

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

MEMBERS

Australia
Britain and Ireland
Canada
Czech Republic
Germany
Japan
New Zealand
Russia
Scandinavia (Denmark, Finland, Norway, Sweden)
United States of America

ASSOCIATE MEMBERS

Argentina and Brazil
China
Egypt
France
Greece
Italy
Switzerland

EXECUTIVE SECRETARY

Dr. Barry Dooley.
Structural Integrity
Southport, PR8 2EJ. UK

Phone: +1-704-502-5081
Email: bdooley@iapws.org

Minutes of the Meetings

of the

Executive Committee

of the

International Association for the Properties of

Water and Steam

**Prague, Czech Republic
2nd – 7th September 2018**

Prepared by: Barry Dooley



CONTENTS

	<u>Page</u>
IAPWS Minutes	1

ATTACHMENTS

1	Agenda for EC	16
2	Schedule for IAPWS Week	17
3	TPWS Minutes.....	18
4	IRS Minutes	26
5	SCSW Minutes	29
6	PCAS Minutes	30
7	PCC Minutes.....	31
8	International Collaboration Project.....	35
9	Press Release of IAPWS Meetings in Prague.....	36
10	Future ICPWS.....	39
11	Canada Report of Activities.....	40
12	Czech Republic Report of Activities	46
13	Germany Report of Current Research	49
14	Japan Report on Current Research	57
15	New Zealand Report on Current Research	65
16	SIAPWS Report of Current Research.....	67
17	Switzerland Report of Current Research	69
18	USA Report on Current Research.....	70
19	List of Participants at ICPWS and IAPWS 2018.....	72

Minutes of the Meetings
of the
Executive Committee
of the
International Association for the Properties of Water and Steam
held in
Prague, Czech Republic
2nd – 7th September 2018

Plenary Session. Sunday, 2nd September 2018. 9:03am

The President of IAPWS, Professor Hans-Joachim Kretzschmar, welcomed the Executive Committee (EC) and other IAPWS members to Prague for the 17th ICPWS and the Executive Committee (EC) and Working Group (WG) Meetings of IAPWS. He first asked the Chair of the Czech National Committee, Dr. Tomáš Němec, to welcome the EC to Prague and introduce the Chairman of the 17th ICPWS, Dr. Jan Hruby. The President then officially opened the 2018 EC Meetings by introducing the National Delegates. All of the Member and Associate Member countries of IAPWS were in attendance with the exception of New Zealand, Argentina/Brazil, China, France and Greece. In total there were 26 people assembled for the EC meeting.

1. Adoption of Agenda

Provisional agendas had been posted on the IAPWS Website for all IAPWS members by the Executive Secretary in June 2018. There were a few additions and the final 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 IAPWS Business Since Last EC Meeting in Kyoto, Japan, August / September 2017

The Executive Secretary indicated that one document had been circulated to the National Committees during the year since the Kyoto meeting for final approval:

- *Release on the IAPWS Formulation 2017 for the Thermodynamic Properties of Heavy Water.* Kyoto EC Minute 7.1 indicated that the Release would have an Editorial Committee review after the Kyoto meeting. This was completed, and the document was circulated for a Postal Ballot on 8th December 2017. No objections were received by 9th March 2018, so the Release became an official IAPWS document (R16-17).

2.2 Press Release / IAPWS Highlights.

The President asked Cook to chair the development of the Highlights/Press Release on the IAPWS / ICPWS proceedings during the week. It was also suggested that Hruby and Němec assist in this development. The Clerks of Minutes from each WG were asked to provide input. The Press Release is discussed in Minute 18.1 and is Attachment 9.

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 further discussion on International Collaborations).

2.4 IAPWS Awards Committees

2.4.1 Helmholtz Award Committee

The Executive Secretary reminded the EC that the Helmholtz Committee for the 2019 award would consist of a member from BIAPWS, Canada, Czech Republic, Germany and Japan. BIAPWS will provide the committee chairman. The President asked BIAPWS delegate, Sparrey, to organize the committee and to report back to the EC on Friday with the names of the members of this committee (see Minute 16.1).

2.4.2 Honorary Fellow Award Committee

The President requested that Nakahara (Chairman) and Harvey form the Committee for 2019. The President would be ex. Officio.

2.5 Preparation for the General Meeting. Host Country for 18th ICPWS

The Executive Secretary indicated that the next country in line to host the 18th ICPWS is the USA, and requested that the head of the US National Committee, Friend, discuss the possibility of holding the next conference with the US Committee and report back to the Executive Secretary by the end of 2018.

2.6 Discussion on Future ICPWS

The Executive Secretary indicated that there had been 17 ICPWS conferences and that the first one was in 1929. Since the 1989 11th ICPWS in Prague the format for the conferences had been the same. This year the number of attendees was reduced compared with previous conferences, and the President, Vice President and Executive Secretary suggested to the EC that a small committee should be formed to review the format and frequency of the conferences and whether they should continue. After some discussion a committee was formed: Friend (Chair), Cook, Hruby, Henderson, Dooley and Rziha. They would meet during the week and report back to the EC at the Friday meeting (see Minute 18.3)

2.7 OPAL Website for IAPWS Documents and Presentations

The President reminded the EC of the Opal Website for storage of IAPWS Working Group files and presentations. This is a password protected site for use by the IAPWS Working Groups.

3. EC Mandate to Working Groups and Membership

The President introduced 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 one ICRN needed attention during the week. ICRN #22 on steam chemistry in the phase transition zone (PTZ) needed finalization by the PCC Working Group, brief review by the Editorial Committee and then a Postal Ballot.

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 Working Group (WG) Chairmen of the Week's Activities

President Kretzschmar 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 3 to 7).

Following this item, the President closed the opening session of the EC at 9:45am.

Activities During the Week in Prague

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

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

Executive Committee Meeting. Friday, 1st September 2017

President Kretzschmar opened the continuation of the EC Meeting at 8:32am. All of the Member and Associate Member countries of IAPWS were in attendance with the exception of Argentina/Brazil, France and Greece. In total there were 30 people assembled for the EC meeting.

The President then presented the 2018 IAPWS Honorary Fellow Award to Mr. Ingo Weber.

Kretzschmar then asked the EC if there were any additional items that should be added to the EC Agenda. None were suggested.

5. Acceptance of Minutes of Previous Meeting

President Kretzschmar asked for comments and changes to the minutes of the EC meeting held in Kyoto, Japan in 2017. No changes were noted, thus the 2017 Minutes were accepted.

6. President's Report

President Kretzschmar next provided his report and indicated that this was the same report as presented at the IAPWS General Meeting:

- 6.1 The President first wanted to thank the Czech National Committee for arranging the 17th ICPWS under the Chairmanship of Hruby.
- 6.2 Membership. Kretzschmar was very pleased to welcome Australia as a Member of IAPWS (Minute13.1).
- 6.3 Working Group (WG) Activities. The President indicated that the Working Group (WG) IRS was very important to IAPWS and encouraged them to include people from industry. The Technical Guidance Documents from the PCC WG were penetrating internationally and giving IAPWS a leadership position.

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 joint meeting with IRS and SCSW had taken place during the week. Full Minutes and the Agenda for TPWS can be found in Attachment 3.

- 7.1 The Working Group (WG) considered a *Revised Release on the IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use (IAPWS-95)*. There had been some minor document updates to clarify some calculations and improve some uncertainty estimates; the formulation had not changed. The WG had voted to approve the draft revised Release. The WG Chairman requested the EC to authorize a Postal Ballot.

The EC approved this Request Unanimously.

- 7.2 The Working Group (WG) considered a *Revised Release on the IAPWS Formulation 2017 for the Thermodynamic Properties of Heavy Water*. The revision reflects an improved formulation, after the WG found some highly accurate liquid data had been omitted from the fit approved last year. The WG voted to approve the draft revised Release. The WG Chairman requested the EC to authorize a Postal Ballot after Editorial Committee approval.

The EC approved this Request Unanimously.

- 7.3 The Working Group (WG) considered a *Revised Advisory Note 3: Thermodynamic Derivatives from IAPWS Formulations*. The revision was needed to make it consistent with the new heavy water Release. The WG voted to approve the draft revised Advisory Note. The WG Chairman requested the EC to authorize a Postal Ballot after Editorial Committee approval.

The EC approved this Request Unanimously.

7.4 Harvey provided an informational item that a Task Group had been formed to prepare a *Guideline on the Diffusion Coefficient of Water*. The new membership of the Task Group will consist of: Yoshida, Harvey, Caupin and Hellmann. The WG also appointed an Evaluation Task Group: Meier (chair) and Orlov [also Anderko from PCAS].

7.5 ICRNs.

Harvey reported that ICRN-27 (properties of humid gases and CO₂-rich mixtures) was closed in 2014. Span and Harvey need to prepare closing statement. The first draft was prepared during the week and should be completed in 2018.

7.6 TPWS Membership.

Chairman Harvey requested EC approval for two new TPWS WG members who had been approved by the WG:

- Cornelia Breilkopf (Technical University Dresden, Germany)
- Robert Hellmann (University of Rostock, Germany)

Harvey also informed the EC that Henning Wolf had retired from PTB, Germany and had requested to be removed from membership.

The EC approved these Membership Changes Unanimously.

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

IRS Chairman Okita indicated that many of the activities of IRS had been reported in the TPWS report. Minutes for IRS and the Agenda can be found in Attachment 4. He then reported on the following informational items on IRS Task Groups:

- Task Group on Categories of Industrial Requirements will continue. The categories will be shared using the OPAL password protected site for the review by each WG.
- Task Group on Industrial Advisory Note will be terminated. The WG will consider reopening the Task Group after the categories have been prepared.
- Task Group on Wet Steam Properties Calculation will continue. The WG will contact ASME through the US Delegate, Friend, and any other specialists for assistance.
- Task Group on ICRN for Acid Gas Dew Points will continue. The WG suggests cooperation with the PCAS WG.

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 5.

9.1 Task Group on Surface Tension of Seawater

The Task Group will continue their work, which could result in a new Guideline by the IAPWS 2019 Meetings in Canada. Duska was added to the Evaluation Task Group.

Discussion was raised by the EC that this could be an area of cooperation with the PCC and PCAS WGs. There was agreement that a joint workshop would be arranged during the 2019 IAPWS meetings in Canada.

9.2 Information for EC.

The Chairman provided two informational items:

- During the week, the SCSW and JCS (Joint Committee on Seawater) organized four BIPM / IAPWS workshops on seawater topics (salinity / density, pH, relative humidity, and the future of JCS).
- In 2019, under the conditions of its formation, the Terms of Reference and the Executive for JCS will have to be re-approved by IAPWS. JCS talked about this during the week and developed a proposal. This will require approval by SCSW and then need to be presented to the EC at the 2019 EC meeting in Canada.

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 6.

10.1 Guidelines.

- Self-diffusion in High Temperature and Supercritical Water over Wide Density Ranges is in an advanced stage of development with Yoshida as Chair. An evaluation committee has been appointed.
- Volatility and Dissociation Constants of Amines and Amine Decomposition Products. Task Group consists of Bellows (Chair) and Anderko.

Discussion was raised by the EC for initiation of important work on Film Forming Substances (FFS). There was agreement that a joint PCAS / PCC workshop would be arranged during the 2019 IAPWS meetings in Canada. Also, it was suggested that an ICRN should be developed on FFS.

10.2 Membership

Chairman Anderko proposed Hugues Arcis (Guelph University, Canada) for membership addition for PCAS. He also indicated that he was stepping down as PCAS Chair after five years and proposed to the EC that Yoshida becomes the new Chair with Arcis as Vice-Chair

The EC approved these Membership Changes 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 7. The following items were covered:

11.1 Technical Guidance Documents (TGD).

The PCC working group had discussed extensively the TGD developments. The TGD Task Group (Chair: Dooley) activities can be summarized as follows.

- *Application of Film Forming Substances (FFS) in Industrial Plants.* The Task Group (Dooley, Hater and Lendi (Joint Chairs), Rziha, and Carvalho) have developed a draft TGD which has been circulated to the full TGD Task Group and the PCC WG. The document requires a few additions which will be added by the end of October, then will be circulated again for review to the PCC WG. The PCC Chairman requested that the document can be sent for a postal ballot following review by the Editorial Committee.

The EC approved this Request Unanimously.

- *Air In-Leakage in Steam Water Cycles.* The Task Group (Carvalho (Chair), Dooley, Rziha and Thomsen) finalized the TGD in August 2018 after review by the TGD Task Group and the PCC WG. It is now being reviewed by the Editorial Committee. The PCC Chairman requested that the document can be sent for a postal ballot following this review.

The EC approved this Request Unanimously.

- *Chemistry Management in Generator Water Cooling Systems.* The Task Group (Svoboda (Chair) and Dooley) will develop the new TGD for the 2019 Meeting.
- *Monitoring Corrosion Products in Flexible (cycling and two-shifting) Plants.* The Task Group (Addison and Thomsen (Joint Chairs), Cook, McCann, Dooley, Henderson, and Powalisz) will develop a White Paper for the 2019 Meeting. Extensive plant sampling and detailed evaluation is on-going and is the focus of an IAPWS International Collaborative Project.
- *Ensuring the Integrity and Reliability of Demineralised Makeup Water Supply to the Unit Cycle.* The Task Group (Joy, Chair) plan to develop the final TGD by the 2019 Meeting.
- *Application of Film Forming Substances (FFS) in Nuclear Plants.* The Task Group (Cook, Chair) will develop a White Paper by the 2019 Meeting.
- *Aspects of Geothermal Steam Chemistry.* The Task Group (Addison, Chair, plus representatives from Geothermal Countries) will finalize the White Paper for the 2019 Meeting.

- *Condensate Polishing for Combined Cycle / HRSG Plants.* The expanded task Group (Khalifa (Chair) met during the week and will develop a White Paper for the 2019 meeting.

11.2 PCC Membership.

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

- Joerg Fandrich (Framatome, Germany)
- Hayden Henderson (AGL, Australia)
- John Powalisz (Sentry Equipment, USA)
- Craig Stuart (CNL, Canada)

The Chairman also indicated that the WG proposes Addison to become an additional Vice Chairman.

The EC approved these Membership Additions Unanimously.

12. Editorial Committee Report

Editorial Committee Chairman Harvey reported that in the preceding year, the Editorial Committee (Harvey, Cook and Cooper) had reviewed the document in Minute 2.1. The Committee also has in progress review of the revised Advisory Note #3, revised Release on Heavy Water, and the TGD on Air In-leakage.

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 Application of Australia for IAPWS Membership

The outgoing Chair of AUSAPWS, Joy, indicated that this was a very significant day for Australia. AUSAPWS had been formed in 2010 and became an IAPWS Associate Member in 2011. He wished to thank a number of people for supporting the development: Dooley (from IAPWS), Mc Dougall (on the seawater side), NZIAPWS, and the past AUSAPWS officers. He then handed the presentation to the in-coming AUSAPWS Chair, Henderson, who provided the current status: a) 160 individual members from the power generation industry, Universities, industry service companies and consultants, and b) 15 companies have provided expressions of interest for Company membership. AUSAPWS also has collaborative support links with Australian Power Institute (API), Aurecon (now AmpControl), Australasian HRSG Users Group (AHUG) and AGL. He then introduced the current AUSAPWS committee, and indicated there are plans for future events, a newsletter, collaboration with other conferences, and expansion into other forums of IAPWS interest.

Henderson then requested EC that AUSAPWS become a full Member of IAPWS.

The EC approved AUSAPWS as a Member of IAPWS Unanimously.

13.2 Report on Membership and Member Dues.

The Executive Secretary indicated that only the Czech National Committee had not paid the 2018 IAPWS dues. Chairman Němec explained this had resulted from a change in the legal status of the Czech National Committee at the end of 2017. He assured the EC that they are actively seeking to pay the 2019 IAPWS dues.

13.3 Reports on Current Associate Members

Status Report on IAPWS Associate Member, China. The Executive Secretary provided a short presentation received from the four participants from China. Approved by China Electric Power Enterprise Federation, the China Electric Power Plant Chemical Standardization Technical Committee became the Associate member of IAPWS in May 2017. This committee is an academic group composed of nearly 40 experts from various research institutes in China and mainly carries out the formulation and revision of China's standards in Power Plant Chemistry, and also organizes some academic activities in Power Plant Chemistry. For example, they have just completed review of the criteria: 1) Technical requirements of stainless steel screen pipe for power plant water treatment equipment; 2) Evaluation of kinetic behavior of strongly basic anion exchange resin for water treatment in power plants; 3) Guideline for the acceptance of pleated filter element for water treatment in power plants; 4) Calibration procedures of trace total organic carbon analyzer in power plant; 5) Determination of the group percentage of chloride form, carbonate form and sulfate form in nuclear grade anion exchange resin; and 6) Determination of thermostability and anti-oxidation stability of strongly basic anion exchange resins for water treatment. Delegates from this committee have participated in the PCC WG activities, and personnel from the Marine Information Technology Research Institute have participated in the SCSW.

Status Report on IAPWS Associate Member, Egypt. Chairman Khalifa provided a short report on 2018 activities and plans for 2019. There are plans for expansion of Egypt's generating capacity to 80,000 MW by 2020, so improving the national capacity and capability is essential. Khalifa indicated that there have been many technical presentations about IAPWS to increase awareness about TGDs in the power generation community. PGESCO have confirmed their support of the national committee. There are still a few administrative and legal items to finalize, but the National Committee is hoping to hold a first meeting in the first quarter of 2019.

Status Report on IAPWS Associate Member, Italy. Chair person Lago provided a short report on activities of INRiM (Istituto Nazionale di Ricerca Metrologica), the recently formed European Metrology Network (EMN) on Climate and Ocean Observation, and on the interfaces with numerous professional organizations. In 2019 INRiM will insert on its website some information and links for National Industries and Companies sponsoring IAPWS activities.

Status Report on IAPWS Associate Member, Switzerland. The Secretary of the Swiss National Committee (SCPWS), Werder, provided a short report on activities (see Attachment 17). Up to now, no team of sponsors to commit on a mid- or long-term basis to a regular Swiss membership fee has yet been assembled. Activities were therefore

limited to a few individuals. The board of SCPWS is currently planning a small event in Spring 2019 to find new participating institutions in Switzerland.

Secretary Werder requested that the Associate Membership of SCPWS be extended for another term.

The EC approved this request Unanimously.

Activities of other Associate Members of IAPWS. The Executive Secretary provided short updates on Argentina/Brazil, France and Greece. The Gibbs Awardee, Fernandez-Prini, will try to reactivate discussion with his colleagues in Argentina. During the week the Executive Secretary and President met with four ICPWS attendees from France, who will try to determine interest across the country. The EC was requested to provide details on French contacts to the Executive Secretary. IAPWS will be supporting the European HRSG Forum (EHF2019) in Athens in May 2019, and will arrange an associated meeting to engage the Greece IAPWS community.

14. Executive Secretary's Report

14.1 IAPWS Bank Accounts, Financial, Auditors and IAPWS Dues

The Executive Secretary reported that IAPWS is on a sound financial footing with currently about £66,00.00GBP in total in the UK and US bank accounts. The status as at 24th August 2018 in the bank accounts had been provided to each National Delegate prior to the EC meeting.

The Executive Secretary next reported that the 2017 financial statements had been forwarded to the IAPWS Auditors in January 2018. Professor Savarik in Czech Republic and Dr. Hencke in Germany had reviewed and approved the financial statements. These 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 2019. He also mentioned that IAPWS By-Law #1 provided the basis of the dues structure, and that this would be used to assess the dues for Australia for the new membership in 2019.

The EC Unanimously Agreed to this Proposal.

The Executive Secretary had also provided a rough estimate of the income and known planned expenditures for 2018 / 2019.

14.2 Time and Place of the 2019, 2020 and 2021 Meetings

2019 IAPWS Meetings. The Head of the Canada National Committee, Cook, indicated that the the 2019 IAPWS meetings will be in Banff, Alberta from 29th September to 4th October 2019 at the Banff Centre for Arts and Creativity. A website (www.IAPWS2019.org) has been developed for the meetings.

2020 and 2021 IAPWS Meetings. The Executive Secretary informed the EC that New Zealand and Italy have been requested to consider hosting the 2020 and 2021 IAPWS meetings. Discussion by the EC resulted in a consensus that it was preferred to hold the 2020 meetings in Italy and the 2021 meetings in New Zealand. The NC heads of Italy (Lago) and New Zealand (Addison) agreed to review these requests with their committees and confirm with the Executive Secretary by the end of 2018. Further details on the 2020 meeting will be provided at the 2019 meetings in Canada.

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 Project.

The President requested the Chairman of the 2019 International Collaboration Committee (WG and SC Chairs) to report on the findings of that committee during the week. Chairman Harvey reported that one collaborative project had been proposed. The following is an overview of the proposed project. The original proposal details are provided in Attachment 8:

The Effects of Combined Impurities (chloride and sulfate) on the Corrosion of Fossil and Combined Cycle / HRSG Boiler Tube Materials

The work proposed in this International Collaboration (IC) project will capitalize on the efforts from the previous collaboration to develop the experimental equipment and procedures. A Master's student (person yet to be determined) will be supported through this IC project to utilize the UNB (University of New Brunswick) test rig and electrochemical test system. A full scope of experiments to pin-point the progression of corrosion in boiler systems with individual and mixed contaminants will be conducted using the Linear Polarization method. This is well suited to identify the threshold for the onset of accelerated corrosion. The test plan will encompass typical IAPWS AVT(R) and AVT(O) chemistry conditions with a range of pH between 9.0 – 9.8, and chloride and sulfate concentrations between 0 – 1000 ppb. The proposal requests £18,000 (GBP) for student support and travel expenses.

Harvey indicated that the Evaluation Committee supported the proposal, that it was technically sound and contributed to the goals of IAPWS. There were a few discussion points for clarification: a) the student was expected to take about a year to conduct the experimental work, and b) it was preferred if an international student could be found. A question was raised by the US Delegate about the availability of sufficient funds within IAPWS; after some discussion the consensus of the EC was that this was an important project for IAPWS, and that the funding could be managed. A proposal was then developed by the SIAPWS Delegate for IAPWS to support the IC once a suitable

international student had been identified. The US Delegate added a caveat to the proposal that the funding should, if possible be staged across 2019 and 2020 to alleviate concerns about minimum balance in the IAPWS accounts. The EC, minus the Delegates from Canada and New Zealand, were then asked to vote.

The Collaborative Project was Approved Unanimously by the Remaining Members of the EC.

16. IAPWS Awards

16.1 IAPWS Helmholtz Award

The President reported that Dr. Hugues Arcis from Guelph University in Canada had received the 2018 IAPWS Helmholtz Award and presented the Helmholtz lecture during the ICPWS.

The President asked the BIAPWS Delegate, Sparrey, for the names of the 2019 Helmholtz Award Committee. The 2019 Helmholtz Committee will consist of: Chairman Sparrey (BIAPWS), Cook (Canada), Nemec (Czech Republic), Rziha (Germany) and Yoshida (Japan).

Action: Nominations will be due to the Executive Secretary by 31st January 2019.

16.2 IAPWS Honorary Fellowships

The President reported that Mr. Ingo Weber from Siemens in Germany had received the 2018 IAPWS Honorary Fellow Award.

The President reminded the EC of the Awards Committee for 2019 with Nakahara (Japan) as Chairman and Harvey (USA) as member with the IAPWS President as ex-officio member.

Action: Nominations are due to the Executive Secretary by 31st January 2019.

17. Election of IAPWS Officers for 2019 and 2020

The Executive Secretary indicated that 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 suggest that the Japan 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 or comments. None were suggested, so he then requested the EC to approve this selection.

The EC Unanimously Approved this Selection Process.

Action: The Japan National Committee should inform the Executive Secretary of their agreement to provide a nomination for Vice President after the next meeting of their committee, and before the end of December 2018.

18. New Business

18.1 Press Release

The President mentioned that Cook had been asked at the EC meeting on Sunday 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 9. 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.

18.2 Czech National Committee Feedback on the Prague ICPWS and EC Meetings.

The ICPWS Conference Chair, Hruby, thought the IAPWS meetings had been a great success. There had been 140 conference participants from 27 countries. Hruby gave the EC an initial financial summary and indicated that a full accounting would be provided to the Executive Secretary later in 2018.

The President thanked Hruby and his extended team for organizing the 17th ICPWS.

The Executive Secretary indicated that the Guidance Document for Organizing ICPWS conferences would be updated based on the experiences of the Czech National Committee in arranging the 17th conference.

18.3 Report on Committee for Future ICPWS

President Kretzschmar asked Friend to provide the EC with feedback on the Committee's discussions during the week. Friend presented the summary in Attachment 10. First, he reviewed the issues which had been raised, and then some possible options for future ICPWS. After much discussion by the EC, the consensus appeared to be moving to a variety of option 7, which could involve a shorter ICPWS (2 – 2.5 days) and 3 days of "normal" EC and WG meetings within a one week timeframe. There was also some discussion on more frequent shorter ICPWS conferences.

The US Chair indicated the US National Committee would report to the Executive Secretary by the end of 2018 on whether they would be willing to host the next ICPWS. They would consider the various options and provide further discussion at the 2019 IAPWS EC Meeting in Canada.

18.4 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 11
Czech Republic	Attachment 12

Germany	Attachment 13
Japan	Attachment 14
New Zealand	Attachment 15
SIAPWS	Attachment 16
Switzerland	Attachment 17
USA	Attachment 18

18.5 Participants

Attachment 19 provides a list of participants at the ICPWS, IAPWS EC and WG Meetings in Prague, Czech Republic in September 2018.

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

19. Closing Remarks and Adjournment

No further business was raised by the EC. The President thanked everybody for participating at this EC meeting. Then he formally closed the 2018 EC meeting at 12:10 pm.