

**Minutes: Properties Subcommittee,
ASME Research & Technology Committee on Water and Steam in Thermal Systems
Schenectady, NY, October 30, 2018**

Attendance:

Richard Harwood, Siemens Energy (Chair)
Jim Bellows, James Bellows & Associates
Dan Cornell, General Electric
Camille Cruz, ASME (by phone)
Dan Friend, NIST (U.S. IAPWS Delegate)
John Gallagher, NIST
Allan Harvey, NIST (Secretary)
Michael Hiegemann (+2 colleagues), GE (Switzerland, by phone)
Frank Udo Leidich, GE (Germany, by phone)
Chuck Marks, Dominion Engineering (by phone)
Peter Murphy, General Electric (by phone)
Jay Patel, General Electric
Anurag Singh, Bhumio Inc.
Andy Witney, General Electric

[NOTE: Items numbered as on Preliminary Agenda, which is attached.]

1-2. Approval of Agenda and Review of Action Items

A preliminary agenda was distributed and approved. Minutes of the Spring 2018 meeting had been approved by email. Progress on action items was briefly reviewed. Pending **Action** items are mentioned under related agenda items below.

3. ASME Steam Tables Books

The Third Edition of the book became available for sale in mid-2014. Total sales of the Third Edition so far are 297 copies (about 50 sales in the past 12 months).

The Compact Steam Tables booklet has sold over 13,500 copies, with approximately 400 in the past 12 months.

4. ASME Software for IAPWS-IF97

No copies of the old “Professional” version were sold in the past year (636 over lifetime of product). No new support requests had been received.

For the new DLL software, Jay Patel reported on progress and reviewed a list of outstanding bugs. There is still testing needed, and also work on the manual. We have the following **Action** items for moving forward:

- Patel send Harvey Fortran routines for thermal conductivity, viscosity, and Prandtl number as soon as possible. Harvey figure out if fixes to Fortran needed.
- Patel fix outstanding bugs and implement an ASME Steam function category, then distribute latest version on Box site (along with latest Manual) by Nov. 30.
- All send Patel bugs, corrections, etc., along with corrections to manual, by Jan. 15.
- Patel test C# wrapper to protect against Excel crashes only if above testing item reveals Excel crashes to be a significant problem.
- Bellows send Patel his Mollier chart spreadsheet for inclusion as an example.

- Patel: Resolve issues identified in testing by Feb. 15, sending out next iteration if necessary, with goal of sending completed version to ASME Press by March 15.
- Cornell: Work with GE and ASME legal to renegotiate the steam property license for GE (probably as a modification of the 2003 agreement) and also establish that those on the Committee that helped with testing, etc. can get individual copies.
- Harvey: discuss pricing with ASME Press (see Fall 2014 Minutes in which we decided to suggest \$200 for the basic Add-in and \$400 with source code included) after above items are complete, and also interface with Camille Cruz at ASME (sending her a copy of the Manual for background) regarding what is needed these days to have a product made by a Research Committee.
- Harwood (and potentially others) work out arrangement with ASME Press for their use of the software, preferably with provision that rights are transferred for as long as ASME continues to pay IAPWS dues.

5. U.S. Implementation of Formulation for General and Scientific Use

Sales of Version 3.0 of the NIST software were 12 in FY 2018, a small decrease over the previous year. A minor update will be made in FY2019 that will fix a few minor items.

6. IAPWS Issues

Dan Friend reported on the call for nominations for the IAPWS Helmholtz and Honorary Fellow awards. We have a candidate in mind to be nominated for the 2019 Honorary Fellow award.

[**Action:** Bellows explore Helmholtz nomination for 2019 based on a paper he saw at the IWC. Friend (with input from Bellows as needed) prepare our nomination for Honorary Fellow.]

We authorized Dan Friend to vote as he saw fit, involving other Committee members (and members of the Water Technology Subcommittee and of PPEC) as appropriate, in any IAPWS documents that come up in the coming months.

[**Action:** Friend send proposed TGD on air in-leakage to PPEC and to Dave Daniels and any other interested people on the Water Technology Subcommittee.]

The 2018 IAPWS meeting and ICPWS was in Prague, Czech Republic, Sept. 2-7. Information is available via the Meetings section of the IAPWS website. The 2019 IAPWS meeting will be in Banff, Alberta, Canada Sept. 29 to Oct. 4, and some information is already linked from the IAPWS website.

The GE people in Switzerland expressed the desire for IAPWS to have a recommended formulation that could calculate seawater properties in thermal desalination processes, making some use of some data that are already available that could be used to extend the range of the current formulation (which is primarily for oceanographic conditions).

[**Action:** Friend suggest to chairs of IAPWS Working Groups TPWS, IRS, and SCSW that they should consider giving higher priority to this topic.]

7. Finances and ASME issues

Current financial information was not available.

We discussed our Subcommittee with Camille Cruz, ASME's Manager for the Energy Conversion and Storage segment. She is our contact for navigating ASME bureaucracy, updating our website, etc.

[**Action:** Harvey prepare and submit GPS request for our 2019 IAPWS expenses.]

8. Old Business

Regarding keeping PPEC informed about IAPWS work, we reaffirmed that we should continue to send them drafts of IAPWS documents.

Chuck Marks reported no progress on the possible project for revising and updating one or two chapters of the *ASME Handbook on Water Technology for Thermal Power Systems*, mainly due to lack of a funding source. We will move this item to our “long term” list.

We discussed ways we might celebrate the 100-year anniversary of ASME Steam Tables efforts in 2021. An article in *Mechanical Engineering* would be desirable, and perhaps a session at IMECE or at ASME Power.

[**Action:** Harvey begin outlining ME magazine article, with help from Bellows, bringing Cruz into the conversation about opportunities in ASME.]

9. New Business

The U.S. National Committee to IAPWS has been asked if it can organize and host the next International Conference on the Properties of Water and Steam, which with typical intervals would be in 2023. We are supposed to provide an initial response by the end of the calendar year. Options include doing it as a standalone conference (where we would definitely need ASME help), co-locating/combining it with an existing ASME conference such as ASME Power, or co-locating it with another existing conference such as the Thermophysical Properties Symposium or a PPEC meeting. If possible, we would want to involve other interested U.S. entities, such as PPEC and EPRI, in the organization and/or as sources of keynote speakers.

Camille Cruz at ASME has established that they are interested, and that we have ample time to work out details. Major planning, including signing agreements and picking a location, would typically happen 3 years in advance. There is a mechanism for handling sponsorships. Further discussion is needed on pros and cons of combining with another conference, how we would pick a location, what sort of fee structure we are aiming at, etc.

[**Actions:** Friend notify IAPWS Executive Secretary that we will be willing to host an ICPWS, probably in 2023 but with a slight possibility of 2022 or 2024 instead. Cruz collect and supply further information about the ASME end of the process.]

Our current list of “long-term” topics includes: desalination and seawater; properties for carbon capture and sequestration; properties for concentrating solar power cycles; fast property calculations for CFD; non-Fortran languages (like Java) for our products and apps related to our products; the possibility of having ASME steam-tables calculations on our Subcommittee website; other working fluids such as carbon dioxide for power cycles, and possible revision of parts of the *ASME Handbook on Water Technology for Thermal Power Systems*.

10. Membership

Two new members of the Subcommittee were unanimously approved. **The Subcommittee added Dan Cornell (GE Power) and Andy Witney (GE Power).**

11. Next Meetings

For Spring 2019, we will meet at NIST Gaithersburg on Wednesday, April 3. There was discussion that we should invite Camille Cruz to the Gaithersburg meeting so she could get acquainted with the work of both Subcommittees. For Fall 2019, it was decided to meet in conjunction with the International Water Conference in Orlando, where the main WSTS Committee and the Water Technology Subcommittee will also be meeting. We would meet Thursday, Nov. 14.

[**Action:** Harvey follow through on arranging for Cruz to attend all or part of April meeting.]

12. Adjournment

The meeting adjourned at approximately 4:15 PM.

Preliminary Agenda: ASME Subcommittee on Properties of Water and Steam

Location: General Electric, Schenectady, NY

Time: Tuesday, October 30, 2018, 8:30 to 4:30

- 1. Approval of Agenda**
- 2. Review of Action Items from Spring 2018 Minutes**
- 3. ASME Steam Tables book and booklet**
 - 3.1. Report on sales Allan Harvey
- 4. ASME Software for IAPWS-IF97**
 - 4.1. Report on sales Allan Harvey
 - 4.2. Technical support, bugs John Gallagher, Harvey
 - 4.3. Code revision and DLL/Excel product Jay Patel
 - 4.4. Plan for completing DLL/Excel product Patel, All
 - 4.5. Future things we could do with software Patel
- 5. Update on implementation of general/scientific formulation** Allan Harvey
- 6. IAPWS issues**
 - 6.1. IAPWS Awards Dan Friend
 - 6.2. IAPWS documents for consideration Dan Friend
 - 6.3. Reports on 2018 ICPWS in Prague
- 7. Finances and ASME issues**
 - 7.1. Committee finances Harwood, Harvey
 - 7.2. ASME structure and procedures, place of Committee Harvey, Camille Cruz Alfonzo
- 8. Old Business**
 - 8.1. US participation in IAPWS PCC activities (EPRI, PPEC) Friend, Bellows
 - 8.2. Revision of ASME Handbook Marks, Bellows
 - 8.3. 2021 100-year anniversary of ASME steam tables work
- 9. New Business**
 - 9.1. Invitation for US to host next ICPWS All
 - 9.2. Review of “long-term” items All
- 10. Membership**
- 11. Next Meetings:** Spring 2019: Wed. April 3 in Gaithersburg. Fall 2019? [IWC is in Orlando Nov. 10-14]
- 12. Adjournment**