

Minutes of the Meetings  
of the  
Executive Committee  
of the  
International Association for the Properties of Water and Steam  
held in  
Dresden, Germany  
11<sup>th</sup> – 16<sup>th</sup> September 2016

**Plenary Session. Monday, 12<sup>th</sup> September 2016. 8:30am**

The President of IAPWS, Professor Hans-Joachim Kretzschmar, welcomed the Executive Committee (EC) and other IAPWS members to Dresden for the Executive Committee and Working Group (WG) Meetings of IAPWS. The President informed the EC that President Guzonas had stepped down from the IAPWS presidency in March 2016 and that, as Vice President, he had taken over the duties. The President then officially opened the 2016 EC Meetings by introducing the National Delegates. Each of the Member countries of IAPWS was in attendance as well as Associate Members, Australia, New Zealand and Switzerland. In total there were 77 people assembled for the EC meeting.

The President, as head of the local organizing committee, indicated that the EC meetings had been arranged by Zittau/Görlitz University of Applied Sciences in cooperation with the Ruhr University Bochum, Dresden University of Technology and VDI - The Society of German Engineers. He also wanted to thank the Exhibitors and Co-sponsors: Swan Analytical Instruments, Siemens Power and Gas, Steag Energy Services, VPC Group and DREWAG Stadtwerke.

1. Adoption of Agenda

Provisional agendas had been posted on the IAPWS Website for all IAPWS members by the Executive Secretary. There were a few changes 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 Releases, Advisory Notes, ICRNs and Technical Guidance Documents

The Executive Secretary indicated that four documents had been circulated to the National Committees during the year since the Stockholm meeting for final approval or review prior to the current EC Meeting. The Executive Secretary reminded the EC of these documents:

- *IAPWS Certified Research Need (ICRN). Thermophysical Properties of Supercooled Water.* The ICRN 30 had been approved by TPWS/SCSW in Stockholm and was circulated for approval by the National Committees on 7<sup>th</sup> July 2015. No comments or objections were received. Thus the document was approved on 7<sup>th</sup> November 2015.
- *IAPWS Guideline. Guideline of the Fast Calculation of Steam and Water Properties with the Spline-Based Table Look-Up Method (SBTL)*  
In Stockholm the EC approved sending the Guideline for Postal Ballot after editorial changes. The Guideline was distributed to National Committees on 17<sup>th</sup>

December 2015. No comments or objections were received. Thus the document was approved on 18<sup>th</sup> March 2016.

- *Technical Guidance Document – HRSG High Pressure Evaporator Sampling for Internal Deposit Identification and Determining the Need to Chemically Clean.*  
Distributed on 16<sup>th</sup> March 2016 for postal ballot. A number of comments were received from the National Committees. These were all addressed by the PCC Task Group. The TGD was recirculated to the National Committees and no further objections or comments were received by 30<sup>th</sup> June 2016. The document will be reviewed finally by the PCC working group during the week prior to approval at the Friday EC.
- *Technical Guidance Document – Application of Film Forming Amines in Fossil, Combined Cycle, and Biomass Plants.*  
Distributed on 28<sup>th</sup> May 2016 for postal ballot. A number of comments were received from the National Committees. These were all addressed by the PCC Task Group. The TGD was recirculated to the National Committees and no further objections or comments were received by 31<sup>st</sup> August 2016. The document will be reviewed finally by the PCC working group during the week prior to approval at the Friday EC.

## 2.2 Press Release.

The President asked Cook to chair the development of the Highlights/Press Release on the IAPWS proceedings during the week. It was also suggested that Feistel and Herrmann 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 for further discussion on International Collaborations).

## 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 2017 award would consist of a member from Japan, Russia, SIAPWS, USA and BIAPWS. Japan will provide the committee chairman. The President asked Japan delegate Nakahara 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 Friend (Chairman) and Petrova form the Committee for 2017. The President would be ex. Officio.

#### 2.4.3 Gibbs Award

The President reminded the EC that the Gibbs Award is awarded every five years at each ICPWS. He then requested that the heads of National Committees, Working Groups and Sub-committees provide a nomination for the 2018 Gibbs Award by 31<sup>st</sup> May 2017 to the Executive Secretary. A selection committee will be formed at the 2017 EC Meetings in Kyoto, Japan and the Gibbs Awardee will be named at that time.

#### 2.5 Numbering of IAPWS Documents (Stockholm 2015 IAPWS Minute 17.2)

The President requested the chair of the Committee, Harvey, to address this item. Members of the committee had been the other members of the Editorial Committee, Cook and Cooper. Harvey reported that there had been the following basic principles in developing the numbering system:

- Identifiers should be unique and concise.
- There should be clear distinctions for different document types.
- Identifier can show revisions, but retain original identifier in some way.
- Retain existing numbering schemes for Advisory Notes and ICRNs.
- It is desirable for “IAPWS” to be part of the identifier

Based on these the committee recommends the following:

**IAPWS TYPEnn-yy(revyear)** where

- TYPE is R (Release), SR (Suppl. Rel.), G (Guideline), AN (Adv. Note), TGD
- nn = numerical sequence of first adoption
- yy = 2-digit year of first adoption
- revyear = 4-digit year of most recent revision or editorial change (omitted if no revision yet)

Some examples were provided for the EC and the following notes of clarification were also discussed:

- In the unlikely event of multiple revisions for a document in a year, the second revyear would be (2016b)
- The new scheme would be retroactively applied to existing documents (but not obsolete documents).
- The existing ICRN numbering would be kept.
- It will be recommended that the identifier will be used in addition to the full title when citing IAPWS documents. (example: *IAPWS R6-95(2014): Revised Release on the IAPWS Formulation 1995 for ...*)
- The identifier will be placed on the cover page (and webpages where documents linked) at the top right of cover page.

The President asked the EC if there were any comments or suggestions and then asked the EC for approval.

**The EC voted unanimously to adopt the new numbering scheme for IAPWS Documents.**

2.6 17th ICPWS. Formation of International Program Committee (IPC)

The President requested the Chair of the Organizing Committee for the 17<sup>th</sup> ICPWS, Hruby, to introduce this topic. Hruby first reminded the EC of the 2<sup>nd</sup> - 7<sup>th</sup> September 2018 dates for the ICPWS in Prague, Czech Republic. He then briefed the EC on location, local organizing committee and the sponsors. The International Program Committee (IPC) needed to be formed and to meet during this IAPWS EC Week. This committee consists of the Chairs of the Working Groups, IAPWS President and Executive Secretary, and Cooper as the Chair of the 16<sup>th</sup> ICPWS. A further report on the 17<sup>th</sup> ICPWS is found in Minute 14.2.

2.7 Overview of OPAL Website for IAPWS Documents and Presentations

The President reminded the EC that there was a Users Guide for the Opal Website in the conference package. This is a password protected site for use by the IAPWS Working Groups.

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 #29 on uncertainties in coolant sampling for low concentration metals.

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 Kretschmar 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 then introduced Professor Friedrich Albrecht, Rector of Zittau/Görlitz University of Applied Sciences to provide a welcoming address to the IAPWS EC.

Following this address, the President closed the opening session of the EC at 9:40 am.

### **Activities During the Week in Dresden**

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, 14<sup>th</sup> September 2016 and the Symposium Program is shown in Attachment 3.

### **Executive Committee Meeting. Friday, 16<sup>th</sup> September 2016**

President Kretzschmar opened the continuation of the EC Meeting at 9:00 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 25 people assembled for the EC meeting. Kretzschmar 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 Kretzschmar asked for comments and changes to the minutes of the EC meeting held in Stockholm, Sweden in 2015. No changes were noted, thus the 2015 Minutes were accepted.

#### **6. President's Report**

President Kretzschmar indicated that the possible new associate memberships of China, Italy and Egypt are very important for IAPWS. He indicated that the IRS working group must survive and that members from industry are very important for IAPWS. Traditionally, the requirements for the development of standards come from industry. He was hopeful that IRS can be strengthened by PCC members. The Technical Guidance Documents of PCC are penetrating into the power plant chemistry and creating worldwide interest. These are putting IAPWS in a leadership position. The President thought that IAPWS should find new working areas as well as the historical areas of power plant industry, energy, refrigeration, air-conditioning, supply and disposal technology, oceanography, atmospheric research, geothermal technology and power plant chemistry. He recognized that members with longterm experience in IAPWS are very important to help find the right future directions and decisions. Finally, he indicated that the working groups and national committees should try to make IAPWS better recognized around the world. He requested that a task group is formed of the chairs of the working groups and national committees to address this important item, and that each should provide proposals/suggestions within the next month to the Executive Secretary.

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 International Collaborative Project on “*Toward an IAPWS Guideline on the Thermodynamic Properties of Supercooled Heavy Water*” was approved in 2015 for a young Czech scientist to spend some time at the University of Maryland. The original allocation was £17,490 GBP, which is now inadequate due to the exchange rate. TPWS requested that the amount allocated to this project be increased by an amount (to be calculated by the Executive Secretary) to make the total number of US dollars available now equal to the number of US dollars that the original allocation would have bought at the time of the Stockholm meeting.

**The EC approved this Recommendation Unanimously.**

- 7.2 Harvey reported on a minor revision of the IAPWS-95 release on thermodynamic properties of water for general and scientific use. This involved refined uncertainty estimates for isobaric heat capacity and changes in the language about extrapolation into metastable regions to account for new experimental data. The actual formulation is unchanged. TPWS had approved the revision, and the Chairman requests the EC to authorize a Postal Ballot after Editorial Committee review.

**The EC approved the Process Unanimously.**

- 7.3 The TPWS Chair then provided five informational items for the EC.
- i) A Task Group was formed to consider developing an IAPWS document based on recent work on an explicit approximation for the enhancement factor of water in humid air (and humid gases more generally). The Task Group consists of Hellmuth (Chair), Hrubý, Feistel, Harvey, Cooper, and Kretzschmar.
  - ii) A Task Group continues to work on a new equation of state (EOS) for heavy water. It was decided that the equation would be finalized based on data available by the end of 2016, with a deadline of 31<sup>st</sup> May 2017 for producing the EOS and a draft Release, and a deadline of 31<sup>st</sup> July 2017 for completion of the work of the Evaluation Task Group. Kretzschmar was appointed Chair of the Evaluation Task Group.
  - iii) A Task Group continues to work on a possible revision of the IAPWS formulations for melting curves of ice. It is hoped that the revision will be ready for IAPWS adoption in 2017.
  - iv) A Task Group continues to work toward a new formulation for the surface tension of water. The database is expected to be finalized soon, and a proposed new equation may be ready for consideration in 2017.
  - v) An update to the Guideline on the Use of Fundamental Physical Constants and Basic Constants of Water (reflecting a new international adjustment of the fundamental physical constants) was approved.

#### 7.4 Gibbs Award.

Chairman Harvey indicated that Friend would be the TPWS member of the Gibbs Award Committee to be assembled at the 2017 EC meetings in Kyoto.

#### 7.5 TPWS Membership. Chairman Harvey first informed the EC that long standing member Phil Hill from Canada had passed away during the last year. He then requested EC approval for three new TPWS WG members who had been approved by the WG:

- Dr. Frédéric Caupin (University of Lyon, France)
- Dr. Andreas Jäger (TU-Dresden, Germany)
- Dr. Simona Lago (INRIM, Italy)

**The EC approved these Membership Additions 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 items with the EC.

#### 8.1 Task Group on Industrial Advisory Note (AN).

There had been no developments since the last meeting, but the requirement for the AN needs to be clarified within IRS and also with PCC. If there is a requirement, then progress will be made before the 2017 meeting with a draft being circulated.

#### 8.2 Editorial Changes to IAPWS Documents.

Weber indicated that this was applicable to two documents:

- Revised Supplementary Release on Backward Equations for Specific Volume as a Function of Pressure and Temperature  $v(p,T)$  for Region 3 of the IAPWS Industrial Formulation 1997.
- Advisory Note 5: Industrial Calculation of the Thermodynamic Properties of Seawater.

The Editorial changes had been presented and discussed. The Working Groups IRS, TPWS and SCSW recommend to adopt these changed documents.

**The EC approved these Changes Unanimously.**

#### 8.3 The Future of the IRS WG.

Chairman Weber indicated that the following few technical topics had been identified, but either the demand in the industry does not exist or they were not in IRS scope:

- Transport properties in wet steam
- Wetness measurements

- Frost formation
- Freezing phenomena
- Slurry ice properties

Weber then informed the EC that a Task Group would be formed on wet steam transport properties which would categorize topics (within / outside current IAPWS scope, etc.), communicate and discuss within IRS, and identify potential experts to be involved for these topics. These are potential topics for 17th ICPWS in Prague.

#### 8.4 Gibbs Award.

Chairman Weber indicated that he would be the IRS member of the Gibbs Award Committee to be assembled at the 2017 EC meetings in Kyoto.

#### 8.5 Membership and Officers of IRS.

The IRS Chairman requested EC approval for one new IRS WG member who had been approved by the WG:

- Dr. Tobias Löw (STEAG Energy Services GmbH, Germany)

**The EC approved this Membership Addition Unanimously.**

Weber then informed the EC that he would be retiring as Chairman of IRS and that the WG requested EC approval for the new officers of the WG:

- Chair: Nobuo Okita, Toshiba, Japan
- Vice-Chair: Adam Novy, Doosan Skoda Power, Czech Republic

**The EC approved these New IRS Officers Unanimously.**

The President then requested that the EC shows thanks to Weber for the excellent leadership of the IRS 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 6.

#### 9.1 Information for EC.

- A Task Group on humid air fugacity and enhancement factor (Hellmuth, Feistel, Harvey, Hruby, and Cooper) was established to formulate the requirements and content of a possible IAPWS guideline as a further contribution to realise the roadmap fixed at the ICPWS 2013 workshop on humidity and as a contribution to further cooperation of IAPWS with BIPM.
- For the extension of the range of formulation for the thermodynamic properties of seawater (Feistel et al.) the TG was requested to continue their work.

- Reports on the Joint Committee of Seawater (JCS) (downloads of TEOS-10) have increased slightly this year, and the IAPWS/BIPM Cooperation on the long-awaited Metrologia paper is now published and has been incredibly successful (most “read” from that journal).
- The SCSW Chair had received a request from the Chair of ISO TG28 SC 2 WG 4 for assistance on the use of water in the petroleum industry. A SCSW task group was formed (Pawlowicz, Feistel, Anderko, Harvey, and Hellmuth) to give a detailed reply, formulate items of common interest and to ask for the possibilities of financial support. A representative of WG 2 will be invited to the next IAPWS meeting for further discussion of specific research targets.
- Proposed guideline for the electrical conductivity of seawater. A SCSW Task Group was formed (Pawlowicz, Feistel, Seitz, and McDougall).
- The Task Group for the Supplementary Release for a Simplified Density Equation was disbanded.
- The next BIPM-CCT meeting (planned for spring 2016) was postponed to spring 2017. The SCSW Chair indicated to the EC that the support for sending a SCSW representative to the 2016 meeting will be used for the 2017 meeting.

## 9.2 EMPIR Proposal.

The Chairman of SCSW proposed that IAPWS support an upcoming EMPIR proposal (approximate budget €2M) coordinated by Seitz (a SCSW and JCS member) by writing a letter signed by IAPWS President. The proposed work will support the tasks of JCS.

**The EC approved this Process Unanimously.**

## 9.3 Advisory Note.

The Chairman next indicated that an Advisory Note will be written on clarifying the IAPWS documents which contribute to TEOS-10. This will require editorial review before being sent for Postal Ballot.

**The EC approved this Process Unanimously.**

## 9.4 Gibbs Award.

Chairman Pawlowicz indicated that he would be the SCSW member of the Gibbs Award Committee to be assembled at the 2017 EC meetings in Kyoto.

## 9.5 Membership.

Pawlowicz then indicated that Spitzer had retired and should be removed from the SCSW membership list.

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 informational items with the EC:

10.1 Guidelines.

Anderko reported that a guideline on *Self-diffusion in High Temperature and Supercritical Water over Wide Density Ranges* was under development by Nakahara and Yoshida. Experimental papers have been already published and work on the guideline has been initiated. A draft will be prepared for the 2017 IAPWS meeting and an evaluation committee will be appointed.

The Chairman also reported that another guideline on *Solubility of H<sub>2</sub>S in Water and Aqueous Solutions of NaCl and CaCl<sub>2</sub>* is also under development by Majer. Experimental and modeling papers have been already published and work on the guideline will be initiated. An evaluation committee will be appointed.

Two other guidelines are also possible on the *Dissociation and Vapor-liquid Distribution of Amines* (Bellows) and *Thermodynamics of Hydration of Gases and Organic Solutes* (Sedlbauer and Majer).

10.2 Gibbs Award.

PCAS Chairman Anderko indicated that he would be the PCAS member of the Gibbs Award Committee to be assembled at the 2017 EC meetings in Kyoto.

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. He covered the following items with the EC:

11.1 Technical Guidance Documents (TGD).

Chairman Rziha requested EC approval for two TGDs:

- *The Application of Film Forming Amines in Fossil, Combined Cycle, and Biomass Power Plants.*
- *HRSR High Pressure Evaporator Sampling for Internal Deposit Identification and Determining the Need to Chemical Clean.*

Both documents had received a final review by the PCC Working Group during the week following extensive review by National Committees and the Editorial Committee twice.

**The EC approved these 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.

- *Monitoring Corrosion Products in Flexible (cycling and two-shifting) Plants.* The Task Group (Addison, Cook, McCann and Thomsen) will develop a White Paper for the 2017 Meeting.
- *Ensuring the Integrity and Reliability of Demineralised Makeup Water Supply to the Unit Cycle.* The Task Group (Joy, Chair) will develop the final TGD by the 2017 Meeting
- *Application of Film Forming Amines in Nuclear Plants.* The Task Group (Cook, Chair) will develop the TGD by the 2017 Meeting.
- *Aspects of Geothermal Steam Chemistry.* The Task Group (Addison, Chair, plus representatives from Geothermal Countries) will develop a White Paper for the 2017 Meeting. This will be used to determine if a TGD can be developed.
- *Air In-Leakage in Steam Water Cycles.* The Task Group (Carvalho, Chair, Dooley, Rziha and Thomsen) will develop a White Paper for the 2017 Meeting which can be easily transitioned into a TGD. Comment was received from BIAPWS delegate, Cooper, that performance effects of air in-leakage could also be included as well as the chemistry aspects.

## 11.3 IAPWS Certified Research Needs (ICRN).

Chairman Rziha provided the EC with the following information for approval.

- ICRN 22 on *Steam Chemistry in the Phase Transition Zone (PTZ)*. This document has been finalized with a new expiry date of September 2018. The document will receive a light review by the Editorial Committee and then be sent for Postal Ballot.
- ICRN 29 on *Uncertainties in Coolant Sampling for Low Concentration Metals* (Fe, Cu, Co, etc). This document has been finalized with a new expiry date of September 2020. The document will receive a light review by the Editorial Committee and then be sent for Postal Ballot.

**The EC approved these ICRN Actions Unanimously.**

## 11.4 PCC Membership and Officers.

Chairman Rziha requested that the following new members be approved:

- Sho Shinotsuka (Mitsubishi Hitachi Power Systems, Japan)
- Dr. Yoichi Wada (Hitachi, Japan)
- Luis Carvalho (ChemTreat, Canada)
- Moataz Khalifa (PGESCO, Egypt)
- Dr. Andreas Wecker (VGB Powertech, Germany)
- Monika Nielsen (Dong Energy, Denmark)

- Utku Keren Gülcek (EnerjiSA, Turkey)
- Mike Sparrey (ABB, UK)

**The EC approved these Membership Additions Unanimously.**

Chairman Rziha then informed the EC that the PCC WG had requested him to remain as Chairman for an additional few years.

**The EC approved this Extension of Chairmanship Unanimously.**

12. Editorial Committee Report

Editorial Committee Chairman Harvey reported that in the preceding year, the Editorial Committee had reviewed the documents delineated in Minute 2.1.

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 except BIAPWS had paid their 2016 dues. The BIAPWS Delegate, Sparrey, indicated that there had been a time delay in changing over BIAPWS officers in 2016 and that the IAPWS Dues would be paid soon.

13.2 Application for IAWPS Membership.

The Executive Secretary informed the EC that New Zealand wished to apply for membership and asked the Chair of the New Zealand National Committee, Addison, to provide the details.

Addison indicated that the TGDs are used extensively across New Zealand and that there was a growing geothermal interest in the IAPWS Releases and Guidelines. The National Committee had decided to change from an individual subscription model to industry sponsored. This had delayed the funding but commitments for full funding have been given from multiple sources across New Zealand. Bank accounts and the financial structure are also in place. Addison provided the names of the NZAPWS committee. New Zealand is ready for full membership in IAPWS and Addison requested approval from the EC.

**The EC approved the Application for IAPWS Membership of NZAPWS Enthusiastically and Unanimously.**

### 13.3 Reports on Associate Members

#### Application of Egypt as an IAPWS Associate Member.

The Executive Secretary informed the EC that Egypt had applied for IAPWS Associate membership and asked the Chair of the Egypt National Committee, Khalifa, to provide the details.

Khalifa indicated that he and his company PGESCo (Power Generation Engineering and Services Co.) have been taking the lead to work representing IAPWS in Egypt. There is currently about 40,000 MW of generating capacity in Egypt which will expand to over 60,000 MW by 2020. This power generation needs rugged guidelines; the cycle chemistry and properties of water and steam are vital. The current interests are to support the power and desalination industries. As the Egypt IAPWS National Committee develops Khalifa will try to include all the entities involved in the power generation industry including electricity holding companies, utilities, independent power producers, and local EPC contractors. Universities and research institutes will also be contacted. Khalifa is working towards having a first meeting in April 2017. He then requested the EC to approve the application to become an IAPWS Associate Member, and indicated that he will report back to the EC on progress at the 2017 meeting in Kyoto.

#### **The EC approved the Application of Egypt to Become an IAPWS Associate Member Unanimously.**

Status Report on IAPWS Associate Member, Australia. Delegate McInnes standing in for Chairman Joy provided a short presentation. The Australian National Committee (AUSAPWS) is planning to apply for full IAPWS Membership in 2017 in Kyoto. AUSAPWS has continued to focus on the Power Cycle Chemistry area but is also developing a wider focus in seawater, carbon sequestration and thermodynamics. McInnes indicated that AUSAPWS has developed By-Laws and is finalizing funding arrangements with API (Australian Power Institute), other companies and individual memberships and sponsorships to complete AUSAPWS funding.

Status Report on IAPWS Associate Member, Switzerland. Chairman Lendi indicated that the Swiss National Committee (SCPWS) will be hosting an international conference on FFA / FFAP in Lucerne in April 2017.

Progress on the Application of Other Countries in Becoming Associate Members of IAPWS. Four people were in attendance from the power plant cycle chemistry area in China at the IAPWS and EC meetings during the week. It is expected that an application for China to become an Associate Member will be signed in China in the coming months.

### 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 £64,000GBP in total in the UK and US bank accounts. The status as at

7<sup>th</sup> September 2016 in the bank accounts had been provided to each National Delegate prior to the EC meeting.

The Executive Secretary next reported that the 2015 financial statements had been forwarded to the IAPWS Auditors in January 2016. Professor Savarik in Czech Republic had reviewed and approved the financial statements. This approval had also been provided to the Heads of all the National Delegates present prior to the EC meeting. Following the distribution of the financial statements, the German Auditor, VDI, also provided approval of the accounts.

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 2017. 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 the new Member, New Zealand.

### **The EC Unanimously Agreed to this Proposal.**

The Executive Secretary had also provided a rough estimate of the income and known planned expenditures for 2016 / 2017.

#### 14.2 Time and Place of the 2017, 2018 and 2019 Meetings

2017 IAPWS Meetings. The Japan Delegate, Nakahara, indicated that the Japan NC will host the IAPWS meetings in Kyoto from Sunday 27<sup>th</sup> August to Friday 1<sup>st</sup> September 2017. The meetings will be held at the Kyoto Research Park (KRP). He also indicated that a number of hotels will be available for accommodation. Updated information on the meetings will be available on the website.

2018 IAPWS Meetings and the 17<sup>th</sup> ICPWS. The Head of the Czech Republic NC, Hruby, reported that the Czech Republic National Committee will organize the 17<sup>th</sup> ICPWS in Prague on 2<sup>nd</sup> to 7<sup>th</sup> September 2018 at the Prague Marriott Hotel. Hruby indicated that a Local Organizing Committee (LOC) has been formed, and the International Program Committee (IPC) was also organized and met during the Dresden week. An initial suite of symposia titles was developed by the IPC. A webpage has been established ([www.icpws2018.com](http://www.icpws2018.com)).

2019 IAPWS Meetings. The Executive Secretary informed the EC that Canada had been requested to consider hosting the 2019 IAPWS meetings.

#### 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. Also one amendment for a current international collaboration had been discussed and approved in the TPWS report (Minute 7).

## 16. IAPWS Awards

### 16.1 IAPWS Helmholtz Award

The President reported that the 2016 Helmholtz Award was to Dr. Frédéric Caupin of Université Claude Bernard Lyon 1 et CNRS in France, and that he had presented the Helmholtz Lecture at the IAPWS Symposium on Wednesday.

Kretzschmar then asked the Japan Delegate, Nakahara, for the names of the 2017 Helmholtz Award Committee. The 2017 Helmholtz Committee will consist of: Chairman Nakahara (Japan), Orlov (Russia), Jensen (SIAPWS), Harvey (USA) and Cooper (BIAPWS).

**Action: Nominations will be due to the Executive Secretary by 31<sup>st</sup> January 2017.**

### 16.2 IAPWS Honorary Fellowships

The President reported that Dr. Allan Harvey from NIST, USA 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.

Kretzschmar then reminded the EC of the Awards Committee for 2017 with Friend as Chairman and Petrova as member with the IAPWS President as ex.-officio member.

**Action: Nominations are due to the Executive Secretary by 31<sup>st</sup> January 2017.**

### 16.3 IAPWS Gibbs Award

The President reminded the EC that nominations from the Heads of NC and WG Chairs should be sent to the Executive Secretary by 31<sup>st</sup> May 2017. The selection process will take place during the Kyoto 2017 meetings.

## 17. Election of IAPWS Officers for 2017 and 2018

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 Czech Republic 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 Czech Republic 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 November 2016.**