Minutes: Properties Subcommittee,
ASME Research & Technology Committee on Water and Steam in Thermal Systems
Gaithersburg, MD, April 16, 2014

Attendance:
Richard Harwood, Siemens Energy (Chair)
Jim Bellows, Siemens Energy
Dan Friend, NIST (U.S. IAPWS Delegate)
John Gallagher, NIST
Allan Harvey, NIST (Secretary)
Chunzhi He, Thermobook.net
Peter Murphy, Alstom Power
Jan Sengers, University of Maryland

[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 Fall 2013 meeting had been approved by email. Progress on action items was briefly reviewed. Leftover Action items carried over (and amended items) are as follows. Harvey contact Barry Dooley about possibility of getting PDFs of old IAPWS ICRNs for possible inclusion on IAPWS website. Singh inquire if need still exists for extension of metastable steam properties for concentrating solar power – if so send Harvey summary of conditions needed. Harvey, as TPWS Chair, contact IRS Working Group Chair about possibilities of addressing this issue if necessary, either with an ICRN or with work toward an extension of the metastable region of IAPWS-IF97. Bellows develop a spreadsheet showing sample calculations to show how to use the DLL product. Others are mentioned under related agenda items below.

3. ASME Steam Tables Books

The Second Edition of the book, reflecting the new IAPWS viscosity formulation and new Region 5 formulation, became available for sale in early 2009. Sales of this edition so far have been 601, about 90 in the last year.

The Compact Steam Tables booklet has sold over 9800 copies, with approximately 1000 in the past 12 months; it is selling at a fairly steady rate.

The complete PDF files for the Third Edition were submitted to ASME Press in early April, 2014; we are now waiting for their feedback. The Third Edition will be included in the ASME Digital Library (a package offered to libraries on a subscription basis – a little of the revenue and therefore royalties would accrue to us). It would also be offered in electronic form (PDF) for individual purchase (at the same price and same royalty as the print version). Rich Harwood distributed CDs with the final electronic files used for the book. It was discussed who should get free copies in recognition of their proofreading and other help. It was voted that Subcommittee funds would pay for copies of the Third Edition for the 5 authors (if they did not already get free copies), Dan Friend, Peter Murphy, Jan Sengers, Prof. Kretzschmar, and EPRI (with the EPRI copy to be sent with our next annual report to them).

[Actions: Harwood ask ASME Press about progress on the book if we have not heard any feedback by the end of April. Harvey find out if authors get free copies, find out from CRTD office who the person should be at EPRI to get a copy when the time comes, and coordinate the distribution. Harvey make sure ASME publicizes Third Edition.]
4. ASME Software for IAPWS-IF97

9 copies of the “Professional” version were sold in the past year. No new bugs or support requests have shown up.

Anurag Singh was unable to attend, but had distributed an Install program for testing. Several people reported various problems with the Install. It was decided that a requirement for the Install would be to work reliably on Windows 7 and beyond, and on Excel 2007 and beyond (the latter requirement could be relaxed to Excel 2010 if necessary). A two-part approach to solving the Install problems was agreed upon. Plan A is for IT experts at GE to do it (we hope justified within GE since they will be getting a site license for the finished product). If that is not possible, it was authorized to expend up to $10,000 from our custodial account to hire an expert to get the Install working correctly for our requirements. The contractor would need to make a proposal, and then the Subcommittee Chair (Harwood), in conjunction with Singh, are responsible for choosing a contractor. Harwood would be responsible for coordinating the business aspect with Norma Johnston at ASME.

[Actions: Singh] look into getting help at GE for the Install and report back by the end of May whether Plan A will work. Harwood coordinate Plan B if needed. Harvey discuss with ASME Press issues of pricing, royalties, and copy protection – on copy protection starting by asking what ASME does now for other software products if it has any for which that is relevant. Singh update documentation as needed and coordinate further testing of the functions.]

5. Web sites

Upcoming ASME reorganization might affect our website, but it is too early to say. Issues related to the IAPWS website (see previous meeting minutes) were discussed again. Harvey reported that the IAPWS pages hosted at NIST had been redone in a way that should make them easier for search engines to find. The position was reiterated: The US Committee does not object if the IAPWS EC wishes to host the site with a commercial provider.

[Action: Harvey] get ASME and IAPWS pages updated as appropriate when Third Edition of Steam Tables book comes out, similarly for any other products, and also make sure things are OK if ASME reorganizes website. Harvey get Google analytics set up to see IAPWS website traffic by the time of the June IAPWS annual meeting.]


NIST completed Version 3.0 of the software and it became available in August 2013. The new version is compatible with 64-bit machines, and adds additional functionality such as the ionization constant and the Prandtl number and properties as a function of enthalpy and entropy, along with the new IAPWS thermal conductivity formulation. The new version has sold 15 copies so far, a slight increase over the recent pace for Version 2.22.

[Action: Harvey] contact NIST Standard Reference Data to see how they are making potential users (including buyers of the earlier versions) aware of the new product.]

7. IAPWS Issues

Dan Friend reported that we had submitted a nomination for IAPWS Honorary Fellow, and that a young scientist from Japan had been chosen as the recipient for the 2014 Helmholtz award.

No documents have come recently from IAPWS for consideration, but there will be several things to review before the next IAPWS meeting in June. The US national delegate was authorized to deal with any such documents that come before our next meeting, soliciting other input as appropriate (this includes input from Jim Bellows on a Technical Guidance Document on corrosion product sampling and analysis). Language on the cover pages of TGDs that differs from other IAPWS documents was discussed, as was
the IAPWS cooperation with BIPM (mostly involving the Subcommittee on Seawater) which we wanted to make sure was continuing.

For the 2014 IAPWS meeting in Moscow (June 23-27), there was concern about difficulties with travel and visas. The following was adopted as a permanent policy for US national representation: **If the US delegate is unable to attend an IAPWS annual meeting, the Subcommittee Chair should be informed ASAP.** The Chair (in consultation with the US delegate if available) will appoint a substitute. **Our custodial funds are authorized to be used for the travel and meeting registration of this substitute.** Also, **funds from our Custodial Account were authorized to pay for Dan Friend’s trip to Moscow for the 2014 IAPWS meeting (assuming he is able to go, otherwise funds are authorized to pay for the travel of the substitute defined above).**

The topic was brought up of helping early-career workers from the US to get to IAPWS meetings (we already do this for the ICPWS). A scholarship program could provide small assistance like covering the registration fee. **A Task Group was appointed (consisting of Peter Murphy and Dan Friend) to consider this issue.**

**[Actions: Friend and Murphy, as Task Group mentioned above, consider the idea of a scholarship program and develop a recommendation to be circulated at least 2 weeks prior to our Fall meeting. Friend bring up question about TGD cover page language to the EC for the upcoming IAPWS meeting, and make efforts to be sure the BIPM interactions are not forgotten.]**

8. Old Business

**EPRI reports and funding:** We received the requested EPRI support for 2014. Our Custodial Account balance as of the end of March, after correcting for a quirk in the way ASME is accounting for our IAPWS dues payment, is approximately $64,000.

**Metastable water/steam:** For metastable steam, see item #1 for a leftover action item for Singh to see if there still exists a need that should be brought to the attention of IAPWS. For metastable water, Jan Sengers reported that the group at Maryland plans to submit a paper on their current thermodynamic formulation to J. Phys. Chem. Ref. Data, independent of any IAPWS formulation and adoption of a possible Guideline. This way the work would be available even if IAPWS decided to wait for some additional data before adopting a Guideline. The committee had no objection to this course of action.

**Heavy Water and Other New Formulations:** Allan Harvey reported that the IAPWS project for Germany-US collaboration toward a new equation of state for D$_2$O had made good progress. Finalizing the new formulation (and sending it for IAPWS testing) may wait until some improved ideal-gas properties, and possibly some additional vapor-pressure measurements, are available. Jan Sengers reported that work had begun on revising the transport property correlations for D$_2$O, and it was suggested that TPWS could appoint an official Task Group for this effort in Moscow.

**ASME News and other publicity:** An item for ASME News should be written when the Third Edition of the Steam Tables book comes out. The article should briefly mention other committee activities and IAPWS, but the focus should be on the new book. Other avenues for publicity were also discussed. **[Actions: Harvey prepare ASME News item when the 3rd Edition of the Steam Tables book is coming out, and get it submitted through Michael Tinkleman at ASME. Harvey check with Mary Grace at ASME to be sure the book will be publicized other places, such as Mechanical Engineering magazine and perhaps its parallel at IMechE.]**

9. New Business

Some of our “long-term” topics were covered above. The current long-term list includes: desalination and seawater; properties for carbon capture and sequestration; properties for concentrating solar power
cycles (which may be dropped depending on the outcome of the “metastable steam” item above); 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; and the relationship between our subcommittee, other ASME committees, and US participation in IAPWS. Peter Murphy mentioned that the thermodynamic property derivatives of IAPWS formulations (as in IAPWS Advisory Note #3) were useful in industry, and that it would be a good idea to add these to the ASME software (after the current Add-in is finished). This will either be added to our “long-term” list or to the agenda for our Fall meeting, depending on the progress on the Add-in. [Action: Harvey make sure item on derivatives appropriately considered in September.]

10. Membership

It was moved and unanimously agreed to add Chunzhi He (Thermobook.net) to the membership of the Subcommittee. It was noted that Peter Huang should be deleted from the list following his retirement from NIST. A NIST humidity expert may be recruited to join us in the future, but not at the moment while that group is understaffed.

11. Next Meetings

For Fall 2014, we will meet at the Alstom facility in Midlothian (near Richmond), VA on Tuesday, September 23. Our Spring 2015 meeting is scheduled for Wednesday, April 1 (possibly extending to the morning of April 2) at NIST headquarters in Gaithersburg, MD. [Actions: Murphy make hosting arrangements at Alstom and communicate information about hotels, etc. as meeting draws closer.]

12. Adjournment

The meeting adjourned at approximately 3:30 PM.
Preliminary Agenda: ASME Subcommittee on Properties of Water and Steam

Location: NIST Admin Bldg, Room B-111, Gaithersburg, MD
Time: Wednesday, April 16, 2014, 9:30 to 5:00

1. Approval of Agenda
2. Review of Action Items from Fall 2013 Minutes
3. ASME Steam Tables book and booklet
   3.1. Report on sales
   Allan Harvey
   3.2. Report on Third Edition and PDF version
   Rich Harwood, 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
5. U.S. Subcommittee and IAPWS Web pages
   Allan Harvey
6. Update on implementation of general/scientific formulation
   Allan Harvey
   6.1. Report on sales
   Allan Harvey
7. IAPWS issues
   7.1. IAPWS Awards
   Dan Friend
   7.2. IAPWS documents for consideration
   Dan Friend
   7.3. Preparation for IAPWS meeting in Moscow
   Friend
8. Old Business
   8.1. EPRI reports and committee finances
   Harwood, Friend, Harvey
   8.2. Metastable steam issues (CFD, CSP)
   8.3. Supercooled water issues
   8.4. Heavy water and other future IAPWS formulations
   Harvey
   8.5. Publicity (ASME News)
   Harvey
9. New Business
   9.1. Review of “long-term” items
   All
10. Membership
11. Next Meeting – September 23, 2014 in Richmond, VA (Spring 2015 in Gaithersburg, April 1/2)
12. Adjournment