

Minutes
ASME Research & Technology Subcommittee on the Properties of Water and Steam
Orlando, FL, October 12, 2005

Attendance:

Jim Bellows, Siemens Power Generation (Chair)
Dan Friend, NIST (U.S. IAPWS Delegate)
John Gallagher, NIST
Allan Harvey, NIST (Secretary)
Anneke Levelt Sengers, NIST
Bill Parry, General Electric
Jan Sengers, University of Maryland
Ingo Weber, Siemens Power Generation

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

1 & 2. Approval of Agenda and Previous Minutes

A preliminary agenda (attached) was distributed and approved. Minutes of the Spring 2005 meeting were approved. Action items from those minutes were reviewed, those not yet done are for the most part discussed later in these minutes. [**Action:** Bellows to transmit ASAP 2004 EPRI report and request for 2005 funding to Norma Johnston at ASME.]

3. ASME Steam Tables Book

Total sales as of 4/21/05 are 917, reflecting 122 books sold in the last year. No new Errata have been found in the last year. There are 74 copies left in the current (second) printing. Annual sales have been “flat” for the past 3 years.

It was discussed that a Second Edition would be appropriate when new IAPWS formulations were adopted for viscosity and thermal conductivity. This will be at least 2 or 3 years in the case of thermal conductivity, so the next printing will still be the First Edition, with Errata corrected. It was decided that a “minimum” next printing of 300 would be appropriate, unless ASME had a good reason to print a larger number. [**Actions:** Gallagher to prepare 2 corrected Figures for the next printing and e-mail them to Harvey by end of November. Harvey to collect material for corrected printing (including suggesting a possible edit to the front matter to indicate the corrected printing), transmit to ASME Press by end of December, and coordinate with ASME Press on issues like number of copies to print.]

4. ASME Steam Tables Software

Total sales are 500 “Professional” version and 38 “Student” version, reflecting 26 Professional and 4 Student in the past year, a rate that has been fairly constant over the past 3 years. The “Student” version is now discontinued from ASME’s catalog.

Current Version 1.1 has had a few minor bugs show up, but nothing serious. A person converting the ASME code to the C language had presented a list of possible bugs which is being reviewed. [**Actions:** Gallagher to transmit diagnosis of items he was looking at to Harvey, who will combine with his diagnoses and prepare response to this person.]

An issue has come up where a user needs properties in the metastable steam region just beyond the point where our software stops calculating. [**Action:** Parry will check to be sure we cover the entire range covered in the IAPWS-IF97 release, and see if slight extrapolation is reasonable.]

There is need for a DLL to allow steam tables functions to be called from applications such as Excel; Bill Parry reported on his efforts in that regard. The presence of WRITE statements in the current Fortran is complicating matters, since we want to be able to use the same Fortran in the DLL and our existing product. A Task Force consisting of Parry, Bellows, Harvey, and Weber was formed to develop a strategy for addressing this issue, which they did. [**Actions:** Harvey to work on Fortran side, moving WRITE statements to a small number of routines that can be dealt with individually and creating a new COMMON to hold information about errors and warnings to pass back to the DLL, which will call an additional routine after each function call to check this information. Goal of finishing by mid-November. Parry to work on Visual Basic side of the problem, goal of having a preliminary version ready by end of December. Bellows to recruit student help for testing.]

IAPWS has come out with further “backward” equations to save computing time. Consideration of whether these should be in our software, along with issues of testing future software updates and of possible use of the .NET framework and others languages like C, were deferred until the DLL is completed but should be on future agendas. [**Action:** Harvey and Bellows put these items on Gaithersburg agenda.]

There continues to be concern about the difficulty companies who want to license the software have in dealing with ASME Press. It was decided that the Chair would write a letter to the Board of Governors and bring up this issue at the upcoming BRTD meeting, raising the question of whether we should seek another publisher for our upcoming products (DLL and Second Edition of Steam Tables book). [**Action:** Bellows to draft letter, consulting with Dick Jacobsen on how to say things.]

5. Web sites

Allan Harvey reported on the Subcommittee and IAPWS Websites. He reported that, as the result of a request at the last IAPWS meeting, there was now an “Awards” section on the IAPWS website. It was decided that, for those desiring printed “steam tables”, it would be desirable to have the NIST Internal Report of printed IAPWS-95 steam tables that Harvey prepared in 1998 available as PDF files on the Web, with the document residing on a NIST website with a link from the appropriate places on the ASME and IAPWS websites. [**Action:** Harvey to check into this possibility and do if feasible.]

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

Allan Harvey reported that sales of Version 2.2 in the past year had been 45 (19 with source code), with sales roughly constant for the past 3 years. At some point in another year or so, an update for a new IAPWS viscosity standard will be needed, followed by thermal conductivity. With regard to the proposed new IAPWS formulation for the thermodynamic properties of ice, it was decided that the Committee would transfer any rights to this to NIST (as it did with IAPWS-95) and NIST could incorporate that into its current product or a different product as it saw fit.

7. Transport Properties

Dan Friend and Jan Sengers reported that the proposed new IAPWS viscosity release had been circulated and a database to be used for evaluation was nearly complete. Work is starting on the thermal conductivity, but it will still most likely be 2008 before final adoption.

It was moved and seconded that, in order to facilitate the timely completion of the thermal conductivity work, an expenditure of up to \$10,000 from our custodial account be authorized to pay for travel and subsistence for a researcher from the Assael group in Greece to come to NIST-Boulder (preferably for a minimum of 6 weeks, and for a maximum of 3 months) to complete the database and develop the dilute-gas part of the correlation for thermal conductivity. The motion passed unanimously.

8. IAPWS Issues

The 2006 IAPWS annual meeting will be September 3-8 in Witney (near Oxford), England. More information will be available under the “Meetings” section of www.iapws.org.

The U.S. delegate was instructed to provide any appropriate support for the proposed nomination by the Czech delegation for IAPWS fellow.

Continuing concern was expressed about the lack of nominations for the IAPWS Helmholtz award, and some improvements were suggested. [**Actions:** Friend to propose to IAPWS that rules for Helmholtz award be changed to allow anybody to submit a nomination (other than self-nominations), and to allow the Helmholtz Award lecture to be at an occasion other than the Symposium if the meeting hosts prefer different timing. Harvey to mention 1/31 nomination deadline when sending out these minutes.]

Reports were given about current activities of the various IAPWS working groups. [**Actions:** Friend to ask Dr. Feistel about U.S. people in the new SCOR committee on thermodynamics of seawater, with the intention that they could be invited to our next meeting. Bellows to get a copy of the new ASME document “Consensus on Operating Practices for the Sampling and Monitoring of Feedwater and Boiler Water Chemistry in Modern Industrial Boilers” (once it is printed; it was approved 10/05) to the IAPWS PCC task group working on related issues.]

9. Membership

Strategy for involving more people at our October 2006 meeting in Schenectady was discussed, including perhaps having a small seminar at which some items of interest to GE workers (such as properties in metastable steam and speed of property calculations for CFD work) could be discussed. Other sources of people to invite to meetings were discussed. [**Actions:** Bellows and Harvey to put Schenectady program on agenda for April 2006 meeting. Parry to bring list of possible areas of interest at GE to April meeting. Harvey to get lists of buyers for the NIST software and the ASME software if possible, to be discussed at April meeting.]

10. Old Business

In recognition of their support of the Subcommittee, particularly in hosting the 2001 IAPWS meeting, it was decided that General Electric and Siemens Power Generation should receive copies of the IAPWS Monograph, to be accompanied by a cover letter from the Subcommittee Chair. Use of Subcommittee funds to purchase these books was authorized; we had one “spare” book that could be used so only one copy is needed. [**Actions:** Harvey to work with Norma at ASME to order book. Bellows to write cover letters to go with books.]

Discussion on item 10.2 was deferred. [**Action:** Bellows to discuss with Len Olavessen ways to encourage participation by members of ASME PPEC committee in IAPWS and perhaps in the U.S. National Committee.]

There is a need to check with somebody in the PTC area to be sure adoption of IAPWS-IF97 is going smoothly. [**Action:** Bellows to contact a colleague involved with PTC on this issue.]

11. New Business

For the longer term, there is still a desire to work on a “5-year plan” for the Subcommittee. [**Action:** Bellows and Harvey to put 5-year plan on agenda for next meeting.]

12. Next Meetings

In Spring 2006, we will meet at NIST-Gaithersburg on Wednesday and Thursday (probably just the morning on Thursday), April 26-27.

In Fall 2006, we will meet at the GE facility in Schenectady, NY, on the Thursday immediately following the International Water Conference in Pittsburgh; this would be Thursday, October 26. Depending on what we do about a seminar program (see item 9 above), the meeting might also stretch into the morning of Friday 10/27.

Respectfully submitted,
Allan Harvey, Subcommittee Secretary

Preliminary Agenda
ASME Subcommittee on Properties of Water and Steam

Location: Siemens Power Generation (Quad 2), Orlando, FL

Time: Wednesday, October 12, 2005, 9 AM to 5 PM

- 1. Approval of Agenda**
- 2. Approval of Minutes from Spring 2005 meeting**
- 3. ASME Steam Tables book**
 - 3.1. Report on sales Allan Harvey
 - 3.2. Errata Allan Harvey
 - 3.3. Future plans, next printing Harvey, All
- 4. ASME Software for IAPWS-IF97**
 - 4.1. Report on sales Allan Harvey
 - 4.2. Technical support John Gallagher
 - 4.3. Known bugs and problems John Gallagher, Allan Harvey
 - 4.4. Possible DLL/Excel product Bill Parry
 - 4.5. Other platforms and languages All
 - 4.6. Plans for new backward equations Allan Harvey, Bill Parry
 - 4.7. Testing of future versions Bellows, Harvey, Parry
- 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. Highlights from 2005 meeting in Greece Dan Friend, All
 - 8.3. Current WG activities Harvey, Parry, Bellows, Lvov
 - 8.4. Preview of 2006 meeting in England All
- 9. Membership**
 - 9.1. Recruitment from industry, and for PCAS Bellows, All
- 10. Old Business**
 - 10.1. Books and proceedings to sponsors of 2001 meeting Bellows, All
 - 10.2. PPEC participation in IAPWS PCC? Bellows, All
 - 10.3. IAPWS/ASME property standards in PTC Bellows
- 11. New Business**
 - 11.1. 5-year plan for committee Bellows, All
- 12. Next Meeting – Time, Place, etc.**
- 13. Adjournment**