

Minutes of the Meetings
of the
Executive Committee
of the
International Association for the Properties of Water and Steam
held in
Niagara Falls, Canada
18-23 July 2010

Plenary Session. Monday, 19th July 2010. 8:30 am

The President of IAPWS, Friend, welcomed the Executive Committee (EC) and other IAPWS members to Niagara Falls for the EC and Working Group (WG) Meetings of IAPWS. The President officially opened the 2010 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.

The President informed the EC of the sad news of the death of Dr. Howard White who had been the Executive Secretary of IAPWS for over 10 years prior to 1989. Dr. White was an IAPWS Honorary Fellow. Friend then asked for a few moments of silence to remember Howard.

The President asked the representative of Canada to provide some opening comments. Guzonas welcomed everybody to Niagara Falls and to the 2010 IAPWS meetings. He provided some background to the Canadian National Committee and wanted to recognize the support of the National Research Council (NRC) of Canada, the Candu Owners Group (COG), and Atomic Energy of Canada (AECL). He then introduced a few of the events which would take place during the week: the IAPWS Symposium, the IAPWS Dinner and the various working group meetings. He particularly thanked the other members of the organizing committee: Tremaine, Hey, Lister and Cook.

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 Doorwerth meeting for final review prior to being approved before or during the current EC Meeting. The Executive Secretary reminded the EC of these documents:

- Technical Guidance Document: Volatile Treatments for the Steam-Water Circuits of Fossil and Combined Cycle/HRSG Power Plants. Distributed 25th May 2010. There had been two sets of comments from the Russian and Japanese National Committees which needed to be addressed by PCC during the week.
- Guideline on an Equation of State for Humid Air in Contact with Seawater and Ice, Consistent with the IAPWS Formulation 2008 for the Thermodynamic Properties of Seawater. Distributed 3rd July 2010. This was the second circulation for this Guideline due to minor changes in the definition of “relative humidity. No objections had been received.
- ICRN 17. Distributed 4th March 2010. One objection had been received on the references. The US NC needs to address prior to EC approval.
- ICRN 21. Distributed 23rd January 2010. The Danish NC had suggested a minor change to the temperature and pressure ranges. This had been addressed and no further comments were received by 1st April 2010, so the ICRN is approved as an IAPWS document.
- ICRN 22. Distributed 4th March 2010. No comments received so the ICRN is approved as an IAPWS document.
- ICRN 24. Distributed 1st October 2009. No comments received so the ICRN is approved as an IAPWS document.

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 and Tremaine to serve on this Committee. The Clerk of Minutes from each WG will also provide input. The Press Release is discussed in Minute 12 and Attachment 11.

2.3 Evaluation Committee on International Collaboration.

The President indicated that two proposal had been received by the Executive Secretary prior to the meeting, and that any further 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 15.1.

2.4 IAPWS Awards Committees

2.4.1 Helmholtz Award Committee

The President indicated that there was a Helmholtz Awardee this year. The Executive Secretary then reminded the EC that the Helmholtz Committee for the 2011 award would consist of a member from BIAPWS, Canada, Czech Republic, Denmark and France. The President indicated that the BIAPWS would provide the committee chairman. The President asked delegate Bignold to organize the committee and to report back to the EC on Friday with the names of the members of this committee (Minute 16.1).

2.4.2 Honorary Fellow Award Committee

The Executive Secretary requested that Watanabe remain on the Committee as the Chairman for 2011 with Rukes as the other member. The IAPWS President would be ex. Officio.

2.5 IAPWS Bank Account and Future IAPWS Dues

The President indicated that the IAPWS Swiss Bank account had been forced to close in 2009. The Executive Secretary had transferred the funds in the Swiss account to the IAPWS US account. The member dues for 2010 had been formulated by conversion of the Swiss Franc amount, as required by the IAPWS Statutes. Dues were paid into the US Bank account. The President requested that a small committee of Svoboda and Tremaine review the ramifications of these events. The Executive Secretary and President would be ex officio members. (See Minute 14.2).

2.6 Committee on Keywords for Internet Access

The President reminded the EC of Doorwerth Minute 16.3 on ensuring that key words used on the Internet accessed PCC documents. Members of the committee, Svoboda and Harvey, indicated that a report would be provided at the EC meeting on Friday (see Minute 18.2).

2.7 WG Future Activities and Mission Statements

The President reminded the EC of Doorwerth Minute 16.4 where he had requested each Working Group to develop a Mission Statement which could be placed on the IAPWS Website. He suggested that each WG Chairman provide this in the WG reports on Friday.

2.8 New IAPWS WG

The President reminded the EC of Doorwerth Minute 16.5 where he had requested Bellows to explore with the ASME committee the possibility of forming a new IAPWS WG on Water Chemistry activities outside of the power cycle. Bellows and Harvey reported that no action had been taken. President Friend suggested that the item be deferred to the 2011 EC Meeting on Friday.

2.9 WG 127 and SCOR

The President mentioned that the collaboration between IAPWS and the oceanographic community could be strengthened further by moving to a more official level. To do this it had been suggested by the Chairman of SCSW, Feistel, that two letters be formulated and sent to IAPSO in relation to WG 127, and to SCOR. The President appointed a small committee to develop a letter with Feistel as Chair and Harvey as member.

2.10 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 provided the following mandates to the WG Chairmen for action during the week.

3.1 Releases, Guidelines and Certified Research Needs.

The Executive Secretary indicated that six ICRNs had either expired in September 2009 or 2010 or will expire in August 2010 and thus needed attention by the WGs during the week: #10 on pH required collaboration by PCAS and SCSW, #16 on Seawater, #18 on Ion Exchange Resins, #19 on Sampling, #20 on Sensors. #23 to address comments from an HRSG Manufacturer.

3.2 Working Group Directions.

The President emphasized the WGs need to remain vibrant and active. He asked the WG Chairmen to 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 11 (Attachments 4 to 8).

The President closed the opening session of the EC at 9:35am.

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, 21st July 2010. The overall theme was on *The Role of Water in Energy Transition*, and the Symposium Program is shown in Attachment 3.

Executive Committee Meeting. Friday, 23rd July 2010

President Friend opened the continuation of the EC Meeting at 8:32am. 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 Doorwerth, The Netherlands in September 2009. No changes were noted, thus the 2009 Minutes were accepted.

6. President's Report

President Friend opened his report by indicating that IAPWS remains financially solvent, and that the Canadian National Committee and IAPWS were very pleased with the attendance at the 2010 meetings. The work conducted over the last year has been substantial with PCC working on Guidance Documents, TPWS/IRS continuing to address the important aspects in thermophysical properties, PCAS putting the WG on a firm footing, and the SCSW adding the oceanographic community which has allowed IAPWS to make a large contribution in this area. For the future, each working group and sub-committee will be developing Mission Statements to provide better visage of the IAPWS work externally. So there are real reasons to be very optimistic in addressing the local and global needs of the water and steam communities. IAWPS is setting the standard internationally where standards are needed. Finally the President thanked all the National delegates for bringing enthusiasm to the meeting.

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

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 some 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 each for IRS and the Subcommittee on Seawater which are reported in Minutes 8 and 9. Full Minutes and the Agenda for TPWS can be found in Attachment 4.

- 7.1 Web Space for Working Material for WGs TPWS and IRS. A password-protected website for documents and presentations of the TPWS and IRS WGs and the SCSW has been arranged. The site is accessible from the Working Groups page on www.IAPWS.org.
- 7.2 International Collaborative Projects. The WG had proposed two projects. These are covered in Minute 15.1.
- 7.3 Guideline on an Equation of State for Humid Air in Contact with Seawater and Ice, Consistent with the IAPWS Formulation 2008 for the Thermodynamic Properties of Seawater. This document had been circulated to the National Committees. The WG TPWS and the SC SW recommend the approval of the Guideline by the EC.

The EC Approved the Guideline Unanimously

- 7.4 Editorial changes to the Revised IAPWS-95 Release. The TPWS WG approved the editorial changes presented by Wagner and informs the EC of the editorial changes.
- 7.5 Revision of the Revised Release on the Pressure along the Melting and Sublimation Curves of Water. The WG TPWS approved the Revision suggestions by Wagner and informed the EC that after Editorial Committee review the document will be sent to the National Committees for Postal Ballot in the coming year.
- 7.6 Development of a new Release on Thermal Conductivity for Water. The TPWS Chairman reported that Sengers had presented a proposed new correlation for the thermal conductivity of ordinary water. The Evaluation Task Group consists of R. Mareš (Chair, responsible for evaluation of the scientific formulation), W. Parry (Co-Chair, responsible for evaluation of the industrial formulation), J. Hruby, K. Miyagawa and K. Orlov. The initial evaluation should be completed by the end of 2010 and the WG plans to have this formulation ready by the next IAPWS meeting in 2011.
- 7.7 Task Group on Metastable Steam and Nucleation. The Chairman informed the EC that a Task Group had been formed with Hruby as Chair and that this TG will modify the existing ICRN-15 on thermodynamic properties of metastable steam to include the possibility of calculation from molecular properties, and will work on a new ICRN on homogeneous nucleation of droplets from supersaturated steam and steam-inert gas mixtures. These will be prepared for the 2011 IAPWS meeting.

- 7.8 ICRN 14 on Thermodynamic Properties of Humid Air und Combustion-Gas Mixtures. Many of the items in this ICRN have been addressed since it was issued in 2002, so the WG will allow this ICRN to expire in 2011 and prepare a closing statement. A new ICRN will be prepared to include carbon capture and sequestration (CCS) and considered at the 2011 IAPWS meeting.
- 7.9 Update of Advisory Note # 2 on Roles of Various IAPWS Documents. A revision of Advisory Note 2 had been presented to the WG to reflect documents approved and/or revised in 2009. This was approved, subject to editorial review.
- 7.10 Educational Steam Tables. Kretzschmar reported on the educational Steam Tables for Excel and Pocket Calculators linked to the IAPWS website. There have been 773 downloads of the Excel product since June 2009, and 995 downloads of pocket calculator software since the 2009 IAPWS meeting.
- 7.11 Membership and TPWS Officers. Kretzschmar requested that the following new member is approved:

K. Orlov, Moscow Power Institute (Russia).

He also requested that following are removed from membership due to their request and/or lack of participation:

Professor Oguchi (Japan),
Professor Dittmann (Germany),
Professor Schiebener (Germany).

The EC approved these Membership Changes Unanimously.

Kretzschmar then announced his intention to step down as TPWS Chairman at the conclusion of the 2011 meeting. The current Vice-Chair, Harvey, will become Chair at that time. In addition, TPWS had voted to add an additional Vice-Chair, Hruby, which was requested to be effective immediately.

The EC approved these TPWS Officer Changes Unanimously.

- 7.12 TPWS Mission Statement. Chairman Kretzschmar reported that the TPWS WG had developed a Mission Statement which he shared with the EC. The text is within the TPWS minutes (Attachment 4). The President indicated that he will review the Mission Statements from all WGs and sub-committees with the Editorial Committee prior to them being put on the IAPWS Website.

8. Report and Recommendations of the Industrial Requirements and Solutions (IRS) Working Group

IRS Chairman Parry indicated that many of the activities of IRS during the week had been reported in the TPWS report, but the IRS group had one separate meeting during the week. Minutes for IRS and the Agenda can be found in Attachment 5. He covered the following items with the EC.

- 8.1 Industrial Formulation IF-97. Chairman Parry indicated that Wagner had presented a brief history of the current Industrial Formulation, IF-97, which was followed by a discussion on the range of validity between 273.15 K and 273.16 K. Wagner had presented that the current description of this region as shown in the release is not correct and proposed new wording, and that the current Release does not give guidance on the estimate of uncertainties of specific enthalpy, and proposed adding a new sentence to the end of the subsection. Miyagawa's test report recommended to accept these proposed changes. The joint session of Working Groups IRS and TPWS had unanimously voted to recommend to the EC that the editorial changes be adopted.
- 8.2 Industrial Survey Task Group. The Chairman informed the EC that a new Task Group under his Chairmanship had been formed to develop a list of companies to include in an industrial survey to determine industrial needs and requirements, develop the industrial survey, develop IAPWS material to send with the survey, and then to send the survey to the identified companies and all of the IAPWS National Committees.
- 8.3 Advisory Note Task Group. This Task Group also under Parry's Chairmanship will investigate whether the current Industrial Release, IF-97, and the associated releases for transport properties provide adequate documentation to ensure that all users will use the entire package of Industrial Formulations correctly and consistently.
- 8.4 IRS Mission Statement. Chairman Parry reported that the IRS WG had developed a Mission Statement which he shared with the EC. The text is within the IRS minutes (Attachment 5). The President indicated that he will review the Mission Statements from all WGs and sub-committees with the Editorial Committee prior to them being put on the IAPWS Website.
- 8.5 Membership and IRS Officers. Chairman Parry indicated that he had retired from GE and would be stepping down as IRS Chairman. Vice Chairman Weber was elected as the new chairman of IRS. N. Okita was elected as the new vice-chairman. It is proposed that these changes take effect at the conclusion of the annual meeting.

The EC approved these IRS Officer Changes Unanimously.

The President thanked Parry for his excellent leadership of IRS. The EC applauded.

Parry requested that the following new members be approved:

P. Murphy (US)
A. Novy (Czech Republic)
M. Hiegemann (Switzerland)

The EC approved these Membership Changes Unanimously.

9 Report and Recommendations on the new IAPWS Subcommittee on Seawater

Subcommittee Chairman Feistel provided a report on the activities of the Subcommittee. Full minutes are in Attachment 6. He covered the following items with the EC.

- 9.1. Further cooperation between IAPWS, SCOR and IAPSO. The Chairman indicated that letters have been drafted from IAPWS to the Presidents of IAPSO and SCOR inviting continuing cooperation in some form of a joint task group. The President asked for comments and indicated that he will review and send out before the SCOR annual meeting which is in September 2010.
- 9.2. Feistel indicated that no progress had been made on the Advisory Note describing the use of IAPWS-IF97 in industrial calculations with seawater within the limits of validity of the current seawater formulation (which will exclude some applications). This document will be prepared on a schedule allowing for approval at the 2011 IAPWS meeting. A Task Group was formed in Doorwerth and an Evaluation Task Group has also been formed.
- 9.3. Modeling of the thermal conductivity of seawater had been presented to SCSW. The results are good for well-defined systems; the limited data available for seawater are scattered and sometimes not physically reasonable. The Task Group on Transport Properties appointed in item 6 of the 2009 SCSW minutes was encouraged to continue: a) developing a final formulation, which will become an IAPWS Guideline, and b) interacting with the effort to produce a new pure water thermal conductivity correlation so that the new seawater correlation will meet this pure water limit.
- 9.4. Modeling of the electrical conductivity of natural waters and seawater had been presented to SCSW. While for seawater the model is not nearly as accurate as good conductivity measurements, it may be possible to use the model to look at composition variations. In combination with existing measurements of seawater conductivity, a progress report on the work for a future IAPWS formulation on the electrical conductivity of seawater will be prepared for the 2011 IAPWS Meetings by the Task Group.
- 9.5. ICRN 16 on Thermophysical Property for Seawater had been discussed. Feistel had suggested that some numbers in the ICRN should change to reflect the industrial requirements. The ICRN was reviewed by the SCSW, adjustments had been made, and revised ICRN 16 was approved with a new expiration date of 2013.

- 9.6 SCSW Mission Statement. Chairman Feistel reported that the SCSW had developed a Mission Statement which he shared with the EC. The text is within the SCSW minutes (Attachment 6). The President indicated that he will review the Mission Statements from all WGs and sub-committees with the Editorial Committee prior to them being put on the IAPWS Website.
- 9.7 Membership and SCSW Officers. Chairman Feistel indicated to the EC that SCSW has voted to add McDougall as an additional Vice-Chair for SCSW, effective immediately, to guide the ongoing activities regarding TEOS-10 and related oceanographic issues.

The EC approved this SCSW Officer Change Unanimously.
Feistel requested that the following new member be approved:

R. Pawlowicz (Canada)

The EC approved this Membership Addition Unanimously.

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

Chairman Nakahara provided the PCAS Report to the EC. He indicated that a number of very useful workshops had been held during the week with PCAS members and joint with PCC and with TPWS/SCSW. Full Minutes can be found in Attachment 7. He covered the following items with the EC:

- 10.1 International Collaboration and Future Guideline Development. Chairman Nakahara indicated that this discussion was based on the joint IAPWS/IUPAC project "Establishing Recommended Data on Thermodynamic Properties of Hydration for Selected Organic Solutes and Gases" with Sedlbauer as the project coordinator. Originally, this project was supposed to result in the publication of a book. However, the plans have changed and a new method of disseminating the results needs to be established. Ehlerova had presented some options at the PCAS meeting regarding the publication of the results either as an Excel format or a web-based application. A report is scheduled for September 2010. Ehlerova had distributed the current version of the report in an electronic form. A draft for one journal paper is almost completed and it was agreed by PCAS to also publish the high temperature data in Chemosphere. Chairman Nakahara informed the EC of the need to develop a schedule for finalizing this project on hydration.
- 10.2 ICRNs. The Chairman reported that discussion had taken place in PCAS during the week on the following ICRNs: 10, 17, 20, 21, 22, 25, and 26. None required any action by the EC and each is covered in the PCAS minutes (Attachment 7).
- 10.3 The future of PCAS. Chairman Nakahara continued the discussion on the future of PCAS that he had introduced at the 2009 EC Meeting. He indicated that the low turnout at PCAS meetings remains a concern. Discussion at the PCAS meetings during the week resulted in a suggestion to consider converting PCAS to

a subcommittee and/or holding only joint workshops and working meetings with other working groups. PCAS feels that the current model of presenting the majority of talks in joint workshops is a step in the right direction but that more focus is needed. The Chairman indicated that PCAS would also like to preserve a separate PCAS workshop. This is partially due to the fact that PCAS's mission is to solve fundamental problems, which differentiates it from the other groups.

The President suggested that PCAS should remain as a WG of IAPWS, but adopt the suggestions for more joint meetings with the other IAPWS WGs. He asked the EC for comments and suggestions. The Chairman of PCC, Svoboda, indicated that PCAS is most important to PCC and particularly for the development of future Technical Guidance Documents, and that there will be no problem in arranging joint sessions. The Chairman of TPWS, Kretzschmar, supported having one joint meeting with TPWS/IRS but that certain items needed to remain in exclusive PCAS workshops.

The President thanked Chairman Nakahara for raising this issue to improve the overall operation of IAPWS. He concluded this item by suggesting that at the next annual meetings in 2011, the WG Chairmen needed to be more proactive than in the past in putting together agendas earlier for their WG sessions. This would encourage more interaction.

- 10.4 PCAS Membership. Chairman Nakahara raised the issue of PCAS membership of persons who have not participated in the activities of PCAS for a long time and indicated that he plans to contact all the current members and will review with PCAS in 2011.
- 10.5 PCAS Mission Statement. Chairman Nakahara reported that PCAS had developed a Mission Statement which he shared with the EC. The text is within the PCAS minutes (Attachment 7). The President indicated that he will review the Mission Statements from all WGs and sub-committees with the Editorial Committee prior to them being put on the IAPWS Website.

11. 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 8. He covered the following items with the EC

- 11.1 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*. The second document which is entitled *Instrumentation for Monitoring and Control of Cycle Chemistry in Fossil and Combined Cycle/HRSG Plants* was approved in 2009. Svoboda reported that these documents are already getting much use in the industry worldwide and are being used in the development of guidelines worldwide. The third document has been prepared over the last year and is entitled *Volatile Treatments for the Steam-Water Circuits of Fossil and Combined Cycle/HRSG*

Power Plants. The document had been circulated to the National Committees. Two sets of comments from the Japanese and Russian committees had been addressed within the PCC WG during the week. Chairmen Svoboda requested that the EC approve this document which would receive final Editorial Review.

The EC approved the Technical Guidance Document Unanimously

Svoboda informed the EC that a number of further Guidance Documents will be prepared over the next year for approval at the EC in September 2011. He then indicated that the world needs truly international guidance on cycle chemistry, which can be the foundation for guidelines in each country and for manufacturers and other organizations worldwide. IAPWS has a unique place in the world with so many international members and specialists plus the expertise from the other WGs.

- 11.2 ICRNs. The Chairman reported that discussion had taken place in PCC during the week on the following ICRNs: 17, 19, 21, 22, 25, and 26. None required any action by the EC and each is covered in the PCC minutes (Attachment 8). ICRNs 19 and 20 will be extended and updated during 2010.

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

J. Izumi (Japan)
M. Zmitko (Czech Republic)

- 11.4 PCC Mission Statement. Chairman Svoboda reported that PCC had developed a Mission Statement which he shared with the EC. The text is within the PCC minutes (Attachment 8). The President indicated that he will review the Mission Statements from all WGs and sub-committees with the Editorial Committee prior to them being put on the IAPWS Website.

12. Editorial Committee Report

Editorial Committee Chairman Harvey reported that in the preceding year, the Editorial Committee had reviewed many proposed documents, including the new Guideline on Humid Air, a Revision of Advisory Note # 2, two editorial changes for existing releases, two Technical Guidance Documents, and four ICRNs.

Chairman Harvey proposed to the EC that McDougall (Australia) is added as a third member of the Editorial Committee.

The EC Unanimously approved this Addition to the Editorial Committee.

13. Membership and Associates

13.1 Members Defaulting on Dues.

The President asked the Executive Secretary to report on the members that are deficient in paying their dues. To the beginning of July 2010 the following member countries had not paid their 2010 dues: France, Greece and Japan. The Greece National Committee also had not paid their dues in 2008 and 2009. The French National Committee has not paid dues for 2005 to 2010.

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. Following the 2009 EC meeting in Doorwerth, the Executive Secretary reported that, as instructed by the EC, he had written to the Head of the French National Committee with copies to the French people who were at the Berlin ICPWS. The letter indicated that France was in danger of having its status changed to Associate Member if there was no positive response by 31st January, 2010. The French Chairman, Dorey, responded in January that he had contacted the various people in France associated with IAPWS activities. They hoped to have a meeting in February/March, but there had been no further response. A reminder was sent by the Executive Secretary to the French NC Chairman at the beginning of July. The President then requested comments from the EC. The Statutes were reviewed and after much discussion the President formulated a motion to change the status of the French to that of Associate Member.

The EC Approved this Motion with a vote of 7 in favor and 1 opposed.

The President then requested comments on the Greece National Committee. The Executive Secretary reported that he had not been able to make contact with the Head of the Greece committee. After some discussion by the EC, the President formulated a motion to approach the Greece National Committee with a similar letter which was sent to France following the Doorwerth meeting to indicate that Greece is in danger of having its status changed to Associate Member if there was no positive response by 31st January 2011.

The EC Approved this Motion Unanimously.

The President then requested if there was any discussion about the Associate Memberships of Argentina/Brazil and Italy. The consensus was to keep them as Associate Members.

13.2 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. Svoboda reported that there are 13 members of the Swiss National

Committee, but they have not been able to get any longterm financial commitment. Svoboda then requested that the EC approves a second three years as an Associate Member of IAPWS.

The EC Approved this Request Unanimously.

13.3 Application of Scandinavian Joint Committee of IAPWS.

The President requested the Head of the Danish NC to provide information on the application submitted to the Executive Secretary on 26th April 2010 for a Scandinavian Joint Committee of IAPWS. Daucik reported that many of the companies supporting the Danish NC have associate companies across Scandinavia (Denmark, Sweden, Norway, and Finland). The application is for a joint Scandinavian IAPWS Committee, which will be abbreviated to SIAPWS. Daucik reported that SIAPWS has conducted an initial meeting and has developed a set of Statutes. There has not been any commitment yet in Iceland, but SIAPWS is hoping that Iceland will also join. Daucik was voted to be the first official Delegate to IAPWS. He then proposed to the EC that the application for full IAPWS membership of SIAPWS be approved.

The EC Approved the Application of SIAPWS Unanimously.

The President then confirmed that the current Danish NC will be disbanded.

13.4 Other Activities in Membership of IAPWS.

The Executive Secretary informed the EC that applications for Associate Membership had also been sent to the United Arab Emirates (UAE) and to Australia.

14. Executive Secretary's Report

14.1 Financial, Auditors and IAPWS Dues

The Executive Secretary reported that IAPWS remained on a sound financial footing with currently over \$96,600 in the US account. The status as at 5th July 2010 in the bank accounts had been provided to each National Delegate present at the EC meeting.

The Executive Secretary next reported that the 2009 financial statements had been forwarded to the IAPWS Auditors in January 2010. Both VDI in Germany and Professor Savarik in Czech Republic had reviewed and approved the financial statements. The Auditors' reports had also been provided to all the National Delegates present.

The Executive Secretary proposed that these organizations continue to act as auditors.

The EC Approved this Unanimously.

The Executive Secretary proposed to the EC that the dues structure for member countries remain unchanged for 2011.

The EC Unanimously Agreed to this Proposal.

The Executive Secretary also provided a rough estimate of the income and known planned expenditures for 2010/2011.

14.2 IAPWS Bank Account and Future Dues Payments

The President reminded the EC of the discussions on Monday of the situation with the past IAPWS Swiss Bank account and the IAPWS Dues payments (Minute 2.5). He asked Svoboda to summarize the findings of the two man committee as Tremaine had left the EC meetings.

Svoboda indicated that the use of a Swiss Bank had become cumbersome as the Executive Secretary had explained at the EC meeting on Monday. For 2011, the Committee proposes that the IAPWS Dues are collected in US dollars equivalent to the Swiss Franc Dues amount for each IAPWS Member at the current rate of exchange on the date that the Dues must be paid. The deposits should be made to the IAPWS US bank account.

The Committee also proposed that the EC will need to prepare and circulate a draft amendment to the IAPWS Statutes at the next ICPWS. This would be to assess dues directly in US dollars for deposit to the IAPWS US bank account.

The EC Unanimously Agreed to these Proposals.

14.3 Time and Place of the 2011, 2012, 2013 and 2014 Meetings

The Executive Secretary indicated that the 2011 meetings would be held in the Czech Republic. Hruby reported that the Czech Republic National Committee will host the 2011 IAPWS Meetings in Pilsen between 4-9 September 2011. He showed a few slides of Pilsen and indicated that the Czech National Committee is looking forward to hosting the 2011 meetings.

The Executive Secretary reported that based on the timing and locations of the previous meetings Russia had been invited to host the 2012 meetings. The Head of the Russian NC responded that 2012 was not possible but that the 2014 meetings could be held in Russia. The next member country in line to hold an annual meeting is the USA. The Head of the US NC was asked if they could consider holding a meeting in 2012. Harvey responded that they would discuss this at their next meeting in September. The Executive Secretary then reminded the EC that he had received a proposal previously to hold a meeting in Abu Dhabi, UAE. Discussion with the IAPWS President lead to following suggested approach: following an Application for Associate Member status for the UAE in

IAPWS, and approval by the National Committees, the EC would consider a proposal to hold the annual meeting in Abu Dhabi in 2012 if this was received before 1st November 2010. The President asked if any member of the EC had any objections to holding an annual meeting in the UAE. None were voiced.

The 16th ICPWS will be held in England and will be arranged by BIAPWS. The BIAPWS delegate, Bignold, provided a short presentation on the arrangements to date. BIAPWS have sought the engagement of the Institute of Mechanical Engineers in order to optimise the planning of the event. A venue has not yet been set for the conference. In the current negotiations, consideration of the budget assumes that a donation of \$25,000 will be provided by IAPWS. The President assured BIAPWS that this would be available as discussed at previous EC meetings. The Executive Secretary reminded BIAPWS that initial planning details on these aspects will be required at the 2011 EC meetings. At that time, the Local Organizing Committee will be in place, an International Program Committee will be determined by the EC and plans should be in place for a joint meeting in 2012 in England of these two committees.

The final item in this section was a request by the President for any comments on the annual meetings. A couple of the attendees wanted to record that the number of retired people in IAPWS was increasing as well as the cost of each annual meeting.

15. 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.

15.1 International Collaborative Projects.

The President requested the Chairman of the 2010 International Collaboration Committee to report on the findings of that committee during the week. Feistel reported that two collaborative projects had been proposed. The details are provided in Attachments 9 and 10:

- An Experimental Study of Thermal Conductivity of the Binary Ammonia + Water System at High Temperatures and Pressures. The IAPWS sponsors are Harvey (USA) and Petrova (Russia). The young scientist is Fanis N. Shamsetdinov or a colleague to be named from the Kazan State Technological University in Kazan, Tatarstan, Russia, and it is proposed that the IAPWS funding of \$18,000 will allow the student to spend six months at NIST, Boulder in the USA.
- Development of Thermodynamic Models for Hydrates in Water – Carbon Dioxide Mixtures. The IAPWS sponsors are Hruby (Czech Republic) and Span (Germany). The young scientist Václav Vinš from the Institute of Thermomechanics, Academy of Science, Czech Republic. It is proposed that the scientist will spend six months at Ruhr-Universität in Bochum in a single stay

starting in February 2011. The proposed IAPWS funding is Euros 12,000 (\$15,423 US). The travel will be paid by the Institute of Thermomechanics.

Feistel indicated that the Evaluation Committee supported both proposals. He indicated that the Committee had ranked the proposals with the Ammonia/Water proposal first because it was based on an ICRN, and had good international cooperation. This led to review of the IAPWS Guidelines for Spending of IAPWS Funds (Toronto, September 1999), and to President Friend requesting that any EC delegate associated with either of the two proposals should leave the room. This left six voting members of the EC. The President then asked whether IAPWS should fund one or both proposals. The delegate from Germany motioned to accept both proposals. This was seconded by the delegate from BIAPWS.

The remaining members of the EC Unanimously supported the proposal to fund both projects. (The delegates from Czech Republic and the US were not present)

16. IAPWS Awards

16.1 IAPWS Helmholtz Award

The President reported that the 2010 Helmholtz Award had been presented to Melonie Myszczyzyn from Canadian Natural Resources Limited at the IAPWS Symposium on Wednesday.

Friend then asked the BIAPWS Delegate, Bignold, for the names of the 2011 Helmholtz Award Committee. The 2011 Helmholtz Committee will consist of: Chairman Rudge (BIAPWS), Guzonas (Canada), Hruby (Czech Republic), Therkildsen (Denmark) and Dorey (France). Nominations will be due to the Executive Secretary by 31st January 2011.

16.2 IAPWS Honorary Fellowships

The President reported that Bignold (BIAPWS) had been elected Honorary IAPWS Fellow, following the established procedures and after unanimous approval through the postal ballot conducted by the Executive Secretary. The Fellowship Award had been presented at the IAPWS Dinner on Thursday evening by the IAPWS President. He reminded the EC of the Awards Committee for 2011 with Watanabe as Chairman and Rukes as member with the IAPWS President as ex-officio member. Nominations are due to the Executive Secretary by 31st January 2011.

17. Election of IAPWS Officers for 2010 and 2011

The President indicated that he would step down at the end of 2010 and that Vice President Daucik will assume the position of IAPWS President on January 1, 2011. According to the Statutes, the election of the next Vice President should be made at the

end of the EC meeting in even years. The President and Executive Secretary had checked the recent history, noted that it is 26 years since Russia had held the IAPWS Presidency and proposed that the Russian National Committee should be asked to nominate one of their committee members for the position. The President asked the EC if there were any other suggestions. None were suggested, so he then requested the EC to approve this selection.

The EC Unanimously Approved this Selection.

Action: The Russian National Committee should inform the Executive Secretary of their nomination for Vice President after the next meeting of their committee, and before the end of October 2010.

Vice President Daucik thanked the President for his leadership over the last two years, and indicated that he was enthusiastic to continue the developments. The EC applauded Friend.

18. New Business

18.1 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 11.

18.2 IAPWS Website and Keywords for IAPWS Internet Access

The President asked Harvey to report on the Committee set up at the Monday EC meetings (Minute 2.6). Harvey provided the following information:

- IAPWS documents and pages are not always easily found (or are not at the top of list) by search engines.
- Use of “FRAMES” makes design easier, but makes “TITLE” and other information that search engines use harder to extract.
- Information as PDF are indexed by search engines but not as easily.
- IAPWS would like Releases, Guidelines and Guidance Documents to be easily found

The Committee suggested that IAPWS uses an HTML page. The page would contain the title of the document, a link to the PDF, a brief description of the document (prepared by the responsible WG), the revision history, and the responsible WG. This will require small redesigns so that the page title is more accessible. This can be implemented gradually as time permits and the details of the pages are provided.

The President proposed to the EC that this new format is adopted.

The EC Unanimously Approved the Proposed New Format.

Harvey then raised a request from PCC Member Maughan about putting the annual IAPWS Symposium papers on the Website. The Canadian delegate, Guzonas, reported that this year's papers will go on the Canadian NC website. A link will be provided from the IAPWS Website. In future it will be necessary to request permission from authors/presenters to post their contributions on the IAPWS Website.

The final item on this topic was that the Russian NC had suggested to produce a Website where Mathcad can be used and to provide a link to this site. IAPWS's previous policy has been not to issue software, so Harvey questioned whether a "link" is included in this policy. The President suggested a small task group of Harvey, Orlov and Nemec to review and report back to the EC at the 2011 meeting.

18.3 Proposal to Establish Links with CIPM

President Friend requested Feistel to inform the EC on this matter. Feistel wondered if a mutual recognition arrangement with the International Committee of Weights and Measures (CIPM) might have some benefit for IAPWS. The International Bureau of Weights and Measures (BIPM) was set up by the Metre Convention and operates under the exclusive supervision of the CIPM. Its mandate is to provide the basis for a single, coherent system of measurements throughout the world, traceable to the International System of Units (SI). Some of Feistel's thoughts/question to the EC include the following:

- Should IAPWS documents be developed consistently with the SI and the metrological principles of BIPM
- BIPM could formally acknowledge that IAPWS documents are consistent with the SI and the metrological principles of BIPM
- A possible IAPWS international role as the BIPM for water properties
- IAPWS could belong to the list of formal BIPM partner organizations.

The President suggested that a small committee of Feistel (Chair), Cooper and Friend investigate the possibilities and benefits of IAPWS developing a cooperation, and report back to the EC at the 2011 meetings.

18.4 Other New Business

President Friend asked the EC if there was any further business. Cooper suggested that each EC meeting includes an item for feedback on the annual Symposium. The Canadian Delegate, Guzonas, reported that the 2010 Symposium had been very helpful in assembling Canadian scientists and engineers and that one new member had joined the Canadian IAPWS Committee.

18.5 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:

Canada	Attachment 12
Czech Republic	Attachment 13
Denmark	Attachment 14
Germany	Attachment 15
Japan	Attachment 16
Russia	Attachment 17
Switzerland	Attachment 18
USA	Attachment 19

18.6 Participants

Attachment 20 provides a list of participants at the IAPWS EC and WG Meetings and at the Symposium in Niagara Falls, Canada in July 2010.

18.7 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 Niagara Falls Meetings. This will be forwarded electronically to the Head of each National Committee.

19. Closing Remarks and Adjournment

The President thanked Guzonas and his Canadian NC colleagues for hosting the IAPWS Niagara Falls Meetings. He also thanked everybody for participating at this EC meeting. Then he formally closed the 2010 EC meeting at 12:24 pm.