

**THE INTERNATIONAL ASSOCIATION  
FOR THE PROPERTIES OF  
WATER AND STEAM**

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**Minutes of the Meetings  
of the  
Executive Committee  
of the  
International Association for the Properties of  
Water and Steam**

**Doorwerth, The Netherlands  
7-11 September 2009**

**Prepared by: Barry Dooley**



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Minutes of the Meetings  
of the  
Executive Committee  
of the  
International Association for the Properties of Water and Steam  
held in  
Doorwerth, The Netherlands  
7-11 September 2009

Plenary Session. Monday, 7<sup>th</sup> September 2009. 8:32 am

The new President of IAPWS, Friend, welcomed the Executive Committee (EC) and other IAPWS members to Doorwerth for the EC and Working Group (WG) Meetings of IAPWS. The President officially opened the 2009 EC Meetings by introducing the National Delegates. Each of the Member and Associate Member countries of IAPWS was in attendance with the exception of Argentina/Brazil, France, Greece and Italy. In total, 57 people were in attendance for the opening IAPWS EC meeting

The President asked the representative of The Netherlands to provide some opening comments. Zeijseink welcomed everybody to Doorwerth and to the 2009 IAPWS meetings. He provided some background to KEMA and introduced the IAPWS Symposium which will be held on Wednesday, and mentioned that he hoped that this meeting would be the initiation of developing a Benelux joint member of IAPWS.

1. Adoption of Agenda

Provisional agendas had been posted on the IAPWS Website for all IAPWS members by the Executive Secretary. There were no further agenda suggestions from the EC. The agenda was then approved by the Heads of all National Delegations and forms Attachment 1 of these minutes.

2. IAPWS Business and Appointment of Committees

2.1 Releases, Advisory Notes, ICRNs and Guidance Documents

The President indicated that six documents had been circulated to the National Committees by the Executive Secretary during the year since the Berlin meeting for final review prior to being approved during the current EC Meeting. The Executive Secretary reminded the EC of these documents:

- ICRN 23 on Dewpoint of Flue Gases. Distributed 20<sup>th</sup> February 2009. There had not been any objections within a four month period so this ICRN became official according to the IAPWS By-Law 4.4.
- Revised Release on the IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use.

Distributed 10<sup>th</sup> July 2009. There had been one comment on English grammar which had subsequently been corrected. According to IAPWS By-Law 3.5, this document is ready for final approval by the TPWS Working Group

- Revised Release on the Equation of State 2006 for H<sub>2</sub>O Ice Ih. Distributed 16<sup>th</sup> May 2009. No comments had been received. According to IAPWS By-Law 3.5, this document is ready for final approval by the TPWS Working Group.
- Technical Guidance Document: “Instrumentation for Monitoring and Control of Cycle Chemistry for Steam-Water Circuits of Fossil Fired and Combined Cycle Power Plants”. Distributed 16<sup>th</sup> May 2009. Some minor nomenclature issues had been raised. These have subsequently been addressed and a revised version of the document was provided to the National Committees during the week. Also according to IAPWS By-Law 3.5, this document is ready for final approval by the PCC Working Group.
- Supplementary Release on a Computationally Efficient Thermodynamic Formulation for Liquid Water for Oceanographic Use. Distributed 3<sup>rd</sup> June 2009. A small editorial correction was identified. According to IAPWS By-Law 3.5, this document is ready for final approval by the TPWS Working Group.
- Advisory Note No. 4: Roles of IAPWS and CIPM Standards for the Density of Water. Distributed 3<sup>rd</sup> June 2009. A small editorial correction was identified. According to IAPWS By-Law 3.5, this document is ready for final approval by the TPWS Working Group.

The respective Working Groups will report to the EC at the Friday meeting on any further changes prior to requesting approval.

## 2.2 Press Release.

The President asked Bellows to serve on this Committee. The Clerk of Minutes from each WG will also provide input. A representative from KEMA will also be assigned to provide local information. The Press Release is discussed in Minute 16.1 and Attachment 10.

## 2.3 Evaluation Committee on International Collaboration.

The President indicated that one proposal had been received by the Executive Secretary prior to the meeting, and that any suggestions from WGs should be given to the Executive Secretary by the end of day. The President then reminded the EC that the Committee to review the proposals would consist of the WG Chairmen, with the

President and Executive Secretary as ex. officio members. A chairman would be chosen by the Committee. The discussion of this Committee is reported in Minute 14.1.

## 2.4 IAPWS Awards Committees

### 2.4.1 Helmholtz Award Committee

The President indicated that there was not a Helmholtz Awardee this year. The Executive Secretary then reminded the EC that the Helmholtz Committee for the 2010 award would consist of a member from USA, Argentina/Brazil, BIAPWS, Canada and Czech Republic. The President indicated that the US National Committee had already nominated Anderko as the representative. The President asked him to organize the committee and to report back to the EC on Friday with the names of the members of this committee (Minute 15.1).

### 2.4.2 Honorary Fellow Award Committee

The Executive Secretary requested that Watanabe remain on the Committee and become the Chairman for 2010. The President then requested Rukes to be the other member. The IAPWS President would be ex. Officio.

## 2.5 Editorial Committee

The President reminded the EC that in Berlin Past President Cooper had proposed that another English speaking person should be added to the Editorial Committee. The suggestion had been made that the English speaking National Committees (BIAPWS, Canada and the USA) should consider nominating one of their members at the 2009 EC Meeting. The Chairman of the Editorial Committee, Harvey, suggested that he would deal with this selection in his report to the EC on Friday. (See Minute 11).

## 2.6 Other business for General Meeting or Requiring Extensive Discussions

No other business was raised by the EC.

## 3. EC Mandate to Working Groups and Membership

The President opened this discussion by mentioning the global crisis and that although IAPWS was not a policy making organization it should have lots of work to do with the load being applied to the Working Groups. He specifically asked the WGs to discuss during the week and report back to the EC on Friday how IAPWS can contribute to global sustainability. He indicated that there were four areas he wanted to emphasize:

- Review the IAPWS documents for approval
- Concentrate on new documents
- Set up new directions of WG involvement

- Address the overall organization of IAPWS WGs. Here he requested that each WG Chairman provide a brief report at Friday's EC meeting on how the current structure of WGs will meet the future, and whether new partnerships need to be developed.

### 3.1 Releases, Guidelines and Certified Research Needs.

The President indicated that the IAPWS documents ready for approval had been dealt with under item 2.1. The Executive Secretary indicated that seven ICRNs had either expired in September 2008 or will expire in September 2009 and thus needed attention by the WGs during the week: #10 on pH, #13 on Surface Tension, #14 on Humid Air, #15 on Metastable Steam, #18 on Ion Exchange Resins, #19 on Sampling, and #20 on Sensors.

### 3.2 Working Group Directions.

The President emphasized that the WG Chairmen should only report to the EC on Friday, those activities that needed approval or discussion by the EC.

## 4. Preview by the WG Chairmen of the Weeks Activities

President Friend requested each WG Chairman to review briefly the main topics which would be covered in their WGs during the week. The details of the WG meetings are covered in detail in Minutes 7 to 10 (Attachments 4 to 7).

The President closed the opening session of the EC at 9:50am.

### **Activities During the Week**

The first day activities of the WGs and Executive Committee were followed by the separate and joint WG meetings and symposia on Monday, Tuesday and Thursday.

The full IAPWS program for the week is shown in Attachment 2.

The IAPWS Symposium was held on Wednesday, 9<sup>th</sup> September 2009. The overall theme was on The Role of Water in Energy Transition. It consisted of two parts: the first was a visit to The Netherlands Water Museum, followed by a Symposium of eight presentations associated with European, Japanese and Dutch Energy Transition. The Symposium Program is shown in Attachment 3.

### Executive Committee Meeting. Friday, 11 September 2009

President Friend opened the continuation of the EC Meeting at 8:34am. All members of IAPWS were present except Argentina/Brazil, France, Greece, and Italy. Friend first asked the EC if there were any additional items that should be added to the Agenda. None were suggested. The Executive Secretary showed the latest Agenda with additional items relating from the Monday EC Meeting.

5. Acceptance of Minutes of Previous Meeting

President Friend asked for comments and changes to the minutes of the EC meeting held in Berlin, German in September 2008. No changes were noted, thus the 2008 Minutes were accepted.

6. President's Report

President Friend opened his report by reminding the EC that IAPWS had learnt in the week that water was critical to The Netherlands. IAPWS has a history back to 1929 and he was very pleased with the attendance and financial situation. IAPWS is doing very well currently and the organization has an obligation to continue. He thought that this was dependent on the National Committees, and he asked them to ensure that there was vibrancy of the local communities. There is a possibility of a new National Committee in Australia, but he was a little disappointed that a Benelux membership had not come to fruition. Friend next talked about global survival, the energy crisis, the supply/demand and sustainability and felt this is where IAPWS can make a difference in the future. The areas of involvement are now very different than in 1929 but in the energy industry climate change and seawater are very important. These put IAPWS in a strong position. There is also the discussion about survival of the power plants with demand increasing, and IAPWS continues to have a large role to play. IAPWS must continue to provide a forum for discussion and sharing information to ensure survival of the power industry and global civilization

7. Report and Recommendations of the Thermophysical Properties of Water and Steam (TPWS) and the Industrial Requirements and Solutions (IRS) Working Groups and the new IAPWS Subcommittee on Seawater

TPWS Chairman Kretzschmar opened this item by indicating that he would report on activities within TPWS and IRS during the week, and would also include most of the items from the Subcommittee on Seawater. He then highlighted only those activities from the working sessions during the week which needed action by the EC or which he thought were of interest to the EC. He indicated that all of the WG activities had been conducted jointly with the exception of one separate meeting for the Subcommittee on Seawater, which is reported in Minute 8. Full Minutes and the Agenda can be found in Attachment 4.

- 7.1 Potential International Collaborative Projects. One Collaborative Project had been suggested by Hruby on the Thermophysical Properties of Supercooled Water. The WGs had endorsed the project. Discussion on the project is contained in Minute 14.1.
- 7.2 Web Space for Working Materials of WG TPWS and IRS. A password protected website for documents from the WG has been setup with accessibility from the WG page on IAPWS.org.
- 7.3 Revision of IAPWS-95 Release. The WGs had approved the revised release and now requested approval from the EC.

### **The EC Approved the Revision Unanimously**

- 7.4 Editorial changes to the Revised IF-97 Release. The WGs approved the editorial changes and authorized the Editorial Committee to consider a cover page issue and to make changes if considered necessary. The WG had also requested that the TPWS Chairman write a note of appreciation to Harvey and Stöcker for their work on the document.
- 7.5 Editorial Changes to the Supplementary Release IAPWS-IF97-S04 on Backward Equations  $p(h,s)$  for Region 3. The WGs approved the Editorial Changes.
- 7.6 New Supplementary Release on a Computationally Efficient Thermodynamic Formulation for Liquid Water for Oceanographic Use. The WGs requested approval of the Revised Release from the EC.

### **The EC Approved the Revision Unanimously**

- 7.7 Development of a new Release on Thermal Conductivity. Vogel had presented the work from his group on the calculation at the molecular level of the low density thermal conductivity of water vapor. The WG found some systematic disagreement with the existing experimental data (and the current IAPWS release) at high temperatures. Sengers had given a status report on the development of a new thermal conductivity formulation. The remainder of the work awaits a decision on how to proceed with the low density part. The WG had some discussion on how to proceed with the low density thermal conductivity work and developed the recommendation that the Task Group will proceed to complete the thermal conductivity correlation without waiting for a possible resolution of the apparent discrepancy between theory and experiment. But the data of Vogel will be considered in the development of the new formulation. Vogel had been added to the Task Group on Thermal Conductivity. The WGs appointed an Evaluation Task Group consisting of Prof. Mareš (chair), J. Hruby, K. Miyagawa and V. Ochkov. Harvey had proposed the new ICRN 24 on Thermal Conductivity of H<sub>2</sub>O at Low Pressures and High Temperatures. This ICRN encourages theoretical work and new experimental work to help resolve the discrepancy mentioned above. The WGs approved the ICRN and recommend that the EC authorize the normal distribution and approval process after the Editorial Committee makes some minor editorial revision.

### **The EC Approved the Process Unanimously**

- 7.8 Revision of the Release 2006 on the Equation of State of H<sub>2</sub>O Ice Ih. The WGs had approved the Revised Release and recommend the approval by the EC.

### **The EC Approved the Revision Unanimously**

- 7.9 Advisory Note 4 on the Roles of IAPWS and the International Committee for Weights and Measures (CIPM) Standards for the Density of Water. Harvey had presented the history of the joint recommendations between IAPWS and the CCM



on the roles of the different standards for the density of water. The WGs had approved the Advisory Note and recommend the approval by the EC.

### **The EC Approved the Advisory Note Unanimously**

Japanese Delegate Watanabe thanked Harvey for preparing this Advisory Note.

- 7.10 Nucleation of water from Supercooled Steam. Hruby had reported on the nucleation of water from supercooled steam, and on efforts (unsuccessful so far) to organize a database (and eventual correlation) for water nucleation data. The WG decided to have a Task Group "Metastable Steam and Nucleation" with Hruby as Chair. Kretzschmar requested to the EC that National Committees forward names of other candidates to the Executive Secretary for this Task Group by December 31, 2009. Japanese Delegate Watanabe requested that clarification was provided to the National Committees. After some discussion, Hruby indicated that this is for pure water and that the chemistry effects were being dealt with by the PCC WG. Hruby was asked to provide a one page clarifying note which could be distributed to National Committees through the Executive Secretary by 31<sup>st</sup> December 2009.
- 7.11 ICRN 15 on Thermodynamic Properties of Metastable Steam. This ICRN had expired in September 2008, but the topic area is still clearly important. A mandate had been given to the Task Group on "Metastable Steam and Nucleation" to revise this ICRN by 2011. The WG requested that ICRN # 15 be extended to expire in 2011.

### **The EC Approved the Extension Unanimously**

- 7.12 ICRN 14 on Thermodynamic Properties of Humid Air and Combustion-Gas Mixtures. This ICRN expired in September 2008, but the topic area is still clearly important. A mandate had been given to the Task Group on "Humid Air and Combustion-Gas Mixtures" to work on revising this ICRN by 2011. The WGs requested that ICRN 14 be extended to expire in 2011.

### **The EC Approved the Extension Unanimously**

- 7.13 Update of Advisory Note # 2 on Roles of Various IAPWS Documents. Advisory Note # 2 is being updated primarily to incorporate the new and revised documents adopted this year. Cooper and Harvey were authorized to make the appropriate updates in the document, along with any needed editorial changes and the WGs requested that the EC supports this procedure.

### **The EC Approved the Procedure Unanimously**

- 7.14 Educational Steam Tables. Ochkov had presented "Live Calculations" of IAPWS Releases on his website which is linked to the IAPWS website. Kretzschmar had presented the educational Steam Tables for Excel now also linked to the IAPWS website. Chairman Kretzschmar indicated to the EC that the steam tables for

pocket calculators had been a successful project with over 500 downloads since the last IAPWS meeting and more than 1,700 downloads altogether.

- 7.15 With regards to membership Kretzschmar requested that the following two new members are approved:

E. Vogel, Ruhr University of Rostock, Germany (TPWS)  
M. Kunick, Zittau/Goerlitz University, Germany (TPWS and IRS)

**The EC approved these membership changes unanimously.**

## 8 Report and Recommendations on the new IAPWS Subcommittee on Seawater

Subcommittee Chairman Feistel provided a report on the activities of the new Subcommittee. Full minutes are in Attachment 5. He told the EC that the Inaugural Meeting took place on Tuesday 8<sup>th</sup> September 2009. The first order of business had been to populate the Subcommittee. Feistel recommended to the EC that the following two groups of people become members of the Subcommittee. The first 18 people were already members of other IAPWS WGs and had agreed to join the Subcommittee:

A. Anderko, M. Anisimov, J. Cooper, D. Friend, A. Harvey, M. Hiegemann, J. Hruby, B. King, H.-J. Kretzschmar, T. McDougall, K. Miyagawa, M. Nakahara, B. Rukes, S. Seitz, R. Span, P. Spitzer, P. Tremaine, D. Wright.

The following six people were new to IAPWS:

F. Camoes, University of Lisbon, Portugal  
D. Fuentevilla, University of Maryland, USA  
H. Glade, University of Bremen, Germany  
G. Marion, Desert Research Institute, Reno, USA  
F. Millero, University of Miami, USA  
B. Rathke, University of Bremen, Germany

**The EC approved these membership changes unanimously.**

Chairman Feistel next indicated that the new Subcommittee recommended to the EC that M. Hiegemann become the Vice Chairman of the Subcommittee.

**The EC approved the Vice Chairman unanimously.**

Feistel then informed the EC that together with the Vice Chairman he had decided to keep the name of the Subcommittee as the “Subcommittee on Seawater” with the abbreviation of SCSW.

Feistel then had a number of informational items for the EC.

- 8.1. The following two new IAPWS documents had been developed jointly with TPWS and approved by the EC as described in Minute 7

- Supplementary Release on a Computationally Efficient Thermodynamic Formulation for Liquid Water for Oceanographic Use, and
- Revised Release on the Equation of State 2006 of H<sub>2</sub>O Ice Ih.

8.2 The following new Subcommittee on Seawater Task Groups had been formed:

- Oceanographic Standards (joint with TPWS) with McDougall as Chair and members: Feistel, Fuentevilla, King, Millero and Wright.
- Advisory Note on Industrial Formulation (joint with TPWS and IRS) with Cooper as Chair and members: Feistel, Glade and Hiegemann.
- Traceability of Salinity (joint with TPWS and PCAS) with Seitz as Chair and members: Camoes, Feistel, Friend, King, McDougall, Millero, Spitzer, and Wright, and Henning Wolf as a coopted member.
- pH Values (joint with PCAS) with Marion as Chair and members: Camoes, Millero, Nakahara, and Spitzer.
- Transport Properties (joint with TPWS and IRS) with Anderko as Chair and members: Glade, Harvey, Millero and Nakahara, and Rich Pawlowicz as a coopted member.
- Industrial Requirements (for desalination and other processes) (joint with IRS and PCC) with Hiegemann as Chair and members: Bellows and Glade.
- Guideline on Sea Air (joint with TPWS) with Feistel as Chair and members: Harvey, Kretzschmar, Wright, and Eric Lemmon as a coopted expert.

## 9. Report and Recommendations of Physical Chemistry of Aqueous Systems Working Group (PCAS)

Chairman Nakahara provided the PCAS Report to the EC. Full Minutes can be found in Attachment 6. He covered the following items with the EC:

9.1 International Collaboration. Sedlbauer had presented an update on the collaborative project between Canada (Tremaine) and Czech Republic (Sedlbauer). This project has now finished and a report has been sent to the Executive Secretary.

9.2 ICRNs. The Chairman reported on the following ICRNs:

- ICRN 10 (pH). Expires September 2009. Both principal investigators, Palmer and Lvov, were not present in Doorwerth so Nakahara had planned to ask them whether the ICRN should continue. But Feistel suggested that as the SCSW was also involved in pH and had formed a Task Group, it might be better to delay making any decision on the ICRN until 2010.
- ICRN 13 (Surface Tension). Marsik had informed PCAS that the project had been closed. An application paper has been published in the Journal of Solution Chemistry. Marsik prepared a closing statement, which is attached as PCAS Attachment B. Svoboda agreed that the ICRN should be closed and commented that the closing statement needed more information.
- ICRN 17 (Amines). This ICRN was reviewed jointly with PCC (see Minute 10.2).

- ICRN 21 (Ultrasupercritical Plant Chemistry). This ICRN was reviewed jointly with PCC (see Minute 10.2).
  - ICRN 22 (Nucleation in Steam Turbines). This ICRN was reviewed jointly with PCC (see Minute 10.2).
- 9.3 Task groups, future directions, and future ICRNs. Chairman Nakahara presented to the EC the following future possible research directions that may result in new ICRNs and guidelines: cavitation, viscosity and thermal conductivity of seawater, electrolyte thermodynamic modeling of multicomponent solutions, hydration properties, application for power generation, fuel cell electrochemistry, CO<sub>2</sub> emission reduction.
- 9.4 PCAS workshop. Chairman Nakahara provided information on the PCAS workshop which included the following two presentations on IAPWS projects:
- Standard Partial Molar Properties of Solutes. Sedlbauer reported that this work is nearing completion. Publication of the results is planned in the near future. The main medium for disseminating the results of this project will be a database. The project is on track and there are no problems with the budget approved by the EC.
  - Equilibrium Constants and Speciation of Aqueous Transition Metal Chlorocomplexes over a Wide Range of Temperature and Pressure. Ehlerova (speaker) and Sedlbauer presented a summary of this IAPWS collaborative project. This work was performed between the University of Liberec (Czech Republic) and Guelph University (Canada). The report from this project has been provided to the Executive Secretary.
- 9.5 Chairman Nakahara reported to the EC that the PCAS WG had discussed how the declining number of participants in PCAS should be addressed in the future. The size of the group has dropped below the “critical mass” for effective work. Anderko had proposed shifting all presentations to joint sessions with TPWS/SCSW or PCC, depending on the topic. Marsik supported the idea. The Chairman had expressed a concern that such an approach was drastic and could make the further existence of the group questionable.

The President requested that further discussion on this topic be delayed until the New Business (Minute 16.4)

## 10. Report and Recommendations of Plant Cycle Chemistry Working Group (PCC)

Chairman Svoboda highlighted those activities that needed action/approval by the EC. A full written report of the PCC WG activities forms Attachment 7.

- 10.1 Technical Guidance Documents. Chairman Svoboda reminded the EC that the first Guidance Document had been approved in 2008. This was on The Measurement of Carryover of Boiler Water and Steam. This document is already getting much use in the industry worldwide. The second document has been prepared over the last year and is entitled Instrumentation for Monitoring and

Control of Cycle Chemistry in Fossil and Combined Cycle/HRSG Plants. The document was prepared by the PCC Task Group, reviewed by the PCC and the Editorial Committee and then sent in May 2009 to National Committees for their Review. A couple of suggestions had been provided by the German National Committee on pH and conductivity. These had been addressed by the Task Group and the document was forwarded to the German National Committee. Another comment was received on terminology used in the power industry with respect to “specific conductivity”. This was also addressed by the Task Group. Final copies were provided to all National Committees in attendance in Doorwerth. Chairman Svoboda then requested approval from the EC.

The EC focused on whether this document needed to be recirculated to the National Committees. After some discussion a formal proposal to the EC for approval was developed which included a final review by the Editorial Committee.

**The EC approved the Technical Guidance Document Unanimously with the caveat that it was reviewed by the Editorial Committee before Publication.**

10.2 ICRNs. Svoboda reported the following information on four ICRNs:

- ICRN 17 on Amines. When the original was circulated in 2008 to National Committees there had been a number of objections. An update will be circulated within the next few weeks to PCC members to restart the approval process.
- ICRN 21 on Ultrasupercritical Cycle Chemistry. The initial version was circulated to National Committees in 2006 and a number of objections were received from the US National Committee. These comments will be addressed by Harvey and a revised ICRN will be circulated within the next year to restart the approval process.
- ICRN 22 on Steam Chemistry in the Phase Transition Zone. Finalization of the first draft was completed during the Doorwerth week. This will be circulated to PCC members to start the approval process in the next few weeks.
- ICRN 25. Corrosion Mechanisms Related to Impurities. The initial draft was discussed during the Doorwerth week. This will be finalized and circulated to PCC members to start the approval and editorial processes prior to approval.

10.3 Svoboda indicated that a new International Collaboration Project had been initiated on Sampling Lines to follow the previous Project on Sampling Nozzles. This was based on ICRN 19 and is discussed in Minute 14.1.

10.4 Water Use outside of the Steam/Water Cycle. Chairman Svoboda indicated to the EC that the PCC WG would like to suggest the following new possible areas of involvement for IAPWS: cooling water, waste water, geothermal water and

steam, external process, and recycling for use as makeup. These areas are not within the technical expertise of current PCC members and thus could be the basis of a new WG or Subcommittee of IAPWS.

President Friend indicated that this item would be dealt with during New Business (Minute 16.5)

- 10.5 The PCC Chairman reported that there appeared to be a new found deficiency with the IAPWS website in that key words used on the internet did not access the PCC documents, or that key words were not being recognized by the normal search engines. President Friend indicated that this would be discussed further in New Business. (Minute 16.3)

- 10.6 PCC Membership. The Chairman informed the EC that three PCC members had withdrawn from membership:

O. Jonas, USA (deceased)  
L. Guinard, France  
J. Vosta, Czech Republic

## 11. Editorial Committee Report

Editorial Committee Chairman Harvey reported that in the preceding year, the Editorial Committee had reviewed many proposed documents, including two Revised Releases (IAPWS-95, and Ice), one new Supplementary Release (liquid water for oceanographic use), the new Advisory Note 4 (liquid density standards), and one Technical Guidance Document (instrumentation for monitoring). The Committee had also reviewed two documents undergoing editorial changes (IAPWS-IF97 and one of its Supplementary Releases), and provided editorial assistance for ICRN 23 on dew point of flue gases.

In addition, The Editorial Committee updated Advisory Note #2 which describes the relative roles of various IAPWS documents concerning thermodynamic properties of water.

Chairman Harvey indicated that the Committee had realized that IAPWS documents have been inconsistent in the way references are included for journal articles. The Committee has therefore established a standard format to be used for future documents (including future revisions of existing documents). The format is:

Wagner, W., and Pruß, A., The IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use, *J. Phys. Chem. Ref. Data* **31**, 387-535 (2002).

Use of the title is recommended but not required, and the closing page number is optional (but should be consistent within a document).

Chairman Harvey next responded to the item deferred from Monday (Minute 2.5) and indicated that he had conferred with Cooper and proposed to the EC that the third member of the Editorial Committee becomes Dan Wright from Canada.

**The EC unanimously approved this Addition to the Editorial Committee.**

## 12. Membership and Associates

### 12.1 Members Defaulting on Dues.

The President asked the Executive Secretary to report on the members that are deficient in paying their dues. To the end of August 2009 the following countries had not paid their dues: Canada, France, USA, Russia and Greece. The Russian dues had been paid during the Doorwerth Week. The Canadian and USA dues are in process. The Greece National Committee also did not pay their dues in 2008. The French National Committee has not paid dues for 2005 to 2008.

The EC then discussed the IAPWS Statute 3.2.1f which indicates that Members defaulting on the payment of dues for three years will have their status changed to that of Associate Member. In special circumstances the EC can vote to keep such a Member at the status of Full Member and reexamine the position each year. After this discussion President Friend suggested a motion for the EC that the Executive Secretary will write to the Head of the French National Committee with copies to the French people who were at the Berlin meeting. The letter will indicate that France is in danger of having its status changed to Associate Member and request a response on the current situation. If there is a positive response then the decision will be left to the 2010 EC meeting. If there is no response by January 31, 2010 then France will become an Associate Member of IAPWS.

**The EC Approved this Motion Unanimously.**

### 12.2 Switzerland as an Associate Member

The President requested the Head of the National Committee of Switzerland, formed in 2007, to say a few words on the advancement of the Swiss National Committee since the Berlin EC meeting. Svoboda reported that the Swiss National Committee has not received any further commitment from other industries in Switzerland. The Committee plan a symposium in the fossil areas to attract attention.

## 13. Executive Secretary's Report

### 13.1 Financial, Auditors and Dues

The Executive Secretary reported that IAPWS remained on a sound financial footing with currently over SFrs 77,550 in the Swiss bank account and about \$9,945 in the US account for a total of \$82,326 combined. The status as at 31 August 2009 in the bank accounts had been provided to each National Delegate present at the EC meeting.

The Executive Secretary next reported that the 2008 financial statements had been forwarded to the IAPWS Auditors in January 2009. Both VDI in Germany and Mr. Miyagawa in Japan had reviewed and approved the financial statements. The Auditors' reports had also been provided to all the National Delegates present.

The Executive Secretary asked the Head of the Japanese National Committee, Watanabe, to relay a message from Mr. Miyagawa to the EC. Watanabe indicated that Miyagawa had been one of the IAPWS Auditors for a number of years and would like to step down. Watanabe also indicated that Japan had taken this rotation from the Russian National Committee and it was now time to move it to another IAWPS Member. The Head of the Czech National Committee, Hruby, suggested Professor Pavel Safarik of the Czech Technical University in Prague for this position.

**The EC approved Professor Safarik unanimously as an Auditor for IAPWS**

The Executive Secretary proposed to the EC that the dues structure for member countries remain unchanged for 2010.

**The EC unanimously agreed to this proposal.**

The Executive Secretary also provided a rough estimate of the income and known planned expenditures for 2009/10.

13.2 Time and Place of the 2010 and 2011 Meetings

The Executive Secretary reported that based on discussions with Tremaine and Hruby at the 2008 Berlin meetings, IAPWS would hold the 2010 meetings in Canada and the 2011 meetings in the Czech Republic. The delegate present from Canada, Lister, indicated that Canada is looking forward to hosting the 2010 meetings in Niagara Falls. The date was originally suggested to be close to a conference on Nuclear Chemistry to be held in the first week of October but the Canadian National Committee now thought that this might be a little too late for the academics in IAPWS.

President Friend requested the Canadian National Committee to inform the Executive Secretary of the dates by the end of October 2009.

Hruby reported that the Czech Republic National Committee will host the 2011 IAPWS Meetings in Pilsen. He showed a few slides of Pilsen and indicated that the Czech National Committee will provide more details at the 2010 meetings.

14. Guidelines, Releases, Certified Research Needs, and International Collaborations

The President indicated that the Releases and ICRNs had been discussed within the WG Reports so no further action was required by the EC.

14.1 International Collaborative Projects.

The President requested the Chairman of the 2009 International Collaboration Committee report on the findings of that committee during the week. Nakahara



reported that two collaborative projects had been proposed. The details are provided in Attachments 8 and 9:

- Thermophysical Properties of Supercooled Water. The IAPWS sponsors are Anisimov (USA) and Mares (Czech Republic). The young scientist is Jana Kalova from the University of West Bohemia in Pilsen, Czech Republic, and it is proposed that the IAPWS funding of \$15,000 will allow her to spend six months at the University of Maryland in the USA starting in January 2010.
- Improved Sampling Techniques. The IAPWS sponsors are Svoboda (Switzerland), Lister (Canada), Daucik (Denmark) and Uchida (Japan). The young scientist will be from Japan but has not yet been decided. It is proposed that the scientist will spend a year in Canada at the University of New Brunswick starting in 2010. The proposed IAPWS funding is \$12,000.

Nakahara indicated that the Evaluation Committee supported both proposals. One was a nice scientific study and the other was applicable to power plants. But the committee realized that the total of \$27,000 needed discussion by the EC. This led to review of the IAPWS Guidelines for Spending of IAPWS Funds (Toronto, September 1999), and to President Friend requesting that anybody associated with the two proposals should leave the room. This left four voting members of the EC. Friend then requested the EC to rank the two proposals. This resulted in the Proposal on supercooled water being prioritized highest. The President then proposed that IAPWS should fund this proposal.

**The EC unanimously supported the proposal to fund the project on supercooled water.**

The President then proposed that the second project also be funded contingent on the Executive Secretary receiving details on the proposed student by 1<sup>st</sup> December 2009. These details will then be circulated to the National Committees for review.

**The EC supported this proposal to fund the second project on sampling with three acceptance votes (BIAPWS, Germany, and USA) and one abstention (Japan).**

## 15. IAPWS Awards

### 15.1 IAPWS Helmholtz Award

The President reported that there had been no nominations for the 2009 Helmholtz Award which was very disappointing. He then asked the US Delegate, Anderko, for the names of the 2010 Helmholtz Award Committee. The 2010 Helmholtz Committee will consist of: Chairman Anderko (USA), Corti (Argentina/Brazil), Rudge (BIAPWS), Marsik (Czech Republic) and Tremaine (Canada). Nominations will be due to the Executive Secretary by January 31, 2010.

## 15.2 IAPWS Honorary Fellowships

The President reported that there had been no nominations for a 2009 IAPWS Honorary Fellow Award. He reminded the EC of the Awards Committee for 2009 with Watanabe as Chairman and Rukes as member with the IAPWS President as ex.-officio member. Nominations are due to the Executive Secretary by January 31, 2010. The President reminded the EC that the award is recognition of outstanding contributions to the functioning and work of IAPWS over substantial periods of time. The contributions to the organization can take many forms, such as highly effective service as an IAPWS Officer or Working Group Chair, or sustained substantial scientific and engineering contributions to the work areas and output of IAPWS. A nomination by a National Committee can be made only for people outside of that National Committee.

## 16. New Business

### 16.1 Press Release

The President requested that Bellows project the Press Release for review by the EC. Suggestions were provided by the EC and the final version is contained in Attachment 10.

### 16.2 15<sup>th</sup> and 16<sup>th</sup> ICPWS

The President first requested Rukes to provide a brief report on the final consolidation of the 15<sup>th</sup> ICPWS.

The 15<sup>th</sup> ICPWS Local Organizing Committee had prepared a financial statement for the 15<sup>th</sup> ICPWS and presented it to the IAPWS President and Executive Secretary. The Committee would like to express their gratitude to the following companies for their financial support:

- Siemens AG Energy Sector
- Alstom Power
- Areva NP GmbH
- EnBW Kraftwerke AG
- Evonik Energy Services GmbH
- RWE AG
- Swan Analytical Instruments AG
- Dr. Thiedig + Co
- Vattenfall Europe AG

Additionally IAPWS is thanked for their funding of the conference. Due to the generous contributions by the above mentioned companies the initially requested IAPWS funding of US\$ 25,000 was finally reduced to roughly US\$ 15,000.

The 15<sup>th</sup> ICPWS Local Organizing Committee welcomes requests by the 16<sup>th</sup> ICPWS organizing committee. Any useful detail information on the conference organization process will be made available.

The President once again wanted to provide his appreciation on behalf of IAWPS for the 15th ICPWS arrangements conducted by the German National Committee.

The President then asked the BIAPWS Delegate, Rudge, to report on the decision making process for the 16<sup>th</sup> ICPWS. Rudge indicated that BIAPWS were happy to host the 16<sup>th</sup> ICPWS in 2013 so as not to clash with the Olympic Games of 2012 in London. They have not selected a location yet but it will be in the UK and not in Ireland. BIAPWS has formed a Sub Group, which will eventually become the local organizing committee. They are actively looking for companies to sponsor the event. Rudge wanted to emphasize that the positive decision to hold the 16<sup>th</sup> was based on a financial evaluation which concluded that BIAPWS would be able to hold the event but that they would require an IAPWS donation, which for the past two conferences has been \$25,000. BIAPWS may need to request an increased amount but this decision will be made at future EC meetings and will depend on the exchange rate and the predicted attendance.

The President thanked BIAPWS for working to make the decision to host the 16<sup>th</sup> ICPWS and that IAPWS looked forward to future developments.

#### 16.3 Keywords for Internet Access for IAPWS Documents

The President indicated that this item had been raised in the PCC report (Minute 10.5) and requested that a Task Group is set up to review the situation and options available. The committee will consist of Svoboda (Temporary Chair), Harvey, and Nemec.

#### 16.4 Future WG Activities

President Friend reminded the EC that this item had been raised in the PCAS report (Minute 9.5) because of the declining numbers in the PCAS WG. The Japanese Delegate, Watanabe, suggested that the PCAS should continue with its current new leadership for at least another year and that each National Committee should encourage people to join PCAS. The President indicated that he would like to see the Mission Statement of PCAS and the other WGs and Subcommittee on Seawater on the IAPWS website, and requested the respective chairmen to develop these for next year's meeting. Overall this discussion provided a very positive consensus that PCAS should continue as an IAPWS WG and that there should be multiple joint WG sessions with TPWS, PCC and SCSW.

#### 16.5 Possible New IAPWS Working Group

President Friend reminded the EC that this item had been raised in the PCC report (Minute 10.4) where a number of new possible topic areas for IAPWS had been delineated. The PCC Chairman had indicated that these topics were outside of the

PCC expertise. The President asked the EC if there were any other possible new areas that should be considered, and also indicated that molecular simulation appeared to be a possibility. TPWS Chairman, Kretzschmar, noted that TPWS does have a molecular simulation Task Group which was not very active. He intended to ask new member, Vogel, to join the group.

The President asked for comments and suggestions. A US delegate, Bellows, suggested that he will enquire of the interest in one of the ASME Research Groups and report back. The President requested that the US National Committee develop a name for a possible new subcommittee by 30<sup>th</sup> November 2009 and that all the National Committees look for possible members and forward the names to the Executive Secretary.

#### 16.6 Reports from National Committees.

Written reports on progress in member countries were not reported to the EC but were either distributed to other members and the Executive Secretary during the IAPWS week, or sent to the Executive Secretary after the meetings. They are attached to these minutes as follows:

Britain and Ireland	Attachment 11
Canada	Attachment 12
Czech Republic	Attachment 13
Germany	Attachment 14
Japan	Attachment 15
Russia	Attachment 16
USA	Attachment 17

#### 16.7 Participants

Attachment 18 provides a list of participants at the IAPWS EC and WG Meetings in Doorwerth, The Netherlands in September 2009.

#### 16.8 List of Members

An up-dated list of members of the Executive Committee, Working Groups, and Honorary Fellows will be developed by the Executive Secretary following the Doorwerth Meetings. This will be forwarded electronically to the Head of each National Committee.

### 17. Closing Remarks and Adjournment

The President thanked Andre Zeijseink and KEMA for hosting the IAPWS Doorwerth Meetings. He also thanked everybody for participating at this EC meeting. Then he formally closed the 2009 EC meeting at 12:46 pm.