

Minutes of the Meetings
of the
Executive Committee
of the
International Association for the Properties of Water and Steam
held in
Stockholm, Sweden
29th June – 3rd July 2015

Plenary Session. Monday, 29th June 2015. 8:34am

The new President of IAPWS, Dr. David Guzonas, welcomed the Executive Committee (EC) and other IAPWS members to Stockholm for the Executive Committee and Working Group (WG) Meetings of IAPWS. The President officially opened the 2015 EC Meetings by introducing the National Delegates. Each of the Member countries of IAPWS was in attendance as well as Associate Members, Australia and New Zealand. In total there were 62 people assembled for the EC meeting.

The President asked the Chairman of SIAPWS, Mats Hellman, to welcome IAPWS and to provide a few details of the planned IAPWS week.

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 eleven documents had been circulated to the National Committees during the year since the Moscow meeting for approval or final review prior to being approved during the current EC Meeting. The Executive Secretary reminded the EC of these documents:

- *Revised Release on the IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use*. Distributed 21st August 2014. No comments or objections were received. Thus document was approved 24th November 2014.

- Four Revised Supplementary Releases for the four sets of “backward” equations that supplement IAPWS-IF97:
 - * *Backward Equations $p(h,s)$ for Region 3, Equations as a Function of h and s for the Region Boundaries, and an Equation $T_{sat}(h,s)$ for Region 4 of IAPWS-IF97.*
 - * *Backward Equations for $p(h,s)$ for Regions 1 and 2 of IAPWS-IF97.*
 - * *Backward Equations for $T(p,h)$, $v(p,h)$ and $T(p,s)$, $v(p,s)$ for Region 3 of IAPWS-IF97.*
 - * *Backward Equations for $v(p,T)$ for Region 3 of IAPWS-IF97. Thermodynamic Derivatives from IAPWS Formulations.*

Distributed 25th July 2014. No comments or objections were received. Thus the documents were approved 24th October 2014.

- Three amended IAPWS Technical Guidance Documents:
 - * *Technical Guidance Document – 2015 Revision: Instrumentation for monitoring and control of cycle chemistry for the steam-water circuits of fossil-fired and combined cycle power plants.*
 - * *Technical Guidance Document – 2015 Revision: Phosphate and NaOH treatments for the steam-water circuits of drum boilers of fossil and combined cycle/HRSG power plants.*
 - * *Technical Guidance Document – 2015 Revision: Volatile treatments for the steam-water circuits of fossil and combined cycle/HRSG power plants*

Distributed on 24th February 2015. Other than a cross referencing correction by the Japan National Committee no objections or comments were received by 31st May 2015. The documents will be reviewed finally by the PCC working group during the week prior to approval at the Friday EC.

- Two draft IAPWS Guidelines:
 - * *Guideline on Thermodynamic Properties of Supercooled Water*
 - * *Guideline on a Virial Equation for the Fugacity of H_2O in Humid Air.*

Distributed on 16th April 2015 for a postal ballot as agreed by the EC in Moscow. No comments or objections were received by 31st May 2015. The documents will be reviewed finally by the working groups during the week prior to approval at the Friday EC.

- One draft IAPWS Guideline:

- * *Guideline on Thermal Conductivity of Seawater*

Distributed on 10th May 2015 for a postal ballot as agreed by the EC in Moscow. No comments or objections were received by 31st May 2015. The documents will be reviewed finally by the working groups during the week prior to approval at the Friday EC.

2.2 Press Release.

The President asked Thomsen and Cook to develop a Press Release on the IAPWS proceedings during the week. The Clerks of Minutes from each WG were asked to provide input. The Press Release is discussed in Minute 17.1 and is Attachment 11.

2.3 Evaluation Committee on International Collaboration.

The President indicated that no proposals had been received by the Executive Secretary prior to the meeting, and that any suggestions from WGs should be given to the Executive Secretary by the end of day. The President then reminded the EC that the Committee to review any proposals received would consist of the WG Chairmen, with the President and Executive Secretary as ex. officio members. A chairman would be chosen by the Committee. (See Minute 15.1 for review of proposals received).

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 2016 award would consist of a member from Czech Republic, Germany, Japan, Russia and SIAPWS. Czech Republic will provide the committee chairman. The President asked Czech Republic delegate Hruby 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 Kretzschmar (Chairman) and Friend form the Committee for 2016. The President would be ex. Officio.

2.5 IAPWS Associate Members.

The President reminded the EC of the discussions in Moscow regarding inactive Associate members and requested the Executive Secretary to provide an update. Following the Moscow meetings a postal ballot was sent to the National Committees of IAPWS with the motion: “Do you agree to keep the Associate Member in IAPWS?” All IAPWS Members voted on each Associate Member. The following results of this postal ballot were displayed to the EC:

1. Should Argentina / Brazil remain as an Associate Member of IAPWS? 4 Yes and 4 No votes.
2. Should France remain as an Associate Member of IAPWS? 8 Yes and 0 No votes.
3. Should Greece remain as an Associate Member of IAPWS? 7 Yes and 1 No votes.
4. Should Italy remain as an Associate Member of IAPWS? 3 Yes and 5 No votes.

There had been no further correspondence with any of the Associate Members since the ballot. The President requested discussion. First, the relevant Section 3.2.1f) of the IAPWS Statutes was quoted: “*After a defaulting Member has been in Associate Member status for three years, its membership shall be terminated; under special circumstances this termination may be deferred by the Executive Committee on an annual basis*”. The postal ballot results led to much EC discussion which eventually resulted in three motions.

Motion 1: Following the IAWPS Statutes and based on the postal ballot, Italy should be removed as an Associate Member of IAPWS, and the Executive Secretary should notify the last known contact.

The EC voted unanimously to support this motion.

Motion 2: Following the IAWPS Statutes and based on the postal ballot, Argentina/Brazil should be removed as an Associate Member of IAPWS.

The EC voted 2 For and 6 Against this motion.

The Executive Secretary was then requested to contact the last head of the Argentina/Brazil Joint Committee to determine if there is any way to re-activate the committee.

Motion 3: Following the IAWPS Statutes and based on the postal ballot, the Executive Secretary should contact the last heads of the France and Greece National Committees to determine if there is any way to re-activate the committee.

The EC voted unanimously to support this motion.

The President finalized this item by indicating that the activities would be discussed again at the 2016 EC meetings.

2.6 Report on CCQM / CCT / BIPM Interfaces

The President reminded the EC that approval was provided at the 2014 EC meetings for travel expenses not to exceed \$8,000USD for two people to attend WG meetings with BIPM to foster continuing relationships. He then asked Feistel to report on any activities over the last year. The interface with BIPM is going well and successful. There were not meetings for CCT and CCM over the last year, but Feistel attended a BIPM Workshop on Measurement Uncertainty on 15th and 16th June 2015 at BIPM, Sevres.

2.7 Cover Page of IAPWS Documents.

The President requested the chair of the Editorial Committee to address this item. Harvey reported that there were a few inconsistencies in the front page of IAPWS documents and that currently the President and Executive Secretary look like “authors” of each document. Also, these officers may be different when somebody looks at the document in the future. Harvey then presented the suggested changes for future documents:

- Consistency – cover page paragraph should just have the basic summary and that any detailed information about the process should be in an “Introduction” or similar section,
- Remove President and Executive Secretary from a prominent position on cover page but include the Executive Secretary and email address at end along with website address, and mention President with listing of Member countries, and
- Add a line to the cover page about how the document should be cited.

The EC voted unanimously to support these changes.

Following the vote the EC discussed whether IAPWS documents should have a document identifier. After much discussion without a consensus, the President requested that each WG and SC chair should discuss this item with their WG and report back to the EC on Friday.

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 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 two ICRNs needed attention during the week: #22 on steam chemistry in the phase transition zone (PTZ) and #24 on thermal conductivity of water at low pressures and high temperatures. Two new ICRNs will also be worked on during the IAPWS week: #29 on uncertainties in coolant sampling for low concentration metals, and #30 on thermodynamic properties of supercooled 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 Guzonas 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 9:40 am.

Activities During the Week in Stockholm

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, 1st July 2015 and the Symposium Program is shown in Attachment 3.

Executive Committee Meeting. Friday, 3rd July 2015

President Guzonas opened the continuation of the EC Meeting at 8:30 am. Each of the Member countries of IAPWS was in attendance as well as Associate Members Australia, New Zealand and Switzerland. In total there were 24 people assembled for the EC meeting. Guzonas 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 Guzonas asked for comments and changes to the minutes of the EC meeting held in Moscow, Russia in June 2014. No changes were noted, thus the 2014 Minutes were accepted.

6. President's Report

President Guzonas indicated that it had been a very good year for IAPWS with many new documents being worked on and published. The activities within the Working Groups during the week had been exceptional. He was very pleased that the interfaces with BIPM had continued and will be strengthened further.

7. Report and Recommendations of the Thermophysical Properties of Water and Steam (TPWS) Working Group

TPWS Chairman Harvey opened this item by indicating that he would report on the activities relating to TPWS although a number of joint meetings with IRS and SCSW had taken place during the week. Full Minutes and the Agenda for TPWS can be found in Attachment 4.

- 7.1 The Working Group (jointly with SCSW) considered the “*Guideline on a Virial Equation for the Fugacity of H₂O in Humid Air*” The Evaluation Task Group gave a favorable report. TPWS and SCSW recommended that the Guideline be approved by the EC.

The EC approved the Guideline Unanimously.

- 7.2 The Working Group (jointly with SCSW) considered the “*Guideline on Thermodynamic Properties of Supercooled Water*”. The Evaluation Task Group report was favorable. TPWS and SCSW recommended that the Guideline be approved by the EC.

The EC approved the Guideline Unanimously.

- 7.3 The Working Group (jointly with PCAS) considered the “*Guideline on Thermal Conductivity of Seawater*”. The Evaluation Task Group report was favorable. TPWS and PCAS recommended that the Guideline be approved by the EC.

The EC approved the Guideline Unanimously.

- 7.4 ICRNs. Chairman Harvey indicated the following activity on ICRNs relating to the WGs:

- ICRN 30. The Working Group (jointly with SCSW) considered a new ICRN on *Thermophysical Properties of Supercooled Water*. TPWS and SCSW approved the ICRN and request that the EC send it for postal ballot after the meeting by the procedure specified in the IAPWS By-Laws.
- ICRN 24. It was decided to allow ICRN 24 (*Thermal Conductivity of H₂O at Low Pressures and High Temperatures*) to expire. Harvey will prepare a closing statement.

The EC approved the Changes to the ICRNs Unanimously.

- 7.5 Chairman Harvey then informed the EC on the following four items of interest:

- A Task Group consisting of Wagner and Harvey was appointed to refine the uncertainty estimates for the isobaric heat capacity in IAPWS-95 based on new data.
- A Task Group including Friend, Feistel and Hrubý has been formed to come up with an opinion of whether the topic of differential evaporation of isotopic species of water is relevant for IAPWS.
- A Task Group consisting of Hellmuth, Hrubý, and Sengers was formed to work on a new ICRN for interfacial properties of supercooled water.
- Existing Task Groups continue to work toward new formulations for the thermodynamic and transport properties of heavy water, and for the surface tension of water.

- 7.6 TPWS Membership. Chairman Harvey requested EC approval for the following TPWS WG membership items:

Membership in TPWS should be terminated for Gernert and Spitzer. He also reported sadly that Dr. Ines Stöcker had recently passed away.

Two proposals were submitted for TPWS membership:

- Dr. Hiroyuki Miyamoto (Toyama Prefectural University, Japan)
- Prof. Dr. Ing. Karsten Meier (Helmut-Schmidt-University in Hamburg, Germany).

Both proposals were approved by the Working Group.

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. Minutes for IRS and the Agenda can be found in Attachment 5. He covered the following two items with the EC.

8.1 Proposed Guideline on the *Fast Calculation of Steam and Water Properties Using Spline Interpolation* (SBTL).

Weber reported that the Guideline document exists and there has been a successful evaluation of the technical content. Editorial changes are now required, and the IRS and TPWS working groups recommend adoption by EC. It is suggested that the Editorial Committee and the authors perform the editorial changes, and after the document has been finalized it is distributed to National Committees for Postal Ballot.

The EC approved the Process for this Guideline Unanimously.

8.2 Industrial Advisory Group. Weber indicated that an additional advisory note will be created (instead of an extension of Advisory Note #2). This will list all documents relevant for power industries and explanation of their interdependencies. The task group will prepare such a document for the 2016 meeting.

8.3 Informational item on discussions within IRS. Weber indicated that no further IRS products appear to be on the horizon after SBTL guideline and so the IRS working group discussed possible topics for future work within IRS. A few technical topics were identified, but either demand in industry does not exist or they were not in IRS scope.

Thus the IRS working group had discussed making itself dormant. Discussion will continue throughout the next year and at the 2016 meeting because of the danger of losing members due to missing justification for travel to meetings.

9. Report and Recommendations of the Sub-Committee on Seawater (SCSW)

SCSW Chairman Pawlowicz reported on the following items. Minutes for SCSW and the Agenda can be found in Attachment 6.

9.1 Highlights.

- Annual report of Joint SCOR/IAPWS/IAPSO Committee on the Properties of Seawater (JCS):
 - Two new members had been proposed: Wolf (PTB) for density, and Stoica (LNE) for pH replacing Spitzer (PTB)

- Downloads of TEOS software and manuals had increased over last year
- Many tasks that had been identified at the JCS workshops at the 16th ICPWS have now been completed, while others have made good progress
- BIPM/IAPWS cooperation continues
- Metrologia article (now 4 articles) in review (#1 accepted 1st July)
- R. Feistel attended BIPM workshop on uncertainty (June 2015)
- Nine presentations providing updates on progress and plans with respect to seawater issues
- JCS proposed a formal procedure for updating TEOS-10 (and IAPWS documents related to TEOS-10); after discussion this was accepted by SCSW/TPWS.

9.2 Task Groups. The Chairman of SCSW informed the EC of the following Task Groups:

- Task Group to write an Advisory Note on TEOS-10 and the role of IAPWS documents within it (Feistel, Pawlowicz, Harvey)
- Task Group to write a Supplementary Release describing a simplified equation for the density of seawater for oceanographic use (Pawlowicz, McDougall, co-opted expert Barker), and evaluation group (Harvey and Feistel)
- Task Group on Providing Uncertainty in IAPWS products (Feistel, Seitz, Hruby, Friend, and Lovell-Smith)

9.3 Interface with BIPM.

The Chairman next requested IAPWS support to send a SCSW member to the April 2016 BIPM/CCT meeting (Paris) to continue working with BIPM on incorporation of Relative Humidity into SI. The estimated cost is 1000 Euros.

The Russian Delegate, Orlov, wanted to make sure that there would be a report distributed following the meeting.

The EC then approved this Request Unanimously.

9.4 Membership. Pawlowicz then requested that the EC approve the following three new members from National Center of Ocean Standards and Metrology in China for the SCSW:

Yongchao Pang. Director, Calibration and Testing Center
 Chuan Zhang. Senior Engineer, Chemical Standards
 Yanan Li. Engineer, CTD calibration

The EC approved these Membership Additions Unanimously.

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

Chairman Anderko provided the PCAS Report to the EC. Full Minutes can be found in Attachment 7. He covered the following items with the EC:

- 10.1 *Guideline on Thermal Conductivity of Seawater*. Chairman Anderko indicated this collaborative effort with TPWS and SCSW had been reported and approved in the TPWS report (Minute 7.3).
- 10.2 Forthcoming Guidelines. Anderko reported that two other guidelines on *Self-diffusion in High Temperature Water* (Yoshida) and on the *Dissociation and Vapor-liquid Distribution of Amines* (Bellows) were under development. It is anticipated that both will be ready for the 2016 meeting.
- 10.3 PCAS Membership. Chairman Anderko requested that the following new member be approved:

Kaj Thomsen. Technical University of Denmark

The EC approved this Membership Addition Unanimously.

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

Chairman Rziha provided the PCC Report to the EC. Full Minutes can be found in Attachment 8 and PCC Nuclear Minutes in Attachment 8A. He covered the following items with the EC:

- 11.1 Technical Guidance Documents (TGD) for Approval. Chairman Rziha requested EC approval for the three amended TGD for Fast Start HRSGs delineated in Minute 2.1. These had received a final review by the PCC Working Group during the week.

The EC approved these Amended TGD Unanimously.

- 11.2 Technical Guidance Documents (TGD) under Development. Chairman Rziha informed the EC that the TGD Task Group (Chair: Dooley) had initiated the following activities during the week.

- Possible future TGD on Corrosion Product Monitoring in Cycling and Two-shifting Plants. A Task Group has been formed (Addison Chair) to develop a White Paper for review by PCC at the 2016 meeting with the possibility of developing a TGD following the meeting.
- New TGD proposed on “Ensuring the Integrity and Reliability of Demineralised Makeup Water Supply to the Unit Cycle”. A Task Group has been formed (Joy Chair) to develop this TGD for approval at the 2016 meeting.
- New TGD proposed on “HRSG HP Evaporator Tube Sampling”. A Task Group has been formed (Dooley Chair) to develop this TGD for approval at the 2016 meeting.
- New TGD proposed on “Film Forming Amines”. A Task Group has been formed (Hater and Lendi Chairs) to develop this TGD for approval at the 2016 meeting.
- Possible future TGD on Geothermal Chemistry. A Task Group has been formed (Addison Chair) to develop a White Paper for review by PCC at the 2016 meeting with the possibility of developing a TGD following the meeting.

- 11.3 ICRNs. Rziha provided the EC with the following information for approval.

ICRN 17 on Amines. The PCC WG had decided that this ICRN will be closed because a Guideline and a TGD are under preparation.

ICRN 22 on Steam Chemistry in the Phase Transition Zone. It is requested that this ICRN is extended for two more years.

ICRN 29 on Uncertainties in Coolant Sampling for Low Concentration Metals. The ICRN will be sent for a final review to the PCC WG. The final version will be sent to the Editorial Committee for a light review. The PCC WG request that the EC then send it for postal ballot after the meeting by the procedure specified in the By-Laws.

The EC approved these ICRN Actions Unanimously.

- 11.4 PCC Membership. Rziha indicated that Thomsen has stepped down as a Vice Chairman of PCC and requested that Leidich become the second Vice Chairman of PCC. Rziha also requested that the following new members be approved:

Roger Lundberg (Sweden)
Nobuo Ishihara (Japan)
Keith Fruzzetti (USA)
Joung Hae Lee (Korea)

The EC approved these Membership Changes Unanimously.

- 11.5 Items Needing Discussion with EC. Chairman Rziha reported on the following discussions by PCC during the week.

- PCC asked for the status of creating an open and closed area on the OPAL webserver (EC minutes 2014). This item lead to discussion by the EC which indicated that the Opal site was a password protected location for Working Group documents, and that a site could be developed for open access on the IAPWS website. Finally a consensus was developed that the WG Chairman would provide approval of documents before placing them on the IAPWS website. A caveat would be added that these documents are not official IAPWS documents.

The EC approved this Unanimously.

- PCC proposed to create a kind of “yellow pages” of all PCC WG members, in order to know the individual fields of expertise (especially for new WG members). This also led to much discussion and then consensus by the EC. It was also agreed that the members contact details could also be on this file if the individual agrees.
- PCC proposed a “refurbishment” of the appearance of the IAPWS website. The content was considered satisfactory. This lead to discussion on whether the refurbishment required a budget for a web designer. Finally a proposal was developed that each WG would suggest somebody to Harvey as chair by October

2015 to constitute a Task Group which would investigate the possibilities of upgrading the IAPWS website and provide a budget. This would be prepared by March 2016 and circulated to the National Committees.

The EC approved this Motion Unanimously.

12. Editorial Committee Report

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

Minor Revision of IAPWS-95 Release
3 Amended Technical Guidance Documents
Guideline on Thermodynamic Properties of Supercooled Water
Guideline on a Virial Equation for the Fugacity of H₂O in Humid Air
Guideline on Thermal Conductivity of Seawater

Harvey then indicated that a large number of documents will need editorial review over the next year and requested early notification.

13. Membership and Associates

13.1 Member Dues.

The Executive Secretary indicated that all IAPWS Members have paid their 2015 dues.

13.2 Reports on Associate Members

The President reminded the EC that discussion had focused on Monday on the inactive Associate Members (Minute 2.5). The Executive Secretary then asked the recent associate members to provide an update on their activities towards membership.

Australia. Chairman Joy provided a short presentation. The Australian National Committee (AUSAPWS) has continued to focus on the Power Cycle Chemistry area but is also developing a wider focus in seawater, carbon sequestration and thermodynamics. AUSAPWS now has about 60 members and has developed an initial Statutes. There were continuing challenges during 2015 in the Australian Electricity Generation industry due to profitability and proposed sales of State owned and private generators as well as plant shutdowns. Joy indicated that AUSAPWS is finalizing funding arrangements with API and also seeking further Company and individual membership and sponsorship to complete AUSAPWS funding. An Australian wide steering committee has been formed. Joy requested that the EC approves a second three year period for Associate Membership and indicated that they are planning to apply for IAPWS Membership at the next meeting in 2016 in Germany.

The EC approved the Continuing Associate Membership Unanimously.

New Zealand. Chairman Addison provided an update on NZAPWS. He indicated that the IAPWS TGD are heavily used in New Zealand. They are currently working on a fee structure for individual member companies and have opened a bank account. NZAPWS

needs 15 paid members to become a non profit incorporated society in NZ. To accomplish these Addison requested that the EC approves a second three year period for Associate Membership and indicated that they are planning to apply for IAPWS Membership at the next meeting in 2016 in Germany.

The EC approved the Continuing Associate Membership Unanimously.

Switzerland. Chairman Lendi indicated that the Swiss National Committee had still not yet been able to acquire financial commitment, but that they plan a National Meeting in autumn 2015 to find new participant institutions. Lendi requested that the EC approves a second three year period for Associate Membership.

The EC approved the Continuing Associate Membership Unanimously.

14. Executive Secretary's Report

14.1 Financial, Auditors and IAPWS Dues

The Executive Secretary reported that IAPWS is on a sound financial footing with currently about £70,000GBP in total in the UK and US bank accounts. The status as at 15th June 2015 in the bank accounts had been provided to each National Delegate prior to the EC meeting.

The Executive Secretary next reported that the 2014 financial statements had been forwarded to the IAPWS Auditors in January 2015. Both Dr. Hencke of VDI in Germany and Professor Savarik in Czech Republic had reviewed and approved the financial statements. Both approvals had also been provided to the Heads of all the National Delegates present prior to the EC meeting.

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 2016.

The EC Unanimously Agreed to this Proposal.

The Executive Secretary had also provided a rough estimate of the income and known planned expenditures for 2015 / 2016.

14.2 Time and Place of the 2016, 2017 and 2018 Meetings

2016 IAPWS Meetings. The German Delegate, Kretzschmar, indicated that the German NC would like to invite IAPWS to Dresden on 11th to 16th September 2016. Arrangements have been made at the Steigenberger Hotel in a central location in Dresden. He indicated that a website will be developed for the meeting and this will be linked with the IAPWS website.

2017 IAPWS Meetings. The Japan Delegate, Nakahara, indicated that the Japan NC would like to invite IAPWS to Kyoto in the week starting Sunday 27th August 2017. Details will be available at the next meeting in Dresden in September 2016.

2018 IAPWS Meetings and the 17th ICPWS. The Head of the Czech Republic NC, Hruby, reported that the Czech Republic National Committee will support the 17th ICPWS in Prague. Much discussion by the EC on the dates suggested of 26th to 31st August 2018 led to the usual direction that the Host National Committee should make the final decision based on the inputs received. Hruby also quickly reviewed the possible conference fee structure, sponsors, hotel and internet services. Full details on the 17th ICPWS will be available at the next IAPWS meeting in Dresden in 2016 when the first meeting will take place between the local organizing committee (LOC) and the international program committee (IPC) to start planning the technical program. The final item was discussion on the IAPWS Donation to the Czech National Committee for the 17th ICPWS. Some discussion first took place on returning this donation to IAPWS before a motion was developed to provide a donation of up to £16,000 upon request to the Executive Secretary.

The EC Approved this Unanimously.

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. Two international collaborations had been suggested during the 2015 IAPWS meetings.

15.1 International Collaborative Projects.

The President requested the Chairman of the 2015 International Collaboration Committee (WG and SC Chairs) to report on the findings of that committee during the week. Chairman Anderko reported that two collaborative projects had been proposed. The following are overviews of the proposed projects. The details are provided in Attachments 9 and 10:

- *Towards an IAPWS Guideline for the Thermodynamic Properties of Supercooled Heavy Water.*
The IAPWS sponsors are Anisimov (USA) and Hruby (Czech Republic). The young scientist (Michal Duška) will be from the Institute of Thermomechanics of the CAS. It is proposed that IAPWS funding of £17,490GBP would cover subsistence for 9 months at the University of Maryland. If approved, a report on the research will be presented at the 2017 IAPWS meetings.
- *High Temperature Data on the Effects of Combined Anion Contamination on the Corrosion of Boiler Materials.*
The IAPWS sponsors are Cook (Canada) and Addison (New Zealand). The scientist is David Addison from Thermal Chemistry. A total budget of £ 9,600GBP is proposed for this project, to reside at UNB over six months (in 6-8 week periods) to assemble and commission a flow-through electrochemical cell and to conduct baseline tests. This would pay for the

travel and living expenses. If approved, a report on the research will be presented describing commissioning and preliminary baseline testing at the next annual meeting in Germany.

Anderko indicated that the Evaluation Committee supported both proposals and that the technical content was of interest to IAPWS. He indicated that the committee recommended to the EC that both are funded, but that if there are financial constraints then the committee ranked the Corrosion of Boiler Materials proposal as priority one as it related directly to a current ICRN. The President indicated that the IAPWS finances were in good condition and developed a motion to support both proposals as submitted.

The EC Approved the Motion to Fund Both Projects Unanimously.

16. IAPWS Awards

16.1 IAPWS Helmholtz Award

The President reported that the 2015 Helmholtz Award was to Dr. Vincent Holten of Cornell University but unfortunately he had not been able to present the Helmholtz Lecture at the IAPWS Symposium on Wednesday.

Guzonas then asked the Czech Delegate, Hruby, for the names of the 2016 Helmholtz Award Committee. The 2016 Helmholtz Committee will consist of: Chairman Vinš (Czech Republic), Wagner (Germany), Hirano (Japan), Orlov (Russia) and Jensen (SIAPWS),

Action: Nominations will be due to the Executive Secretary by 31st January 2016.

16.2 IAPWS Honorary Fellowships

The President reported that Professor Masaru Nakahara had been elected an 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 to him at the IAPWS banquet by the IAPWS President.

Guzonas then reminded the EC of the Awards Committee for 2016 with Kretzschmar as Chairman and Friend as member with the IAPWS President as ex.-officio member.

Action: Nominations are due to the Executive Secretary by 31st January 2016.

17. New Business

17.1 Press Release

The President mentioned that Cook and Thomsen had been asked at the EC meeting on Monday to develop a Press Release. This was developed with input provided by each WG and SC. Cook indicated that a document had been prepared. The final version is Attachment 11. The President indicated that this release will be sent to all NCs and WGs of IAPWS and it should be distributed as widely as possible and sent to any journals and publications.

17.2 Numbering System for IAPWS Documents

The President now returned to this item from the Monday EC meeting and asked the Chairman of the Committee to report. Harvey indicated that the WG Chairs had met during the week. There was a desire from PCC to have the TGD with identifiers. As ICRNs already had numbers the committee suggests that this should be done for all IAPWS documents, and that this should be retroactive for the documents already published. The actual numbering system had not been discussed, and Harvey suggested that the Editorial Committee develop a proposal which will be circulated to the National Committees by the end of 2015 for an administrative postal ballot.

The EC Approved this Suggestion Unanimously

17.3 SIAPWS National Committee Feedback on the Stockholm Meetings.

The SIAPWS Delegate, Hellman, thanked everybody for attending and indicated that everything appeared to have proceeded very smoothly.

17.4 Other New Business

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

17.5 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 12
Canada	Attachment 13
Czech Republic	Attachment 14
Germany	Attachment 15
Japan	Attachment 16
Russia	Attachment 17
Switzerland	Attachment 18
USA	Attachment 19

17.6 Participants

Attachment 20 provides a list of participants at the IAPWS EC and WG Meetings in Stockholm, Sweden in June/July 2015.

17.7 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 Moscow Meetings. This will be forwarded electronically to the Head of each National Committee and the Working Group Chairs.

18. Closing Remarks and Adjournment

The President thanked everybody for participating at this EC meeting. Then he formally closed the 2015 EC meeting at 12:06pm.