

Minutes of the Meetings
of the
Executive Committee
of the
International Association for the Properties of Water and Steam
held in
Boulder, Colorado
30th September – 5th October 2012

Plenary Session. Monday, 1st October 2012. 8:30 am (64 people in attendance)

The President of IAPWS, Daucik, welcomed the Executive Committee (EC) and other IAPWS members to Boulder for the EC and Working Group (WG) Meetings of IAPWS. The President officially opened the 2012 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, Greece and Italy.

The President indicated to the EC that Dr. Geoff Bignold, Honorary Fellow of IAPWS, had passed away on 4th August 2012 and asked for a moment of silence.

The President asked the delegate of USA to provide some opening comments. Friend welcomed everybody to Boulder and to the 2012 IAPWS meetings. He briefly reviewed some of the events planned for the week and provided some background on the US National Committee which is an ASME entity. He recognized the sponsors for the meetings: EPRI, NIST, GE Energy, Siemens Energy, Nooter/Eriksen and Sentry Equipment.

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 Technical Guidance Documents

The Executive Secretary indicated that seven documents had been circulated to the National Committees during the year since the Plzen meeting for final review prior to being approved before or during the current EC Meeting. The Executive Secretary reminded the EC of these documents:

- IAPWS Guideline: *Guideline on a Low Temperature Extension of the IAPWS-95 Formulation for Water Vapor*. Distributed 10th April 2012. No objections have been received so the document will be reviewed by the TPWS working group during the week prior to approval at the Friday EC.

- Revised IAPWS Technical Guidance Document: *Instrumentation for Monitoring and Control of Cycle Chemistry for the Steam-Water Circuits of Fossil Fired and Combined Cycle Power Plants*. Distributed 5th June 2012. There was one comment from BIAPWS on the format of the final version. The document will be reviewed by the PCC working group during the week prior to approval at the Friday EC.
- ICRN 20: *Sensors for use at Elevated Temperature in the Plant Cycle of the Power Industry*. Distributed on 3rd November 2011. No objections were received before 4th March 2012, and thus the ICRN was approved at that time.
- ICRN 27: *Thermodynamic Properties of Humid Gases and CO₂-Rich Mixtures*. Distributed on 29th September 2011. One minor change was made before 1st February 2012, and thus the ICRN was approved at that time.
- ICRN 28: *Thermophysical Properties of Metastable Steam and Homogeneous Nucleation*. Distributed on 7th October 2011. One suggestion was addressed by 10th February 2012, and thus the ICRN was approved at that time.
- IAPWS Release: *Release on the IAPWS Formulation 2011 for the Thermal Conductivity of Ordinary Water Substance*. Distributed 11th October 2011. No objections were received by 13th January 2011 so the Release was approved at that time
- IAPWS Release: *Revised Supplementary Release on Properties of Liquid Water at 0.1 MPa*. Distributed 11th October 2011. No objections were received by 13th January 2011 so the Revised Supplementary Release was approved at that time

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 (to be called Highlights in future).

The President asked Bellows to develop a Press Release on the IAPWS proceedings during the week. Joy was also appointed to the committee. The Clerks of Minutes from each WG were asked to provide input. The Highlights is discussed in Minute 18.3 and is Attachment 10.

2.3 Evaluation Committee on International Collaboration.

The President indicated that two proposals 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. Because one of the proposals caused a conflict of interest for the TPWS Chairman it was suggested that Kretzschmar represent TPWS on the committee. 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 2013 award would consist of a member from Germany, Japan, Russia, USA and BIAPWS. The President indicated that Germany would provide the committee chairman. The President asked delegate Kretzschmar 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 President requested that Rukes remain on the Committee for a fourth year as the Chairman for 2013 because of the passing of Bignold. The IAPWS President requested that Bellows join the two man committee. The President would be ex. Officio.

2.4.3 Gibbs Award Committee

The President reminded the EC that the next Gibbs Award would be conferred at the 16th ICPWS in 2013 and that the selection process had been initiated in Plzen in 2011. The chairman, Watanabe, was asked to provide an update of the process. The chairman indicated that one of the three nominations made by three IAPWS countries had created a conflict of interest for one of the members of the original committee. Watanabe had requested that this member step down. As this reduced the makeup of the committee the chairman then requested that Petrova from the Russian National Committee join the committee. Watanabe indicated that the committee would meet during the week and report back to the EC on Friday (Minute 16.3).

2.5 IAPWS Statutes and By-Laws

The President requested that the chairman of the committee formed in Plzen provide a status report. Harvey reminded the EC that currently the Statutes can only be changed at a General Meeting by a two-thirds vote of the EC Members present at the meeting in association with each ICPWS. He indicated that the committee (Svoboda and Watanabe) had met electronically during the last year and considered the items raised in Plzen and a few other items that had been raised by the committee. Harvey indicated that further consideration would be given during the week and that a final set of suggestions would be provided at the Friday EC meeting (Minute 18.2).

2.6 International Program Committee for the 16th ICPWS

The President requested Cooper to provide an update on the progress of the 16th ICPWS. Cooper first showed a map of the area around Greenwich where the conference will be held at Greenwich University, which is close to the Greenwich Observatory. The important item for the current IAPWS week in Boulder is a meeting of the International Program Committee (IPC) to decide on the logistics for acquiring abstracts, choosing the papers / presentations, and the timing of the IPC meeting with the Local Organization Committee in London in early 2013 to structure the technical program. The results of this meeting will be provided to the EC at the Friday meeting (Minute 14.2).

2.7 Report on BIPM/CIPM and SCOR/IAPSO Interfaces

The President asked the SCSW Chairman, Feistel, to report on this item. Feistel indicated that following the 2011 EC Meetings in Plzen an opportunity arose for a small IAPWS delegation to attend the BIPM meetings in February 2012 to discuss cooperation between the two organizations. This required a special postal ballot to provide the necessary funds for the SCSW Chairman to attend.

The President requested that Harvey include in the revision of the IAPWS Statutes and By Laws facility for IAPWS people in the future to attend similar meetings of major interest to the IAPWS work and working groups (Minute 18.2).

SCSW Chairman Feistel then introduced the opportunity for IAPWS to form a Joint Committee on the Properties of Seawater (JCS) in collaboration with the Scientific Committee on Oceanic Research (SCOR) and the International Association for the Physical Sciences of the Oceans (IAPSO). This will be discussed during the week and a recommendation provided to the EC on Friday (Minute 9).

2.8 Other Business Requiring Extensive Discussions

No other business was raised by the EC.

3. EC Mandate to Working Groups and Membership

The President first requested that Feistel provide a short outline of the new direction within the Sub-Committee on Sea Water and particularly the extension to include the interface between the ocean and the atmosphere. This is reported in the joint TPWS / SCSW Minutes (Attachment 4).

The President then 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 four ICRNs had either expired already or will expire in September 2012 and thus needed attention by the WGs during the week: #21 on thermophysical properties associated with ultra-supercritical plants, #23 on dewpoint of flue gases, #24 on thermal conductivity of H₂O at low pressure and high temperatures, and #25 on corrosion mechanisms related to contaminants in steam / water.

3.2 Working Group Directions.

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

4. Preview by the WG Chairmen of the Week's Activities

President Daucik 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 7).

The President closed the opening session of the EC at 9:30am.

Activities During the IAPWS Week in Boulder

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

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

The IAPWS Symposium was held on Wednesday, 3rd October 2012. The overall theme was on “The Energy-Water Nexus: Status and Prospectus”, and the Symposium Program is shown in Attachment 3.

Executive Committee Meeting. Friday, 5th October 2012

President Daucik opened the continuation of the EC Meeting at 8:30 am. Each of the Member and Associate Member countries of IAPWS was in attendance with the exception of Argentina/Brazil, Greece and Italy. In total there were 28 people assembled for the EC meeting. Daucik 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 Daucik asked for comments and changes to the minutes of the EC meeting held in Plzen, Czech Republic in September 2011. No changes were noted, thus the 2011 Minutes were accepted.

6. President's Report

President Daucik opened his report by indicating that another fruitful year of IAPWS history had been written with five documents being published, as well as some revisions of earlier documents, some ICRNs and some new documents. He considered that the process of formation of these documents and workshops is even more fruitful and inspiring which points to the evaluation of new knowledge and new fields of action. The best example of this is the collaboration between the SCSW and international scientific bodies in oceanography and meteorology. Furthermore, the collaboration with Bureau International de Poids et Mesures (BIPM) in the field of seawater gives another interesting perspective.

The President then indicated that:

- PCC is also in the process of extending the field of activity by introducing the Technical Guidance Documents. This year the problems of sampling and quality assurance/control had been dealt with.
- TPWS is working on an extension of the IAPWS-95 formulation into the low temperature regime and even to supercooled water

- PCAS is working on hydration free energy of metal ions and organic species.
- IRS is formulating the future needs of the power industry, especially methods for H₂O properties with high computational speed for property-intensive applications like CFD (computational fluid dynamics), and time-dependent power plant simulations.
- Global economic crises challenge the industry. Reliable data on properties of water and aqueous solutions are critical for optimizing of the power production processes. Thus IAPWS products play an important role for further development of society.
- Climate changes indicate an even more serious problem linked to water resources. Purification and recycling of water are the fields, where IAPWS involvement would improve the possibilities for optimization of the processes.

The President finished his report by indicating that there are a lot of challenges, lots of questions to be answered and lots of problems to be addressed. He thanked all the participants in IAPWS activities for their effort during the past year and encouraged them to continue in this important work. IAPWS is preparing the 16th International Conference on Properties of Water and Steam, and the local organizing committee and international program committee are doing very well and he wanted to encourage all working groups to actively participate in this event with or without papers presenting the fine results of the IAPWS efforts.

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 Harvey opened this item by indicating that he would report on activities within TPWS, IRS and SCSW during the week. 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 separate meetings for IRS and the Subcommittee on Seawater which are reported in Minutes 8 and 9. Full Minutes and the Agendas for TPWS and SCSW can be found in Attachment 4.

- 7.1 The WG considered a Guideline on a Low Temperature Extension of the IAPWS-95 Formulation for Water Vapor. This allows the IAPWS-95 thermodynamic formulation to be used for water vapor down to 130 K. This document was approved by the WG. The WG recommends that the EC approves the Guideline.

The EC approved the Guideline Unanimously.

- 7.2 A Revised Guideline was presented on the Critical Locus of Aqueous Solutions of Sodium Chloride. This is a relatively minor revision of the existing Guideline, reflecting better theoretical understanding. The WGs TPWS and PCAS voted to approve the Revised Guideline and recommend to the EC that it should be sent for Postal Ballot following review by the Editorial Committee.

The EC approved this Process Unanimously.

7.3 Chairman Harvey then presented the following informational items to the EC:

- TPWS approved minor editorial changes to the Revised Release on the IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use (IAPWS-95).
- TPWS and IRS approved minor editorial changes to the Revised Release on the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam (IAPWS-IF97).
- A Task Group was appointed to work toward the extension of the seawater thermodynamic formulation to higher temperatures. The Task Group consists of Feistel (chair), Cooper, Harvey, Hiegemann, Hrubý, Kretzschmar and Pawlowicz.
- A Task Group was appointed to reexamine the behavior of IAPWS-95 when extrapolated into metastable liquid regions. The Task Group consists of Hrubý (chair), Anisimov, Feistel, Hellmuth, Holten and Wagner.
- As a result of the annual review by the appropriate Task Group, the WG approved a minor revision to the Guideline on the Use of Fundamental Physical Constants and Basic Constants of Water (consisting of substituting a current reference for an obsolete one).
- A Task Group was appointed to work on a new formulation for the thermodynamic properties of heavy water. The Task Group consists of Harvey (chair), Cooper, Holten, Span and co-opted expert Lemmon of NIST.
- A Task Group was appointed to examine whether the uncertainty estimates of IAPWS-95 can be improved due to new data that has become available. The Task Group consists of Wagner.

7.4 With regard to expiring ICRN-21 (Thermophysical Properties Associated with Ultra-supercritical Coal-fired Steam Generators), TPWS and IRS recommend that the EC allow this ICRN to expire and that the IAPWS contacts prepare a closing statement to be placed on the website.

7.5 With regard to expiring ICRN-24 (Thermal Conductivity of H₂O at Low Pressures and High Temperatures), TPWS and IRS recommend that the ICRN be renewed for 3 years after minor modifications to referencing are made to bring the document up to date.

The EC approved this Renewal Unanimously.

7.6 TPWS Membership. Chairman Harvey requested that the following new members are approved:

M. Fedorov (University of Strathclyde, Scotland, UK)

V. Holten (University of Maryland, USA)

The EC approved these Membership Changes Unanimously.

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

IRS Chairman Weber 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 Survey. Chairman Weber indicated that a survey questionnaire had been discussed and will be finalized by IRS within the next months. The invitation to the survey will be distributed among IRS members and also will be sent out to the IAPWS National Committees asking for further distribution to companies that are not represented in IAPWS.
- 8.2 Task Group on Advisory Notes. The Chairman informed the EC that the job of the Task Group is to investigate whether the current system of advisory notes is sufficient to ensure that IAPWS formulations are used correctly. Discussion evolved around guidance regarding transport property formulations. Several suggestions were made, including adding an overview table to the IAPWS website and adding transport properties to Advisory Note #2. Discussion will continue within the TG and the final result will be presented in 2013. The Chairman also indicated that Kretzschmar will check if Advisory Note #3 needs an update and will provide such an update in 2013 if required.
- 8.3 With regards to ICRN 23 on Dewpoint of Combustion Gases, Chairman Weber indicated that ICRN 23 had been extended last year because a new publication had become available in 2011. However, background information on the paper could not be obtained so far. So IRS recommends that the ICRN be closed. A formal closing statement will be provided by Okita.

The EC approved this Unanimously.

The chairmen indicated to the EC that the topic remains of interest and activities understanding the background of currently available dew point predictions will continue. If necessary, a new ICRN will be proposed in the future.

- 8.4 IRS Membership. Chairman Weber requested that the following new member be approved:

R. Pawellek (STEAG Energy Services GmbH, Germany)

The EC approved this Membership Change Unanimously.

9. Report and Recommendations of the Subcommittee on Seawater (SCSW)

The minutes for SCSW are included in the TPWS minutes in Attachment 4.

SCSW Chairman Feistel immediately indicated that he wanted to recommend officer and membership changes to the EC.

- 9.1. Chairman Feistel recommended to the EC that Vice Chairman Pawlowicz becomes the Chairman of the SCSW and that he becomes the second Vice Chairman.

The EC approved this SCSW Officer Change Unanimously.

Then Chairman Pawlowicz requested that the following new member be approved:

H. Uchida (Research Institute for Global Change, Japan)

The EC approved this Membership Addition Unanimously.

- 9.2 Chairman Pawlowicz provided the following informational items to the EC:

- Anderko had reported on activities of the Task Group “Transport properties of seawater”. A draft guideline for thermal conductivity was not ready for this meeting but should be ready in the next year. To speed process, an evaluation group was appointed in advance (Miyagawa and Blanchetti)
- IAPWS-2008 refers to 'salinity' but TEOS-10 recommendation developed later formally discourages the use of the word 'salinity' in cases where numerical values are implied or required. In such cases a more precise term associated with a specific definition, such as Absolute Salinity, Reference Salinity, etc. should be used. IAPWS-2008 should include some editorial changes to make this clear. Task group: Feistel, Pawlowicz, McDougall and Friend.

- 9.3 The Chairman next discussed the proposal for a “Joint Committee on the Properties of Seawater” (JCS) with SCOR and IAPSO. He outlined the following terms of reference:

- 1) To act as a 'point of contact' for issues related to the bulk properties of seawater.
- 2) To maintain and update documents, websites and software of TEOS-10 and other standards.
- 3) To encourage the uptake of TEOS-10 and other standards by the oceanographic community by acting as a source of advice.
- 4) To globally coordinate research and the development of standards related to the properties of seawater across different scientific communities.
- 5) To identify developing needs for standards and encourage research in those areas.
- 6) To issue reports or other documents on issues relating to the bulk properties of Seawater.
- 7) To work towards international and interdisciplinary uniformity and consistency of the standards and measurements procedures used in oceanography.

Chairman Pawlowicz then requested approval for the creation of, and participation in JCS.

The EC approved this Unanimously.

He then proposed that the JCS Executive will consist of Pawlowicz (chair) with Feistel and McDougall (vice chairs).

The EC approved this Executive 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 joint workshops had been held during the week. Full Minutes can be found in Attachment 6. He covered the following items with the EC:

- 10.1 PCAS Membership. Chairman Nakahara requested that the following new member be approved:

M. Fedorov (University of Strathclyde, Scotland, UK)

The EC approved this Membership Addition Unanimously.

Chairman Nakahara then addressed the issue of deleting inactive members from the PCAS membership list. For this purpose, three criteria were proposed and accepted by the PCAS WG. An inactive member will be deleted from the list if (1) they have not participated in the activities of PCAS for a long time (substantially longer than the previously used 3-year period of inactivity), (2) their past contributions (such as creation of releases, guidelines or organizational leadership) cannot be reasonably used to justify their retention, or (3) their lack of continued participation is coupled with the associate member status of their home countries. Based on these criteria, the Chairman suggested to the EC that the following seven members are deleted from the PCAS membership list: Covington, Majer, Neumann, Perboni, Regazzoni, Smirnova and You.

The EC approved the Process and these Membership Deletions Unanimously.

Nakahara indicated that they will be welcome to rejoin the group if they choose to do so.

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

Chairman Rziha highlighted those activities that needed action / approval by the EC. A full written report of the PCC WG activities forms Attachment 7. He covered the following items with the EC

- 11.1 Technical Guidance Documents. Chairman Rziha reminded the EC that four Technical Guidance Documents (TGDs) had been approved between 2008 and 2011. The PCC Task Group had identified a need for a few revisions to the TGD *Instrumentation for Monitoring and Control of Cycle Chemistry in Fossil and Combined Cycle/HRSG Plants*. This document had been revised and circulated to the Task Group, PCC, Editorial Committee and National Committees. Minor changes had been made and the document was reviewed with PCC during the week. Chairmen Rziha requested that the EC approve this document.

The EC approved the Revision of the Technical Guidance Document Unanimously.

Chairman Rziha indicated that a number of new TDGs are in preparation.

- 11.2 ICRN 17 on Amines. The Chairman reported that a major revision of this ICRN is in preparation.
- 11.3 ICRN 19 on Sampling of Corrosion Products. A closing statement is in preparation.
- 11.4 ICRN 25 on Corrosion mechanisms that are related to the presence of contaminants in steam / water circuits, particularly in boiler water was drafted and discussed with PCC during the week. It was approved for finalization through the Editorial Committee prior to sending for a postal ballot.
- 11.5 International Collaboration on Sampling Lines. The Chairman informed the EC that this related to ICRN 19 and had been delayed in 2011 due to the problems in Japan. A final report has been issued and a closing statement for the ICRN will be developed.
- 11.6 PCC Membership. Chairman Rziha recommended to the EC that Thomsen (Denmark) become the second Vice Chairman of PCC.

The EC approved this PCC Officer Change Unanimously.

The Chairman then requested that the following new members be approved:

Anders Fredrikson (Tekniska Verken, Sweden)
Mats Hellman (Hellman Vatten AB, Sweden)
Taro Ichihara (Mitsubishi Heavy Industries, Japan)
Hideo Hirano (CRIEPI, Japan)
Paul McCann (E-on, UK)
David Addison (Thermal Chemistry, New Zealand)
Stephanie Marais (Eskom, South Africa)
Randy Turner (Swan, USA)
David Moed (TU Delft, The Netherlands)
Andy Witney (GE Energy, USA)
Kirk Buecher (Mettler Toledo, USA)

The EC approved these Membership Additions Unanimously.

12. Editorial Committee Report

Editorial Committee Chairman Harvey reported that in the preceding year, the Editorial Committee had reviewed the following documents:

- Revised Release on Thermal Conductivity.
- Revised Supplementary Release on Liquid Water at 0.1 MPa.
- Revised Technical Guidance Document on Instrumentation and Monitoring.
- Guideline on Low Temperature Extension of IAPWS-95 for Water Vapor.
- Revision of Advisory Note 2.

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. All IAPWS Members have paid their 2012 dues.

13.2 Reports on Associate Members

The Executive Secretary requested the delegate from each Associate Member and potential Associate Member to provide a short update.

Australia. Chariman Joy indicated that activities in ANAPWS were moving along nicely with an initial concentration on power plant chemistry. They are seeking other possible involvements in sea water, carbon sequestration and thermodynamics. ANAPWS has 40 members and the Australian Power Industry (API), Aurecon and CS Energy have joined. They are involved in two major conference activities in Australia: Australasian HRSG Users Group (AHUG) and API PowerChem. An Australian wide steering committee has been formed and a draft of ANAPWS By-Laws has been developed. Discussions are continuing with API to link with ANAPWS. Joy indicated that they are on track to apply for IAPWS Membership at the next ICPWS in 2013.

New Zealand. Chairman Addison provided an update on NZAPWS. One of the main activities is connected with the 750MW of geothermal on the North Island, which represents about 13% of the country's demand. A national committee has been formed and they have held the first one-day Technical Symposium with 30 attendees. This covered power (fossil and geothermal), dairy/milk processing, Universities, Crown Research Institutes, industrial consultants and vendors. NZAPWS will become an incorporated society in New Zealand. They are planning another one-day symposium in 2013 and to apply for full IAPWS Membership at the 16th ICPWS in London.

France. Dorey indicated that after a lapse of about 10 years he is trying to re-activate a French National Committee and will try to get as many French people to the 16th ICPWS in London. All the WG Chairmen were requested to forward names of possible interested people in France that Dorey can contact.

Switzerland. Delegate Hiegermann reported the Swiss National Committee has not had a meeting in the past year and that there are no research programs under way. He indicated that the SNC applies for a prolongation of its status as an associate member with IAPWS, and hopefully it will succeed in its efforts to create a new small member base in the future.

South Africa. Delegate Marais indicates that South Africa is trying to establish a national committee. This has been launched by Eskom, the large national utility that has a large array of power stations. It will initially be from a power cycle chemistry perspective but they want to engage many other fractions of the South African industry. They will try to penetrate the universities, water management and reclamation industries. Marais indicated that they hope to launch a first meeting soon and apply for Associate Membership at the next ICPWS in London.

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 \$93,000 in the US bank account. The status as at 12th September 2012 in the bank account had been provided to each National Delegate present at the EC meeting.

The Executive Secretary next reported that the 2011 financial statements had been forwarded to the IAPWS Auditors in January 2012. 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 remains unchanged for 2013.

The EC Unanimously Agreed to this Proposal.

The Executive Secretary also provided a rough estimate of the income and known planned expenditures for 2012 / 2013.

14.2 Time and Place of the 2013, 2014 and 2015 Meetings

2013 IAPWS Meetings. The Executive Secretary indicated that the 2013 IAPWS meetings will be held during the 16th ICPWS in London in September 2013. The President then requested Cooper as Chairman of the ICPWS International Program Committee to provide an update of the activities of the committee during the week.

Cooper indicated that the 16th ICPWS will be held in England and is being arranged by BIAPWS. The Institution of Mechanical Engineers (IMechE) will act as co-hosts and as conference administrators. Cooper confirmed that dates for the conference are Sunday September 1st to Thursday September 5th 2013, and that it will be held at Greenwich University in London.

When asked by the Executive Secretary about the Financial Statement for the 16th ICPWS, Cooper reported that this had not yet been developed. The BIAPWS delegate, McCann, confirmed this, but also indicated that BIAPWS and the Local Organizing Committee (LOC) will meet twice in the next month and that this item will be addressed. As the financial statement and the IAPWS Donation to the ICPWS are very important items within the financial situation of IAPWS, a motion was developed that BIAPWS should provide both to the Executive Secretary as soon as possible (within two months).

The EC Approved this Unanimously.

Cooper, as Chairman of the International Program Committee (IPC), next reported that the IPC had met during the week to develop the key dates for: a) submission of abstracts (11th January 2013); b) IPC meeting at Greenwich with the LOC (31st January / 1st February 2013); and c) acceptance of presentations (15th February 2013). The IPC also agreed that the final submissions for the conference can be formal papers or PowerPoint presentations, and that the format and date of the conference proceedings is a LOC decision. Included within the ICPWS will be a number of workshops on seawater and the environment; there will also be a one day event on power cycle chemistry.

2014 IAPWS Meetings. The Head of the Russian NC, Petrova, indicated that the Russian NC looks forward to welcoming IAPWS and the EC to Moscow. Details will be provided at the 2013 meetings in London.

2015 IAPWS Meetings. The Executive Secretary indicated that SIAPWS has been asked to host the 2015 Annual IAPWS meetings and to report back to the Executive Secretary by the end of 2012. Delegate Hellman indicated that this will be discussed at the next SIAPWS 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 2012 International Collaboration Committee (WG and SC Chairs) to report on the findings of that committee during the week. Chairman Weber reported that two collaborative projects had been proposed. The following are overviews of the proposed projects. The details are provided in Attachments 8 and 9:

- *An experimental study of viscosity of the binary ammonia and water system at high temperatures and pressures.* The IAPWS sponsors are Friend (USA) and Petrova (Russia). The young scientist (Il'giz R. Gabitov or colleague to be named) will be from Kazan National Research Technological University, Russia.
It is proposed that IAPWS funding of \$20,000 would cover subsistence for 6-7 months at NIST in Boulder. If approved, a report on the research will be presented by the next annual meeting in London.
- *Development of a new Equation of State for Heavy Water.*
The IAPWS sponsors are Harvey (USA) and Span (Germany). The young scientist is Stefan Herrig from Ruhr-Universität Bochum. A total budget of \$7,500 is proposed for this project, which would last for 4 months beginning in early 2013. This would pay for the travel expenses of Herrig to Boulder (IAPWS would be invoiced for \$1,500 or the actual expense, whichever is smaller), and for 4 months of living expenses at \$1,500 per month. If approved, a report on the research will be presented by the next annual meeting in London.

Weber indicated that the Evaluation Committee supported both proposals and that the technical content was of interest to IAPWS. He indicated that normally the committee would recommend to the EC that both are funded, but the committee this year realized that there could be some financial constraint in an ICPWS year, so they ranked the Heavy Water proposal as priority one. This led to review of the IAPWS Guidelines for Spending of IAPWS Funds (Toronto, September 1999) in relation to the expenditures projected over the next year. The President indicated that there should be discussion on whether the EC thinks this project should be funded.

After much discussion a motion was developed to support the heavy water proposal to the full level proposed (\$7,500).

The EC approved the proposal to fund the project by 5:1 with the delegates from Germany and the US abstaining because of their involvement in the proposal.

16. IAPWS Awards

16.1 IAPWS Helmholtz Award

The President reported that the 2012 Helmholtz Award had been presented to Maxim Fedorov at the IAPWS Symposium on Wednesday.

Daucik then asked the German Delegate, Kretzschmar, for the names of the 2013 Helmholtz Award Committee. The 2013 Helmholtz Committee will consist of: Chairman Kretzschmar (Germany), Yasuoka (Japan), McCann (BIAPWS), Orlov (Russia), and Friend (USA).

Nominations will be due to the Executive Secretary by 31st January 2013.

The previous Helmholtz Committee Chairman, Hruby, wished to encourage national committees and WG Chairmen to generate more candidates in future related to IAPWS activities.

16.2 IAPWS Honorary Fellowships

The President reported that Kretzschmar (Germany) and Friend (USA) had been elected Honorary IAPWS Fellows, following the established procedures and after unanimous approval through the postal ballot conducted by the Executive Secretary. The Fellowship Awards had been presented at the IAPWS Dinner on Thursday evening by the IAPWS President. He reminded the EC of the Awards Committee for 2013 with Rukes as Chairman and Bellows as member with the IAPWS President as ex-officio member.

Nominations are due to the Executive Secretary by 31st January 2013.

16.3 Gibbs Award

Following the final arrangements for the Gibbs Award Committee on Monday (Minute 2.4.3) the President requested Chairman Watanabe to report on the selection process during the week. Watanabe indicated that after two meetings the committee had ranked

the three nominees and decided to make a recommendation to the EC that Digby MacDonald is nominated for the 2013 Gibbs Award.

The EC Approved this Unanimously.

Chairman Watanabe further suggested that the President informs MacDonald of the nomination and that IAPWS will pay the associated expenses for travel to London. If the suggested nominee cannot attend, then Watanabe indicated that the committee had selected a runner-up.

Chairman Watanabe also had a few suggestions for future Gibbs Award nominations because his committee felt there was insufficient information provided for this most prestigious IAPWS Award. The nomination should include a single page statement providing: a) the contributions to the progress of science and technology, b) contributions to IAPWS activities, and c) a complete CV.

17. Election of IAPWS Officers for 2013 and 2014

The Executive Secretary indicated that the President would step down at the end of 2012 and that Vice President Petrova will assume the position of IAPWS President on January 1, 2013. 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, and noted that it is 12 years since Canada has held the IAPWS Presidency and proposed that the Canadian National Committee should be asked to nominate one of their committee members for the position. The Executive Secretary 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 Canadian 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 November 2012.

The Executive Secretary thanked the President for his leadership over the last two years, and indicated that his enthusiasm will continue under President Petrova. The EC applauded Daucik.

18. New Business

18.1 EC Preparations for the 16th ICPWS

The President asked BIAPWS about arrangements for the EC and General Meeting (GM) within the 16th ICPWS Week. IPC Chairman Cooper indicated that space would be provided on Sunday 1st and Friday 6th September 2013 for the EC Meetings and that the GM will be arranged in a large enough room during the week.

18.2 IAPWS Statutes and By-Laws

The President requested the Chairman of this Committee to report to the EC on activities during the week following initial brief discussion at the EC on Monday (Minute 2.5). Chairman Harvey reported on the following items:

- Changes to Major Activities and Products of IAPWS. Additions will be made in the Statutes and By-Laws to include up-to-date products and activities. This was originally in 2011 directed towards the PCC Technical Guidance Documents, but discussion by the EC required a little broader coverage (activities with seawater for instance).
- Finances. The requirement for IAPWS to hold a Swiss Bank account disappeared in 2009 when the Swiss banking laws changed. Changes to the Statutes and By-Laws will be made to indicate that the Swiss Franc remains the currency of IAPWS, but that IAPWS business will be conducted in a currency of convenience for the Executive Secretary with approval from the EC. IAPWS Dues will be in the currency of convenience converted from Swiss Francs at the exchange rate on 1st January of that year.
- Associate Members. A clear distinction will be made in the Statutes and By-Laws between new and old Associate Members of IAPWS.
- ICRNs. The time period for existence of ICRNs will be increased to five years with flexibility for a shorter period if a WG or SC requests.
- Acquiring New Members. New writing will be added to the Statutes and By-Laws indicating that part of the job description for the President and Executive Secretary is to acquire new Members of IAPWS.
- Travel for Officers and WG Chairmen. The consensus of the EC was that there already is coverage in the Statutes and By-Laws for providing support to WG Chairmen and others for making visits to other associations and meetings to represent IAPWS, and to promote further activities of IAPWS. The Executive Secretary can provide funds up to a threshold with approval of the EC.
- Procedure for Changing the Statutes. Currently changing the Statutes can only be accomplished at a General Meeting and this makes it difficult to respond quickly. The initial suggestion from the Committee was to recommend changing the Statutes provisionally at an EC annual meeting with a 2/3 vote of EC members present. This would become final at the second annual EC again by a 2/3 vote. Activity at a GM would then become informational. This then led to extensive EC discussion which included a 3/4 vote instead of 2/3, provisional versus permanent changes, and absentee EC members. Finally the Executive Secretary requested the following two part motion be considered by the EC. First there will be an advanced circulation to EC members of suggested changes to the Statutes and By-Laws by the Executive Secretary. Secondly at the EC meeting a 3/4 vote of members is required for approval.

The EC Approved this Motion Unanimously.

Harvey indicated that the changes will be drafted, and then the Executive Secretary will circulate the suggested revised Statutes and By-Laws to the EC. If further comments are received there may be two iterations prior to a vote at the EC meeting before the 16th ICPWS in London. The decision will be provided to the GM.

A final request from the EC was that the Statutes committee review the IAPWS Mission Statement to ensure that it reflects the actual current work activities of IAPWS.

18.3 Press Release

The President mentioned that Bellows and Joy had been asked on Monday to develop a Press Release. A “Highlights” had been developed with input provided by each WG and SC. The President asked bellows to circulate it to the WG / SC Chairmen to finalize it. The final version is contained in Attachment 10.

18.4 Other New Business

President Daucik asked the EC if there was any further business. No other business was raised.

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:

BIAPWS	Attachment 11
Canada	Attachment 12
Czech Republic	Attachment 13
Germany	Attachment 14
Japan	Attachment 15
Russia	Attachment 16
USA	Attachment 17

18.6 Participants

Attachment 18 provides a list of participants at the IAPWS EC and WG Meetings and at the Symposium in Boulder, Colorado, October 2012.

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 Boulder Meetings. This will be forwarded electronically to the Head of each National Committee.

19. Closing Remarks and Adjournment

The President thanked Friend and his US NC colleagues for hosting the IAPWS Boulder Meetings. He also thanked everybody for participating at this EC meeting. Then he formally closed the 2012 EC meeting at 12:30pm.