

**Minutes: Properties Subcommittee,
ASME Research & Technology Committee on Water and Steam in Thermal Systems
Orlando, FL, November 14, 2019**

Attendance:

Jim Bellows, James Bellows & Associates
Kirk Buecher, Mettler-Toledo
Dan Cornell, General Electric (by phone)
Camille Cruz, ASME (by phone)
Dan Friend, NIST (U.S. IAPWS Delegate)
Frank Gabrielli, retired
John Gallagher, NIST
Allan Harvey, NIST (Secretary)
Jay Patel, General Electric (by phone)
Jan Sengers, University of Maryland
Anurag Singh, Bhumio Inc. (by phone)
Andy Witney, General Electric (by phone)

[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 2019 meeting had been approved by email. Progress on action items was briefly reviewed. Pending **Action** items are mentioned under related agenda items below.

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

Total sales of NIST's Steam 3.0 were 19 in Fiscal 2019, including 3 distributor agreements and 1 site license. An update will be made in FY2020 that will fix a few minor items.

4. 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 329 copies (about 30 sales in the past 12 months).
The Compact Steam Tables booklet has sold over 14,000 copies, with approximately 500 in the past 12 months.

5. ASME Software for IAPWS-IF97

3 copies of the old "Professional" version were sold in the past year (639 over lifetime of product). No new support requests had been received.

For the new DLL software, Jay Patel reported on progress. There is still testing needed, and also work on the manual. We were unable to find the previous site license, so that will probably need to start from scratch. We have the following **Action** items for moving forward:

- o Patel include function descriptions in appropriate places, be sure post-install scripts are implemented, and put new install on Box (by Nov. 30).
- o Patel put current Word document of Manual on Box (ASAP).
- o Bellows cross-check between Add-in and draft manual to be sure all the needed functions are in both places, cross-check manual against version by Layla Bellows and bring up to date if needed (by December 15).
- o Friend remind people as appropriate on the above items.

- Bellows send Patel his Mollier chart spreadsheet for inclusion as an example (by Jan. 15).
- Bellows check to see if he has copy of Siemens site license (by Jan. 15). Patel talk to GE legal to start process there.
- Harvey send sample spreadsheet that calls all functions (by Dec. 15).
- All send Patel bugs, corrections, etc., along with corrections to manual to Bellows, by Jan. 30.
- Bellows: Cross check manual versus software by Jan. 31, correcting manual as needed.
- Patel: Resolve issues identified in testing and send out next (hopefully final) version by Feb. 29 with a March 15 deadline for feedback on this iteration.
- 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 the items up to those with the Jan. 31 deadline 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.

6. IAPWS Issues

Dan Friend reported on the process for nomination for the IAPWS Helmholtz and Honorary Fellow awards. We had no immediate candidates, but one participant had an idea for a possible Helmholtz nominee.

[**Action:** Any ideas for nominations should be conveyed to Dan Friend by December 15.]

Dan Friend was authorized to vote favorably on the IAPWS ICRN being circulated regarding needs for new thermodynamic data for ordinary water.

Jan Sengers reported that a new IAPWS formulation for the viscosity of heavy water is being evaluated, with a plan to obtain final approval at the 2020 IAPWS meeting. The same Task Group has made substantial progress on a thermal conductivity formulation, and hopes to have a version for evaluation in early 2020, pending some decisions about what to do regarding an “industrial” recommendation.

The 2019 IAPWS meeting was in Banff, Alberta, Canada., Sept. 29 to October 4; the Minutes are now available on the IAPWS website. The 2020 meeting will be in Torino (Turin) Italy, September 6-11. A meeting website has been set up: <http://iapws2020.inrim.it/>.

We discussed our plan to host the IAPWS meeting and ICPWS in the US in 2023. The options would be a standalone conference (with ASME doing conference organization services), or something joint with another ASME conference (like ASME Power; this could be either a fully integrated joint conference or a separate conference located at the same site). There are pluses and minuses to each approach. In either case, ASME would take a 15% overhead on our conference budget and we would need approval from the ECS segment. Camille Cruz forwarded the current version of the form we would need to fill out (which is in the process of revision). We tentatively decided to pursue a standalone conference (with estimated attendance in the 75-200 range), because of the greater autonomy it would provide and because the overlap between interests at the ICPWS and ASME Power appears to be minimal.

Possible sites were discussed, with important factors being ease of getting to the location from Europe and Japan, cost, and capacity of venue (we don’t want to be lost as a small meeting in a big space, but we want to have enough room if we go above our projected size). College campuses may be options.

[**Actions:** Harvey ask ASME for an example of the event form successfully filled out, and ask if ASME has a list of venues for events of our approximate size. Bellows look into two possible college sites, telling us what he learns by Dec. 31. Harvey and Friend work on ASME’s event form. All think of topic areas for next ICPWS (by our April meeting),]

7. Finances and ASME issues

Current financial information was not available; the reports received from ASME suggest that some expenses may have been mis-assigned between our Subcommittee's account and that of the main WSTS Committee. Eric Kangas, as Secretary of the Main Committee, is trying to get clarification.

[**Action:** Harvey prepare and submit GPS request for our 2020 IAPWS expenses by Dec. 31.]

8. Old Business

For promoting our work, Kirk Buecher will talk up IAPWS PCC work at a couple of conferences he will attend in the next few months.

We discussed ways to celebrate the 100-year anniversary of ASME Steam Tables efforts in 2021. Allan Harvey has outlined an article for *Mechanical Engineering*, and perhaps a history-oriented session at IMECE would be a place to give a talk. Other possible magazine locations for at least short items include *Chemical & Engineering News*, *Chemical Engineering Progress*, and *Power*. An exhibition related to steam tables in the NIST library was also mentioned as a possibility.

[**Actions:** Bellows provide feedback on outline for ME magazine article, and begin working with Harvey to flesh it out. Harvey approach ME magazine with idea for article. Harvey try to get response to question about possibility of historical sessions at ASME meetings.]

The proposal to make "standardized steam property tables" a Historical Mechanical Engineering Landmark has been approved by the ASME History and Heritage Committee. Richard Pawliger of that committee will begin working on the accompanying brochure, with our Subcommittee providing information as needed. Since this is a "virtual landmark," there may not be a formal ceremony, but if we do have a ceremony logical sites would be ASME Headquarters (possibly the site of the headquarters in the 1920s) or else our Spring 2021 Committee meetings at NIST in Gaithersburg.

9. New Business

Our current list of "long-term" topics includes: desalination and seawater; properties for carbon capture and sequestration; properties for concentrating solar power cycles; data for wet steam from operating turbines; 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

The Subcommittee unanimously voted to make Kirk Buecher (of Mettler-Toledo) a member. We noted that longtime member Richard Jacobsen had died in August.

[**Action:** Harvey and Friend draft letter to widow of Dick Jacobsen to be sent by Harwood as Subcommittee Chair.]

11. Next Meetings

For Spring 2020, we will meet at NIST-Gaithersburg on Wednesday, April 29. For Fall 2020, the plan is to meet in conjunction with the International Water Conference in San Antonio, where the main WSTS Committee and the Water Technology Subcommittee will also meet and where Camille Cruz from ASME should be able to join us. We would meet Thursday, Nov. 12, at the hotel where the IWC is held.

[**Action:** Harvey take care of Gaithersburg arrangements for April.]

12. Adjournment

The meeting adjourned at approximately 3:45 PM.

Preliminary Agenda: ASME Subcommittee on Properties of Water and Steam

Location: Hilton Lake Buena Vista, Orlando, FL, Fuchsia Room

Time: Thursday, November 14, 2019, 8:30 to 4:30

- 1. Approval of Agenda**
- 2. Review of Action Items from Spring 2019 Minutes**
- 3. Update on implementation of general/scientific formulation** Allan Harvey
- 4. ASME Steam Tables book and booklet**
 - 4.1. Report on sales Allan Harvey
- 5. ASME Software for IAPWS-IF97**
 - 5.1. Report on sales Allan Harvey
 - 5.2. Technical support, bugs John Gallagher, Harvey
 - 5.3. Code revision and DLL/Excel product Jay Patel
 - 5.4. Plan for completing DLL/Excel product Patel, All
- 6. IAPWS issues**
 - 6.1. IAPWS Awards Dan Friend
 - 6.2. IAPWS documents for consideration Dan Friend
 - 6.3. Progress on heavy water transport properties Jan Sengers
 - 6.4. Review of 2019 IAPWS in Banff Dan Friend
 - 6.5. Hosting next ICPWS (2023 or 2024?)
- 7. Finances and ASME issues**
 - 7.1. Committee finances Harwood, Harvey
- 8. Old Business**
 - 8.1. US participation in IAPWS PCC activities (EPRI, PPEC) Friend, Bellows
 - 8.2. 2021 100-year anniversary of ASME steam tables work Harvey, Bellows
 - 8.3. Steam property tables as ASME Historic Landmark Harvey
- 9. New Business**
 - 9.1. Review of “long-term” items All
- 10. Membership**
- 11. Next Meetings:** April 29, 2020 in Gaithersburg. Fall 2020? (IWC in San Antonio Nov. 8-12)
- 12. Adjournment**