.

VII. Open Discussion & Other Issues

a. None.

VIII. Next Meeting – Wednesday, November 2nd at 2:00 PM US Eastern Time