

**Minutes: Properties Subcommittee,  
ASME Research & Technology Committee on Water and Steam in Thermal Systems  
Dominion Engineering, Inc., Reston, VA, October 12, 2016**

Attendance:

Jim Bellows, James Bellows & Associates  
Dan Friend, NIST (U.S. IAPWS Delegate)  
John Gallagher, NIST  
Allan Harvey, NIST (Secretary)  
Chunzhi He, Thermobook.net  
Anneke Levelt Sengers, NIST  
Chuck Marks, Dominion Engineering  
Jan Sengers, University of Maryland  
Anurag Singh, General Electric (by phone)

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

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

In the absence of our Chair and Vice-Chair, it was decided to proceed through the agenda without an official Chair. A preliminary agenda was distributed and approved, with the addition of a lab tour. Minutes of the Spring 2016 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 199 copies (about 66 sales in the past 12 months). The rate is declining slightly, as might be expected.

The Compact Steam Tables booklet has sold over 12,500 copies, with approximately 800 in the past 12 months; this is similar to the previous few years.

4. ASME Software for IAPWS-IF97

Two copies of the old “Professional” version were sold in the past year (634 over lifetime of product). No new support requests had been received.

For the new DLL software, Anurag Singh has made edits to the documentation. His role at GE will be changing, and he will need to mostly turn over this area of work to somebody else (yet to be assigned; this person may inherit some of the actions assigned to Singh below). An obstacle is the necessity to get permission to share the latest version of the software outside GE. We have the following **Action** items for moving forward:

- o Singh look at April 2016 minutes to be sure all the points raised there are addressed, and also address the confusing use of Psi for pressure in SI units.
- o Singh immediately send current manual to group for next round of checking.
- o Singh work to set up ability to share the software for testing.
- o Harvey and Bellows use current software to find places where Add-In returns error code numbers rather than the preferred #NUM (or messages like T>Tmin which are also OK), so they can be fixed if possible.
- o Bellows send Singh his spreadsheet for inclusion as an example.
- o All: Test next version when it is able to be distributed.

- Singh (and/or successor): Continue to 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.

Incorporation of splines for fast calculation (according to the new IAPWS Guideline) and thermodynamic derivatives (IAPWS Advisory Note) for our software in the future are deferred until after this first version of the software is issued, as are questions about possibly moving away from software in the future.

## 5. Web sites

There was nothing new to report regarding the IAPWS website or that of our Subcommittee.

## 6. U.S. Implementation of Formulation for General and Scientific Use

Sales of Version 3.0 of the NIST software were approximately 15 in FY16. A minor update may be made in 2017 to include some mixture-related properties accidentally left out of the interface in Version 3.0.

## 7. IAPWS Issues

We discussed a candidate to be nominated for IAPWS Honorary Fellow. It was noted that the IAPWS Gibbs award, given to a senior researcher, will be awarded in 2018 and nominations should be made by May 2017. People are asked to think about possibilities, and this will be discussed at our next meeting. Nomination of an early-career researcher for the IAPWS Helmholtz award is due Jan. 31. Some avenues for finding candidates were discussed.

**[Actions:** Bellows put together Honorary Fellow nomination material ASAP. Harvey contact one or two other national delegates for possible support. Friend email Chair of IAPWS Subcommittee on Seawater to ask if he knows of a good Helmholtz award prospect in that area. Bellows look at recent issues of *PowerPlant Chemistry* to find Helmholtz possibilities.]

The US IAPWS delegate mentioned several items he was being asked to vote on (Associate Membership for Italy, minor revisions to IAPWS-95 Release, new Advisory Note 6 about IAPWS seawater-related documents), all of which met with the Committee's approval.

The 2016 IAPWS meeting in Dresden was well attended, although the US contingent was smaller than usual. The 2017 IAPWS meeting will be in Kyoto, Japan, Aug. 27 to Sept. 1. Information will be available via the Meetings section of the IAPWS website.

The possible program for travel subsidies for early-career workers to attend IAPWS meetings is on hold until our finances and procedures for dealing with expenditures with ASME are worked out. We will want, if possible, to provide subsidies for the 2018 ICPWS in Prague as we have for previous ICPWS.

## 8. Finances and ASME issues

Our Segregated Account balance is approximately \$50,000. The US delegate's expenses for the 2016 IAPWS meeting are in the process of being paid from these funds.

We submitted a request through ASME's GPS system for collecting money from EPRI to be designated specifically to pay IAPWS-related expenses (but not IAPWS dues). This was approved and now ASME and EPRI must work out the legal details. We must ask again each year through GPS for funding our IAPWS work (dues and travel expenses for US delegate) and for partial travel funding of the Subcommittee Secretary to the Gaithersburg meeting (to offset Conference Services fees).

**[Actions:** Friend follow up with EPRI contact as needed about travel funding. Harvey work with Harwood and Friend to prepare GPS requests for 2017, which will be for IAPWS expenses and for our Gaithersburg meeting expense (the latter only after investigating if the cost still exists).]

## 9. Old Business

Dan Friend reported that he had been to a meeting of the PPEC committee (which is now independent of ASME) in September. He will continue to share documents with them and try to keep them informed of IAPWS activities, but nothing more concrete has been established.

It was decided to appoint Jim Bellows as our Subcommittee liaison to PPEC going forward.

There was discussion of US participation in IAPWS PCC activities, and Chuck Marks is willing to serve on the IAPWS Task Group working on guidance for film-forming amines in nuclear plants.

**[Action:** Friend find appropriate IAPWS channel to suggest Chuck Marks be added to Task Group.]

With regard to possibly revising and updating the *ASME Handbook on Water Technology for Thermal Power Systems*, we had heard from ASME Press that the best strategy would be to prepare updates of individual chapters that could be sold separately. Chapter 7 on water/steam chemistry is the highest priority for us, but it would be useful to think about what other updates might be needed.

**[Actions:** Marks prepare proposal for revising Chapter 7 for April meeting, potentially to be requested for ASME funding through GPS. Marks and Bellows look through book to make recommendations about what other chapters most need to be updated or rewritten. Harvey contact 2 or 3 people from Water Technology subcommittee for their recommendations. Friend ask PPEC leadership if they have any recommendations. Marks synthesize all these recommendations to report in April.]

## 10. 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; 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.

## 11. Membership

There were no proposals for change in membership. We hope to welcome one or two more people from GE, and by our next meeting Anurag Singh may have a better idea of the degree to which he can participate going forward.

## 12. Next Meetings

Our Spring 2017 meeting is scheduled for Wednesday, April 19 (possibly also the morning of April 20) at NIST headquarters in Gaithersburg, MD. At Jan Sengers’ suggestion, we will explore having a local expert in seawater corrosion give a talk, probably to the main WSTS committee meeting.

**[Actions:** Sengers check on availability of corrosion speaker and how much time he would need (suggested 30-40 minute range) to do the job. Harvey consult with Main Committee officers (after they have met in November at the IWC) about eliminating Thursday morning from our Gaithersburg schedule next year. Bellows tell the Main Committee when he attends about the possible April speaker, and also our Fall 2017 plans.]

For Fall 2017, there was consensus that we should try to meet in conjunction with the IWC in Orlando (Nov. 12-16), meeting in the IWC hotel (rather than at Siemens).

**[Actions:** Harvey and Bellows communicate with WSTS Committee and IWC people regarding these plans as the time gets closer, with the goal of setting a date at our April 2017 meeting.]

## 13. Adjournment

The meeting adjourned at approximately 3:20 PM.

**Preliminary Agenda: ASME Subcommittee on Properties of Water and Steam**

**Location: Dominion Engineering, 12100 Sunrise Valley Drive, Reston, VA**

**Time: Wednesday, October 12, 2016, 8:30 to 5:00**

- 1. Approval of Agenda**
- 2. Review of Action Items from Spring 2016 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 Anurag Singh
  - 4.4. Future incorporation of splines, derivatives?
- 5. U.S. Subcommittee and IAPWS Web pages** Allan Harvey
- 6. Update on implementation of general/scientific formulation** Allan Harvey
- 7. IAPWS issues**
  - 7.1. IAPWS Awards Dan Friend
  - 7.2. IAPWS documents for consideration Dan Friend
  - 7.3. Report on 2016 IAPWS meeting in Dresden Friend, Harvey, J. Sengers
  - 7.4. Proposed travel subsidy program Friend, Peter Murphy
- 8. Finances and ASME issues**
  - 8.1. Committee finances Harwood, Friend, Harvey
  - 8.2. New GPS process for our expenses Harvey
  - 8.3. Possible EPRI agreement for some IAPWS costs Harvey, Friend
- 9. Old Business**
  - 9.1. US participation in IAPWS PCC activities (EPRI, PPEC)
  - 9.2. Interactions with PPEC Friend
  - 9.3. Revision of ASME Handbook Marks, Bellows, Harvey
- 10. New Business**
  - 10.1. Review of “long-term” items All
- 11. Membership**
- 12. Next Meetings** – April 19-20, 2017, NIST Headquarters, Gaithersburg, MD (maybe only the 19th).  
Discuss Fall 2017 (with IWC in Orlando, which is Nov. 12-16?).
- 13. Adjournment**