

**Minutes: Properties Subcommittee,
ASME Research & Technology Committee on Water and Steam in Thermal Systems
Gaithersburg, MD, April 16-17, 2008**

Attendance:

Jim Bellows, Siemens Power Generation (Chair)
Dan Friend, NIST (U.S. IAPWS Delegate)
John Gallagher, NIST
Allan Harvey, NIST (Secretary)
Rich Harwood, Siemens Power Generation
Peter Huang, NIST
Richard Jacobsen, Idaho State University
Anneke Levelt Sengers, NIST
Serguei Lvov, Penn State University
Peter Murphy, General Electric
Bill Parry, General Electric
Jan Sengers, University of Maryland

[NOTE: Items numbered as on Preliminary Agenda, which is attached. Numbering reflects order on agenda, not necessarily order in which items were actually discussed.]

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

A preliminary agenda (attached) was distributed and approved with the provision that the order of considering items would be changed. Minutes of the Fall 2007 meeting had been approved by email. Progress on action items was briefly reviewed. Leftover **Action** items carried over are as follows. [Bellows to circulate IAPWS PCC minutes to ASME's PPEC committee and Water Technology Subcommittee. Bellows and Parry to present IAPWS monographs at Siemens and GE, respectively. Parry and Harvey to look at tightening software convergence tolerances on H and S. Parry to get installation of DLL done and circulated, followed by testing by several people. Harvey to write up a brief article (a couple of paragraphs) on ICRNs. Harvey to see about getting it into *Mechanical Engineering* and *Chemical Engineering Progress*; Bellows to see about getting it into *Chemical & Engineering News*. Harwood to see if there is an appropriate PowerGen conference where we can publicize (can be done if we have an ASME logo on material). Bellows to investigate status of EPRI funding from past years and call Jim Mathews to discuss.]

3. ASME Steam Tables Books

As of 4/2/08, total sales of the book are 1250, reflecting 112 books sold in the last 12 months. Annual sales have been "flat" for several years. The new Compact Steam Tables booklet has sold 3082 copies (many in bulk orders), with approximately 1900 in the past 12 months.

A Second Edition will include the new IAPWS Region 5 properties and new viscosity. We will attempt to have this ready to send to printing by the time of the IAPWS meeting in September.

[**Actions:** Harvey to produce revised text and tables and coordinate with ASME Press. Parry to see if he can produce updated figures of the regions for Chapter 1. Gallagher to make new charts of viscosity, kinematic viscosity, and Prandtl number. Harvey to discuss pricing with ASME Press, with an increase to reflect our 10% royalty, but with a strong desire to keep the price below \$100. Harvey to check with ASME Press about possibilities for putting book on CD-ROM. Harvey and (Bellows or Harwood) to produce brief Foreword for 2nd Edition.]

4. ASME Software for IAPWS-IF97

Total sales are 554 “Professional” version, reflecting 27 Professional in the past 12 months, a slight increase but overall sales have been fairly flat for several years. No new bugs have shown up.

Bill Parry reported progress on the DLL. He needs to do some more work on the VBA side to deal with bad data, and get the install program done. There are potentially some issues with the Vista operating system to deal with, which may involve finding a way to put a digital signature on the DLL. *It was moved, seconded, and passed unanimously to authorize up to \$500 from our Custodial Account to solve the digital signature problem, with up to an additional 20% available if authorized by the Chair.* Once these issues are solved, more testing will be needed.

[**Actions:** Parry and Murphy to figure out how to address the digital signature issue, incorporate a disclaimer, and produce a final beta version by June. Harwood to investigate possibilities for testing at Siemens. Bellows to see if UCF students can be recruited for testing (perhaps giving them copies of the Compact Steam Tables booklet as incentive).]

The issue of the need for a coherent site licensing policy, with 2 or 3 levels of usage, was discussed.

[**Action:** Jacobsen to test waters with ASME Press about a site licensing policy.]

5. Web sites

There was little new to report on this item, other than promotion of the upcoming IAPWS meeting.

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

Allan Harvey reported that sales of Version 2.2 in the first half of Fiscal 2008 had been 23 (13 with source code), with sales roughly constant for several years. Later in 2008, a minor update will be needed for a new IAPWS viscosity standard and new melting and sublimation curves. In the medium term (perhaps coinciding with the new thermal conductivity formulation in a few years), things will be switched over to the interface used for NIST’s Refprop software, since the old existing interface cannot be maintained or upgraded.

7. Transport Properties

Jan Sengers reported that the new IAPWS viscosity formulation has been circulated by Postal Ballot and adoption in Berlin is expected. A small revision of the thermal conductivity release (only the “general and scientific use” part) is being proposed to make it consistent with the new viscosity formulation. Writing is underway on the journal article describing the new viscosity formulation. There will be 2 papers at the upcoming IAPWS conference in Berlin on the viscosity work. The thermal conductivity is more difficult, and will require at least 2 more years.

8. IAPWS Issues

It was agreed that Dan Friend as U.S. National Representative be authorized to vote on behalf of our Committee should a nomination for IAPWS Honorary Fellow be received, and that he was authorized to go ahead when asked about the Helmholtz award nominee unless he had concerns.

The many documents coming up for approval at the next IAPWS meeting were discussed, including revisions to the Statutes and By-Laws. No objection was noted to any of these received so far (**NOTE:** they can be viewed at <http://www.iapws.org/drafts/>). *Dan Friend as U.S. National Representative was authorized to deal with other documents that might be forthcoming.* It was noted that a new category of document was coming from the PCC Working Group, which might need a new name such as “Guidance Document.”

[**Action:** Bellows to try to come up for an appropriate name for this category of document.]

Updates were given of plans for various Working Groups in Berlin.

The 2008 ICPWS in Berlin was discussed. Avenues for publicizing were discussed. The idea of proposing an international collaboration project to help the work on the thermal conductivity was mentioned. The importance of “water management” as a future topic for IAPWS was discussed. It was discussed that, as a backup plan if the preferred situation did not work out, the U.S. might be able to host the 2012 ICPWS in Boulder in conjunction with the Symposium on Thermophysical Properties.

[**Actions:** Harvey to check with M. Tinkleman about an item in *ASME News*. Harwood to check with regard to PowerGen. Friend to suggest to Andre Zeijseink water management as topic for inclusion in symposium at 2009 IAPWS meeting (and forward ASME handout on topic). Sengers and Friend to assess need for international collaboration project for thermal conductivity after visit of Sengers to Boulder.]

9. Membership and Officers

Peter Murphy of General Electric was unanimously approved for membership in the Subcommittee. Peter Huang of NIST was unanimously restored to membership in the Subcommittee. Rich Harwood of Siemens Power Generation was nominated to take over as Chair of the Subcommittee immediately following the conclusion of this meeting, pending approval of the main WSTS Committee. Deep appreciation was expressed to Jim Bellows for his many years of chairing the committee.

It was communicated that ASME’s Center for Research and Technology Development wants a current copy of our membership list.

[**Action:** Harvey to send updated list to Norma Johnston at ASME.]

10. Old Business

With regard to royalties, it was communicated by Dick Jacobsen and Michael Tinkleman that we would get a 10% royalty “off the top” on sales of our future products, and also on the Compact Steam Tables booklet. This was the arrangement we had been asking for all along; the subcommittee is grateful to Jacobsen and Tinkleman for their efforts in finally bringing this about.

With regard to EPRI reports and funding, Jim Bellows reported that he had very recently sent our 2007 report to the ASME office. He is unsure of the status of the previous 2 or 3 years.

[**Actions:** Bellows to check with Norma about status of these reports, talk to Jim Mathews at EPRI, and provide a more complete financial report to be discussed at our Fall 2008 meeting.]

Serguei Lvov reported on the successful symposium held Oct. 9-10, 2007, at the meeting of the Electrochemical Society in Washington. It was jointly sponsored by the ECS, IAPWS, and our Subcommittee (our contribution was \$2000). There were 25 papers, 7 of which were invited, and it was good publicity for IAPWS and related groups. The papers will be published in ECS Transactions (www.ecsdl.org/ECST/).

11. New Business

There was some discussion during the meeting of fruitful future topics, such as hydrogen-related systems and humid gases.

12. Next Meetings

It is intended to have our Fall 2008 meeting at the Alstom facility in Connecticut, for 1.5 days most likely starting on a Thursday morning. We will plan to have a Symposium with both Committee members and Alstom people presenting. After discussion, it was decided that our preferred timing was Nov. 6/7. If that doesn’t work, early/mid October timing, like Oct. 9/10, is preferred. If meeting at Alstom does not work out, we will meet (maybe Sun/Mon Oct. 26/27) at the IWC in San Antonio.

[**Action:** Bellows to confirm Alstom meeting timing with Frank Gabrielli by May 15.]

In Spring 2009, we will meet at NIST-Gaithersburg on Wednesday and Thursday (just the morning on Thursday), April 29-30.

Agenda: ASME Subcommittee on Properties of Water and Steam

Location: NIST Admin Bldg, Room B-113, Gaithersburg, MD

Time: Wednesday, April 16, 2007, 10:30 AM to 5 PM, Thurs. April 17, 8:30 to Noon

- 1. Approval of Agenda**
- 2. Review of Action Items from Fall 2007 Minutes**
- 3. ASME Steam Tables book and booklet**
 - 3.1. Report on sales Allan Harvey
 - 3.2. Plans for Second Edition of book Harvey, All
- 4. ASME Software for IAPWS-IF97**
 - 4.1. Report on sales Allan Harvey
 - 4.2. Technical support, bugs John Gallagher, Allan Harvey
 - 4.3. DLL/Excel product Bill Parry
 - 4.4. Plans for new backward equations & transport Allan Harvey, Bill Parry
 - 4.5. Testing All
- 5. U.S. Subcommittee and IAPWS Web pages** Allan Harvey
- 6. Update on implementation of general/scientific formulation** Allan Harvey
- 7. Report on transport properties** Dan Friend, Jan Sengers
- 8. IAPWS issues**
 - 8.1. IAPWS Awards Dan Friend
 - 8.2. IAPWS documents for consideration Dan Friend
 - 8.3. Current WG activities Harvey, Parry, Bellows, Lvov
 - 8.4. Preparation for Berlin IAPWS meeting & ICPWS All
- 9. Membership and Officers** All
 - 9.1. New chair Bellows, Harwood
- 10. Old Business**
 - 10.1. Royalties Jacobsen
 - 10.2. EPRI reports and funding Bellows
 - 10.3. ECS symposium Lvov
- 11. New Business**
 - 11.1. 5-year plan for committee Bellows, All
- 12. Next Meeting – Time, Place, etc.**
- 13. Adjournment**