

IAPWS Minutes

2026

International Association for the Properties of Water and Steam



Record of the:	Annual Meeting in Bristol, England 28 June to 3 July 2026
Includes Minutes of:	EC and all WGs
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**THE INTERNATIONAL ASSOCIATION
FOR THE PROPERTIES OF
WATER AND STEAM**

MEMBERS

Australia
Britain and Ireland
Canada
Czechia
Germany and Switzerland
Italy
Japan
New Zealand
NORDIC (Denmark, Finland, Norway, Sweden)
United States

ASSOCIATE MEMBERS

Argentina and Brazil
China
Egypt
France
Greece
India
Israel
Netherlands

EXECUTIVE SECRETARY

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**Minutes of the Meetings
of the
Executive Committee
of the
International Association for the Properties of
Water and Steam**

**Bristol, England
29 June 2026 and 3 July 2026**

Prepared by Daniel G. Friend

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Minutes of the IAPWS Executive Committee

Monday 29 June 2026 9:00 AM

At 9:00 AM, the President of IAPWS, Monika Nielsen, welcomed the Executive Committee (EC) and other IAPWS members to the EC Meeting. There were 58 individuals in attendance.

The President then called the roll and confirmed that all ten Members were present and represented by their official delegates. The only Associate Members with a presence were Netherlands and Greece. All Working Groups (WGs) were represented by their Chairs, except that the Industrial Requirements and Solutions (IRS) WG was represented by Aurel Ranniste Sachssendahl, in the absence of the Chair; Ranniste Sachssendahl would serve as Acting Chair of IRS throughout the week.

The President then recognized IAPWS Fellow Jeff Cooper, as the longest active IAPWS member, who joined this year's Annual Meeting after a short absence.

The President then introduced and thanked the local hosts from the British and Irish National Committee.

1. Adoption of Agenda

Provisional agendas had been e-mailed to all IAPWS members by the Executive Secretary in early March of 2026, and posted on the IAPWS and Annual Meeting websites. The final Agenda for the Executive Committee, as adopted, is included as Attachment 1 of these minutes.

2. IAPWS Business and Appointment of Committees

2.1. IAPWS Business since Last EC Meeting in Helsinki, Finland June 2025

The Executive Secretary reported that the following items were completed in the time period noted. Referenced agenda items are in *italic* when referring to 2025 agenda and in normal typeface when referring to 2026 items.

All late dues from 2025 were submitted before the 2026 Annual Meeting; see 15.1 and 15.1. ICRN 32 *Conductivity of Electrolytes in Aqueous Solutions* was posted shortly after the 2025 meeting; see 12.5. ICRN 33 *Film Forming Substances in Water/Steam Cycles (Fossil, Nuclear, Industrial, and Geothermal Plants)* passed its postal ballot and was posted in mid-March of 2026; see *PCAS minutes item 5*. PCC Working Group presented 3 additional webinars this period (for a total of 4), and these are posted on our website and available for viewing; see *PCC item 4*. PCC also sponsored and/or participated in a number of HRSG Forums and events (Heat Recovery Steam Generators), although sponsorship information is not always clear. On February 1 of this year, AUAPWS informed us that they will not be able to host the 2027 Annual Meeting; see 16.2 and 17.1. The Executive Secretary has been informed that we have a revision to the *Guideline on the Use of Fundamental Physical Constants and Basic Constants of Water* coming this year from TPWS (see 8) and a new ICRN on Electrode Boilers and new Technical Guidance Documents on *Benchmarking Power Plants using Repeat Cycle Chemistry Situations* and on *Geothermal Direct Contact Steam Turbine Steam Purity* under consideration within PCC Working Group (see 12).

Finally, the Executive Secretary informed the EC that longtime IAPWS stalwart and Fellow, Digby McDonald, passed away in this period—a tribute has been posted on the IAPWS website; Oldřich Šifner, another Fellow from the Czech Republic, also passed away.

The President called for a moment of silence to respect their memories.

2.2. IAPWS Highlights / Press Release

The President asked William Cook to chair the development of the Highlights/Press Release for the IAPWS Annual Meeting this week, working with local organizer Ryan Morris and Duncan McAllister from Australia.

Each Working Group was asked to provide input by close of business on Thursday. The Press Release is discussed in item 20.1 and is included as Attachment 22.

2.3. Evaluation Committee on International Collaboration

The Executive Secretary indicated that no proposals for International Collaborative Projects (ICPs) had been received, but recommendations from WG Chairs could be forwarded to the Executive Secretary through the end of the day. The President reminded the EC that the Evaluation Committee on ICPs would consist of the WG Chairs (or Acting Chairs), with the President and Executive Secretary as *ex officio* members. The Committee was asked to consider budgets of all active and proposed ICPs, including yearly breakdowns, choose its Chair, and report back Friday under item 18.

2.4. IAPWS Awards for 2026 (Honorary Fellow, Helmholtz)

The President noted that Jan Hrubý and Nobuo Okita served on the Honorary Fellow Award Committee in 2025, asked that Hrubý serve again, and solicited additional members; Fellow Hans-Joachim Kretzschmar volunteered and was added to the Committee; see item 19.1.

The Executive Secretary noted that Japan rotates off the Helmholtz Award Committee for 2026, NORDIC IAPWS rotates into the Chair position, and Canada rotates onto the Committee. The President requested that Lehtikainen provide the names of the Committee members from Nordic IAPWS, USA, Australia, BIAPWS, and Canada to be reported to the EC on Friday under item 19.2.

The Executive Secretary indicated that nominations for both Honorary Fellow and Helmholtz Awards are typically due to the Executive Secretary by 31 January, but the deadline could be delayed if the Annual Meeting is held later in the calendar year.

The Executive Secretary indicated that he would be sending out the usual calls for nominations after the conclusion of the Annual Meeting.

2.5. Improvements to the IAPWS Website

President Nielsen noted that this topic would be covered on Friday in item 16.2, and asked Paul McCann, as Chair of the Website Refreshment Committee, for any further updates. McCann indicated that he had some points to propose, and asked that people provide input about the website before Friday, so that he could prepare his report.

2.6. Other business requiring special/extensive discussions

Barry Dooley led a discussion about the need to improve engagement with the National Committees of Associate Members and noted that progress toward full membership of essentially all of these Committees has stalled. David Addison noted that it may be difficult for Associate Members to establish a path to Membership, in part because the process is not well described. Dooley also discussed the goal of elevating the status of the IAPWS Fellow title. The EC established a Task Group to pursue these issues, to report back to the EC on Friday under item 14.2 or 15.3. The TG members are David Addison, David de Vos, David Little, Ken Yoshida, and Sheau Yan Tan; Dooley to serve as Chair.

No further business was brought forward at this time.

3. EC Mandate to Working Groups and Membership

3.1. Releases, Guidelines, TGDs, ICRNs, WG Webinars, WG White Papers

The President noted that several IAPWS documents were in process as mentioned under 2.1 and emphasized the importance of such outputs for the organization. The Executive Secretary noted that WG Webinars and WG White Papers had been added to the list of outputs.

3.2 Closing Documents for ICRNS and International Collaborations

The Executive Secretary noted that the *Film Forming Substances* ICP should be ending and needs a closing document. TPWS ICRN 30 and PCC ICRN 26 need closing statements.

4. Future of IAPWS

4.1. Strategic Planning

The President reviewed the strategic planning process that had begun at the Helsinki meeting, and reminded the EC of the eight strategic planks introduced last year. (See Attachment 2.) Considering the breadth of the effort, she proposed a focus on *Target Group and Markets* for the current year. There was some discussion of how we would determine target groups—plant engineers, process chemists, ...; with the scope of the organization perhaps expanding more into carbon capture, nuclear plants, and seawater; and with more potential focus on Associate Members of IAPWS or perhaps on countries without membership or even strengthening the sustainability of current Members. As had been discussed in an earlier email to the Chairs of the Working Groups, the EC established a Task Group on Strategic Planning: *Target Group and Markets*. The Task Group was to meet during the week and report back on Friday (Item 14.1). Monika Nielsen would serve as Chair, with members Friend, Dooley, Ranniste Sachssendahl, Hrubý, Giuliano Albo, Yoshida, and McCann.

4.2. Future of ICPWS

The President reviewed the recommendations of a Task Group on the ICPWS that reported last year in Helsinki (Item 14). It was confirmed that Canada would be in a position to host the ICPWS in 2029, pending a decision of the meeting location for 2028. Cook would provide an update to the EC on plans at the Friday EC meeting. (Item 17.2)

5. Preview of Week's WG Activities by WG Chairmen

TPWS Chair Hrubý noted work on the expiring ICRN, new data and efforts on replacement for IAPWS 95, an update on a Guideline on Fundamental constants, and joint meetings with SCSW, IRS, and PCAS, among other activities for the week.

SCSW Chair Giuliano Albo noted that the week's meetings would include discussions to clarify issues on continuation and sustainability for the Subcommittee, a series of talks, and joint meetings with other WGs.

PCAS Chair Yoshida reported on a full day joint meeting with PCC, a focus on Film Forming Substances, and additional work on thermochemistry.

IRS Acting Chair Ranniste Sachssendahl indicated that there would be an election of new WG officers, reports on wet steam calculations, extensive discussions on implementations of the SBTL (Spline-Based Table Look-up) method for water properties, and joint meetings with PCC and TPWS.

PCC Chair Addison reviewed planned efforts on the benchmarking, geothermal, and electrode boiler documents; discussion of webinars, and joint meetings with other working groups.

To conclude the morning EC meeting, the President and local organizers presented a few additional logistical details—noting the hard stop Tuesday to catch the bus for the technical visit and the group photo to be taken at a break of the Wednesday Symposium.

The EC meeting was adjourned at about 10:10 AM.

Activities During the Week

The first day activities of the Executive Committee were followed by Working Group meetings, the IAPWS Symposium, the IAPWS Dinner/Banquet, and the IAPWS Technical Visit. The schedule for IAPWS week is shown in Attachment 3.

Friday 3 July 2026 9:00 AM

President Nielsen opened the continuation of the EC meeting at 9:00 AM. All of the IAPWS Members were in attendance as well as Associate Member Netherlands. All WGs were also represented, with Adam Nový representing IRS. A total of about 18 people were in attendance.

6. Acceptance of Minutes of Previous IAPWS EC Meeting

President Nielsen proposed acceptance of the minutes of the 2025 IAPWS EC meeting as posted, and these minutes were accepted unanimously without revision.

7. President's Report

The President provided her report, which is included as Attachment 4 to these minutes.

8. Report and Recommendations of Joint TPWS, IRS, SCSW

Minutes of the TPWS/SCSW WG meetings conducted during the week, followed by the final agenda for TPWS, are in Attachment 5. TPWS Chair Hrubý discussed the following items with the EC.

Hrubý reported on progress toward the replacement of the IAPWS-95 formulation (Task Group: A. Harvey, A. Giuliano Albo, F. Caupin, D. Friend, J. Hrubý, Y. Kayukawa, S. Lago, N. Okita, R. Span), and noted that work is being conducted in conjunction with faculty/staff at the Ruhr University Bochum; there is a need to better define IRS needs in the metastable steam region (Hrubý); a portion of the existing International Collaborative Project on IAPWS 95 needs to be reduced because of a retirement, and it was proposed to reduce the budget of the ICP. The proposal is included in Attachment 5.

A closing statement on ICRN 30 (*Thermophysical Properties of Supercooled Water*) will be prepared by Hrubý. Progress has been made on a Formulation for the Static Dielectric Constant of Heavy Water (Task Group: J. Cox, J. Young, A. Harvey, and P. Tremaine). Work on Calculation of Enhancement Factors Using Virial Coefficients (Task Group: A. Harvey, G. Garberoglio, and R. Hellmann) has continued. An update of IAPWS G5-01(2026) *Guideline on the Use of Fundamental Physical Constants, and Basic Constants of Water* (A. Harvey) was completed and approved by the Working Group. TPWS proposes for membership Sharat Chandrasekhar of Blade Energy Inc.

The EC approved a reduction in the budget for the ICP Towards a replacement for the IAPWS Formulation 1995: Detailed analysis of available data from \$12,500 to \$5,600 without objection.

The EC approved release of the revised guideline IAPWS G5-01(2026) *Guideline on the Use of Fundamental Physical Constants, and Basic Constants of Water* without objection.

The EC approved TPWS WG membership for Sharat Chandrasekhar without objection.

9. Report and Recommendations of Separate IRS Meetings

Minutes of the IRS WG meetings conducted during the week, followed by the agenda, are in Attachment 6. IRS Member Nový, substituting for Acting Chair Sachssendahl, discussed the following items with the EC.

The IRS proposes new Working Group officers as follows: Aurel Ranniste Sachssendahl as Chair; Adam Nový as Vice Chair; with Richard Harwood remaining as an additional Vice Chair.

The EC approved Aurel Ranniste Sachssendahl as Chair of the IRS WG and Adam Nový as Vice Chair of the IRS WG without objection.

The IRS noted that Task Groups on *Wet steam properties calculation* and on *Translation of IF-97 Fortran routines into other programming languages* were being discontinued. There would be an increased focus on IAPWS implementations and release of SBTL methods for industrial calculations. A new Task Group on *SBTL Development* (Kunick, Lea, Harvey, and Kretzschmar) was established. A new Task Group on *SBTL Evaluation* (Novy, Pawellek, Sachssendahl, Löw, Bennoit, and Senoo) was established.

The IRS requested that the EC clarify policies on distribution of software code, instead of only documentary standards; and the technicalities of a final repository for code, including the need for a source code management system.

There was a lively discussion on these issues, including review of past/current policies on distribution of software, liability issues, awareness that some IAPWS software is currently available from various sources, questions on pricing versus freeware, The IRS made clear that distribution of software for final use, a developmental site, and version control were requirements for the successful implementation of the SBTL method for industrial calculations.

The EC approved, without objection, the concept of distribution of IRS software when technical, financial, and liability issues were addressed.

The EC requested, without objection, that Paul McCann, as Chair of the Website Refreshment Committee, investigate with the current IAPWS web service provider the ability and pricing for hosting and serving software and software development, including a version control system.

The EC requested, without objection, that IRS provide a more detailed proposal for IAPWS to implement software distribution—providing specific hosting, serving, version control, development, pricing, ... recommendations.

10. Report and Recommendations of Separate SCSW Meetings

Minutes of the SCSW were included in the Minutes of TPWS (Attachment 5). Chair Giuliano Albo discussed the following items with the EC.

The major topics of the meetings included measurements for the density and equation of state of seawater; heat capacity measurements of IAPSO seawater; vibrating tube measurements for density, and their uncertainties, with substitution methods; and absolute density measurements for seawater.

Giuliano Albo also discussed activities projected for 2026 and 2027: investigation and engagement with industry and agencies working with “salt” water at high temperature/pressure (e.g. desalination, brines); determining and attempting to resolve perceived shortcomings of TEOS-10 which limit its widespread use in the oceanographic community; investigating the perceived advantages of EOS-80, more widely used, to establish more traceable and standardized approaches; and further work on use of vibrating tube measurements and protocols for seawater density. An important question posed was how to ensure that TEOS-10 can be maintained and hosted in a sustainable manner, and whether IAPWS should have an increased role in the future of TEOS-10 in support of the oceanographic community and related interests. The current dissemination platform is maintained by the Joint Committee on the Properties of Seawater (JCS), a group intersecting IAPSO, SCOR, and IAPWS.

Considering previous IAPWS discussions related to the “sunsetting” of the SCSW because of limited attendance at meetings and lack of development of recent IAPWS outputs, Giuliano Albo proposed to the EC that the work of the SCSW continue, in conjunction with TPWS and other organizations. Further, to strengthen the position of seawater efforts within IAPWS and indicate its maturing and continual role, he proposed that the “subcommittee” be re-designated as a working group and convened as the Seawater Working Group (SWWG) going forward, with the same membership and mandate as the SCSW.

There was discussion of the historical decision to designate the group as a subcommittee and reference to the relevant IAPWS Statutes and Bylaws.

The EC approved, without objection, the organizational change from the Subcommittee on Seawater (SCSW) to the Seawater Working Group (SWWG) with membership and mandate unchanged.

The EC reminded the Chair of SWWG to add the appropriate description of the WG for the IAPWS web pages.

The EC requested, without objection, that Giuliano Albo provide to the Executive Secretary text to be placed on the SWWG web pages.

There was considerable discussion of the desirability and approach to having IAPWS help with the maintenance and dissemination of seawater properties. As in Item 9, there were questions about liability, ownership of intellectual property, possibilities of linking with an external website, ownership of the external domain, etc.

The EC approved, without objection, the SWWG request to investigate with the JCS an optimal approach to ensuring continuity and maintenance of the material now hosted on the TEOS-10.org web pages.

The EC requested, pending the results of the investigation mentioned above, that Paul McCann, as Chair of the Website Refreshment Committee, investigate with the current IAPWS web service provider the ability to host or link with information such as that disseminated at TEOS-10.org.

11. Report and Recommendations of PCAS

Minutes (and Agenda) of the PCAS WG meetings conducted during the week are in Attachment 7. PCAS Chair Yoshida discussed the following items with the EC.

PCAS proposed that three members be added to the PCAS WG roster: Jennifer Shin (Canadian Nuclear Laboratories), Ghinwa McGill (United Kingdom National Nuclear Laboratory), and Seishi Shimizu (University of York, UK). It was also noted that Masakatsu Ueno should be removed from the rolls of the WG.

The EC approved, without objection, PCAS WG membership for Jennifer Shin, Ghinwa McGill and Seishi Shimizu.

PCAS proposed that Derek Hall be accepted as a second Vice Chair of the PCAS WG, and noted that the terms for the Chair (Yoshida), Vice Chair (Arcis), and the proposed second Vice Chair will be discussed together at the 2028 Annual Meeting.

The EC approved, without objection, the selection of Derek Hall as a Vice Chair of the PCAS Working Group.

Chair Yoshida reported that the PCAS WG in conjunction with the TPWS WG has established a new Task Group on electrolyte conductivity. Members are Arcis, Harvey, and Anderko. The primary purpose is to help address some research needs as described in ICRN 32 (*Conductivity of Electrolytes in Aqueous Solutions*).

Yoshida reported on the status of two International Collaborative Projects currently in progress within PCAS. It was noted that for the Film Forming Substances ICP, experimental work is nearly complete, a report to IAPWS is in preparation, and a manuscript for a peer-reviewed publication is also in preparation. For the ICP on low-dose iodine, the first set of experiments has been completed and the project should be finalized in the second quarter of 2028. While no expenditures had been invoiced to IAPWS to date and a decrease in the overall budget had been approved by the EC in 2025, PCAS proposes a small increase in the overall budget from £12.3k agreed to in 2025 to £12.6k in part to anticipate some degree of inflation as the timeline for the project has been extended.

The EC approved, without objection, an increase in the budget of the ICP *Radiation Chemistry of Iodine Under Low Dose Rate Conditions Relevant to Design Basis Accidents in PWRs* to a total of £12,600.

12. Report and Recommendations of PCC

Minutes (and Agenda) of the PCC WG meetings conducted during the week are in Attachment 8. PCC Chair Addison discussed the following items with the EC: Highlights; WG Progress 2025/26; Meeting Highlights; Activities 2026/27; TGD updates; ICPs; ICRNs; Membership/Officers; Legal disclaimers.

Among the highlights, Addison noted that the WG has undergone a full reset since 2022 and aims to focus on “*what current and future problems can we solve*” and “*what is the best value for PCC and IAPWS when everyone is together in the room*” rather than serve as a “chemistry show and tell.” There is also an emphasis on the PCC priority list. There have been updates to the process/flow diagrams, PCC mission, ... and an emphasis on leadership from the WG officers.

Chair Addison noted that the PCC LinkedIn page now has 666 followers; 3 additional webinars were presented with 318/497/117 registered, respectively. These are posted to YouTube with 99 subscribers and 1369 views to date. Communication is through a MailChimp email list/management account. The PCC White Papers are used and referenced, and PCC outreach is through the web pages, other conferences, relations with PPChem, etc. Addison noted approval and issue of the FFS ICRN; drafts of the benchmarking and geothermal TGDs and the electrode boiler ICRN. He noted that about 38 people attended WG meetings this year and there were robust discussions of the TGDs and ICRN in progress. He pointed to work on the PCC priority list and an update to the mission statement. He reported that support and resources were available for TGDs and WPs, and noted the growth and diversity of active PCC membership. He highlighted an improvement in work flows for the WG and progress on an ICRN concerning film forming substances.

Chair Addison emphasized planning for future activities including webinars on water/steam oxides; flex ops; corrosion products; and provisionally, on instrumentation. Planning is ongoing for the ICPWS in 2029 and there is a review of the PCC priority list. Dooley led a discussion within the WG on status of TGDs including benchmarking (2026); electrode boiler (2027); cps flex plants (WP); geothermal (2027); nuclear FFS (2027); flue gas (WP 2027).

Addison requested EC approval for postal ballots on the benchmarking TGD following editorial review; and the conversion of the CPS White Paper to a TGD pending PCC approval and editorial review.

The EC approved, without objection, a postal ballot for the Technical Guidance Document *Benchmarking Fossil, Combined Cycle, and Biomass Power Plants Using Repeat Cycle Chemistry Situations (RCCS)* upon completion of editorial review.

The EC approved, without objection, a postal ballot for a new Technical Guidance Document based on the PCC White Paper *Corrosion Product Sampling, Monitoring and Analysis for Flexible and Fast Starting Plants* subsequent to PCC WG approval and upon completion of editorial review.

Addison requested that an EC postal ballot be conducted for the draft ICRN 34 *Corrosion and Hydrogen and Oxygen Gas Generating Processes within Electrode Boilers* after a required editorial review; and suggested a policy to indicate on the IAPWS website and each ICRN that a letter of support from IAPWS could be requested by entities considering projects designed to resolve challenges documented in the ICRN.

The EC approved, without objection, an editorial review and subsequent postal ballot for a draft ICRN *Corrosion and Hydrogen and Oxygen Gas Generating Processes within Electrode Boilers*.

There was some discussion and evident consensus concerning the inclusion of text indicating that a letter of support could be included with ICRNs. The wording of the text (on the website and on each document) was not finalized and the sender of the letter (President, WG Chair, or Executive Secretary) was not yet determined. These are subject to further decisions.

PCC proposed that nine members be added to the PCC WG roster: Ourania Ioannidou – PPC Group, Greece; Jónas Þór Markússon – Viðskiptastjóri; Christopher Liebenau; Abra Penezic – Swan;

Tan Sheau Yuan – Mettler Toledo; Lukasz Grzybowski –Uniper Energy; Rizwan Ali – ESB; Griff Tilley – Viola; and Jennifer Shin –Canadian Nuclear Laboratories.

The EC approved, without objection, PCC WG membership for Ourania Ioannidou, Jónas Þór Markússon, Christopher Liebenau, Abra Penezic, Tan Sheau Yuan, Lukasz Grzybowski, Rizwan Ali, Griff Tilley, and Jennifer Shin.

PCC requested that the EC extend the PCC chairmanship of David Addison for two additional years (through 2028) and noted that Buecher is stepping down as Vice Chair.

The EC approved, without objection, the extension of the term of David Addison as Chair of the PCC Working Group through the 2028 IAPWS Annual Meeting.

Addison presented the concept of including a legal disclaimer on the IAPWS website and on various documents, primarily Technical Guidance Documents. He proposed that the language be kept short and simple, and suggested possible language. There was discussion of the issue, and it was noted that each country may have different needs for a statement disclaiming liability. There seemed to be general consensus around the concept but not agreement on the placement and final text to be used. An EC task group was proposed consisting of David Addison and Ryan Morris to explore the issue further.

The EC approved, without objection, the establishment of a Task Group on Legal Disclaimers to explore statements of legal disclaimers and to circulate to the Executive Committee a proposal within a one month time period. The members are David Addison and Ryan Morris.

13. Editorial Committee Report

Committee Chair Harvey reported that no new IAPWS documents were officially reviewed during the year, but that he had informally commented some material. He noted that Jeff Cooper wishes to step down from the Committee. The Committee comprises Harvey and Cook, with the possibility of recruiting a third member.

14. Reports and Recommendations of other EC Committees

14.1. Report of the Strategic Planning Committee

President and Committee Chair Nielsen reported on the progress and plans of the committee formed on Monday under Item 4.1 and mentioned in the President's report in Item 7. The Committee met during the week and agreed to monthly meetings to advance its agenda. The second slide in Attachment 2 described the general areas for the *Target Group and Markets* focus discussed in 2025 and the fourth slide indicates the specific tasks which the Committee intends to address during the year: review of statutes, mission, vision; survey of WGs; work with other organizations; expansion of membership in WGs; recommendations National Committees; recommendations for WGs.

The Task Group on Strategic Planning: *Target Group and Markets* will report back to the EC at the 2027 Annual Meeting.

14.2. Report of the Committee on Associate Members

Dooley, as Chair of the Task Group on Engagement with Associate Members, reported on discussions held during the week. He reviewed the Associate Members which were nearly defunct and those struggling to progress to full Membership. He noted that some TG members had current engagement with Associate Members, and might be able to elevate the engagement. Engagement with India, Greece, France, and Belgium (not an Associate Member) was discussed.

The Task Group would develop engagement activities during the year (e.g., webinars, participation in National Committee meetings, etc.). Dooley would prepare a letter for the Executive Secretary to send to the (last

known) delegates from Associate Member National Committees and/or as the basis for other TG members to initiate engagement activities.

The EC, without objection, supported this approach for the *Task Group on Engagement with Associate Members*.

15. Membership and Associates

15.1. Report on Members Defaulting on Dues

The Executive Secretary reported that 2026 dues from the United States had not been received by the time of the Annual Meeting. Late dues for 2025 had been received from the U.S. National Committee.

Harvey, representing the U.S. National Committee, gave a short presentation about the status of the Committee and the possibility of dues payment. He noted that there is considerable progress within the reorganized National Committee, operational funds are still insufficient to pay the dues at this time, and fundraising, especially through sponsorships, is a near-term focus of the Committee.

15.2 Reports of Members (Written and/or oral highlights)

Written reports on progress in member countries provided in conjunction with the Annual Meeting are attached to these minutes as follows:

• Australia	Missing
• BIAPWS	Attachment 9
• Canada	Attachment 10
• Czechia	Attachment 11
• German-Swiss	Attachment 12
• Italy	Attachment 13
• Japan	Attachment 14
• New Zealand	Attachment 15
• NORDIC IAPWS	Attachment 16
• United States	Attachment 17

The report from the Australian National Committee was missing as these minutes were being finalized.

15.3. Reports of Associate Members

The Executive Secretary reported that reports and communications had been received from the National Committees of Associate Members Israel, Greece, and China. A representative from the Netherlands National Committee, Ludwin Daal, was present and gave a brief report on the status. All Associate Members were contacted prior to the Annual Meeting to request reports and status updates.

• China	Attachment 18
• Greece	Attachment 19
• Israel	Attachment 20

The Executive Secretary noted that Associate Member status for Argentina and Brazil, China, Egypt, France, Greece, India, and Israel would be expiring this year if the EC takes no action. Considering that the EC would be taking specific and high priority action to better engage with Associate Members (See 14.2), it was proposed that the status of all of these Associate Members would be renewed for another term.

The EC approved, without objection, the extension of Associate Member status of Argentina and Brazil, China, Egypt, France, Greece, India, and Israel for an additional three-year period as allowed under clause 3.3 of the IAPWS Statutes.

16. Executive Secretary's Report

The Executive Secretary reported that from his perspective, things are going well as Executive Secretary, and again expressed thanks to Barry Dooley for his advice and assistance as Deputy Executive Secretary during this past year.

16.1. IAPWS Bank Accounts, Financials, Auditors and Dues

The Executive Secretary reported that he had forwarded the IAPWS financial report through 31 May 2026 to all heads of National Committees. There is a healthy balance in the bank accounts, although Friend noted that it was very close to the reserve requirement of three years of projected income as a reserve balance that had once been applied to IAPWS finances. It was noted that currency in U.S. dollars against the Swiss Franc (the official currency of IAPWS) was considerably reduced for much of the year, resulting in higher dues for some Members.

It was noted that there were considerable obligations that might be coming due for IAPWS in the coming year, included funding the International Collaborative Projects on replacing IAPWS 95 and on iodine radiation chemistry; both were approved in 2024 but nothing had been spent to date. These obligations are reflected in the "projections" page of the financial report.

The Executive Secretary reported that the financial report for IAPWS fiscal year 1995 (which is also calendar 1995) was sent to the auditors in early January. The two auditors, Pavel Šafařík and Tapio Werder, approved the books. The Executive Secretary thanked Werder for noting a small discrepancy which was subsequently resolved; he noted that we need to thank Šafařík for his years of service as an auditor—Šafařík has asked to step down from that role.

The EC requested, without objection, that Executive Secretary Friend send an official note of thanks to Pavel Šafařík for his long years of service as IAPWS auditor.

Friend noted that we now need to find two auditors for the current fiscal year (2026). The President asked Tapio Werder if he was willing to serve again and asked for a volunteer to serve as the second auditor.

The EC approved Tapio Werder (GSAPWS) and Griff Tilley (BIAPWS) to be IAPWS auditors for calendar and fiscal year 2026.

The Executive Secretary suggested that unless there are significant changes in IAPWS structure, the dues for National Committees remain the same.

The EC approved, without objection, keeping the IAPWS dues structure unchanged for 2027.

16.2. Other IAPWS Organization Business/Website

The Executive Secretary noted that the annual corporate filings are up to date and the U.S. tax filing with the Internal Revenue Service is up to date. For the IAPWS website, Tribal Systems continues to support our

website hosting, security, and support; dollar amounts are in the financial report. GoDaddy continues to support our email service and the iapws.org domain.

It was noted that McCann, Harvey, Addison, DeVos, and Friend took some training on the website (or were offered training) as planned. Friend receives the Contact Us inquiries, and has responded or routed about one question per month. Harvey has been the primary person for posting documents, although Friend has done some as well. Friend has posted about 11 events and 10 news items during the year. Friend indicated that when contacted by a WG chair, National Committee, or other officer, he is usually able to post items of interest.

Paul McCann, as Chair of the Website Refreshment Committee and representing the PCC WG, gave a brief report on concepts for additional changes/additions to the website. (See Attachment 21.) He emphasized that changes in the text for ICRNs and a need for a structure to highlight webinars, white papers, and international collaborations were priorities. (See also, Item 12.) A further discussion of the website noted the need for IAPWS to have some dedicated file storage, with Microsoft 365 as a primary possibility.

The EC requested, without objection, that McCann, in conjunction with the full Website Refreshment Committee, work with Tribal Systems to design and implement the changes needed.

The EC requested, without objection, that Friend explore and implement a method for creating shared file storage for IAPWS, and proceed with establishing an IAPWS Microsoft 365 account as appropriate.

The President noted that the term of the Deputy Executive Secretary would be expiring at the end of the calendar year. The Executive Secretary noted that while appreciative of the support and assistance of Dooley during the year, he would continue to work with Dooley whether or not he was in the position of Deputy Executive Secretary. He thought that a division of the duties of the Executive Secretary into two distinct but complementary responsibilities would be difficult, and not really necessary. However, considering the importance of continuity of operations in a case in which the Executive Secretary was not available, Friend proposed to create a document describing the roles of the Executive Secretary and listing all business operations accounts, with a goal of defining a backup individual as feasible.

The EC requested, without objection, that Friend forward to the President, before the end of 2026, such a document describing the duties and accounts for which the Executive Secretary is responsible.

17. Upcoming Meetings

17.1. Time and Place of 2027 (German-Swiss) and 2028 (Australia?) Meetings

2027 IAPWS Meetings The German-Swiss delegate confirmed that the National Committee would host the 2027 Annual Meeting in Potsdam, Germany from 5 September through 10 September 2027. He noted that Potsdam is a scientifically and culturally significant location. Details of the arrangements will be shared as they become available.

The Executive Secretary will notify the EC of details when plans are confirmed.

2028 IAPWS Meetings The Australian delegate confirmed that Australia would be able to host the 2028 Annual Meeting, as the difficulties that presented for the 2027 meeting have been addressed. Details on time and location are not yet available.

17.2 Planning for next ICPWS

The Canadian delegate confirmed that Canada would be hosting the 19th International Conference on the Properties of Water and Steam in 2029. Vancouver, Calgary, and Toronto are the locations currently under consideration, but neither the dates nor venue have been finalized.

18. International Collaborations

No new International Collaborative Projects were considered this year. The status and budgets of existing ICPs (*Towards a Replacement for the IAPWS Formulation 1995: Detailed Analysis of Available Data*; *Analysis of Film Forming Amine Coatings in High Temperature Water Loops*; and *Radiation Chemistry of Iodine Under Low Dose Rate Conditions Relevant to Design Basis Accidents in PWRs*) were discussed within the WG reports for TPWS, PCAS, and PCC (Items 8, 11, and 12).

19. IAPWS Awards

19.1 Helmholtz Award Committee

The President reported that the 2026 Helmholtz Award winner, Jacy Conrad, gave the opening talk at the Symposium and was involved in IAPWS activities. The head of the NORDIC IAPWS Committee reported that the members of the Helmholtz Award Committee would be Jensen (Chair, Nordic), Anderko (U.S.), McAllister (Australia), Tilley (BIAPWS), and Cook (Canada).

The Executive Secretary was reminded to remove the requirement of date-of-birth information from the Call for Nominations. The Executive Secretary noted that the due date for nominations could be changed to 28 February since the Annual Meeting would be held in September of 2027.

19.2. Honorary Fellowship

The President reported that Karsten Meir had been awarded an Honorary Fellow Award for 2026, and Andrei Anderko, the Honorary Fellow Award Winner from 2025, received his Award at this meeting because of his absence at the 2025 meeting.

The Honorary Fellow Award Committee for 2027 will be Hrubý (Chair) and Kretzschmar.

The Executive Secretary confirmed that he would be sending out instructions for nominations for both the Helmholtz Award and Fellow Award in the near future.

20. New Business

20.1 Press Release

McAllister, on behalf of the Highlights/Press Release Committee reported that the Press Release would soon be available, but asked for further information from the Executive Secretary. The document was sent to the Executive Secretary shortly after the meeting, and it is included as Attachment 22 to these minutes. The President indicated that this release would be sent to all EC members and that it should be distributed as widely as possible, sent to any journals and publications, and that it would be posted on the IAPWS website.

20.2 Election of IAPWS Officers for the 2027 through 2028 Term

President Nielsen noted that this would be the final Annual Meeting for which she would serve as President, but that she would remain in office through the end of 2026. She noted that Duncan McAllister from Australia is Vice President and in normal succession, Australia would designate McAllister to be President for the 2027 through 2028 term. McAllister indicated that Australia would select him to be President and that he would accept the office.

The EC elected, without objection, Duncan McAllister (Australia) to serve as IAPWS President for the term beginning 1 January 2027 and ending on 31 December 2028.

President Nielsen noted that it had been 17 years since BIAPWS had held the presidency, so it was next in line. She asked if BIAPWS would be able to propose a candidate for Vice President for the 2027-2028 term,

presumably ascending to the presidency in 2029. BIAPWS would have until mid-December 2026 to confirm the name of the Vice President nominee.

The EC selected, without objection, BIAPWS to appoint its candidate for the IAPWS Vice President to serve in 2027 and 2028, presumably ascending to the presidency in 2029.

20.3 Britain & Ireland IAPWS Committee feedback on 2026 Annual Meeting

Griff Tilley, as delegate from BIAPWS, indicated that the IAPWS week had been largely successful from his perspective. He acknowledged and thanked Ryan Morris for all of the hard work that Ryan had expended on preparing for the IAPWS Annual Meeting. He noted that there were 141 people who had registered, including 72 for the full week and 69 for the Symposium only. Attendees joined from 19 countries, and the finances look to break even, although the numbers are not yet final. He looked forward to working with the German-Swiss National Committee, as needed, for the 2027 Annual Meeting.

A list of attendees is provided in Attachment 23.

20.4 Other items raised during IAPWS week

No additional items were brought forth for discussion.

21. Adjournment

There being no further business, the President adjourned the meeting at 12:45 pm.

Attachment 1: Agenda for the IAPWS EC

AGENDA for the EXECUTIVE COMMITTEE of IAPWS

Bristol, England 28 June to 3 July 2026

Monday, 29 June 2026 Opening Plenary Session (9:00 – 10:15 am)

- Opening Remarks, Welcome, and Introductions by IAPWS President Monika Nielsen
1. Adoption of Agenda
2. IAPWS Business and Appointment of Committees
 - 2.1 IAPWS Business since Last EC Meeting June 2025
 - 2.2 IAPWS Highlights / Press Release
 - 2.3 Evaluation Committee on International Collaboration
 - 2.4 IAPWS Awards for 2027 (Honorary Fellow, Helmholtz)
 - 2.5 Improvements to the IAPWS Website
 - 2.6 Other business requiring special/extensive discussions.
3. EC Mandate to Working Groups and Membership
 - 3.1 Releases, Guidelines, TGDs, ICRNs, WG Webinars, WG White Papers
 - 3.2 Closing Documents ICRNs and International Collaborations
4. Future of IAPWS
 - 4.1 Strategic Planning
 - 4.2 Future of ICPWS
5. Preview of Week's WG Activities by WG Chairmen

Friday, 3 July 2026. Executive Committee Meeting (9:00 am – 12:30 pm)

6. Acceptance of Minutes of Previous IAPWS EC Meeting
7. President's Report
8. Report and Recommendations of Joint TPWS, IRS, SCSW
9. Report and Recommendations of Separate IRS Meetings
10. Report and Recommendations of Separate SCSW Meetings
11. Report and Recommendations of PCAS
12. Report and Recommendations of PCC
13. Editorial Committee Report
14. Reports and Recommendations of other EC Committees
 - 14.1 Strategic Planning Committee
 - 14.2 Committee on Associate Members
15. Membership and Associates
 - 15.1 Report on Members Defaulting on Dues
 - 15.2 Reports of Members (Written and/or oral highlights)
 - 15.3 Reports of Associate Members
16. Executive Secretary's Report
 - 16.1 IAPWS Bank Accounts, Financials, Auditors and Dues
 - 16.2 Other IAPWS Organization Business/Website
17. Upcoming Meetings
 - 17.1 Time and Place of 2027 (German-Swiss) and 2028 (Australia?) Meetings
 - 17.2 Planning for next ICPWS
18. International Collaborations
19. IAPWS Awards
 - 19.1 Helmholtz Award Committee
 - 19.2 Honorary Fellowship Committee
20. New Business
 - 20.1 Press Release
 - 20.2 Election of IAPWS Officers for the 2027 through 2028 Term
 - 20.3 Britain & Ireland IAPWS Committee feedback on 2026 Annual Meeting
 - 20.4 Other items raised during IAPWS week
21. Adjournment

D.G. Friend 03 July 2026

Attachment 2: Slides from Strategic Planning Meeting

IAPWS - STRATEGIC PLANNING



1. Target Group and Markets

Update of the IAPWS Objectives

Thoughts on Target Group (non-exhaustive list)

- Primary Target Groups
 - Engineers in power generation (thermal, nuclear, geothermal)
 - Equipment manufactures (turbines, boilers, heat exchangers)
 - Process and simulation software developers
 - Applied researchers in thermophysical properties
- Emerging Target Group
 - Hydrogen and Power-to-X developers
 - Carbon capture and Storage (CCS) actors
 - Advanced nuclear technology (e.g. SMRs)

Thoughts on Market (non-exhaustive list)

- Core Market
 - Thermal power generation (coal, gas, biomass, nuclear)
 - Industrial steam systems
- Expansion and Future Markets
 - Nuclear innovation (Gen III/IV, SMRs)
 - High-efficiency and hybrid thermodynamic cycles
 - Large-scale desalination
 - Hydrogen production and energy systems
 - Carbon Capture and Storage (CCS)
 - Energy storage systems involving steam cycles
 - Steam compressors
 - Heat pumps

Access and Engagement Channels

- Different target groups requires different approaches
 - Engineers -> integration into software, guidelines (TGD's), technical tools
 - Researchers -> ICRNs, collaboration (ICP), publication, working groups
 - Industry -> best practices and implementations guidance
 - Regulators -> alignment with formal standards and codes



1.1 Task Group members 2026/2027

- Monika Nielsen (Chair)
- Dan Friend (Executive Secretary)
- Barry Dooley
- Paul McCann (PCC)
- Ken Yoshida (PCAS)
- Jan Hruby (TPWS)
- Aurel Sachssendahl (IRS)
- Alberto Giuliano Albo (SCSW)



1.2 Target Groups & Markets – Tasks for 2026/2027

1. Update of IAPWS Statutes, Mission and Vision
 - What is our aim? Attract new people? Get higher attendance at the meetings
2. Create a Survey for the IAPWS WG
 - Who is your target group?
 - Who is in your personal networks?
 - What do you see as the gap in knowledge?
3. Identify other organizations
 - CCS, H₂, refrigerants...
 - Ask what knowledge they need and how IAPWS can help
4. Identify how we can reach out and attract new members for TPWS, IRS, PCAS and SCSW?
 - How can the National Groups help
5. Request to each National Committee
 - Come back in 2027 and report to the IAPWS EC on what they need of new knowledge
6. Recommendation for each WG chair to ensure that their WG sets up a YouTube channel and runs at least 2 webinars this year, eg what the WG does, steam tables???



Attachment 3: Schedule for Week

Schedule of IAPWS Meetings Bristol, England 28th June – 3rd July 2026

(All technical meetings will be at Bristol Hotel)

Sunday 28 June.	6:00 – 8:00 pm	Welcome Reception and Registration Bristol Hotel
Monday 29 June.	9:00 am	Executive Committee - Opening Plenary Session
	10:15 am	Coffee / Tea Break
	10:45 am	TPWS/SCSW/IRS Joint Meeting
	10:45 am	PCAS and PCC Separate Meetings
	12:15 pm	Lunch
	1:30 pm	TPWS/SCSW/IRS Joint Meeting
	1:30 pm	PCC and PCAS Joint Meeting
	3:00 pm	Coffee / Tea break
	3:30 pm	TPWS/SCSW/IRS Joint Meeting
	3:30 pm	PCC/PCAS Joint Meeting
Tuesday 30 June.	9:00 am	PCC/PCAS Joint Meeting
	9:00 am	TPWS/SCSW/IRS Joint Meeting
	10:15 am	Coffee / Tea break
	10:45 am	PCC & PCAS Sep. Mtgs.; TPWS/SCSW/IRS Joint
	12:00 pm	Lunch
	12:10 – 6:00 pm	IAPWS Technical Visit (Hinkley Point C)
Wednes. 1 July	9:00 – 4:30 pm	IAPWS Symposium
	6:30 – 11:15 pm	IAPWS Dinner/Banquet (SS Great Britain)
Thurs. 2 July	9:00 am	TPWS/SCSW/PCAS Joint Meeting
	9:00 am	PCC and IRS Separate WG Meetings
	10:15 am	Coffee / Tea break
	10:45 am	Separate meetings of Working Groups
	12:15 pm	Lunch
	1:30 pm	Separate meetings of Working Groups
	3:00 pm	Coffee / Tea break
	3:30 pm	Separate meetings of Working Groups
Friday 3 July	9:00 am	Executive Committee Meeting (9:00am - 12:30 pm) (Will include at least one member from each National Member Delegation)

TPWS - Thermophysical Properties of Water and Steam WG

SCSW - Subcommittee on Seawater

IRS - Industrial Requirements and Solutions WG

PCAS - Physical Chemistry of Aqueous Solutions WG

PCC - Power Cycle Chemistry WG

D.G. Friend

16 June 2026

Attachment 4 President's Report

Report of IAPWS President Monika Nielsen to IAPWS Executive Committee

3 July 2026

Good morning, everyone.

First of all, I would like to thank BIAPWS, the Organizing Committee, and everyone involved in planning this Annual Meeting. Thank you for hosting us and for creating another excellent week of productive discussions, scientific collaboration, and valuable networking.

Every Annual Meeting reminds us that IAPWS is much more than technical documents and working group meetings. It is a community built on trust, cooperation, and friendships developed over many years. Those personal relationships are one of our greatest strengths, and they enable us to work effectively together even after we return home.

It has been another busy week, and I now look forward to hearing the reports from each of our Working Groups. I know that an enormous amount of work has taken place throughout the year and during the past week, and I would like to thank everyone for their dedication and commitment.

One development I particularly appreciate is the continued effort by the Working Groups to prepare their agendas well in advance of the Annual Meeting. Having the agendas available early makes a real difference. It gives delegates and National Committees a much better opportunity to plan their participation and obtain the necessary approvals from their employers. Although it requires additional planning from the Working Groups, I believe it has become an important factor in maintaining strong attendance, and I would like to thank everyone involved for making this happen.

I would also like to recognize the excellent work carried out by PCC over the past year. The webinar series has been a great success. It has generated significant interest, reached audiences far beyond our traditional members, and helped raise the visibility of both PCC and IAPWS as a whole. This is exactly the type of outreach that helps us remain relevant and attracts new people to our organization.

I would strongly encourage every Working Group to organize at least one webinar each year. It is an excellent way of increasing visibility, sharing expertise, and attracting future members. Every Working Group has valuable expertise to share, and even one webinar each year explaining your group's work, ongoing activities, and future challenges could make a significant difference.

Increasing our visibility throughout the year—not only during the Annual Meeting—is one of the best investments we can make in the future of IAPWS. This also includes an effort to get more activity and involvement from our Associate Member Countries. This is something that is very important and something that needs to be addressed. I'm pleased that a task group has been formed this week to address this issue as we all believe it is very important.

When I spoke to you last year, I shared my ambition to strengthen the strategic work within IAPWS. During the past year, I have learned an important lesson. The scope of strategic planning across the entire organization is simply too large to manage all at once. Rather than trying to solve everything at once, we need a structure that will allow the work to continue beyond a single presidency.

That is why I am very pleased that we have now established the *Target Group & Markets* Task Group and on Wednesday morning we had a productive meeting discussing what we need to do during the next year.

Of course, there is still much more to do.

Strategic planning is not a one-year project, it is a continuous process. I hope we will continue to build on this work so that our strategy becomes a natural part of how we develop IAPWS.

As I come to the end of my two years as President, I would like to thank all of you.

Serving as President has been both an honour and a privilege.

I have had the opportunity to meet many dedicated people, learn more about our National Committees, and experience first-hand the remarkable commitment that exists throughout IAPWS.

None of what we accomplish is the work of one person. It is the result of hundreds of volunteer hours contributed by people who care deeply about our organization and our technical mission.

I also want to recognize that every one of us has a demanding professional life outside IAPWS. Our families and our employers, rightly, remain our first priority. That is why I believe we must ensure that our work within IAPWS remains enjoyable, rewarding, and sustainable.

We should never feel that we have to do everything. It is far better to focus on the tasks we can complete well than to take on so much that volunteering becomes a burden.

If we continue to support each other, share the workload, and build on each other's strengths, I am confident that IAPWS will continue to thrive.

Finally, I would like to thank Dan for an excellent collaboration over the past two years, it's been a pleasure and I think you are doing an excellent job as the Executive Secretary.

Thank you to all the delegates, the Working Group Chairs, the Executive Committee, the Organizing Committee, and everyone who has contributed to making this week such a success.

And finally, thank you to each of you for your commitment to IAPWS.

Thank you.

Attachment 5 TPWS Minutes

Minutes from the TPWS/SCSW 2026 meeting

1. Opening Remarks; Adoption of Agenda

The TPWS/SCSW meeting started on June 29, 2026, at 10:45. The agenda was approved.

2. Appointment of Clerk of Minutes

A. Albo was appointed Clerk of Minutes.

3. Potential projects

No new project was proposed.

4. IAPWS Certified Research Need (ICRNs)

4.1 ICRN 30: Thermophysical Properties of Supercooled Water (O. Hellmuth), concluding statement

Because O. Hellmuth is no more active in TPWS, J. Hrubý will write a concluding statement.

4.2 ICRN 31: New Thermodynamic Data for Ordinary Water (A. Harvey and J. Hrubý), expired October 2024, an update prepared by A. Harvey and J. Hrubý, extended to September 2029.

A. Harvey prepared an update which has been already approved. New data is needed for specific regions. Also, quantum-mechanical and molecular dynamic simulations are needed for high temperatures where experimental data are lacking.

4.3 Discussion of possible new ICRNs

New ICRN. Possibly one for density of seawater.

5. Reports on seawater-related topics (joint with SCSW and PCAS)

5.1 Measurements of density and equation of state for seawater. (J. Hrubý, A. Blahut, V. Vinš).

J. Hrubý (A. Blahut was the primary investigator) presented results of experimental data and a preliminary EOS for seawater. The paper was published in 2026 (J. Phys. Chem. Ref. Data). It reports densities in metastable regions as well. The reason for measuring the subcooled density in seawater is that the derivative of the T-p curve can not be determined with necessary accuracy without subcooled data. This is linked with the thermal expansion coefficient that is needed by oceanographers. Using independent speed of sound values, the other thermodynamic properties were calculated and compared with existing measurements. The general agreement with TEOS-10 is around 50 ppm, somewhat worse near the equilibrium melting line. The deviations are large in the region of supercooled liquid, where TEOS-10 is extrapolated. A new form of equation of state for water was proposed. It includes electrostatic contribution due to ionic species and a part based on scaling the equation of pure water.

5.2 Heat capacity measurements in IAPSO sea water (P. A. Giuliano Albo)

Preliminary results of the heat capacity measurements with Differential Scanning Calorimeter (DSC) were discussed. In particular, the calibration and related mathematical models of the heat transfer processes in DSC were analyzed. Advantages of an oscillatory temperature course as opposed to a temperature ramp were discussed.

5.3 Vibrating tube substitution method or density measurements in seawater and expected uncertainty (P. A. Giuliano Albo)

Calibration and uncertainty estimates for measurements of density of seawater using a vibrating tube densimeter were discussed. The substitution method was discussed in detail. The investigations show that expanded uncertainty of 20 ppm in density can be achieved realistically.

5.4 Recent Progress in Absolute Density Measurements of Seawater (Yohei Kayukawa)

The apparatus for determination of the density of seawater by hydrostatic weighing was improved. The weighing system was placed into a barostatic chamber in order to avoid small drifts observed with the previous design. The sinker was surface-treated in order to prevent sticking bubbles on its surface. The improved apparatus is the world-wide most accurate instrument for absolute measurements of density of seawater, at part per million absolute accuracy.

5.5 Discussion of seawater topics

Comment: *model presented by J. Hrubý might in future be used as a basis for a reference equation of seawater.*

Comment: *It was suggested to extend the model for seawater to conditions of geothermal wells especially for industrial applications.*

Comment: *The speed of TEOS-10 calculations are inadequate for oceanographic applications, mainly due to the continuous calculation of the density from temperature and pressure always needed before performing further calculations. IAPWS-IF97 is much faster than IAPWS-95 but seems to be not accurate enough to be used as the pure-water basis for TEOS-10 calculations.*

Comment: *The request of the extension at high temperature of the seawater EOS lifts the problem of speciation of seawater components.*

5.6 Task Group on density measurement of SW.

A. Albo suggested forming a task group on the density of seawater (Albo, Kayukawa, Hrubý). The TG will prepare a guideline on recommended procedure for measurement of density of seawater with a vibrating tube densimeter.

5.7 The SWSC continues its activities in coordination with TPWS and other organizations;

5.8 Request to EC to re-designate the SCSW as the “Seawater Working Group” with the same membership and same mandate.

5.9 SCSW proposes to EC to be allowed to offer JCS the possibility to host TEOS-10 website.

6. Industrial Requirements and solutions for Properties Calculations (joint with WG IRS)

6.1 Report of the Task Group “Wet steam properties calculation” (A. Nový, J. Hrubý, R. Span, K. Meier, F. di Mare, S. Senoo, M. Kunick)

It has been suggested to close the old task group and open a new group with updated parameters of interest for industry.

6.2 Report on the development of a new Industrial Formulation for the properties of water and steam using the SBTL method (M. Kunick, H.-J. Kretzschmar, F. di Mare, B. Lea, A. Ranniste Sachssendahl, A. Novy, R. Pawellek, T. Löw, R. Harwood, N. Okita, S. Senoo)

6.3 Report on the Evaluation of STBL-Property Functions based on IAPWS-95 (M. Kunick, B. Lea, R. Pawellek, T. Löw, A. Ranniste Sachssendahl)

Recorded in IRS Minutes.

6.4 Discussion of a way towards a Draft-Release for the new Industrial Formulation: Confirmation of the Task Groups to develop and to evaluate the new Industrial Formulation.

After the 6.2, 6.3 and 6.4 talks, there was a discussion on how to share the excellent results in a form that was adopted by IAPWS in the past. The software is available with a MIT license at the moment.

6.5 Report of the joint Task Group “Wet Steam Data from Operating Turbines” (S. Senoo, N. Okita, A. Anderko)

Postponed to the 2027 IAPWS Meeting.

7. State of Development of a New Formulation for the Thermodynamic Properties of Ordinary Water (Replacement of IAPWS-95)

7.1 Report of Task Group (A. Harvey, A. Giuliano Albo, F. Caupin, D. Friend, J. Hrubý, Y. Kayukawa, S. Lago, N. Okita, R. Span)

A. Harvey presented an update on the development of a new formulation of thermodynamic properties of water and steam in the form of a Helmholtz equation of state that started at Ruhr Universität Bochum (RUB) in the group of Prof. Roland Span. A. Harvey and J. Hrubý contacted the group before the IAPWS Meeting in Bristol. The development is the subject of a M.Sc. thesis of a student, who is expected to continue the work as a Ph.D. project.

IAPWS requirements on the new formulation were discussed. It was suggested that the developers are invited to the 2027 IAPWS Meeting to present and discuss the status of development. The WG gave mandate to A. Harvey as the TG Chair and to J. Hrubý as the WG Chair to communicate with the Bochum group.

7.2 Report of Task Group on Melting Pressure Curves of Ice Phases (B. Journaux, A. Harvey, J. Hrubý, M. Brown).

8. Report of Task Group on Surface Tension of Ordinary Water (joint with WG IRS and SCSW) (V. Vinš, A. Harvey, O. Hellmuth, V. Holten, J. Hrubý, R. Mareš, F. Caupin)

The Revised Release on Surface Tension of Ordinary Water Substance IAPWS R1-76(2014) was

discussed. Possible improvements are slight adjustment of the critical exponent and considering an additional term for very low temperatures. These changes would require re-fitting the equation, with minor effects on the computing values. Therefore, it is not recommended to change the equation, until new high-quality data is available at high temperatures (above 100 °C), where the data situation is unsatisfactory. **The TG will reconsider the statement of uncertainties, which appears too pessimistic.**

9. Report of Task Group on Melting Pressure Curves of Ice Phases (B. Journaux, A. Harvey, J. Hrubý, M. Brown).

B. Journaux presented melting lines of ice phases computed from EOSs of the individual phases (ices and liquid water). EOSs of the ices are in the form of Gibbs energy represented by splines. Experimental data was obtained by combination of spectroscopic and computational approaches and it is independent of the existing T-p data, except for the adjustment of triple points.

The TG should propose a revision of Release R14-08(2011) on the melting pressure curves of the ice phases. An Evaluation Task Group will be formed when a draft is available.

10. Joint session with WGs PCAS and IRS

10.1 Decluttering isotherms: Reconceptualizing solvation, sorption, and surface tension via statistical thermodynamic fluctuation theory (S. Shimizu)

In PCAS Minutes.

10.2 Progress on a Formulation for the Static Dielectric Constant of Heavy Water (J. Cox, J. Young, A. Harvey, and P. Tremaine).

Developed formulation is based on the existing formulation for ordinary water, which is rescaled with help of critical parameters. The formulation will be limited to liquid phase up to 600 K, which is sufficient for main applications. The draft guide is almost finished. An Evaluation Task Group has been formed (H. Arcis and D. Friend). The WG should approve the Guideline by email before the 2027 IAPWS meeting to be ready for EC approval.

10.3 Calculation of Enhancement Factors Using Virial Coefficients (A. Harvey, G. Garberoglio, R. Hellmann)

The main contribution to the calculator of enhancement factor comes from the fugacity of water in the gas phase. This quantity can be calculated when the cross-second virial coefficient is known. Accurate cross virial coefficients are difficult to be measured but for some species we have accurate ab-initio calculations. In the guideline, the recommendation for the calculation of the enhancement factor will be reported. The range of pressure is still to be defined. The uncertainty of computed values must be provided. Possible inclusion of the third virial coefficient, where reliable values are available, will be considered. Meier reported that R. Hellman made a significant progress in calculations of higher order virial coefficient involving hydrogen.

10.4 Van der Waals loop for water: General considerations and results with new cubic and non-cubic equations of state (J. Hrubý)

Two forms of cubic equations are presented to prevent divergencies in the two-phase region, which are an artefact of contemporary multiparameter EOSs including IAPWS-95. A smooth Van der Waals loop is needed to obtain stable predictions for mixtures and for modeling phase interfaces using gradient theory.

Developed cubic EOSs represent accurately the 2nd virial coefficient, and density, compressibility, and Gibbs energy of saturated liquid. Temperature dependent coefficients of the equation are represented by splines. For water, the EOSs provide reasonable accuracy in the vapor region, liquid region up to about 200 MPa, and supercritical region. In the critical region, the EOSs show “classical” behavior. Next steps will include data for the 3rd virial coefficient, crossover representation of the critical region, and application to mixtures.

10.5 An updated methodology for thermodynamic assessment of cesium speciation and volatility during a flask transient scenario (H. Arcis, R. Burrows, R. George, C. Hills, R. James, G. McGill, T. Smith.)

In PCAS Minutes.

10.6 UKNNL-CNL Collaboration on Radiation Chemistry of Iodine Under Low Dose Rate Conditions Relevant to Design Basis Accidents in PWRs (G. McGill, H. Arcis, R. Burrows, C. McGregor, J. Shin.

In PCAS Minutes.

10.7 Defining ranges of the metastable steam region relevant to industrial applications, in particular turbines operating in wet steam (low-pressure turbines, nuclear power cycles) (J. Hrubý)

In some industrial processes, in particular in expansions in steam turbines and nozzles, dry steam is found in metastable state (supersaturated steam, subcooled steam). It is desirable that the new formulation of thermodynamic properties of water is valid in this region. It was proposed to collaborate with IRS in defining the range of metastable water relevant to industry.

11. Other Business

11.1 Update: IAPWS G5-01(2026) Guideline on the Use of Fundamental Physical Constants, and Basic Constants of Water (A. Harvey)

The SI systems has changed, main constants have been fixed or updated. The document was updated correspondingly. In particular, recommended values and information on the dipole moment and polarizability of water was modified and references were updated. The updated Guideline was circulated and approved by the working group. It will be submitted to the EC for approval.

11.2 Report on International Collaborative Projects

In 2022, Allan Harvey, Roland Span, and Jan Hrubý proposed Young Scientist IAPWS Fellowship Project “Towards a replacement for the IAPWS Formulation 1995: Detailed analysis of available data”. The planned budget of the project was not used so far. The development of a new formulation was initiated recently in the group of R. Span at Ruhr Universität Bochum (RUB). Because of personal situation at NIST in Boulder, the planned stay of a young scientist at NIST is not needed. Given the great importance of the new thermodynamic formulation for IAPWS, the WG TPWS recommended retaining the USD 5,600 budget allocation earmarked for visits to RUB and utilizing it in accordance with the original plan.

12. Membership

Sharat Chandrasekhar (Blade Energy Inc, USA) accepted as a new TPWS member.

13. Contribution to Press Release

Contribution to Press Release was written by A. Albo and J. Hrubý.

14. Preparation of the Formal Motion to the EC

Formal Motion to the EC was prepared by A. Albo and J. Hrubý.

The TPWS/SCSW meeting was adjourned at 16:15 on July 2, 2026.

Proposal of reduction of planned budget of Young Scientist IAPWS Fellowship Project

In 2022, Allan Harvey, Roland Span, and Jan Hrubý proposed Young Scientist IAPWS Fellowship Project “Towards a replacement for the IAPWS Formulation 1995: Detailed analysis of available data”. The planned budget of the project was not used so far. The development of a new formulation was initiated recently in the group of R. Span at Ruhr Universität Bochum (RUB). Because of personal situation at NIST in Boulder, the planned stay of a young scientist at NIST is not needed. Given the great importance of the new thermodynamic formulation for IAPWS, the WG TPWS recommended retaining the **USD 5,600** budget allocation earmarked for visits to RUB and utilizing it in accordance with the original plan.

On behalf of the IAPWS Sponsors: Jan Hrubý

**Agenda for the IAPWS Working Group
Thermophysical Properties of Water and Steam (TPWS)
Bristol, United Kingdom, June 28 – July 3, 2026**

1. Opening Remarks; Adoption of Agenda [Monday morning]
2. Appointment of Clerk of Minutes
3. Potential International Collaborative Projects
4. IAPWS Certified Research Needs (ICRNs)
 - 4.1 ICRN 30: Thermophysical Properties of Supercooled Water (O. Hellmuth), concluding statement required.
 - 4.2 ICRN 31: New Thermodynamic Data for Ordinary Water (A. Harvey and J. Hrubý), expired October 2024, an update prepared by A. Harvey and J. Hrubý, extended to September 2029.
 - 4.3 Discussion of possible new ICRNs
5. Reports on seawater-related topics (joint with SC SW and PCAS)
 - 5.1 Measurements of density and equation of state for seawater. (J. Hrubý, A. Blahut, V. Vinš).
 - 5.2 Heat capacity measurements in IAPSO sea water (A. Albo)
 - 5.3 Vibrating tube substitution method for density measurements in seawater and expected uncertainty (A. Albo)
6. Industrial Requirements and Solutions for Property Calculations (joint with WG IRS) [Monday afternoon]
 - 6.1 Report of the Task Group “Wet steam properties calculation” (A. Nový, J. Hrubý, R. Span, K. Meier, F. di Mare, S. Senoo, M. Kunick)
 - 6.2 Report on the development of a new Industrial Formulation for the properties of water and steam using the SBTL method (M. Kunick, H.-J. Kretzschmar, F. di Mare, B. Lea, A. Ranniste Sachssendahl, A. Nový, R. Pawellek, T. Löw, R. Harwood, N. Okita, S. Senoo)
 - 6.3 Report on the Evaluation of STBL-Property Functions based on IAPWS-95 (M. Kunick, B. Lea, R. Pawellek, T. Löw, A. Ranniste Sachssendahl)
 - 6.4 Discussion of a way towards a Draft-Release for the new Industrial Formulation: Confirmation of the Task Groups to develop and to evaluate the new Industrial Formulation.
 - 6.5 Report of the joint Task Group “Wet Steam Data from Operating Turbines” (S. Senoo, N. Okita, A. Anderko) [Joint with PCAS, Tuesday?]
7. State of Development of a New Formulation for the Thermodynamic Properties of Ordinary Water (Replacement of IAPWS-95) [Tuesday morning]
 - 7.1 Report of Task Group (A. Harvey, A. Giuliano Albo, F. Caupin, D. Friend, J. Hrubý, Y. Kayukawa, S. Lago, N. Okita, R. Span)
8. Report of Task Group on Surface Tension of Ordinary Water (joint with WG IRS and SC SW) (V. Vinš, A. Harvey, O. Hellmuth, V. Holten, J. Hrubý, R. Mareš, F. Caupin)
9. Report of Task Group on Melting Pressure Curves of Ice Phases (B. Journaux, A. Harvey, J. Hrubý, M. Brown). The TG should propose a revision of Release R14-08(2011) on the melting pressure curves of the ice phases. In a second step, it will develop releases for the equations of state of the crystalline phases and the pressure solid-solid-equilibria. (?)
10. Joint session with WGs PCAS and IRS [Thursday morning]
 - 10.1 Decluttering isotherms: Reconceptualizing solvation, sorption, and surface tension via statistical thermodynamic fluctuation theory (S. Shimizu)

- 10.2 Progress on a Formulation for the Static Dielectric Constant of Heavy Water (J. Cox, J. Young, A. Harvey, and P. Tremaine).
- 10.3 Calculation of Enhancement Factors Using Virial Coefficients (A. Harvey, G. Garberoglio, R. Hellmann).
- 10.4 Van der Waals loop for water: General considerations and results with new cubic and non-cubic equations of state (J. Hrubý)
- 10.5 An updated methodology for thermodynamic assessment of cesium speciation and volatility during a flask transient scenario (H. Arcis, R. Burrows, R. George, C. Hills, R. James, G. McGill, T. Smith).
- 10.6 UKNNL-CNL Collaboration on Radiation Chemistry of Iodine Under Low Dose Rate Conditions Relevant to Design Basis Accidents in PWRs (G. McGill, H. Arcis, R. Burrows, C. McGregor, J. Shin).
- 10.7 Defining ranges of the metastable steam region relevant to industrial applications, in particular turbines operating in wet steam (low-pressure turbines, nuclear power cycles) (J. Hrubý)
- 11. Other Business
 - 11.1 Update: IAPWS G5-01(2026) Guideline on the Use of Fundamental Physical Constants, and Basic Constants of Water (A. Harvey)
 - 11.2 Report on International Collaborative Projects
- 12. Membership
- 13. Contribution to Press Release
- 14. Preparation of the Formal Motion to the EC

June 26, 2026

Jan Hrubý (Chair), A. Albo, A. Jäger, (Vice-Chairs)

Attachment 6 IRS Minutes

Minutes of the IAPWS working group IRS,

Bristol, UK, June 28th – July 3rd, 2026

(Numbering of the topics follows IRS agenda)

1. Opening Remarks; Adoption of Agenda (Monday morning)

Aurel Sachssendahl (on behalf of IRS Chair F. di Mare) opened the IRS at 10:25 am, 29rd June 2026 meeting for IRS, prior to the joint meeting with TPWS. There were total 6 members present (A. Sachssendahl, A. Novy, H.J. Kretzschmar, M. Kunick, B. Lea, R. Pawellek).

Agenda was adopted with following changes according to preliminary one.

- a) The “Report of the joint Task Group “Wet Steam Data from Operating Turbines” (S. Senoo, N. Okita, A. Anderko), formerly item 5.1, will be skipped upon request of S. Senoo, as he is unavailable.
- b) The item “International cooperations/projects/challenges for IRS” (Francesca di Mare, N. Okita, B. Lea): Activities within the ECCSEL-ERIC (CO2), formerly item 6.1, will be skipped as well as per request by F. di Mare.
- c) The Report of the joint Task Group “White paper on geothermal plant issues” (N. Okita, Francesca di Mare, D. Addison, S. Terada, K. Wada), formerly item 6.4, has been removed from IRS agenda and moved only to PCC.
- d) The Report on “Thermal and Geothermal Power Generation Technologies” (W. Kazuhiro) will take place on Tuesday morning in a joint PCC/PCAS/IRS session at 9:00 a.m. This is now listed as item 5.1. in IRS agenda, and the former separate IRS item 6.5 has been removed.

Other items were adequately reordered.

2. Appointment of Clerk of Minutes

Adam Nový appointed as a clerk of minutes for IRS

3. Election of Chair and Vice Chair

Because the actual chair, F. di Mare, would like to step down as chair as she is not able to attend regularly, but she will stay in the WG as member, to support the group. The actual vice chair (R. Harwood) stays in function. On the online meeting, held on 13th May 2026, was proposed new chair A. Sachssendahl (proposed by HJK and FdM) and secondary vice chair proposal Adam Novy (proposed by FdM and AS) to be accepted at the start of the Bristol meeting.

The chair proposal was unanimously accepted by actually present members and the second vice chair was also unanimously accepted by present members.

4. TPWS /SCSW/IRS joint Meeting (Monday afternoon)

4.1 Report of the Task Group “Wet steam properties calculation” (A. Nový, J. Hrubý, R. Span, K. Meier, F. di Mare, S. Senoo, M. Kunick)

A. Nový reported no progress and no new inputs/measurements. The company’s interests are currently very limited and thus no progress has been made. It has been decided to discontinue this TG. There were no objections to discontinuing the group from IRS, TPWS respectively. There is possibility in the future to rise again due to new industry needs.

TODO:

Close the TG

4.2 Report on the development of a new Industrial Formulation for the properties of water and steam using the SBTL method

(M. Kunick, H.-J. Kretzschmar, F. di Mare, B. Lea, A. Ranniste Sachssendahl, A. Novy, R. Pawellek, T. Löw, R. Harwood, N. Okita, S. Senoo)

M. Kunick reviewed the last 2 years of development. There are being prepared 2 different applications, one suitable for CFD with (v, u) independent variables pair and the second on for HBDs calculations with independent variable pair of (p, h).

Both SBTLs will be based on IAPWS-95 so they will have the same boundaries as scientific formulation IAPWS-95 (273.15 - 1273.15 K) and accordingly a smaller high temperature region. Addition of spline functions in the meta stable region are to be smoothly connected to the stable region and also the accuracy at the critical point may be improved but in the vicinity of the critical point one can switch to the original approach.

H.-J. Kretzschmar explained how, using „AN3-07(2018): Revised Advisory Note No. 3: Thermodynamic Derivatives” from IAPWS formulations, any derivatives from the base functions can then be determined. In conclusion there are still unfinished two functions (c_p and c_v) in both SBTL versions and two functions (isobaric cubic expansion coefficient and isothermal compressibility coefficient) to be possible to obtain any derivative function.

Now M. Kunick covered the evaluation, see point 4.2 and then continued 4.1 to summary and outlook.

Outlook:

- **SBTL based on (p, h) until 09/2026 (metastable functions)**
- **SBTL based on (v, u) until 12/2026**
- **Draft Release to be finalized until 06/2027**

Plans to distribute the new industrial formulation of water and steam properties are made using a proper repository (during development phase GitHub) in the name of IAPWS containing all necessary code to compile a version and including unit tests and a comparison to reference values. Licensing the code under MIT as a permissive license to allow any type of usage.

The following discussion:

From the broad discussion following was pointed out:

- Continuity of the 1st derivatives as the bi-quadratic polynomials to achieve fast property, assure 1st derivative is continuous, but the second derivative does not have to be at the cells boundaries.
- Explained, that use of (v, u) is common in CFD finite volume balance equations
- The computational speed is nearly independent of the grid size. MK Explained, the nodes data being efficiently organized in memory
- Comment on typical grid size, that for example 0.1 – 20MPa liquid has 75 grids
- The SBTL method itself has not changed, as presented in G13-15 guideline from 2015 so the method itself probably will not be subject to the standard release
- Discussion of the treatment of metastable region with respect to transition from IAPWS-95 to gas equation
- It is assumed that from the legal point of view, guarantees based on new standard, there will be some time for transition, but the target is the new standard, replacing IF97 and it was commented, that the transition from IFC-67 to IF97 was also accepted and the changes at that time were much bigger.
- Clarify, what will be the subject of the release, the answer is a proper source code repository (currently GitHub but subject to further evaluation) as opensource containing all necessary data and procedures, which will generate grid data

4.3 Report on the Evaluation of STBL-Property Functions based on IAPWS-95

(M. Kunick, B. Lea, R. Pawellek, T. Löw, A. Sachssendahl)

Evaluation of the results was performed last year with a SBTL based on (v, u) in CFD and in tools used in the industry (KRAWAL of Siemens Energy and Epsilon of Iqony). Computing time comparisons for CFD applications (using v, u dependency) are very promising. Deviations of calculations with SBTL based on IAPWS-95 in comparison to IF97 were very small 0.05% - 0.015% max. More details already in minutes from Helsinki 2025 and will be confirmed during the evaluation phase.

4.4 Discussion of a way towards a Draft-Release for the new Industrial Formulation: Confirmation of the Task Groups to develop and to evaluate the new Industrial Formulation.

There were discussed many aspects of the problem, so final thoughts are grouped

a) Find out the general EC position about releasing software code:

Bring to the EC the idea of hosting repository with the SBTL formulation source code and tests and ask for position.

b) Where and how, technically, to host the final repository:

If a) is positive, check EC for possible hosting under IAPWS sites or under some reliable and government owned institution (like for example NIST, which AH ruled out for now) within the IAPWS member countries or using a open source repository under the name of IAPWS.

c) What to be published in release (except the code and documentation):

From discussion it was concluded, that release the “low level” full description, including how all the coefficients are calculated and how all the problematic states are treated, is technically impossible as it is too much information and data. It was concluded that, the focus for the release should be on the “high level” of basic function description, verification values and practical examples, directed for end users.

d) Possible other impacts of new standard:

The need to revise IAPWS documents referring to the IF97 standard.

e) Steps to draft release:

Two TGs, each with own responsibilities, proposed:

1st) SBTL Development TG (M. Kunick, B. Lea, A. Harvey, H-J. Kretzschmar)

Focus on core development and thermodynamics, finalize missing functions/features, production repository preparation incl. user documentation, check potential impact on other IAPWS releases

2nd) SBTL Evaluation TG (A. Nový, R. Pawellek, A. Sachssendahl, T. Löw, S. Bennoit, S. Senoo)

Evaluate “the product” against IAPWS-95 and IF97, i.e. check if all the imaginable deviations are within the permissible range. CFD testing Ruhr University Bochum.

Possible testing in proprietary SW within IAPWS related companies

5. PCC/PCAS/IRS joint meeting (Tuesday morning)

5.1 Report on “Thermal and Geothermal Power Generation Technologies” in (K. Wada)

K. Wada from Toshiba Energy gave excellent overview of the latest thermal, especially CCPP, and also geothermal power generation possibilities. After introducing Toshiba company and the track record of installations, he gave an overview of the last high tech CCPP ideas. After he continued to the Geothermal applications, pointing out still potential for growth in installations worldwide (where appropriate conditions). Also, he commented on the specific operational problems for geothermal turbines due to steam (in)purity, specific blades design due to the deposits need of rotor coating. Then explained the advantage of large LSBs and axial output, resulting in high efficiency and compact size. At the end there were some installation examples, also so called portable geothermal powerplants with power in the order of single MWs, with advantage of quick installation and minimized environmental approval procedures.

6. IRS separate meeting (Thursday morning)

6.1 Report of the Task Group “Categories of industrial requirements” (N. Okita, H.-J. Kretzschmar, A. Nový, chairs or representatives of other WG)

The prepared overview of requirements and categories has been discussed. No direct actions and changes are applied. For next IAPWS annual meeting an update of the visualization is anticipated to share and edit easily from all TG members. An additional category shall be introduced to name companies related to any requirement.

6.2 Translation of IF-97 Fortran routines into other programming languages (A. Nový)

No activity, some inputs from latter discussion will be used for new SBTL standard evaluation. With new standard ahead there is no immediate need for this. We all focus on SBTL standard evaluation.

TODO:

Close the TG

7. Other Business

nothing to report

8. Membership

No changes in membership.

9. Preparation of the Formal Motion to the EC

- Report Chair and Vice chair changes (adapt IAPWS website)
- Report: Conclusions and TODO of each TG/WG **SBTL has the priority!**
- Discontinued: Task Group “Wet steam properties calculation”
- Discontinued: Task Group “Translation of IF-97 Fortran routines into other programming languages”
- New SBTL Development TG
- New SBTL Evaluation TG
- Discuss the general EC position about releasing software code (refer to 4.4)
- Where and how, technically, to host the final repository (refer to 4.4)

10. Adjournment

Adjourned 2nd July 2026 11:00

Updated Agenda for the IAPWS Working Group Industrial Requirements and Solutions (IRS) Bristol, UK, June 28nd – July 3rd , 2026

1. Opening Remarks; Adoption of Agenda (Monday morning)
2. Appointment of Clerk of Minutes
3. Election of Chair and Vice Chair
4. TPWS /SCSW/IRS joint Meeting (Monday afternoon)
 - 4.1 Report of the Task Group “Wet steam properties calculation” (A. Nový, J. Hrubý, R. Span, K. Meier, F. di Mare, S. Senoo, M. Kunick)
 - 4.2 Report on the development of a new Industrial Formulation for the properties of water and steam using the SBTL method
(M. Kunick, H.-J. Kretzschmar, F. di Mare, B. Lea, A. Ranniste Sachssendahl, A. Novy, R. Pawellek, T. Löw, R. Harwood, N. Okita, S. Senoo)
 - 4.3 Report on the Evaluation of STBL-Property Functions based on IAPWS-95
(M. Kunick, B. Lea, R. Pawellek, T. Löw, A. Ranniste Sachssendahl)
 - 4.4 Discussion of a way towards a Draft-Release for the new Industrial Formulation:
Confirmation of the Task Groups to develop and to evaluate the new Industrial Formulation.

5. PCC/PCAS/IRS joint meeting (Tuesday morning)
 - 5.1 Report on “Thermal and Geothermal Power Generation Technologies” in (W. Kazuhiro)
6. IRS separate meeting (Thursday morning)
 - 6.1 Report of the Task Group “Categories of industrial requirements” (N. Okita, H.-J. Kretzschmar, chairs or representatives of other WG)
 - 6.2 Translation of IF-97 Fortran routines into other programming languages (A. Nový)
7. Other Business
8. Membership
9. Preparation of the Formal Motion to the EC
10. Adjournment

June 29, 2026

Aurel Ranniste Sachssendahl (Chair), Adam Nový, Richard Harwood (Vice Chairs)

Attachment 7 PCAS Minutes

PCAS WG Minutes

Bristol, England, June 29 – July 2, 2026

Present:

Ken Yoshida (Chair)

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Hugues Arcis (Vice-Chair)

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Jennifer Shin

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Jacy Conrad

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Derek Hall

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Seishi Shimizu

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Mayu Jobe

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Andre Anderko

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PCAS separate meeting, June, 29 morning

(1) Agenda was approved after discussion of proposed changes. The group reviewed the agenda and outlined the major actions expected during the meeting.

(2) Derek Hall was appointed as the clerk of minutes.

(3) Minutes of the 2025 meeting were approved.

A brief discussion was also held concerning participation across working groups and how members may engage in activities involving more than one group.

(4) PCAS members in attendance each gave introductions and an overview of their PCAS-related research activities.

K. Yoshida reported activities related to film-forming substances.

H. Arcis reported activities related to thermodynamic databases, CRUD studies, and radiation chemistry.

J. Shin reported activities related to radiation chemistry.

J. Conrad reported activities related to the nuclear fuel cycle, water radiolysis, and the extension of water radiolysis models to elevated temperatures.

S. Shimizu reported activities related to theoretical modeling, interests in solubility data experiments, and improvement of adsorption isotherm theory.

M. Jobe reported activities related to the international collaboration with W. Cook and K. Yoshida on film-forming amines.

A. Anderko reported that he is transitioning to emeritus status while continuing research. He described OLI activities in aqueous thermodynamic and transport modeling, geothermal chemistry, general and localized corrosion models using mixed-solvent electrolytes, critical mineral chemistry, mineral scaling in water treatment and oil and gas applications, and flow-accelerated corrosion.

(5) Possibility of ICRNs

J. Conrad led a discussion of ICRNs, including the need for radiolysis updates. The group discussed documentation and recruitment gaps and agreed that PCAS would benefit from a concise welcome package for new members.

The proposed welcome package should document key procedures, describe the benefits and possible IAPWS actions available to PCAS members, and help new members understand how to participate effectively.

D. M. Hall volunteered to formulate this document with input from PCAS. The group also discussed advertisement and outreach options to help recruit new academics.

The group discussed the desirability of structuring ICRNs so that they can be compatible with letters of support for external funding proposals.

(6) International collaboration

The group discussed the need for a template and supporting information explaining the international collaboration process and what it can be used for. PCAS can formalize this process to improve clarity, support recruitment, and increase PCAS activity.

(7) Discussion of future activities of PCAS

Action items were identified to support PCAS activity during the coming year, including preparation of ICRN-related documentation, development of an IAPWS/PCAS process and member-benefits document, preparation of a template for international collaborations, and development of suggestions for future ICRNs.

(8) Discussion of the possibility of releases and guidelines

The group discussed conductivity measurements in the range of approximately 5–125 °C. A possible guideline for conductivity measurements was discussed, including the possibility of expanding ICRN 32 and using that activity as the basis for a future guideline.

PCC/PCAS joint meeting, June, 29 afternoon

The following presentations were given by PCAS and PCC members:

- D. Addison (Thermal Chemistry), PCC Chair/Thermal Chemistry – High Temperature Heat Pump Steam Generators and Steam Compressors - PCC Keynote presentations
- M. Jobe (Tokushima University), Investigation of Flow-Accelerated Corrosion Mitigation by Film-Forming Amines in a High-Temperature and High-Pressure Loop (Update of the International Collaboration on FFA; M. Jobe, K. Yoshida, S. Weerakul, Y. Tai, and W. Cook)
- D. M. Hall (Penn State University), Automated detection and quantification of localized corrosion in steel using X-ray computed tomography data
- G. McGill (UKNNL), UKNNL-CNL Collaboration on Radiation Chemistry of Iodine Under Low Dose Rate Conditions Relevant to Design Basis Accidents in PWRs (G. McGill, H. Arcis, R. Burrows, C. McGregor, P. Yakabuskie, J. Shin)
- S. Shimizu (University of York), Understanding how molecules interact with surfaces and water: From thermodynamic principles to data analysis
- K. Yoshida (Tokushima University), NMR Analysis of Supercritical Water Reaction of 1-Butanol as a Model Intermediate Product for Decomposition of Film Forming Amines (K. Yoshida, A. Doi, Y. Yamaguchi, and T. Hirano)
- S. Mori (Kurita Water Industry), Transition from Film to Dropwise Condensation: Enhancing Heat Transfer in Steam Systems via Hydrophobic Films

PCC/PCAS/IRS joint meeting, June, 30 morning

The following presentations and discussion sessions were given:

- Kazuhiro Wada (Toshiba), Toshiba's Thermal and Geothermal Power Generation Technologies
- David Addison, geothermal steam purity TGD 1st open review/discussion session
- David Little (Nalco), Reliable Corrosion Product Monitoring via IAPWS guidance for Flexible Operation

PCC/PCAS joint meeting, June, 30 morning

The following presentations and open discussion were given:

- D. M. Hall (Penn State University), Examining how solution chemistry impacts aggregation tendencies of corrosion products for nuclear power generation systems
- D. McAllister (AUSAPWS), Loy Yang B Experience with Corrosion Product Sampling and Analysis and Boiler Tube Oxide Deposit Density
- PCC Corrosion Product Sampling Open Discussion

IAPWS Technical Visit, June, 30 afternoon

The members of PCAS participated in the IAPWS Technical Visit to Hinkley Point C.

IAPWS 2026 Symposium, July, 1

The members of PCAS participated in the IAPWS Symposium. The list of presentations is part of the official Symposium program.

The following PCAS-related presentation was included in the program:

- A. Anderko (OLI Systems), Prediction of the Solubility of Iron Oxides in Wide Temperature Ranges: Thermodynamic Foundation for Understanding Flow-Accelerated Corrosion (P. Wang, M. B. Hariri, J. Kosinski, B. Perdicakis and A. Anderko)

The members of PCAS also attended the IAPWS Dinner/Banquet.

TPWS/SCSW/PCAS joint meeting, July, 2 morning

The following presentations were given by TPWS and PCAS members:

- S. Shimizu (University of York), Decluttering isotherms: Reconceptualizing solvation, sorption, and surface tension via statistical thermodynamic fluctuation theory
- Progress on a Formulation for the Static Dielectric Constant of Heavy Water (J. Cox, J. Young, A. Harvey, and P. Tremaine)
- A. Harvey, Calculation of Enhancement Factors Using Virial Coefficients (A. Harvey, G. Garberoglio, R. Hellmann)
- J. Hrubý (Institute of Thermomechanics of the CAS), Van der Waals loop for water: General considerations and results with new cubic and non-cubic equations of state
- G. McGill (UKNNL), An updated methodology for thermodynamic assessment of caesium speciation and volatility during a flask transient scenario (H. Arcis, R. Burrows, R. George, C. Hills, R. James, G. McGill, T. Smith)

PCAS separate meeting, July, 2 afternoon

(1) PCAS membership

The group discussed PCAS membership, including recruitment needs and options for improving participation by new academics and other potential members. It was agreed that three new members, Jennifer Shin, Ghinwa McGill, and Seishi Shimizu, would be nominated as members of

PCAS, and that one member, Masakatsu Ueno, would be removed, subject to the Executive Committee approval.

(2) Vice-Chair

It was agreed that Derek Hall would be added as a new Vice-Chair, with Hugues Arcis continuing in his role as Vice-Chair, subject to the Executive Committee approval.

(3) Planning activities for 2026/2027

The group reviewed actions for 2026/2027, including ICRN-related documentation, preparation of the new member welcome package, development of an international collaboration template, and possible conductivity measurement guideline activities.

PCAS proposed a new task group to compile conductivity data to address ICRN 32, Conductivity of electrolytes in aqueous solutions, with a longer-term goal of developing a fundamental model for limiting conductivity of ions over a wide range of temperatures and pressures.

The first international collaboration project (ICP), between PCC and PCAS, on FFS will complete the experimental tests, generate a report and submit it for a peer-reviewed journal in 2027.

The second ICP, between PCC and PCAS, on iodine will complete the second set of experiments for 2027. One invoice for 2026 is on its way to IAPWS. The project is on track to be completed in 2028.

We discussed the idea of revising the ICP deliverables to be either a report or a peer-reviewed paper. This would remove potential plagiarism concerns by submitting a report first which would have significant overlap with any paper that is published.

(4) Preparation of report for Executive Meeting

The group prepared the PCAS report for the Executive Committee meeting.

**IAPWS Physical Chemistry of Aqueous Systems (PCAS) Working Group
Draft Agenda
Bristol, England June 28 – July 3, 2026**

Sunday 28 June 6:00 pm – 8:00 pm	Welcome Reception and Registration at Bristol Hotel
Monday 29 June	9:00 am Executive Committee - Opening Plenary Session
	10:15 am Coffee / Tea Break
	10:45 am PCAS Separate Meeting

- (1) Adoption of agenda
- (2) Appointment of clerk of minutes
- (3) Approval of minutes from the 2025 meeting
- (4) Progress reports on PCAS-related activities (by all group members)
- (5) Possibility of ICRNs
- (6) International collaboration
- (7) Discussion of future activities of PCAS
- (8) Discussion of the possibility of releases and guidelines

12:15 Lunch

1:30 pm **PCC/PCAS Joint WG Meeting**

- (9) D. Addison (Thermal Chemistry), PCC Chair/Thermal Chemistry – High Temperature Heat Pump Steam Generators and Steam Compressors TBC - PCC Keynote presentations
- (10) M. Jobe (Tokushima University), Investigation of Flow-Accelerated Corrosion Mitigation by Film-Forming Amines in a High-Temperature and High-Pressure Loop (Update of the International Collaboration on FFA; M. Jobe, K. Yoshida, S. Weerakul, Y. Tai, and W. Cook)
- (11) D. M. Hall (Penn State University), Automated detection and quantification of localized corrosion in steel using X-ray computed tomography data
- (12) G. McGill (UKNNL), UKNNL-CNL Collaboration on Radiation Chemistry of Iodine Under Low Dose Rate Conditions Relevant to Design Basis Accidents in PWRs (G. McGill, H. Arcis, R. Burrows, C. McGregor, P. Yakabuskie).
- (13) S. Shimizu (University of York), Understanding how molecules interact with surfaces and water: From thermodynamic principles to data analysis
- (14) K. Yoshida (Tokushima University), NMR Analysis of Supercritical Water Reaction of 1-Butanol as a Model Intermediate Product for Decomposition of Film Forming Amines (K. Yoshida, A. Doi, Y. Yamaguchi, and T. Hirano)
- (15) W. Hater, The adsorption of Oleyl Propylendiamine (OLDA) on Metal Surfaces under Dry Steam Conditions
- (16) S. Mori (Kurita Water Industry), Transition from Film to Dropwise Condensation: Enhancing Heat Transfer in Steam Systems via Hydrophobic Films

	3:00 pm	Coffee / Tea Break
	3:30 pm	PCC/PCAS Joint WG Meeting – continued
Tuesday 30 June	9:00 am	PCC/PCAS/IRS Joint WG Meeting
		(17) Kazuhiro Wada, Toshiba Meetingmal and Geothermal Power Generation Technologies
		(18) David Addison, geothermal steam purity TGD 1st open review/discussion session
		(19) David Little (Nalco), Reliable Corrosion Product Monitoring via IAPWS guidance for Flexible Operation
	10:15 am	Coffee / Tea Break
	10:45 am	PCC/PCAS Joint WG Meeting – continued
		(20) D. M. Hall (Penn State University) Examining how solution chemistry impacts aggregation tendencies of corrosion products for nuclear power generation systems
		(21) D. McAllister (AUSAPWS) Loy Yang B Experience with Corrosion Product Sampling and Analysis and Boiler Tube Oxide Deposit Density
		(22) PCC Corrosion Product Sampling Open Discussion
	12:00	Lunch
	1:30 pm – 6:00 pm	IAPWS Technical Visit (Hinkley Point C)
Wednes. 1 July	9:00 am – 4:00 pm	IAPWS Symposium
		(23) Andre Anderko (OLI Systems), Prediction of the Solubility of Iron Oxides in Wide Temperature Ranges: Thermodynamic Foundation for Understanding Flow-Accelerated Corrosion (P. Wang, M.B. Hariri, J. Kosinski, B. Perdicakis and A. Anderko)
	6:30 pm	IAPWS Dinner/Banquet

Thursday 2 July 9:00 am

TPWS/SCSW/PCAS Joint WG Meeting

- (24) S. Shimizu (University of York), Decluttering isotherms: Reconceptualizing solvation, sorption, and surface tension via statistical thermodynamic fluctuation theory
- (25) J. Hrubý (Institute of Thermomechanics of the CAS), Surface tension of binary aqueous mixtures with salts at low temperatures (M. Součková, M. Čenský, A. Blahut, O. Prokopová, J. Hrubý, V. Vinš)
- (26) Progress on a Formulation for the Static Dielectric Constant of Heavy Water (J. Cox, J. Young, A. Harvey, and P. Tremaine).
- (27) A. Harvey, Calculation of Enhancement Factors Using Virial Coefficients (A. Harvey, G. Garberoglio, R. Hellmann).
- (28) J. Hrubý (Institute of Thermomechanics of the CAS), Van der Waals loop for water: General considerations and results with new cubic and non-cubic equations of state
- (29) G. McGill (UKNNL), An updated methodology for thermodynamic assessment of caesium speciation and volatility during a flask transient scenario (H. Arcis, R. Burrows, R. George, C. Hills, R. James, G. McGill, T. Smith).

10:15 am Coffee / Tea Break

10:45 am **TPWS/SCSW/PCAS Joint WG Meeting**

- (30) Measurements of density and equation of state for seawater. (J. Hrubý, A. Blahut, V. Vinš).
- (31) A. Albo (INRIM), Heat capacity measurements in IAPSO sea water
- (32) A. Albo (INRIM), Vibrating tube substitution method for density measurements in seawater and expected uncertainty

12:15 pm Lunch

1:30 pm **PCAS Separate Meeting – continued**

- (33) PCAS membership
- (34) Planning activities for 2026/2027
- (35) Preparation of report for Executive Meeting

3:00 pm Coffee / Tea Break

3:30 pm **PCAS Separate Meeting – continued**

Friday 3 July

9:00 am

Executive Committee Meeting (9:00 am – 1:00 pm)

June, 29 2026

K. Yoshida (Chair)

Attachment 8 PCC Minutes

IAPWS POWER CYCLE CHEMISTRY (PCC) WORKING GROUP (WG) MINUTES – REVISION 3.0, 18 JULY 2026

IAPWS 2026, BRISTOL, UK

GENERAL COMMENTS

1. These minutes provide a general overview of all discussions and actions at the PCC meeting. They are not a verbatim record of the meeting but they are a best attempt to capture all key elements of discussions and relevant actions/decisions of the PCC Working Group.
 2. All special task groups (STGs) currently formed in PCC or formed at the most recent meeting are open to any members of PCC should they wish to get involved regardless of their attendance at the meeting or otherwise. The responsibility is on individuals to take the initiative to reach out and signal their interest and get involved should this be what they wish.
 3. Other IAPWS PCC related actions may be generated during the year by the PCC Executive and the various STGs. However all actions that require a discussion and vote within PCC (e.g the progression of ICRNs or TGDs) will be undertaken via an in person discussion at the next IAPWS meeting or via a specific postal ballot.
-

MONDAY 29 JUNE

PCC WG Meeting

1. Appointment of Clerk of Minutes
 - Willy Cook appointed as Clerk of Minutes.
2. Introduction to PCC 2026 Meeting
 - David Addison introduced PCC and the purpose of IAPWS for anyone new to PCC – see presentation.
 - Summary of PCC Reset program
 - Program started at IAPWS 2022 in New Zealand – goal was the following
 - Improve deliverables,
 - Recover from stall during Covid,
 - Move PCC forward,
 - Grow PCC,
 - Prepare PCC for the future,
 - Make the most of our PCC Emeritus members while they still wish to be involved etc

- Move PCC away from just a “chemistry show and tell” session/loose conference to some “relevant show and tell” combined with more focus on *“what current and future problems can we solve”* and *“what is the best value for PCC and IAPWS when everyone is together in the room”*
 - Update of processes/flow diagrams, PCC mission, priority lists – PCC members actively involved in these activities, more clarity for what PCC is and what PCC does and can do
 - Move to MailChimp system for more professional and easier to manage communications to PCC.
 - **Note:** The only current PCC email list is maintained by the PCC Chair via the MailChimp email system. Previous open CC lists used prior to 2022 are no long valid and should not be used. If there is any information that PCC members wish circulated to all of PCC send to the PCC Chair for incorporation into the next PCC Email.
 - Overview of Int’l Collaboration Projects – what may be done this year?
 - 1 year since new IAPWS website roll-out, great success!
 - Kirk stepping down as PCC Vice Chair – vacancy for new member.
 - PCC Deliverables Highlights – 2025/2026
 - Approval and Issue of FFS ICRN
 - Issue of draft Benchmarking TGD for ongoing review
 - Issue of draft electrode boiler ICRN for ongoing review
 - Issue of draft geothermal steam purity TGD for ongoing review
 - New IAPWS website and PCC pages online
 - Delivery of 3 more PCC Webinars (high interest) and posting on YouTube (high interest)
 - Increase in PCC attendees for 2026 (2020/2021 – Covid years, 2022 = 25, 2023 = 23, 2024 = 17, 2025 = 40) – **this year ~35**
 - Ongoing ICRN and TGD drafting and development and progress to approval and robust PCC discussions
 - PCC Management Summary – major thanks to support and leadership of PCC Vice Chairs
 - No one is being paid by IAPWS to be here – all on our \$\$\$ and time (or our companies \$\$\$ and time)
 - IAPWS does not have a HR department
 - If you have an issue raise it with the Chair or one of the Vice Chairs and we’ll see what we can do to resolve the problem
 - Goes without saying that we should be civil and professional but also not shy away from difficult and challenging discussions
 - Being challenged robustly is part of the scientific process – don’t make it personal or don’t take it personally. We should all be able to have a beer or wine together at the end of each day and have a laugh.
 - All voices in PCC are equally valued and will be listened to and considered as part of our processes
 - Processes for distribution of PCC and IAPWS materials will be followed, no shortcuts, no passed up comments or reviews. This is what makes IAPWS, IAPWS.
3. Amendments / Adoption of Agenda
- Approved
4. Approval of Minutes of PCC Helsinki 2025
- No comments or issues reported. Minutes approved.

5. Review of Actions from last PCC WG Meeting
 - Radiochemistry of iodine - presentation with PCC/PCAS this afternoon
 - Corrosion product white paper – to be discussed during week
 - ICRN22 – closed
 - ICRN26 – Aluminium in power plants, closing statement needed (Dooley / Svoboda) – stalled with Addison due to miscommunication. Closing statement issued to ES for updating on website.
 - IAPWS bluebook – reference on website, done!
 - TGD updates later in the week
 - Priority list updates later in week
 - Flow charts – complete
 - LinkedIn – PCC page up and running
 - Webinars – more required
6. Review of current ICRNs and closing/closing statements
 - ICRN25 – Cook extension or closing statement next year
 - ICRN32 – conductivity – still open

ACTION: Cook to contact Canadian team to get some action on this activity (Peter Tremaine, Jane Ferguson, Hugues - complete

 - ICRN33 – released, advertised on LinkedIn, research starting to flow in
 - Discussion on how to promote and get work initiated about ICRNs.

ACTION: Before EC meeting on Friday this week, update wording to ICRN description on how ICRNs can be used as justification for applying for research grants. (Hater, Cook, McCann) – Complete
7. End of current PCC Chair’s standard 5-year PCC Term in 2026 and replacement discussions as flagged at IAPWS 2025 and in correspondence to PCC
 - Asked for expressions of interest for new chair
 - Discussion around Chair role and responsibilities including succession planning from current PCC Vice Chairs
 - Decision needed by Thursday to present to EC on Friday – discussion document sent in March 2026 to spark thought and discussion and in minutes from last year’s meeting. PCC to discuss during the week
8. PCC Vice Chair vacancy and replacement
 - Kirk Buchner standing down after a number of years as PCC Vice Chair – THANK YOU for your service!
 - Need decision by Thursday – can be replaced or left vacant.
9. International Collaborations – possible projects to be discussed and processed at IAPWS 2026
 - None provided prior to meeting
10. IAPWS PCC Webinars Update

- 3 webinars in past year (60 – 75 min), extremely popular, 100's of registrations, attendance, questions and discussions. Extremely good for raising awareness of IAPWS and PCC. Shows clear demand of more knowledge and information.
- Ongoing delivery of PCC Webinars in conjunction with Combined Cycle Journal (USA) – FFS (Dooley and Hater), Steam Purity (Dooley and Svoboda), Generator Cooling (Svoboda)
 - 318 / 497 / 117 registered for each one – very high numbers attending online, lots of questions
- Webinars posted to YouTube- 90 subscribers, 1359 views to date of current webinars

11. IAPWS PCC LinkedIn Page Update -

- LinkedIn Page – 666 followers at time of meeting. Great for spreading IAPWS and PCC information. No comments read or replied to however.

12. IAPWS TGDs Updates– (Barry Dooley)

a. TGDs Overview – Status/update requirements of current TGDs

- STG – subject-task group, need members who are willing to WRITE materials
- Last TGD published in 2019 – need new guidance published frequently
- Possible refreshment of published TGDs
- White Paper – Corrosion products in flex plant published in 2025. Waiting comments and application experience to move to full TGD. PCC to discuss internally during the week, identify any issues and vote on Thursday.

ACTION: Get PCC approval to move this to TGD with EC approval at Friday's meeting –
Completed.

b. Benchmarking

- As discussed and agreed at IAPWS 2025 to look into development of a TGD in this area. STG (Addison/Dooley/McCann) moved with urgency and focus to get complete draft done in 2025/2026
- Draft sent to PCC in May 2026 for initial PCC review comments.
- Several comments received via different communication pathways and incorporated by STG. All valid review comments provided individual feedback with relevant edits/amendments made to draft TGD as required. Good feedback and comments helps to ensure more robust TGDs so thank you to all for your reviews.
- Note: All PCC document reviews should also be provided in the manner as requested by the STG at the time. This is normally via direct emails to the STG. The only current PCC email list is maintained by the PCC Chair via the MailChimp email system. Previous open CC lists used prior to 2022 are no long valid and should not be used.

c. Corrosion Product Sampling

- Examples of work related to the CPS WP to be discussed in the PCC/PCAS joint session. WP being widely utilised worldwide. To be discussed in more detail later

d. Geothermal Steam Chemistry

- Working draft ready for review and discussion. STG to meet and decide path forward for provisional PCC approval and move to EC to propose postal ballot (Kazuhiro Wada-

Toshiba, Jonas – Iceland, Hater, Addison, Dooley, Svoboda). To be discussed in more detail later

e. Electrode Boiler Chemistry

- Draft being prepared by Addison / Nielsen – based on that work decision made to move to ICRN first which has been provided to PCC for review (June 2026) to be discussed and approved by PCC. To be discussed in more detail later
- Workshop held by Nielsen in June 2026. Summary to be provided in joint PCC/PCAS session

ACTION: Addison, Nielsen, Dooley, Þór Markússon, Little discuss path forward

f. Flue gas condensation

- PCCChem published document. Need to combine Loder document and potentially update and move to TGD. (Nielsen, Daal and Loder (Cook)). Publish as White Paper? To be discussed in more detail later

g. Application of FFS in Nuclear Plants

- Fandrich suggests to change to White Paper for flexibility with Duncanson (EPRI) and Jagan (CNL). ODACon only FFS applied in nuclear plants.

ACTION: Update STG, discuss moving forward with White Paper (Dooley, Cook, Little)

h. Instrumentation

i. Steam Purity

j. Application of Film Forming Substances in Fossil and Combined Cycle Plants Revision with FFS Conference Materials

k. Carryover

l. Flue gas condensation

13. Paul McCann - FFS measurement STG – Update

14. Wolfgang Hater – Possible Industrial Boiler TGD update

15. Barry Dooley, Paul McCann, David Addison - Benchmarking draft TGD– 1st open review/discussion session

- Discussion to address two rounds of review and comments that came back associated with document preparation and review.
- Benchmarking originally used in the EPRI BTFR (boiler tube failure report) Program. Benchmarking very commonly used tool across all fossil power plants
- RCCS – repeat cycle chemistry situations background discussed. Extensively discussed at IAPWS 2025
- RCCS and BM are NOT DEPENDENT on plant OEM or design. Database covers many, many different OEM, design configurations etc. The results of the evaluation have been published in the external literature and are publicly available.
- Ranking order has been consistent since 2008.
- Weightings have been validated with over 30 years (>300 assessments worldwide)
- RCCS weightings have been developed to provide general guidance.
- “Can be used as self-assessment or by a consultant but doesn’t need an expert” – good to have plant-to-plant-to-fleet comparisons, doesn’t require independent expert review.
- Examples of use of BM for FAC, RCCS provided and explanations given for how they are applied.

- Discussion around legal implications / insurance / liability issues. The TGD is a tool for plants to use that leads to performance improvements. IAPWS should not have legal caveats since these are guidance documents to be used as such “guidance” or “tools”. However, a very basic legal disclaimer for all IAPWS TGDs agreed to be a good thing for TGDs plus updating of older TGD contact details to the new @IAPWS email addresses info@iapws.org etc for example as older TGDs predate IAPWS specific email addresses. (already identified issue at IAPWS EC level at previous meetings and during the website redevelopment)

ACTION: Addison to raise at EC meeting and progress to solution for both points – suitable legal disclaimer and update of TGD contact details.

- Opportunity this week for any other issues/comments to be discussed openly in PCC or 1:1 with STG members before final discussion and voting on Thursday. Proxy member comments welcomed for anyone not present in person at IAPWS 2026. Bring to EC for provisional approval on Friday. Will need Editorial Review and Postal Ballot.

ACTION: Get PCC approval to move this to TGD with EC approval at Friday’s meeting – Completed.

PCC and PCAS Joint Meeting

- Presentations as per agenda

TUESDAY 30TH JUNE

PCC and PCAS and IRS Joint Meeting

David Addison, geothermal steam purity TGD 1st open review/discussion session

- More difficult TGD to develop based on no previous references to go against, uniqueness of each plant/field design and limited publication of data. TGD driven mainly by New Zealand experience and plants. New Zealand provides large amount of global geothermal training and engineering services to SE Asia in combination with Japanese plant OEMs. Requires a slightly different approach to the TGD than usual with more back ground information provided
- Provisional draft issued in early June 2026 to PCC and expanded STG
- STG expanded, leverage additional site-specific expertise due to lack of published literature.
- Advancement: non-condensable gases section removed; steam quality aspects to be added; no superheating prior to turbine (deposition); silica limits need verification; customization section needed; steam line drain pot sampling guidance (?)
- Japanese expecting comments on draft TGD – provided and discussed, desire to not be overly prescriptive. Need balance between OEM and Utility/steam turbine operators. Need to seek additional commentary from Iceland
- Next draft end of July after re-work by key NZAPWS members with support from STG.
- Aim for approval at 2027 meeting
- Dooley comment: missing input from Russia and experience from Moscow Power Institute. Addison – very limited geothermal development in Russia in last 30 years. No interaction at global level in International Geothermal Association etc organizations.

ACTION: Addison/NZAPWS to work up next revision, work with STG and then to PCC for additional review.

Monika Nielson – June 2026 Nordic IAPWS eBlr workshop summary (from Monday’s agenda)

- Workshopped 37 ppl; 27 companies represented. Addison from NZAPWS provided web based presentation of currently IAPWS work

- Issues:
 - Chemical monitoring, sampling, analysis, instrumentation
 - Purification / treatment
 - Wastewater / drainage management
 - Materials selection
 - Make-up – automatic desired
 - N2 blanket, H2, O2 management
- Conductivity monitoring is extremely important (redundancy required!)
- Filtration important
- More automation and online monitoring required
- Verification of key issues and clear need for ICRN and TGD.

ACTION: PCC should publish operating experience on e-boilers to get recent experiences out there. Addison/Nielson to draft paper for publication (PPChem etc)

David Addison, Monikia Nielson, eBlr TGD/ICRN 1st open review/discussion session

- ICRN needs direct input from electrochemistry experts in PCAS – Hall/Cook/Yoshida to help review and update draft ICRN.
- Need to include hydrogen generation data from hot water electrode boilers

ACTION: Have an PCAS look at the ICRN language and background science to see what is required to move this forward to EC this Friday – completed

ACTION: Addison to review Nordic IAPWS hot water boiler data, summarise and include in ICRN. Revised draft ICRN to PCC for final email review then to Editorial for completion and publishing. ICRN approved by EC.

PCC Priority List 2026 Discussion and Update – Led by David Addison – PCC Chair

- From 2025 priority list majority are addressed or in play but Flex Ops has been neglected – how do we fix this?
 - Webinar suggested (Paul with support from Addison, deVos, Neilsen, Daal – practical experience across fleet)
 - White paper / technical paper (PPChem)

ACTION: Paul to develop webinar (2015 article published in PPChem – update)

- Demin Water has been neglected – review in 2027

THURSDAY 2ND JULY

Paul McCann – FFS measurement STG update

- STG – McCann, Andre, Wolfgang, Levi, Ronnie, Little, Griff, Sonia
- Anodamine declined to participate
- First draft / discussion early this year

ACTION: STG to prepare first draft for review by end of Dec 2026

Wolfgang Hater – Industrial Boiler TGD update

- What do we do? TGD? White Paper?
- Technical Paper? “Applying IAPWS TGDs in ISGs”
- Andre suggests TGD and downgrade to WP or other if necessary
- Wolfgang has seen real need from industry for guidance
- Paul confirms gap and need for guidance on lower pressure boilers (proposes Griff for potential STG lead – perhaps defer to next year to provide focus)
- DA proposes STG and paper for PPChem

ACTION: have ISG session with invited presentations for next IAPWS meeting (Addison, McCann, Griff to coordinate)

Tapio Werder – GSAPWS – Power Plant Chemistry Data Knowledge Database Project Introduction

- GSAPWS focus with academics and university researchers
- Goal – encourage industry to participate in IAPWS
- Tool developed with Python / AI with keywords and summary outputs from the AI tool (in English)

ACTION: STG for GSAPWS knowledgebase to make presentation to PCC next meeting to demonstrate the tool and make it fully available

Dutch IAPWS (DAPWS) presentation – Ludwin Daal, BlueXPRT/DAPWS

- Summary of DAPWS meeting, March 2026
- Condenser leakage experience presented

National Committee reps – member PCC related issues updates (round the table discussion)

PCC Workflows (updated for 2026) – Paul McCann – PCC Vice Chair

- Summarized by D. Addison

ACTION: TGD & White Paper & Int’l Collaboration workflows need “approval” added for Circulation for PCC WG for review “and approval” - Completed

ACTION: Make flowcharts publicly available with IAPWS PCC branding on PCC webpage

Discussion about a possible future IAPWS PCC International Water/Steam Chemistry Conference run by PCC – David Addison – PCC Chair

- Other meetings ... VGB, EPRI, EUHSG, ABHUG, NPC, IAPWS
- Conferences > 2 days are challenging to have approvals granted
- PPC be more proactive for ICPWS – build a world class program for 2029 ICPWS in Canada – IAPWS 100-yr anniversary
 - Structure program around TGDs, solicit case studies
 - Guidelines and Releases – Fundamental Science
 - ICRNs, solicit academic and R&D papers
- STG – Cook, Addison
 - Hybrid?

- 3-day conference + 1 day training / WG meetings + 1 day IAPWS EC / WG

ACTION: STG to discuss and start mapping out possible structure/plan to discuss at IAPWS 2027

PCC TGD Groups/Subject Task Group (STG) review and working time (continued):

Barry Dooley, Paul McCann, David Addison - Benchmarking draft TGD– 2nd open review/discussion session

- Covered content on Monday
- Comments reviewed and dispositions accepted

MOTION: PCC WG agreed TGD is ready for EC release for national committee and additional reviews as per flow chart.

Unanimously Approved by PCC

Next step to pass on to Editorial Committee for updates. Exec. Secretary sends TGD out for international review with 3-month duration for review and comment. Note that this means there is additional opportunity for additional, relevant PCC review during this process for any additional thoughts/comments.

David Addison, Monikia Nielson, eBlr TGD/ICRN 2nd open review/discussion session

- PCAS review on ICRN content and scientific need completed

MOTION PCC WG agreed ICRN is ready for EC approval and Editorial Review once additional hot water boiler data added.

Unanimously Approved by PCC

ACTION: STG to attempt to get better engagement with the eBlr OEMs

ACTION: Paper to be written and published on eBlrs and issues to disseminate recent eBlr experience

ACTION: Continue work toward draft TGD

David Addison, geothermal steam purity TGD 2nd open review/discussion session

- Draft has been written with initial remote STG feedback received – needs re-work around silica data etc, format adjustments, requirements of JAPWS

ACTION NZAPWS/STG to redraft and send out for second draft review

ACTION: Prepare 2nd draft and circulate to PCC (include Iceland)

Items from PCC WG Business - Led by David Addison (PCC Chair)

1. Discussion of PCC 2026 Priority List and reporting back
 - Priority list discussion and additions
 - Nordic: Carbon Capture as a provisional future priority area
 - Japan: Knowledge transfer / training
 - North America: burgeoning nuclear buildouts – doubling of current fleets

ACTION: David to try and solicit more American participation into future PCC sessions

2. TGD Updates – (Led by Barry Dooley)

- Corrosion Product Sampling / Decay Map for FlexOps Plants White Paper
 - Development of proxy method for start-up monitoring with reference to sampling methods in TGD-6
 - Presentations given on application during IAPWS 2026
 - Correlation factor – STG to draft new sentences for incorporation into document
 - Comments incorporated about sample flow and caveats associated with this
 - STG recommends drafting TGD for end of 2026 (Dooley, McCann, Mar

MOTION: PCC WG agreed White Paper is ready for TGD development to move through process

Unanimously Approved by PCC

ACTION: Let EC know TGD will be sent to EC following PCC approval (likely postal ballot) as per TGD flow chart for circulation to national committees and published at next meeting

- FFS in Nuclear
 - Fandrich prepared to continue with Duncanson, Jagan, Willy
 - Duncanson indicated still need for guidance given new interest from nuclear plants in US and elsewhere

ACTION: Prepare draft for 2027 release – Willy to coordinate

- Flue Gas Condensation
 - Neilsen – stalled for 2 years
 - Loder posed several questions that need to be answered

ACTION: Monica to clean this up, put it on White Paper template and circulate to PPC for review. Target Aug 2026

3. Progress updates from IAPWS 2026 and progress plans from Task Group Chairs

- a. Proposals for new TGDs
 - None at the moment – continue with current work streams, Benchmarking, geothermal steam purity, electrode boilers, CPS
- b. Updates on progress with ICRNs being drafted and possible new additions
 - i. Electrode boiler ICRN
 - ii. Other ICRNs
- None at the moment
- Website updates: ICRNs may be used and attached to applications

ACTION: for ICRN's propose to EC that the Exec. Secretary may be able to write a letter of support

4. Possible PCC related future International Collaborations

- Prepare for February 2027

5. PCC Webinars for 2026/2027

- a. Review of 2025/2026 Webinars
- b. Registrations, attendance, YouTube etc
- c. Future PCC webinars, subjects, presenters etc
 - Everyone is happy with these
 - FlexOps webinar
 - Paul McCann
 - Oxides webinar
 - Barry “yes” for this
 - Corrosion product sampling
 - David Addison
 - Instrumentation webinar
 - Need for DCACE and EDI to reduce operator burden in Japan
 - Who can deliver this? David Addison? Academic? Mar (Swan)
 - Discussion around conflict of interest (CoI) if equipment suppliers are delivering this webinar – how to best manage this

ACTION: PCC chairs to develop CoI management policy and how to address or remediate these potential issues. Perceived CoI is the same as a real CoI but should be able to be effectively managed.

6. Other PCC Communications
 - a. PCC WG update calls
 - b. LinkedIn **ACTION: David de Vos to post regularly**
 - c. Email lists
7. Review of PCC Work Flow Chart (2010) to reflect current work practices – Paul McCann
 - a. PCC Task Groups
 - b. White papers
 - c. Webinars
 - d. LinkedIn
 - e. Future related conferences (FFS etc)
8. IAPWS 2027 and 2028 updates
 - 2027 Germany September –

ACTION: Tapio to find venue for PCC social event

- 2028 ??? - TBC
9. Review, update, rationalization and consolidation of PCC actions
 - Reviewed previously
 - Minutes circulated in the next week or so
 10. PCC Public Relations / Contribution to Press Release
 - Numbers, key actions, successes, challenges
 11. Changes in PCC Membership and Election of Officers

New PCC Members

Ourania Ioannidou – PPC Group, Greece
 Jónas Þór Markússon - Viðskiptastjóri / Key Account Manager
 Christopher Liebenau - International Sales Engineer
 Abra Penezic – R&D Analytical Instruments, Swan
 Tan Sheau Yuan – Global Segment Manager, Mettler Toledo
 Lukasz Grzybowski – Manager Power, Uniper Energy
 Rizwan Ali – ESB
 Griff Tilley – Viola, Product Applications Specialist
 Jennifer Shin – Canadian Nuclear Laboratories, Research Scientist

MOTION: PCC to approve new members of PCC as per nominated names and add to mailing list.

Unanimously Approved by PCC. All names added to PCC mailing list.

PCC Executive

- Nominations for PCC Chair solicited.

MOTION: David Addison nominated to continue in Chair role for additional 2-year term.

Unanimously approved by PCC, reluctantly accepted by Addison.

- Vice Chair vacancy, volunteers or nominations for vacant position solicited.
 - o No nominations received, will continue with 3 Vice Chairs

12. Adjourn

IAPWS POWER CYCLE CHEMISTRY (PCC) WORKING GROUP (WG) PROGRAM FOR IAPWS 2026 – BRISTOL, UK,

SUNDAY 28 JUNE

Afternoon	Informal opportunity for IAPWS PCC Task Groups to meet in person to discuss week ahead
6:00 – 8:00 pm	Welcome Reception and Registration – Location TBC

MONDAY 29 JUNE

09:00 – 10:15	IAPWS EC initial meeting – (Location TBC)
10:15-10:45	Morning Tea
10:45 – 12:00	PCC Internal – PCC WG Meeting – (Location TBC)
	16. Introduction to PCC 2026 Meeting

17. Amendments / Adoption of Agenda
18. Appointment of Clerk of Minutes
19. Approval of Minutes of PCC Helsinki 2025
20. Review of Actions from last PCC WG Meeting
21. Review of current ICRNs and closing/closing statements
22. End of current PCC Chair's standard 5 year PCC Term and replacement discussions
23. International Collaborations – possible projects to be discussed and processed at IAPWS 2026
 - a.TBC
24. IAPWS PCC Webinars Update
25. IAPWS PCC LinkedIn Page Update
26. IAPWS TGDs Updates– (Barry Dooley)
 - a.TGDs Overview – Status/update requirements of current TGDs
 - b. Benchmarking
 - c.Corrosion Product Sampling
 - d. Geothermal Steam Chemistry
 - e.Electrode Boiler Chemistry
 - f. Flue gas condensation
 - g. Application of FFS in Nuclear Plants
 - h. Instrumentation
 - i. Steam Purity
 - j. Application of Film Forming Substances in Fossil and Combined Cycle Plants Revision with FFS Conference Materials
 - k. Carryover
 - l. Flue gas condensation
27. Paul McCann - FFS measurement STG – Update
28. Wolfgang Hater – Possible Industrial Boiler TGD update
29. Barry Dooley, Paul McCann, David Addison - Benchmarking draft TGD– 1st open review/discussion session
30. Monika Nielson – June 2026 Nordic IAPWS eBlr workshop summary
31. David Addison, Monika Nielson, eBlr TGD/ICRN 1st open review/discussion session
32. David Addison, geothermal steam purity TGD 1st open review/discussion session

12:15 pm to 1:30 pm

Lunch

1:30 pm to 5:30 pm

PCC and PCAS Joint Meeting (includes afternoon Tea Break)

David Addison, PCC Chair/Thermal Chemistry – High Temperature Heat Pump Steam Generators and Steam Compressors - PCC Keynote presentations

M. Jobe , Investigation of Flow-Accelerated Corrosion Mitigation by Film-Forming Amines in a High-Temperature and High-Pressure Loop (Update of the International Collaboration on FFA; M. Jobe, K. Yoshida, S. Weerakul, Y. Tai, and W. Cook)

Derek M. Hall, Penn State University - Automated detection and quantification of localized corrosion in steel using X-ray computed tomography data

HUGUES ARCIS - UKNNL-CNL COLLABORATION ON RADIATION CHEMISTRY OF IODINE UNDER LOW DOSE RATE CONDITIONS RELEVANT TO DESIGN BASIS ACCIDENTS IN PWRs (G. MCGILL, H. ARCIS, R. BURROWS, C. MCGREGOR, J. SHIN)

S. Shimizu , Understanding how molecules interact with surfaces and water: From thermodynamic principles to data analysis

K. Yoshida, NMR Analysis of Supercritical Water Reaction of 1-Butanol as a Model Intermediate Product for Decomposition of Film Forming Amines (K. Yoshida, A. Doi, Y. Yamaguchi, and T. Hirano)

Wolfgang Hater, The adsorption of Oleyl Propylendiamine (OLDA) on Metal Surfaces under Dry Steam Conditions

Shintaro Mori, Kurita, Transition from Film to Dropwise Condensation: Enhancing Heat Transfer in Steam Systems via Hydrophobic Films

3:00 pm to 3:30 pm

Coffee/Tea Break

3:30 pm to 5:30 pm

PCC and PCAS Joint Meeting – Continued

Evening

PCC Social Dinner – Location TBC

TUESDAY 30TH JUNE

09:00 – 10:15

PCC and PCAS and IRS Joint Meeting

Kazuhiro Wada, Toshiba's Thermal and Geothermal Power Generation Technologies (Provisional – pending presentation release approval)

PCC and PCAS Joint Meeting (Continued) – Related to Corrosion Product Sampling PCC White Paper

David Little, Nalco, Reliable Corrosion Product Monitoring via IAPWS guidance for Flexible Operation

Andre Anderko, Prediction of the Solubility of Iron Oxides in Wide Temperature Ranges: Thermodynamic Foundation for Understanding Flow-Accelerated Corrosion (P. Wang, M.B. Hariri, J. Kosinski, B. Perdicakis and A. Anderko)

10:15-10:45

Morning Tea

10:45 – 11:15	PCC and PCAS Joint Meeting (Continued) – Related to Corrosion Product Sampling PCC White Paper Derek M. Hall, Penn State University - Examining how solution chemistry impacts aggregation tendencies of corrosion products for nuclear power generation systems Duncan McAllister, AUSAPWS – Loy Yang B Experience with Corrosion Product Sampling and Analysis and Boiler Tube Oxide Deposit Density PCC Corrosion Product Sampling Open Discussion
11:15 – 12:00	PCC Priority List 2026 Discussion and Update – Led by David Addison – PCC Chair Tapio Werder – GSAPWS – Power Plant Chemistry Data Knowledge Database Project Introduction Dutch IAPWS (DAPWS) presentation – Ludwin Daal, BlueXPRT/DAPWS National Committee reps – member PCC related issues updates (round the table discussion) PCC Workflows (updated for 2026) – Paul McCann – PCC Vice Chair Discussion about a possible future IAPWS PCC International Water/Steam Chemistry Conference run by PCC – David Addison – PCC Chair
12:00 pm – 10:30 pm	Lunch
12:10 pm – 6:00 pm	IAPWS Technical Visit – Technical Tour to Hinkley Point C – Bus leaves at 12:10, box lunch provided

WEDNESDAY 1ST JULY

08:30 to 4:30 pm – BIAPWS Symposium

Theme TBC

See separate Symposium program – refer to the IAPWS2026 website for now - <https://iapws2026.com>

PCC (very interesting and related) presentations as part of the BIAPWS Symposium to be confirmed soon

Includes: IAPWS Helmholtz Award Lecture

5:00 pm (Approx)

Transport to IAPWS Dinner/Banquet

6:30pm to 11:15 pm

IAPWS Dinner/Banquet TBC

THURSDAY 2ND JULY

9:00 am – 12:00 pm

PCC TGD Groups/Subject Task Group (STG) review and working time (continued):

1. Barry Dooley, Paul McCann, David Addison - Benchmarking draft TGD– 2nd open review/discussion session
2. David Addison, Monikia Nielson, eBlr TGD/ICRN 2nd open review/discussion session
3. David Addison, geothermal steam purity TGD 2nd open review/discussion session

10:15-10:45 am

Morning Tea

10:45 – 12:15 pm

PCC TGD Groups/Subject Task Group (STG) review and working time (continued):

12:15 pm - 1:30 pm

Lunch

1:30 pm - 5:30 pm

PCC WG Business - Led by David Addison – PCC Chair (Location TBC)

- (1) Discussion of PCC 2026 Priority List and reporting back
- (2) TGD Updates – (Led by Barry Dooley)
 - (a) Progress updates from IAPWS 2026 and progress plans from Task Group Chairs
 - (b) Proposals for new TGDs
- (3) Updates on progress with ICRNs being drafted and possible new additions
 - a. Electrode boiler ICRN

- (4) c. Other ICRNsPossible PCC related future International Collaborations
- (5) PCC Webinars for 2026/2027
 - a. Review of 2025/2026 Webinars
 - b. Registrations, attendance, YouTube etc
 - c. Future PCC webinars, subjects, presenters etc
- (6) Other PCC Communications
 - a.PCC WG update calls
 - b. LinkedIn
- (7) Review of PCC Work Flow Chart (2010) to reflect current work practices – Paul McCann
 - (a) PCC Task Groups
 - (b) White papers
 - (c) Webinars
 - (d) LinkedIn
 - (e) Future related conferences (FFS etc)
- (8) IAPWS 2027 and 2028 updates
- (9) Review, update, rationalization and consolidation of PCC actions
- (10) PCC Public Relations / Contribution to Press Release
- (11) Changes in PCC Membership and Election of Officers
- (12) Adjournment

3:00 pm – 3:30 pm Afternoon tea/coffee

3:30 pm to 5:30 pm PCC WG Business - Led by David Addison – PCC Chair (Location TBC)
Continued

FRIDAY, 3RD JULY

09:00 – 13:00 IAPWS Executive Meeting (TBC)

Attachment 9 BIAPWS



Report on BIAPS 2026

Committee Members

The committee members are:

Role	Name	Contact Details
Chair	Griff Tilley	chair@biapws.org
Vice-chair	Vacant	vicechair@biapws.org
Secretary	Luke Wood	secretary@biapws.org
Vice-secretary	Lukasz Grzybowski	vicesecretary@biapws.org
Treasurer	Hugh Lloyd	treasurer@biapws.org

Status

BIAPWS currently has 18 corporate members. The focus is predominantly power cycle chemistry and power plant operations, including operators such as Uniper, RWE, and EDF, suppliers such as Veolia, Nalco, and Ovivo, and consultancy firms (Amentum, Deep Water Blue). A complete list is available on our website.

Research

BIAPWS is not directly funding research relevant to IAPWS. Our members may be undertaking their own research (for example EDF) but this is not coordinated by BIAPWS. Topics that we know are being researched are:

- Film forming substances – these continue to be used and there have been several presentations on their development and use in plants.
- PFAS – the treatment of PFAS is beginning to develop, with BIAPWS aware of several technologies under development. These are proprietary solutions for the treatment of PFAS, although it should be recognised that there is no single technology suitable for all situations (contaminated ground from fire resistant fluids require a different process to drinking water treatment).
- Water treatment technologies continue to see development. There have been minimal developments on ion exchange technologies but developments relating to membrane technologies continue to develop.

BIAPWS have considered hydrogen production, installed capacity within the UK continues to remain low and it is expected hydrogen production technologies (such as electrolyzers) will continue to be a niche technology.

Focus for 2026/27

The BIAPWS organising committee will resume preparations for the 2027 BIAPWS symposium.

Attachment 10 Canada



1

IAPWS Canadian National Committee Annual Report 2026

Submitted to IAPWS EC, Bristol, UK, July 3rd, 2026

CNC Executive: *William Cook (Chair); Jane Ferguson (Vice-Chair); Yevgenia Kravtsova (Conexus Representative – adhering organisation), Peter Tremaine; Ben Loder; Craig Stuart; Olga Palazhchenko; Sarita Weerakul, Basil Perdicakis*

1. Canadian National Committee: Dues for the Canadian National Committee (CNC) of IAPWS are supported by the National Research Council (NRC) of Canada. This arrangement requires support and participation by a national organization representing industry. The agreement with Conexus Nuclear Inc. (formerly the CANDU Owners Group (COG)) and the NRC is in its fifth five-year term, which was renewed this past March 2026 and is now valid until March 2031.

2. CNC Activities

2.1 Activities at the University of New Brunswick (UNB)

Willy Cook

As Director of UNB's CNER Institute (Centre for Nuclear Energy Research), W. Cook continues to expand CNER's consulting expertise and services to Canada's nuclear industry. Activities continue to include engagement with local nuclear power generating stations and the Canadian Nuclear Laboratories, Conexus and other utilities.

Dr. Ben Loder graduated in the past year with his PhD thesis focused on work initiated with the IC project between Canada and New Zealand. The current IC between Japan and Canada saw Dr. Sarita Weerakul and Mayu Jobe participate in a research exchange between UNB and Tohoku University examining FFA effects on FAC mitigation, results of which were presented at IAPWS annual meeting this year and last.

Olga Palazhchenko

Olga's activities of interest to IAPWS include:

- On-going modelling of magnetite deposition in CANDU nuclear stations
- Continuing test program to test flooding conditions in a deep geological repository with used nuclear fuel from advanced reactors (NSERC-CNRC Small Modular Reactors Research Grant Initiative). This is a collaboration with NRCan.
 - Testing will consider different soil chemistries, damaged fuel cladding, and the effect of radiolysis products on material degradation, with engagement from NWMO.

2.2 Activities at the University of Guelph

Peter Tremaine

NSERC/UNENE Senior Industrial Research Chair and Research Chair Renewal: The 5-year term for the UNENE Research Chair in High Temperature Aqueous Chemistry is nearly complete and proposal preparation is underway for an additional 5-year term. The UNENE Chair is funded by UNENE together with our industrial partners Conexus, NWMO, EPRI, and NSERC.

2.4 Conexus Nuclear Inc. Activities

Conexus is a not-for-profit corporation with voluntary funding from international CANDU owning utilities and Canadian National Laboratories. Conexus' mission is to improve the performance of CANDU stations worldwide through member collaboration. R&D program members include Ontario Power Generation, Bruce Power Limited Partnership, New Brunswick Power and Canadian Nuclear Laboratories.

CANDU Industry-IAPWS Engagement

Craig Stuart, formerly CNL, has moved into a new position with EPRI for chemistry of nuclear power coolant systems. Pam Yakabuski (CNL) is Chair of the Conexus Chemistry Working Group and Willy Cook and Peter Tremaine participate in the chemistry working group meetings and provide input to the annual Conexus R&D planning process. W. Cook keeps the Working Group members informed of the Canadian IAPWS activities.

CNL supported a IAWPS International Collaborative Project related to the radiation chemistry of iodine and its volatility under low dose rate conditions, in support of the development of chemistry models of severe accident progression. This project was developed through a radiation chemistry task group that includes members from the PCAS and PCC Working Groups. CNL's role was to provide the laboratory facilities and technical personnel to execute experiments in support of the test matrix that was derived collaboratively with NNL UK. NNL UK subsequently leveraged the experimental data to compare to model simulation results. The preliminary findings were presented to IAPWS during the joint PCC/PCAS session in Bristol.

2.5 Oil Industry Activities

Basil Perdicakis represents the Oil Sands Alliance on the CNC. Oil Sands Alliance is a consortium of five of Canada's major oil sands producers: Canadian Natural, Cenovus Energy, ConocoPhillips Canada, Imperial and Suncor. Oil Sands Alliance works collaboratively with governments, Indigenous communities and stakeholders to promote a policy and investment environment that supports a globally competitive oil sands sector. In 2022, Pathways Alliance merged with COSIA creating an association to amplify collaborative efforts to advance oil sands innovation and industry growth. COSIA continues this work as the innovation arm of Oil Sands Alliance. Oilsands Alliance continues to work in areas that cause failures in once-through steam generating systems and steam pipelines used for SAGD processes in oilsands bitumen extraction. Current activities include:

- Magnetite solubility work in collaboration with OLI (A. Anderko presented some of this work in IAPWS Symposium this year)
- COSIA Once Through Steam Generation Centre of Excellence – R&D into inorganic fouling, organic fouling, wear issues – Large R&D effort with numerous universities and PI's participating, including W. Cook from UNB.
- Steam quality measurements (water quality based, pressure drop/nozzle basis)
- Iron transport analysis

Attachment 11 Czechia

Czech Society for the Properties of Water and Steam

Annual Report 2026

Submitted to IAPWS Executive Committee, June 2026

Steering board of CZPWS

Chair: Jan Hrubý (Institute of Thermomechanics of the Czech Academy of Sciences - IT CAS, hruby@it.cas.cz), Vice-Chair: Milan Sedlář (SIGMA Research and Development Institute), Secretary: Ondřej Bartoš (Czech Technical University in Prague), Member: Adam Nový (Doosan Škoda Power, s. r. o.), Member: Vladimír Majer (Technical University of Liberec).

CZPWS Meetings

Annual meeting of the CZPWS was held on May 27, 2026. The form of the meeting was hybrid. CZPWS members were informed about the activities of CZPWS Chair and approved CZPWS Financial Statements. CZPWS is a member of the Council of Scientific Societies of the Czech Republic (CSS CR). Based on this membership, CZPWS receives funding for paying CZPWS Member Dues to IAPWS.

RESEARCH

Surface tension of aqueous solutions. The team of the Institute of Thermomechanics of the Czech Academy of Sciences (IT CAS) measured surface tension for aqueous solutions of sodium chloride (NaCl) and ammonium sulfate $[(\text{NH}_4)_2\text{SO}_4]$. The experiments were performed with help of standard tensiometer and with a unique experimental set up employing a modified capillary rise method. The temperature range of the experiments extended from -24 °C to +24 °C including the metastable supercooled region, which is especially important for the application of the data in modeling atmospheric processes.

Density of standard seawater. The team of IT CAS continues the research of density of cold and supercooled solutions with help of a unique dual-capillary dilatometer. Article [2] is dedicated to the density of standard seawater ($S_p = 34.995$). Isobaric measurements were performed from 298.15 K down to the supercooled liquid region, about 8–13 K below the equilibrium freezing line, at pressures from atmospheric up to 110 MPa. Densities relative to the density at the reference temperature of 293.15 K are presented together with derived thermal expansion coefficients for individual isobars. Expanded uncertainties ($k = 2$) of the relative densities range from 0.000 020 to 0.000 031. Besides the dual-capillary data, results of complementary density measurements with IAPSO Standard Seawater using a vibrating tube densimeter (VTD) from 275.15 to 343.15 K at ambient pressure were obtained. A correlation based on scaling the equation of state for supercooled ordinary water was developed to represent standard seawater densities in the studied region.

Cavitation. The problems studied in the SIGMA Research and Development Institute and the Centre of Hydraulic Research in the period of June 2025 – June 2026 have been related mainly to the modelling of cavitation erosion during the hydrodynamic cavitation and to the thermal effects of cavitation and the exact description of water and water vapour properties during the cavitation flows. In cooperation with

the Institute of Thermomechanics and the Institute of Physics (both parts of the Czech Academy of Sciences) and in cooperation with the Palacký University Olomouc, tests of cavitation resistance of samples treated with different methods and 3D printed samples with different surface patterns have continued from the last years. These tests have been accompanied by advanced numerical simulations of cavitation within a new project JAK/CZ.02.01.01/00/23_020/0008501/ Metamaterials for thermally stressed machine components. Concerning the thermal effects of cavitation, a new hot water cavitation tunnel (Venturi type) including the test circuit has been subjected to extensive pressure and thermal tests. It is equipped with two sapphire windows which will enable to measure in the infra-red spectrum. Another important activity has been the numerical simulation of vortical and cavitation structures generated at the suction of submerged vertical pumps. Some simulation results have been published as the impact paper [1].

Standard derivative properties of oxygen containing organic aqueous solutes at high temperatures and pressures. Vladimír Majer, Josef Šedlbauer and Martin Slavík (Technical University of Liberec, Czech Republic) prepared a comprehensive review [3] which critically examines standard molar volumes and heat capacities of aqueous oxygen-containing organic solutes over a wide range of temperatures and pressures. These thermodynamic derivative properties, defined at infinite dilution, reflect changes in solute-solvent interactions as a function of temperature and pressure and also enable the calculation of quantities at the Gibbs free energy level, essential for describing phase equilibria and reaction processes at superambient conditions. The article focuses on data sets of standard molar properties calculated from experimental measurements above 400 K, where strong temperature and pressure effects emerge, particularly near the critical region of water. Methods for determining the standard molar volumes and heat capacities from density and calorimetric measurements are reviewed, with emphasis on high-precision flow techniques, namely vibrating-tube densimetry and differential-flow calorimetry. A comprehensive database of standard molar volumes and heat capacities was established for 213 solutes, containing 3500 values, spanning temperatures up to 623 K and pressures up to 40 MPa. All compiled data were critically evaluated, assigned error margins, and are available with all supplementary information as an electronic Excel Annex to this publication.

References:

1. Sedlář, M.; Moravec, P.; Doubrava, V.; Komárek, M. Numerical Analysis of Influence of Different Anti-Vortex Devices on Submerged Vortices and on Overall Performance of Vertical Mixed-Flow Pump. *Fluids* 10, 325 (2025). <https://doi.org/10.3390/fluids10120325>.
2. Blahut, A; Prokopová, O; Čenský, M; Lukianov, M.; Vinš, V.; Hrubý, J. Density of Standard Seawater from 298.15 K Down to the Supercooled Liquid Region and up to 110 MPa. *J. Phys. Chem. Ref. Data* 55, 013101 (2026), <https://doi.org/10.1063/5.0310170>
3. Majer, V; Slavík, M; Cibulka, I; Šedlbauer, J. Standard molar volumes and heat capacities of aqueous organic oxygen-containing solutes at high temperatures and pressures: A Review and Database. In preparation.

Attachment 12 Germany/Switzerland

GSAPWS to IAPWS Executive Committee

**Research Activities on the Properties of Water and Steam
of the German-Swiss Association for the Properties of Water and Steam (GSAPWS) e.V.
in the Period 2025/2026**

<https://gsapws.org>

First Chair: Prof. Dr. Karsten Meier
Helmut-Schmidt-Universität/Universität der Bundeswehr Hamburg, Germany

Second Chair: Tapio Werder
PPCHEM AG, Hinwil, Switzerland

Deputy Chair: Dr. Harald Milsch
GFZ Helmholtz Centre for Geosciences, Potsdam, Germany

Deputy Chair: Aurel Ranniste Sachssendahl
Siemens Energy, Erlangen, Germany

The 2026 General Meeting and the Annual Meeting of the German-Swiss Association for the Properties of Water and Steam (GSAPWS) took place at the Helmut Schmidt University Hamburg on 5 and 6 March, 2026.

In the following, activities of certain members of the German-Swiss Association for the Properties of Water and Steam in the years 2025 to 2026 are summarized.

GFZ Helmholtz Centre for Geosciences

Section 4.3 - Geoenergy, Potsdam

Dr. Harald Milsch, Ulrike Hoffert

Projects

Geothermal fluids display a huge variability in chemical composition and salinity. The approach that is pursued at GFZ is to fill the existing data gaps systematically by determining the properties of synthetic fluids containing the main salts only, i.e. typically NaCl, CaCl₂, and KCl. To evaluate the error in density, viscosity and electrical conductivity that comes with neglecting the minor constituents of natural fluids, four European geothermal sites are selected that span a huge variability in salt concentration and composition. For each site, four synthetic samples are prepared and parameterized by measurements for the abovementioned properties as a function of temperature, one containing the main salts only and the three others containing one dominant minor salt each in addition to the former base solution. In cooperation with BRGM, France, the resulting original data points are compared with predictions from numerical modelling using the PHREESCALE geochemical code in connection with PhreeqC. The results for density indicate an excellent match between analytical and numerical data and are published (Hoffert et al., 2026; see below). This study is still ongoing for viscosity and electrical conductivity and the results will be published after completion step by step.

Recent Publications

Ulrike Hoffert, Laurent André, Arnault Lassin, Harald Milsch and Ingo Sass (2026):
Effect of minor components on the density of geothermal fluids dominated by NaCl, KCl
and CaCl₂ dissolved salts. International Journal of Thermophysics, 47(42).
<https://doi.org/10.1007/s10765-026-03718-6>

**Helmut Schmidt University / University of the Federal Armed Forces Hamburg Institute of
Thermodynamics**

Prof. Dr. Karsten Meier, Dr. Robert Hellmann

Project

In an ongoing project, thermophysical properties of mixtures of water vapor and simple gases are predicted from first-principles calculations. Investigated properties include second and third virial coefficients, with an important application being the enhancement factors of water and ice. Furthermore, the transport properties shear viscosity, thermal conductivity, and binary diffusion coefficient in the dilute gas limit are calculated. So far, the gases nitrogen, oxygen, argon, carbon dioxide, air, hydrogen, carbon monoxide, hydrogen sulfide, and sulfur dioxide have been investigated. Currently, the third cross virial coefficients of water with hydrogen are calculated.

PPCHEM AG, Hinwil

Tapio Werder, Michael Rziha

Publications in the PPCHEM[®] Journal which are of Interest for PCC:

- "Corrosion Product Sampling, Monitoring and Analysis for Flexible and Fast Starting Plants – White Paper" PPC Working Group of the IAPWS; PPCHEM[®] 2025, 27(3).

Ruhr University Bochum

**Faculty of Mechanical Engineering, Chair of Thermal Turbomachines and Aeroengines Prof. Dr.
Francesca di Mare**

Projects:

The recent work focuses on the development of a foundational framework for assessing how non-perfect gas behavior - according to the terminology introduced by Traupel in his derivation of a formal definition for perfect vapors - affect aerodynamic scaling in radial turbines, operated with supercritical CO₂ (sCO₂), through rigorous usage of equivalent performance parameters. A multi-fidelity methodology is employed, combining analytical meanline modeling, CFD simulations (supported heavily by SBTL), and experimental data from an unshrouded high-specific-speed rotor. The experimentally derived performance map for air is used to scale rotational speeds and mass flow rates for CO₂ under both subcritical (near-perfect gas) and supercritical (real gas) inlet conditions. Validation against full-stage measurements confirms strong predictive capability of the meanline and CFD approaches, with the SST turbulence model outperforming the Spalart-Allmaras in diffuser flow predictions. The equivalent parameters are shown to preserve kinematic and dynamic similarity for subcritical CO₂, verifying the scaling procedure in the limit of a perfect gas. Consistently higher values of isentropic efficiency are observed for the supercritical CO₂ case, while maintaining similar blade-to-jet speed ratios. The increases in efficiency are presumably attributed to Reynolds number effects, though potentially amplified by volume-ratio (thermodynamic) effects. Translating the dimensionless parameters into physical performance highlights the remarkable potential of supercritical CO₂ cycles: for the 250 mm

test rotor, mass flow and shaft power theoretically increase from 3 kg/s to over 300 kg/s and from 110 kW to 10 MW when transitioning from air to sCO₂. These findings underscore the extreme power densities and compact turbomachinery designs achievable in future s CO₂-based power cycles. (see [1]).

Recent Publication:

- [1] Lea, B.; Ziája, K.; di Mare, F.:
MULTI-FIDELITY ANALYSIS OF AERODYNAMIC SCALING OF A FLUID-FLEXIBLE
RADIAL INFLOW TURBINE, Proceedings of the ASME Turbo Expo 2026 in Milano. (in
publication process)

SWAN Analytische Instrumente AG, Hinwil (Switzerland)

Mar Nogales

Contribution to the revision of the White Paper "Sampling, monitoring and analysis of corrosion products for flexible and fast-starting equipment" (PCC W P 24-001, published January 2025; <https://www.iapws.org/wg/PCC.html>).

Contribution to the released revision of the TGD "IAPWS TGD2-09(2024): Instrumentation for Monitoring and Control of Cycle Chemistry for the Steam/Water Circuits of Fossil-Fired, Combined Cycle, and Industrial Power Plants"

Technical University of Dresden

Institute of Power Engineering, Thermal Power Machinery and Plants Dr.

Andreas Jäger

Projects:

1. The cooperation regarding the establishment of gas hydrate models, in particular hydrogen hydrates, with colleagues from the Institute of Thermomechanics of the Czech Academy of Sciences in Prague and from Ruhr-University Bochum is continued. TU Dresden is supporting the work, which is mainly carried out within a DFG-project by Ruhr-University Bochum with Dr. Václav Vinš from the Czech Academy of Sciences being a "Mercator Fellow" of the project. An extension of the model to gas hydrates forming structure sH has been published in The Journal of Chemical Physics last year.

Recent Publications:

- [1] Fiedler, F.; Vinš, V.; Nguyen Nhat, L.; Jäger, A.; Span, R. Extension of a Hydrate Model for Structure H Applied to Multiparameter Equations of State. J. Chem. Phys. 2025, 163 (1), 014506. <https://doi.org/10.1063/5.0266340>.

**Zittau/Goerlitz University of Applied Sciences, Faculty of Mechanical Engineering / KCE-
ThermoFluidProperties, Amberg**

Prof. Dr. Matthias Kunick, Prof. Dr. Hans-Joachim Kretzschmar, Dr.

Sebastian Herrmann

Projects

1. Development of a new industrial formulation for steam and water using Spline-Based Table Look-Up Method (SBTL)
 - SBTL functions for the independent variables specific volume and specific internal energy (v, u) and for pressure and specific enthalpy (p, h) are being developed based on the scientific formulation IAPWS-95.

- The developed SBTL functions are evaluated in CFD and power cycle simulations, together with Siemens Energy Erlangen, Iqony Solutions Zwingenberg and Chair of Thermal Turbomachines and Aeroengines of Ruhr University Bochum.
 - A draft IAPWS Release for the new industrial formulation is being developed.
2. Development of fast property-calculation algorithms for gaseous mixtures of water with non-condensable gases in thermo-hydraulic process simulations:
 - Development of computationally efficient algorithms for the properties of gaseous mixtures of water vapor with Ar, CO, CO₂, He, H₂, N₂, and O₂. The mixture model combines the ideal mixing of real fluids with a residual part obtained from a virial-mixing approach or a one-fluid model.
 - Implementation and verification of the property library LibSBTL95 in ATHLET.
 3. Application of the Spline-Based Table Look-Up Method (SBTL) to ammonia/water mixtures
 - SBTL functions have been developed for the calculation of the phase equilibrium of ammonia/water mixtures.
 4. Development of a new ASHRAE standard for calculating thermodynamic properties of moist air, ASHRAE Project SPC 213P: Method for Calculating Moist Air Thermodynamic Properties.
 - The vapor pressure and saturation temperature equations of the IAPWS-IF97 Industrial Formulation and the melting pressure equation of the IAPWS Formulation 2011 are being incorporated into the new ASHRAE Standard.
 - Special equations for density, specific isobaric heat capacity, specific enthalpy and specific entropy of dry air and steam are being developed using structure optimization.

Attachment 13 Italy

ITAPWS. 2026 Report on activities to IAPWS

Committee Overview and Collaborations

The Italian National Committee (**ITAPWS**) operates as a key scientific and industrial body under the leadership of the chair **P. Alberto Giuliano Albo** of the Istituto Nazionale di Ricerca Metrologica. The committee is designed to facilitate a multidisciplinary approach, bridging the gap between academic research and industrial requirements in the field thermophysical properties and their applications.

Active members represent a balanced cross-section of the Italian research landscape, including specialists from the National Institute of Metrological Research (**INRiM**), the National Institute of Oceanography and Experimental Geophysics (**OGS**) and **Nippon Gases**. ITAPWS collaborates with **Politecnico di Torino**, and industrial leaders such as **Snam**, **Industrie De Nora**, **Ansaldo Green Tech** and **Nuovo Pignone** (Baker-Hughes).

The **mission** of ITAPWS focuses on seawater modeling for oceanography and industrial applications, and advancing water and steam science to promote **sustainable energy**, high-efficiency power generation, **supercritical electrolysis** and **carbon capture and storage**.

Members of ITAPWS are involved in multiple IAPWS working groups and task groups, and chair the **Subcommittee on Seawater (SCSW)**. The committee is also an active participant in **IAPWS strategic planning**. By maintaining these global links, ITAPWS ensures that Italian technical standards for aqueous systems remain aligned with the latest scientific formulations.

2026 Research Activities

1. Thermophysical Properties of Alkaline Solutions The committee is developing simplified models for NaOH aqueous solutions at high temperatures (650–750 K) and pressures (22–35 MPa) to support the design of supercritical electrolysis. The current model utilizes a modified Patel-Teja equation of state to estimate density, viscosity, and electrical conductivity, specifically for conditions where experimental measurements are difficult. New parameters were calculated for pure water to improve density predictions in the supercritical region, as original models systematically underestimated these values. For electrolyte solutions, a two-component mixture approach using Van der Waals mixing rules was adopted, modeling NaOH as a pseudo-fluid combined with pure water. Estimated uncertainty for density in the relevant electrolysis range is better than 10%, while relative deviation for molar conductivity is better than 4% compared to limited experimental data. The model also provides preliminary approximations for the diffusivity of hydrogen and oxygen molecules within the solution, which is a critical factor for designing efficient electrolytic cells. This research represents a starting point for the designing of supercritical electrolytic cells to be improved in new versions with the collaboration of IAPWS partners.

2. Advancements in Calorimetry Research into Differential Scanning Calorimetry (DSC) focuses on enhancing the precision of enthalpy and specific heat measurements, which traditionally face uncertainties of up to 10%. The committee has implemented a new measurement model using discrete elements to account for thermal conductivities and heat capacities of both the sample and the reference. The solution to this discrete element system includes an exponential decay term and a constant heat flow, requiring measurements to be collected only after exponential effects become negligible. A refined work equation,

$$c_{p,s} = m_r/m_s c_{p,r} - Q/v \quad (1)$$

where $c_{p,s}$, m_s and $c_{p,r}$, m_r are the specific heat capacities and the mass of the sample and the reference fluid, respectively, while Q is the heat flow measured by the DSC and v is the variation ratio of the temperature. This measurement procedure has been verified using reference fluids like undecane and nonane, yielding deviations as low as a few parts per thousand. However, measurements for seawater at a salinity of SP=35 showed deviations in the order of 1 %, highlighting the need for further methodological improvements in complex aqueous systems. To address these challenges, the committee is exploring Modulated DSC (MDSC) techniques. In MDSC, temperature oscillations are forced around a fixed value of temperature instead of linear ramps. This allows for a quasi-isothermal approach that isolates heat flow components more accurately. The primary source of uncertainty is currently attributed to measurement repeatability. Current efforts are focused on developing new models for quasi-isothermal modulated DSC. This approach aims to satisfy the growing industrial demand for high-accuracy caloric data.

3. Density Metrology Technical work in density metrology involves improving the calibration and precision of Vibrating Tube (VT) densimeters, which calculate density based on oscillation periods. The research evaluates three calibration "schools": modeling cell material properties, polynomial surface fitting, and the highly accurate "Substitution Method". Polynomial surface fitting works well for liquids but often results in 1% uncertainty for gases. The Substitution Method utilizes two reference fluids, at the same nominal condition, to derive sample density, reducing significantly the error by eliminating unstable vacuum measurements. For seawater density, avoiding vacuum-based calibrations is recommended to maintain the accuracy at the level of 10 ppm. Sensitivity analysis indicates that reference density values and cell temperature are key factors. The measurement of temperature inside commercial VT-densimeters remains a challenge. Calibrated thermometers must be precisely positioned to avoid perturbing the measurements. Pressure repeatability and cell drift during long measurement runs also contribute to uncertainty. The ultimate goal is to achieve a measurement uncertainty of approximately 20 ppm for seawater. Such precision is essential to meet the rigorous requirements of the global oceanographer community.

Future Outlook and Actions

ITAPWS plans to include the collaborators as members of the National Committee, plans to promote the participation of industrial partners, institutions and agencies, and create a network of oceanographers in the framework of the SCWS.

Attachment 14 Japan

Current Status of Activities in Japan

Submitted to the Executive Committee Meeting, IAPWS

June 2026

The Japan Association for the Properties of Water and Steam (JPAPWS)

Japanese National Committee to IAPWS

Chaired by Dr. Yohei Kayukawa,

National Institute of Advanced Industrial Science and Technology (AIST)

I. Overview

The Japan Association for the Properties of Water and Steam (JPAPWS), serving as the Japanese National Committee to IAPWS, promotes close collaboration between academic researchers and industrial engineers in the fields of water and steam properties, thermophysical measurements, power cycle chemistry, and related energy technologies.

JPAPWS held **General Assembly meetings (4 per year, 1 site visit)** in FY2025. The General Assembly consists of **34 members** in total. Its membership and organizational structure are summarized as follows:

- Steering Committee, including JPAPWS Chair, Vice chairs (3), Secretaries (2)
- Auditor (1)
- Corporate members: 14 companies
- Individual members from research institutes, and related organizations

Further details are available on: <https://www.jpapws.org/en/jpapws-in-detail>

In FY2025, as a results of our **funded research projects**, JPAPWS continued to advance its core activities on multiple fronts. In the area of thermophysical properties and industrial requirements, the domestic subcommittee pursued research topics including **A) thermodynamic properties of heavy water under metastable conditions** and an empirical correlation for sulfuric acid dew point.

In the area of power cycle chemistry, members are actively engaged in IAPWS working groups on **B) film-forming amines (FFAs) and related water treatment technologies**, contributing fundamental research as well as practical field experience from Japanese thermal and nuclear power plants— both of which were presented at the IAPWS Annual Meeting in Helsinki. JPAPWS also engages actively in physical chemistry of aqueous systems through its PCAS-linked activities.

Beyond technical research, JPAPWS devotes sustained effort to knowledge dissemination and community engagement. **The 3rd JPAPWS Symposium (June 2025, Osaka)** in co-organization with the Japan Association of Solution Chemistry, brought together academic and industrial participants around the theme of physical chemistry of water and aqueous solutions. Eight members participated in the IAPWS Annual Meeting in Helsinki, contributing to the Executive Committee and all standing committees. Following the meeting, JPAPWS compiled its Annual Report on IAPWS Activities — a Japanese-language document distributed to all members — continuing a tradition maintained without interruption since the predecessor organization. Members also contributed invited review articles to domestic journals, helping to communicate the latest IAPWS-related developments to the broader Japanese engineering community.

New initiatives in FY2026 include two funded research surveys on **C) ice, water, steam, and hydrates** and on **D) degassed cation conductivity control criteria**, as well as JPAPWS-related contributions to the **ongoing revision of JIS B 8223** on boiler feedwater, boiler water, and steam quality.

II. Organizational Activities

II-1. JPAPWS General Assembly and Regular Meetings

The JPAPWS General Assembly and regular meetings were held four times during FY2025 (April 2025 – March 2026).

Meeting	Date	Venue	Key Agenda
1st	May 13, 2025	Keio University, Mita Campus, East Annex 9F, Tokyo (Hybrid)	IAPWS updates; FY2024 accounts; Symposium 2025 planning
2nd	Oct 10, 2025	Keio University, Mita Campus, East Bldg. 4F Open Lab, Tokyo (Hybrid)	Bylaw revision; Members & officers; IAPWS annual meeting report; Symposium 2025 report
3rd	Jan 14–15, 2026	TKP Matsuyama City Station CC, Matsuyama / Miura Co. Hojo Factory, Ehime (On-site)	Joint committee with JSRAE; Industrial site visit (Miura Co.); Symposium 2026 planning
4th	Mar 17, 2026	Buddhist Promoting Foundation Bldg., 3F, Minato-ku, Tokyo (Hybrid)	Officer & member election; FY2025 accounts; FY2026 budget; Symposium 2026 planning

Presentations at each meeting:

1st General Meeting (May 13, 2025, Keio University Mita Campus):

- Yasuhiro Kawahara (Kimura Chemical Plants Co., Ltd.): "Experience of Large-Scale Electrode-Type Electric Boilers"
- Nobuo Ishihara (Mitsubishi Heavy Industries, Ltd.): "Big Data Factorial Analysis using Plant Operational Data for Dose Rate Reduction"
- Nobuo Ishihara (Mitsubishi Heavy Industries, Ltd.): "Hydrazine Alternatives for the Pressurized Water Reactor/Pressurized Heavy Water Reactor Secondary System: Evaluation of Hydrogen Injection"
- Nobuo Ishihara (Mitsubishi Heavy Industries, Ltd.): "Water Chemistry of PWR Plants Expressed with Numbers"

2nd General Meeting (Oct 10, 2025, Keio University Mita Campus):

- Yasuhiro Kato (Keio University): "A Redox Evaluation Based on the Hydration Structure of Water"

3rd General Meeting & Tour (Jan 14–15, 2026, Matsuyama / Miura Co. Hojo Factory):

Joint committee session with a subcommittee of the Japan Society of Refrigerating and Air Conditioning

Engineers (JSRAE), held at TKP Matsuyama City Station Conference Center on January 14.

- Yohei Kayukawa (AIST): "Introduction to the JSRAE Research Project on Natural Refrigerant Systems and the Japan Association for the Properties of Water and Steam (JPAPWS)"
- Takeru Kimura (Mayekawa Mfg. Co., Ltd.): "Recent developments in natural-refrigerant refrigeration systems"
- Ken Yoshida (Tokushima University): "Overview of the IAPWS PCAS Working Group and Studies on Film-Forming Amines"

4th General Meeting (Mar 17, 2026, Buddhist Promoting Foundation Bldg., Minato-ku):

- Takumi Kojima (Keio University): "Analysis of premelting at ice-rubber interface using molecular dynamics simulation"
- Yuuki Yamashita (Osaka University): "Elucidating cosolvent effects on biomembrane properties using molecular dynamics simulation"

II-2. Industrial Site Visit

An industrial site visit was held on January 15, 2026, at Miura Co., Ltd. Hojo Factory (Matsuyama, Ehime Prefecture), in conjunction with the 3rd General Meeting. The tour covered an overview of Miura Co., Ltd., the Hojo Factory operations, and the factory facilities.

III. Technical Subcommittee Activities

JPAPWS operates two technical subcommittees corresponding to IAPWS standing committees: the Subcommittee on Basic Technologies of Power Plants (linked to IRS) and the Subcommittee on Power Cycle Chemistry (linked to PCC). Their FY2025 activities are summarized below.

III-2. Subcommittee on Basic Technologies of Power Plants

Corresponding IAPWS Committee: IRS (Industrial Requirements and Solutions)

The subcommittee met twice during FY2025 (61st and 62nd meetings). Activities covered preparation of presentations for the IAPWS Annual Meeting in Helsinki and follow-up on ongoing research topics.

61st Meeting (May 13, 2025, Keio University Mita Campus — Hybrid):

- Presentation rehearsal for the IAPWS Annual Meeting: "Thermodynamic property measurements for heavy water at metastable states" (Tomoya Kutsumi, Toyama Prefectural University) — JPAPWS-funded research grant
- Progress update on an empirical correlation for sulfuric acid dew point
- Status of IRS online working group meetings

62nd Meeting (October 10, 2025, Keio University Mita Campus — Hybrid):

- Progress report on the sulfuric acid dew point correlation (including presentation at the IAPWS Annual Meeting and subsequent developments)
- Overview report on IRS-related activities at the IAPWS Helsinki Annual Meeting

III-3. Subcommittee on Power Cycle Chemistry

Corresponding IAPWS Committee: PCC (Power Cycle Chemistry)

The subcommittee held one meeting during FY2025.

5th Meeting of the Technical Subcommittee for Water-Steam Cycle Chemistry / 9th Technical Discussion Meeting (November 4, 2025, Keio University Mita Campus — Hybrid):

- Report on PCC standing committee activities at the IAPWS 2025 Annual Meeting in Helsinki (Taro Ichihara, Mitsubishi Heavy Industries Power IDS Co., Ltd.)

V. JPAPWS Symposium 2025

The JPAPWS Symposium 2025 was held on June 2, 2025 at the International Building, Graduate School of Engineering Science, Osaka University (Toyonaka, Osaka). The symposium was co-organized with the Japan Association of Solution Chemistry, under the theme "Physical Chemistry of Water and Aqueous Solutions: From Molecular-Level Analysis to Water Quality Management Technology." The event was open to students and young researchers.

Oral presentations (invited lectures):

- Shintaro Mori (Kurita Water Industries Ltd.): "Water Treatment Technologies Contributing to Productivity and Energy Efficiency"
- Ken Yoshida (Tokushima University): "Chemistry of Film-forming Amines and Aqueous Solutions: Future Perspectives through Advanced Fundamental Research and Academic-Industrial Collaboration"
- Yasuo Kameda (Yamagata University): "Structure of liquid water studied by neutron and X-ray diffraction methods"
- Yuta Nakatsuchi (Mitsubishi Heavy Industries, Ltd.): "Research of Water Quality Management for Gas Turbine Combined Cycle Power Plant"
- Taro Ichihara (Mitsubishi Heavy Industries Power IDS Co., Ltd.): "Hydrogen damage in a power boiler: Correlations between damage distribution and thermal-hydraulic properties"
- Naoki Noguchi (Tokushima University): "Experimental studies on water, ice and clathrate hydrates under high pressure using diamond anvil cell"
- Hideki Tanaka (Okayama University): "Temperature dependence of gas solubilities in water coexisting with hydrates"
- Kenji Yasuoka (Keio University): "Molecular simulation of water and machine learning"
- Nobuyuki Matubayashi (Osaka University): "All-Atom Energetics of Cosolvent Effects on Aggregation of Functional Molecules"
- Susumu Okazaki (Yokohama City University): "Molecular dynamics study of water and polymers — Molecular mechanism of swelling and embrittlement"
- Masahide Terazima (Kyoto University): "Protein reaction intermediates detected by time-resolved diffusion technique in aqueous solution"
- Masaru Nakahara (Kyoto University): "Life Devoted to Science and Engineering"

V. Publications and Outreach

JPAPWS members have been actively engaged in disseminating knowledge related to IAPWS activities to the Japanese power, engineering and scientific communities through invited review articles (in Japanese) and an international conference. Notable contributions in FY2025 are described below.

K. Yoshida, "*Hydrothermal Reactions of Amines for Boiler Water Treatment: Fundamental Insights and Future Perspectives*," *Chemical Engineering*, 2025, 89, 253–256 (invited, in Japanese).

This invited review article, written in Japanese for a domestic engineering audience, summarizes the author's research on the hydrothermal behavior of film-forming amines (FFAs) — organic compounds increasingly used in place of conventional chemicals such as hydrazine in power plant water-steam cycle treatment. Drawing on fundamental physicochemical studies, the article discusses the decomposition pathways and reaction products of FFAs under high-temperature boiler conditions, and outlines future perspectives for their safe and effective application. Published in a leading Japanese chemical engineering journal, this work represents a sustained effort by JPAPWS members to bridge IAPWS-related international research with domestic industrial practice.

K. Yoshida, "*Multilayer Structure and Hydrothermal Reactions of Film-Forming Amines at High-Temperature Water-Metal and Steam-Metal Interfaces — A Multifaceted Approach Using Surface Analysis and Solution NMR*," *Bunseki Kagaku*, in press, 2026 (invited, in Japanese).

This forthcoming invited article, also written in Japanese, presents a detailed investigation of the protective film structures formed by FFAs on metal surfaces under high-temperature water and steam conditions. Combining surface analysis techniques with solution-state NMR spectroscopy, the study elucidates the multilayer architecture of FFA-derived films and their hydrothermal stability. The work directly supports IAPWS PCAS and PCC working group activities on film-forming substances, and contributes to raising awareness of frontier FFA research within Japan's power generation industry.

Y. Kayukawa, "Effect of Environmental Pressure in Fine Measurements of Density for Sea-Water Samples," International Workshop on Environmental Engineering 2025, Kitami, Hokkaido, Japan, July 18–21, 2025.

This international conference presentation reported recent progress in high-precision density measurements for seawater samples using a hydrostatic weighing apparatus with controlled environmental pressure. The study addressed the need for sub-ppm-level density measurements in relation to the Thermodynamic Equation of Seawater 2010 (TEOS-10), and demonstrated the importance of suppressing atmospheric pressure fluctuations during buoyancy measurements. The apparatus includes a closed pressure-controlled system capable of maintaining pressure variations within approximately ± 1 Pa, and preliminary measurements indicated that even small environmental pressure changes can affect the precision of seawater density measurements. This work contributes to JPAPWS activities related to thermophysical properties of water and aqueous systems, and supports future improvements in high-accuracy seawater property measurements.

VI. Annual Report on IAPWS Activities

JPAPWS has a long-standing practice of compiling and distributing an Annual Report on IAPWS Activities — a Japanese-language document that provides a comprehensive account of each year's IAPWS Annual Meeting. This tradition dates back to the era of the predecessor organization (the 139th Committee of the Japan Society for the Promotion of Science) and has been maintained without interruption ever since.

The FY2025 edition covers the 56th IAPWS Annual Meeting, held in Helsinki, Finland, June 22–27,

2025. The report was co-authored by the eight Japanese participants who attended the meeting: Yohei Kayukawa (National Institute of Advanced Industrial Science and Technology (AIST), JPAPWS President), Nobuo Okita (Toshiba Energy Systems & Solutions, Vice President), Ken Yoshida (Tokushima University), Taro Ichihara (Mitsubishi Heavy Industries Power IDS), Tomoya Kutsumi (Toyama Prefectural University), Tomohiko Yoshii (Kimura Chemical Plants), and Yasuhiro Kawahara (Kimura Chemical Plants).

Based on the official IAPWS minutes and the participants' own notes, each author contributed sections corresponding to their area of involvement. The report covers the Executive Committee proceedings, all standing committee sessions (TPWS, IRS, PCAS, PCC, SCSW), the IAPWS Open Symposium, and other events. The completed report is distributed to all JPAPWS members, serving as an essential resource for those who could not attend and as a permanent record of Japan's engagement with IAPWS.

This annual reporting activity represents a distinctive and sustained contribution by Japan to the broader IAPWS community. By systematically documenting and disseminating the outcomes of each annual meeting in Japanese, JPAPWS plays a vital role in communicating international standardization developments and scientific advances to the domestic power generation and related industries.

VII. Future Plans and Priorities

In FY2026, JPAPWS will pursue the following priorities. Two research grant projects have been approved, each with a budget allocation of JPY 1,000,000, to be carried forward as needed over a period of approximately three years.

Survey on the Properties of Ice, Water, Steam, and Hydrates

Principal Investigator: Yohei Kayukawa (AIST)

Water exists as a three-phase substance — ice, liquid water, and steam — and the properties of ice and clathrate hydrates (including gas hydrates and semi-clathrate hydrates) have growing relevance across fields such as energy resources, cold thermal storage, and materials science. While IAPWS has systematically addressed the properties of water and steam, ice and hydrate-related properties have received comparatively less attention within the JPAPWS community. This project aims to survey the current state of research on the thermophysical and transport properties of ice, water, steam, and hydrates; to review phase equilibria and equations of state incorporating the solid phase; and to assess opportunities for expanding JPAPWS research activities and collaboration with industry. The research will draw on collaboration with researchers in the fields of refrigeration engineering and hydrate science, and findings will be reported at the JPAPWS Symposium and disseminated through review articles.

Fundamental Research Toward Establishing Control Criteria for Degassed Cation Conductivity

Principal Investigator: Ken Yoshida (Tokushima University)

The increasing frequency of start-up and shutdown cycles in thermal power plants, driven by the expansion of renewable energy, has introduced new challenges for boiler water and steam quality management. In particular, air ingress (CO₂) during start-up can cause temporary spikes in cation conductivity, and both VGB and IAPWS are moving toward adopting "degassed cation conductivity" as a new quality indicator — yet the scientific basis for the control limit values remains incomplete. This project will conduct experimental studies on corrosion behavior in the presence of CO₂, review and experimentally validate proposed limit values for degassed cation conductivity, and systematically survey

international trends in water quality guideline revisions (IAPWS TGD, VGB, JIS). The outcomes are intended to contribute to future revisions of IAPWS TGDs and JIS B 8223-1, and will be disseminated through English-language review articles and presentations at relevant academic and industrial forums.

Revision of JIS B 8223 (Boiler Feedwater, Boiler Water and Steam Quality)

In a related development, JIS B 8223, the Japanese Industrial Standard governing the quality of boiler feed water, boiler water, and steam, is currently undergoing a major revision led by the Japan Boiler Association and the Thermal and Nuclear Power Engineering Society. Since the most recent revision in 2021, the expansion of renewable energy and tighter occupational safety regulations on hydrazine have driven significant changes in boiler water treatment practice, including the wider adoption of non-hydrazine oxygen scavengers and film-forming-substances (FFS) treatments. These developments have led to a decision to split the standard into two parts: JIS B 8223-1 for industrial boilers and JIS B 8223-2 for power utility boilers. A formal drafting committee was convened in April 2026, with publication targeted for FY2026. The revision content, particularly provisions related to FFS treatment and degassed cation conductivity, is closely connected to ongoing IAPWS PCC and PCAS working group activities, and several JPAPWS members are contributing to the drafting process through their affiliated organizations.

Attachment 15 New Zealand



New Zealand Association for the Properties of Water and Steam (NZAPWS) Annual Report

Date: 3 July 2026

Key Achievements:

1. NZAPWS is now into its 10th year of full IAPWS membership
2. NZAPWS is holding a symposium on 7/8/9 September in Rotorua, New Zealand. Focus on electrode boilers, fossil cycles, geothermal cycles, heat pumps and other areas of water/steam interest. <https://nzapws.org.nz/events/>
3. NZAPWS has robust funding in place and has gained additional sponsors for the 2026/2027 year as part of the NZAPWS 2026 and is in a good financial position
4. NZAPWS has an active membership covering the following areas:
 - a. Fossil power generation
 - b. Industrial steam production and use for dairy product production
 - c. Geothermal power generation (subsurface and surface operations)
 - d. Humidity research and services
 - e. Water/steam analytical services
 - f. Water/steam chemical treatment and services
 - g. Electrode/electrical resistance boilers
 - h. Heat pumps and steam compressors
5. NZAPWS have a dedicated website – www.nzapws.org.nz to provide relevant information and to manage meetings for NZAPWS

Key Activities:

1. NZAPWS 2024 meeting very successful
2. NZAPWS supported the AUSAPWS 2025 meeting and will support the AUSAPWS 2027 meeting
3. Next NZAPWS meeting to be 7/8/9 September in Rotorua, New Zealand
4. David Addison of NZAPWS continues as PCC Chair but is actively seeking a replacement from the NZAPWS committee in 2026
5. David Addison and Ian Richardson and Chris Morris along with Nobuo Okita (Toshiba) of

Japan have drafted a Geothermal TGD which has been reviewed and a revision is in development.

5. David Addison is working on a electrode boiler ICRN with Monica Nielsen – to be published in 2026 and move to a TGD.
7. Jeremy Lovell-Smith has had ongoing involvement in TPWS and SCW and intends to continue to be actively involved (but unable to attend IAPWS 2025)

6. Publications:

None for 2026 at this stage

7. David Addison
NZAPWS Chairperson
Mobile + 64 21 843 762
Email: david.addison@thermalchemistry.com
Web: www.nzapws.org.nz

Attachment 16 NORDIC IAPWS



INTRODUCTION AND STATUS FROM THE NORDIC IAPWS

IAPWS Annual meeting 2026

NORDIC IAPWS

REPORT FROM 2025 AND PLANS FOR 2026

Members

- Matarvattensektionen (Sweden)
- IAPWS Denmark
- Vesikemialyhdistys ry (Finland)
- Ørsted (direct company member)
- E.ON (direct company member)
- Norway is establishing national group
- Iceland has started national discussions

Finance

- Members pay a membership fee to Nordic IAPWS

Executive Committee

- Chair Arja Lehtikoinen
- Two members from each member country DE/FI/SWE
- One representative from direct company members
- Norway and Iceland invited to EC meetings

Actions during 2025

- Virtual annual meeting with a technical presentation
- IAPWS Annual meeting 2025 in Helsinki, Finland
 - 70 participants throughout the week and 30 more at the symposium from ~20 different countries
- Website development ongoing
<https://nordiciapws.org/>
- Friday Events 2025
 - 5 technical webinars during the year. Presentation material and recordings available for members on the webpage.

Actions during 2026

- Annual meeting and 2-day workshop in March in Copenhagen
- Friday events: 2 webinars in spring and 2 or 3 planned in the autumn
- Website development to continue

Annual meeting 2027

- Meeting with workshop and possible plant visit

13.7.2026 Arja Lehtikoinen

2



NORDIC IAPWS NATIONAL MEMBERS



WE ARE STRONG TOGETHER

- Member amounts (companies, institutions and single persons)
 - Sweden ~115
 - Denmark ~45
 - Finland ~50
- Funding is based on collecting membership fees
- Sweden, Denmark and Finland have been working for several years, Norway will start this year as a full member. We expect Iceland to join in the coming years.
- All national members have their own executive committees to arrange their own activities, each in their own language

National activities

- Annual meetings with workshop and /or plant visit
- Seminars
- Study visits
- Sweden and Finland: Scholarship for meritorious thesis works
- Denmark: Electrical boiler group
 - Meeting once a year
- Sweden: Project grant to Membran Protec for evaluation of test rig with PVDF-UF membranes to be tested at various energy plants

13.7.2026 Arja Lehtikoinen

3



THANK YOU

NORDIC IAPWS | nordiciapws.org
Part of IAPWS | iapws.org

Attachment 17 United States

U.S. National Committee to IAPWS 2026 Report on Activities of Potential Interest to IAPWS

Communicated from the National Institute of Standards and Technology, Boulder, CO and Gaithersburg, MD:

In collaboration with the group of Prof. Tremaine at the University of Guelph (Canada), the available data for the static dielectric constant of heavy water have been evaluated, and a formulation has been developed (based on the existing formulation for ordinary water) for the dielectric constant of liquid heavy water up to 600 K.

In collaboration with researchers at Eötvös Loránd University (Hungary), an improved partition function and thermochemical functions were developed for the dominant isotope of water. This will inform the ideal-gas heat capacity contribution in a future replacement of IAPWS-95. Reference: T. Furtenbacher, A.H. Harvey, and A.G. Császár, “Improved Partition Functions and Related Thermochemical Quantities for the $^{16}\text{O}_2$ and H_2^{16}O Molecules,” *J. Phys. Chem. Ref. Data* **54**, 033103 (2025).

High-accuracy refractivity measurements were performed on water vapor simultaneously at an optical frequency and a near-infrared frequency at 293, 333, and 373 K in order to characterize its dispersion. Reference: P.F. Egan, “Two-color measurements supporting a revised formulation for the refractive index of air,” *Meas. Sci. Technol.* **37**, 255003 (2026).

Communicated from OLI Systems Inc., Parsippany, NJ:

Aqueous chemistry of critical materials

Aqueous chemistry of critical materials remains a major focus of research at OLI. Most of the work is conducted under the auspices of the Critical Materials Innovation Hub of the US Department of Energy. The overall objective of this research is the development of novel processes for the recovery and recycling of critical materials and understanding the environmental effects of elements associated with these processes.

In 2025-2026, OLI worked in collaboration with researchers from the Idaho National Laboratory on modeling the recycling of end-of-life solar panels, with emphasis on the recovery of tellurium and cadmium. The results of this work are described in the following paper:

A. Mukhopadhyay, L. Diaz, D. Ginosar, R. Morco, M. Shi, R. Repukaiti, H. Ahmed, H. Jin, G. Das, and A. Anderko, “Electrochemically-Enabled Recycling of Cadmium Telluride Photovoltaic Solar Panels for Extracting Critical Semiconductor Materials,” *ACS Sustainable Resource Management*, **3** (2026) 985-997

Also, work continued on using aqueous electrolyte thermodynamics to understand the solubility behavior of rare earth elements and its effects of biological activity. The latest results of this research are reported in:

A.M. Redwan, D.W. Reed, J.D. St. Jeor, G. Das, A. Anderko and Y. Fujita, "Impact of europium and samarium on growth and metabolism of two anaerobic wastewater microorganisms," *Environmental Science and Pollution Research* **33** (2026) 3532-3545

Also, significant efforts are currently focused on developing models for solvent extraction of rare earth elements.

Thermodynamic modeling of flow-accelerated corrosion

Under the auspices of Canada's Oil Sands Innovation Alliance (COSIA), OLI developed a comprehensive model for predicting the solubility of various iron oxides in wide ranges of temperatures and solution environments. The model is designed to predict conditions that are conducive to flow-accelerated corrosion, which is partially controlled by the solubility of magnetite and other iron oxides. The results of this work are reported in:

P. Wang, M. Bagheri Hariri, J.J. Kosinski, B. Perdicakis, A. Anderko, "Modeling the Solubility of Iron Oxides in Wide Temperature Ranges: Thermodynamic Foundation for Understanding Flow-Accelerated Corrosion," *Fluid Phase Equilibria*, **602** (2026) 114618.

Communicated from Idaho National Laboratory, Center for Radiation Chemistry Research, Idaho Falls, ID:

Stochastic Simulation of Low-LET Water Radiolysis at Elevated Temperatures:

A stochastic independent reaction times (IRT) model for water radiolysis has been extended to temperatures up to 350 °C, spanning conditions relevant to water-cooled reactor systems. In the IRT approach, the diffusion and reaction of species within a radiation spur are treated probabilistically rather than through explicit simulation of particle trajectories, capturing the essential stochastic physics of track chemistry at far lower computational cost than full Monte Carlo methods. The present work incorporates temperature-dependent diffusion coefficients, experimental reaction rate constants and Smoluchowski-based extrapolations where direct high-temperature data are unavailable, to predict radiolysis product yields from 25 to 350 °C. This work aims to provide an independent theoretical framework for examining the temperature dependence of water radiolysis yields without invoking the adjusted physicochemical-stage parameters required by earlier Monte Carlo approaches.

Radiation-Induced Degradation of Hydroxylamine in Aqueous Nitric Acid Media:

Hydroxylamine is used as a plutonium reductant and nitrous acid scavenger in aqueous used nuclear fuel reprocessing flowsheets, where it is subject to intense ionizing radiation fields. Cobalt-60 gamma irradiations were performed to identify and quantify hydroxylamine degradation products in concentrated aqueous nitric acid. A multiscale computational model was developed in parallel to describe the radical-induced degradation pathways of hydroxylamine in these solutions. The combined experimental and modeling approach provides a mechanistic basis for predicting hydroxylamine stability under conditions relevant to aqueous nuclear fuel reprocessing and waste treatment operations.

This work was supported through the INL Laboratory Directed Research & Development (LDRD) Program under DOE Idaho Operations Office Contract DE-AC07-05ID14517. Multiscale model calculations made use of the resources of the High-Performance Computing Center at INL, which is supported by the U.S. DOE Office of Nuclear Energy and the Nuclear Science User Facilities under contract no. DE-AC07-05ID14517.

Attachment 18 China (Associate)

Hello, President, Executive secretary and Colleagues from all countries!

We are so sorry that China electric power plant chemical standardization technical committee cannot send the representative to attend this meeting. I would like to make a brief report on the current situation of the Chinese Committee, and entrust the organizing committee to speak on our behalf.

China electric power plant chemical standardization technical committee is an academic group, focus on the formulation and revision of China's standards in Power plant chemistry, and the organization of power plant chemistry academic activities. Since July 2025, we held one power plant chemistry standard working meeting, and completed the release of ISO standard 'Petroleum and related products-Determination of anti-aging for phosphate ester turbine control fluids'. Currently, We are developing three international standards, including two ISO standards of 'Petroleum and related products-Determination of mineral oil content in triaryl phosphate ester fire-resistant fluids' and 'Plastics-Ion exchange resin-Part 6: Determination of exchange capacity of strong-acid cation exchange resins in sodium form', as well as an IEC standard of 'Solar thermal electric plants-Biphenyl/Diphenyl oxide-based heat transfer fluids for use in line-focus concentrated solar power applications'. Additionally, we completed the formulation or revision of 13 Chinese standards in the field of power plant chemistry.

China electric power plant chemical standardization technical committee will continue to promote technological advancement in power plant chemistry and the development of standardized system in China. We are willing to share the achievements with the counterparts all over the world, and jointly promoting the advancement of international power plant chemical technology.

Thank you!

Attachment 19 Greece (Associate)

From 2025 July till today, the effort for expanding interest on IAPWS activities in Greece was continued. Additional people were introduced in the mailing list of the Hellenic Association, from the petroleum refinery sector.

The National Committee is actively supporting IAPWS activities, establishing regular update on IAPWS activities (documents, events etc.) to HIAPWS participants. Persons participating in HIAPWS also contribute to IAPWS WGs.

Nevertheless, the effort for regular communications/web meetings between the National Committee members has been relaxed. Still, the main obstacle for officially setting a Committee is the lack of financing.

A web symposium is under consideration to be organized in the winter, depending on response from members.

Attachment 20 Israel (Associate)

Status Report to the IAPWS Executive Committee

Dear Members of the Executive Committee,

ISRAPWS (IAPWS Israel) is a non-profit association dedicated to the sharing of experience and technical knowledge among professionals in the field of water and steam properties. Our core activity is the facilitation of knowledge exchange and community engagement among members working in thermal power cycles, process industries, and related scientific applications.

Our main annual event is a one-day symposium traditionally held each November at a conference venue in Petach-Tikva. The agenda typically includes professional and technical lectures focused on water and steam chemistry, operational challenges, and relevant case studies. An open discussion session is also held to promote direct dialogue in an open and friendly environment—an atmosphere we aim to foster throughout the year among all community members.

In addition to the annual conference, other activities include webinars and personal contact among members of the community. Our most recent webinar featured **Dr. Barry Dooley (IAPWS)** and was very well received. Additional webinars are planned for the near future. The agenda of our most recent conference (2026) is attached to this report for your reference.

ISRAPWS operates entirely in the spirit of non-profit activity. All organizational work is conducted by volunteers, and funding for the annual symposium is secured through modest sponsorships from participants. Looking ahead, we are committed to strengthening the community and increasing our influence and financial sustainability.

We had planned to participate in the last year IAPWS Annual Meeting (22–27 June 2025, Helsinki), with the intention of meeting the EC and engaging in discussions on water-steam chemistry and power plant operations. Unfortunately, due to current regional flight restrictions (no-fly zone), we have had to cancel our travel plans.

This year, we had the opportunity to participate in the EHF 2026 conference in Prato. We hope to meet you at a future IAPWS event and continue our active contribution to the organization.

On behalf of ISRAPWS, I extend our sincere thanks to the Executive Committee for your continued support and for welcoming us as an Associate Member of IAPWS.

With respect and appreciation,

Yitzhak Nussbaum

Executive Secretary

ISRAPWS – IAPWS Israel

20.5.2026

IAPWS ISRAEL 2025

Israpws 25.11

THE SIXTH IAPWS ISRAEL CONFERENCE

TUESDAY, NOVEMBER 25, 2025. PRIMA LINK HOTEL, MOTA GUR 4 PETACH-TIKVA

09:00 – 14:30

REGISTRATION:

YITZHAK NUSSBAUM

054-3299076

NUSS355@GMAIL.COM

[HTTP://WWW.IAPWS.ORG](http://www.iapws.org)

IAPWS: The International Association for the Properties of Water and Steam

IAPWS is an international non-profit association of national organizations concerned with the properties of water and steam, particularly thermophysical properties, cycle chemistry guidelines, and other aspects of high-temperature steam, water and aqueous mixtures relevant to thermal power cycles and other industrial and scientific applications.

09:00 - 10:00	Registration + Refreshments
10:00-10:20	ISRAPWS Updating Yitzhak Nussbaum ; Executive Secretary ISRAPWS
10:20-10:50	Challenge of Water Quantity and Quality in Israel Danny Greenwald ; Water Governance & Management Specialist Kefar-Sava
10:50-11:20	Inferred pH from Specific and CACE conductivities in solutions of Sodium Phosphate and Ammonia or other Neutralizing Amines and their decomposition products Dr. Daniel Zinemanas ; consultant Haifa
11:20-12:00	Phosphorus Transport and Uptake via Nanoparticles Yitzhak Nussbaum ; The Robert H. Smith Faculty of Agriculture, Food, and Environment, The Hebrew University of Jerusalem Rehovot
12:00 - 12:50	Lunch
12:50-13:30	Forest Matchmakers: Trees, Fungi & Bacteria—Perfect Partnerships Dr. Yaara Oppenheimer-Shaanan ; Dep. of Plant and Environmental Sciences, Weizmann Institute of Science Rehovot
13:30-14:10	Implementing an Advanced Oil-Testing Program: The Role of the RBOT/RPVOT Test in Routine Monitoring of Lubricating Oils (Dedicated to the Memory of Mr. Ilia Frumin) Marius Grisar ; Senior Consultant, Industrial Oil & Insulating-Liquid Diagnostics Maintenance & Procurement Strategy, Transformer Academy Lecturer, 30+ Years in Energy (IEC & beyond) Haifa

Attachment 21 Website Refresh Report

Proposed website updates

POWER CYCLE CHEMISTRY WORKING GROUP (PCC WG)

1. ICRNs

- Purpose – amend wording, e.g. “ICRNs may be used to support applications for the funding of research projects. A letter of support from the IAPWS Executive Secretary may be provided on request”.

2. Webinars, White Papers & International Collaborations

- Improve visibility and profile by each having a dedicated page under the Technical Guidance tab
- Webinars:
 - Add link to YouTube channel
 - Tidy up formatting
 - Reduce descriptive text once held

The screenshot shows the IAPWS website with the following content:

IAPWS Certified Research Needs

IAPWS Certified Research Needs (ICRNs) represent the considered opinion of experts in the field that research on a particular subject is needed. They are often developed as a response to the inavailability of adequate data of a particular kind. They consist of a statement of the problem, a statement of the technical need, a contact person, and an expiration date. No funding is available from IAPWS, but the ICRNs may be copied and attached to proposals for funding agencies.

Note that all ICRNs are numbered but some numbers in the sequence are not listed on this page because the corresponding ICRN has expired or has not yet been issued.

Webinars

Welcome to the IAPWS Power Cycle Chemistry (PCC) Group national series featuring presentations from leading experts in our international community. These sessions provide valuable insights into the latest research, best practices, and current developments in power cycle chemistry and water/steam properties.

Webinar: Chemistry issues of water-cooled generators and other electrical machines

Dr. Steffen Kunkel presented the fourth webinar of the IAPWS Power Cycle Chemistry Working Group on 27 May 2024. **Chemistry issues of water-cooled generators and other electrical machines**

Water generator water cooling only a few problem areas (leakage to corrosion and deposits) have emerged in more than 70 years of history. IAPWS experts follow conditions for water chemistry and steam purity to optimize of water/steam conditions. Other problem areas, mainly related to generator design, are corrosion between the bearing and the rotor conductors (H₂O/oil sludge test), plugging of bearings, and corrosion deposits inside of rotating parts. In addition, hydro- and electrostatically induced vibrations and the gas. The webinar addresses these problems and gives guidance for necessary tests and preventive measures. Customer documents which can be downloaded: <https://www.iapws.org/technicalguidance/pccwebinars>



Attachment 22 Press Release

Press Release

IAPWS Executive Committee and Working Group Meetings

Bristol, England

29 June – 3 July 2026



Between June 29th and July 3rd, 141 scientists, engineers and guests representing 19 countries met at The Bristol Hotel Conference Centre in Bristol, United Kingdom for the annual meetings of the IAPWS Executive Committee and Working Groups. This series of meetings began in 1929 in London, UK with the purpose to connect scientists and researchers with the industry operators, engineers and managers who use their work. Collaboration and engagement across these varied groups provides guidance to the researchers on topical problems within industry and provides the engineers with the latest research results for direct application in their facilities.

IAPWS produces and releases guidelines on the recommended scientific formulations for physical and chemical properties of water in its various forms as well as technical guidance documents that are the concerted opinion of IAPWS members on the best operating practices for power plant chemistry. IAPWS also documents certified research needs that represent the opinion of experts in their respective fields that a research program is greatly needed to fill a current gap in knowledge. All this information is freely available and can be found on the IAPWS website at www.iapws.org.

On Wednesday 1 July, the 2026 IAPWS Symposium was presented by BIAPWS members and invited speakers. The symposium covered theoretical work and practical experience related to nuclear power generation as well as the latest experiences in the operation of electrode boilers. During the Symposium, the annual Helmholtz award was presented to Dr. Jacy Conrad (Idaho National Laboratory, USA). Dr. Conrad received the award for her major contributions to the thermochemistry of cation ionization and hydrolysis in heavy water under Pressurized Heavy Water nuclear reactor coolant conditions; and to understanding water radiolysis products in nuclear reactor and spent fuel reprocessing environments.



Following the Symposium, a banquet was held on SS Great Britain, the world's first ironclad steam vessel to combine a screw propeller and an iron hull. During the banquet, Dr Andre Anderko was presented with his IAPWS Honorary Fellow Award, originally announced at the 2025 meeting in Dr Anderko's absence. A second IAPWS Honorary Fellow Award was presented to Dr Karsten Meier.



IAPWS, through the various working groups, produces releases and guidelines, technical guidance documents (TGD) and IAPWS certified research needs (ICRN). These can be found for free download on the IAPWS website at www.iapws.org.

The IAPWS Working Group Thermophysical Properties of Water and Steam (TPWS) discussed primarily the development of a new formulation of thermodynamic properties of ordinary water, replacing in future the currently valid IAPWS-95. IAPWS-95 provides an excellent

representation of experimental data in most regions, and it has found immense applications in power generation, geophysics, physical chemistry, biochemistry, etc. However, new data, new theoretical knowledge, and new applications require a complete re-design of the formulation. The development of the new formulation has started at Ruhr Universität Bochum, Germany, under the leadership of Prof. Roland Span.

The Subcommittee on Seawater (SCSW) approved a plan of work for the next year including the involvement of the oceanographer community to investigate the possibility of providing traceable measurements of the salinity through density measurements, thanks to the availability of a new hydrostatic weighing with part per million absolute uncertainty. Furthermore, the working group consolidates its bond with industrial partners working in the field of hydrothermal processes.

The Industrial Requirements and Solutions Working Group (IRS) reviewed the progress in the development of a new Industrial Formulation for the properties of water and steam based on the Spline-Based Table Look-up (SBTL) method. The Working Group discussed the roadmap towards a future IAPWS release, including technical aspects of implementation, validation, distribution, and long-term maintenance of the formulation. Significant progress has been achieved in the development of SBTL formulations based on IAPWS-95 for both engineering and CFD applications. To support the next phase of the project, IRS established two dedicated Task Groups: an SBTL Development Task Group to finalize the formulation, supporting functions, and documentation, and an SBTL Evaluation Task Group to perform independent validation against IAPWS-95 and IAPWS-IF97, including testing in industrial and CFD applications. These activities will provide the basis for a future draft release and represent an important step towards a next-generation industrial standard for fast and accurate water and steam property calculations. The Working Group also reviewed and updated the categorization of industrial requirements addressed by IAPWS and agreed to continue refining the framework to improve the linkage between industrial application needs and future IAPWS activities.

The Physical Chemistry of Aqueous Systems (PCAS) working group expanded its collaboration with the Power Cycle Chemistry (PCC) working group this year, sharing a full day of joint sessions rather than the customary half day, with a program focused on presentations relevant to technical guidance document and guideline revisions. The joint session also featured progress reports from two ongoing IAPWS International Collaborations: one on flow-accelerated corrosion mitigation by film forming amines, and another on the radiation chemistry of iodine. A particular highlight was a theoretical perspective on sorbents providing a foundation for understanding film forming substances in the PCAS-PCC joint session, complemented by a thermodynamics-based contribution in the joint session with the Thermophysical Properties of Water and Steam (TPWS) working group. Additional presentations addressed the adsorption behavior of film forming amines on metal surfaces, the transition from film to dropwise condensation for enhanced heat transfer, and X-ray computed tomography methods for quantifying localized corrosion in steel. Throughout the week, PCAS placed particular emphasis on connecting its discussions to concrete IAPWS outputs, continuing to build the working group's activities and its collaboration across IAPWS. PCAS proposed a new

task group to compile electrical conductivity data to address ICRN 32, Conductivity of electrolytes in aqueous solutions, with a longer term goal of developing a fundamental model for limiting conductivity of ions over a wide range of temperatures and pressures.

The Power Cycle Chemistry (PCC) working group once again had strong attendance from many member countries. Highlights of the technical presentations related to PCC activities included: further detailed studies on the reactions of film forming amines; application of the White Paper on corrosion product sampling; and the increasing use of high temperature heat pumps in industrial processes. PCC members benefited greatly from the joint sessions held with members of PCAS. The successful delivery of three PCC webinars was discussed and plans made for a further three webinars in 2026-27. The webinar series has been very successful in promoting the work of IAPWS and PCC to potential members. During the week several task groups met to produce revised drafts of the white papers and technical guidance documents being developed. PCC expects some of these documents to be published by IAPWS prior to the 2027 Annual meeting. All members in attendance contributed to a revision of the PCC priority list – information on the operation of flexible and fast-starting plants remains a key concern for industry around the world.

We were also pleased that Jeff Cooper was able to join us. Jeff has been involved in IAPWS for over 60 years, contributing significantly to the development of the properties of water and steam. His presence was a good reminder of the contributions that can be made at IAPWS.

IAPWS welcomes scientists and engineers with interest in the thermophysical properties of water, steam, and aqueous systems and in the application of such information to industrial uses. The next IAPWS meeting will be held in Potsdam, Germany in September 2027. Further information on meetings can be found at the IAPWS website (www.iapws.org) as it becomes available. People interested in IAPWS documents and activities should contact the chairman of their IAPWS National Committee (see website) or the IAPWS Executive Secretary, Dr. Daniel G. Friend, dg.friend@iapws.org. People do not need to be citizens or residents of member countries to participate.



**Delegates from the IAPWS Symposium, Executive Committee and Working Groups The
Bristol Hotel Conference Centre, Bristol, UK – 1 July 2026**

Attachment 23 Registration List

IAPWS/BIAPWS Meeting 2026

29 June - 03 July 2026 | Bristol

ATTENDEE LIST

The following attendee list is order alphabetically by surname/family name and is for both the IAPWS Annual Meeting and the BIAPWS Symposium

First Name	Surname	Organisation	Country	Meeting
David	Addison	TCL	New Zealand	IAPWS Meeting
Robin	Aldworth	Holtec Britain	UK	BIAPWS Symposium
Rizwan	Ali	Electricity Supply Board	Ireland	IAPWS Meeting
Andre	Anderko	OLI Systems Inc	USA	IAPWS Meeting
Cezzanta	Andrade	Veolia	UK	BIAPWS Symposium
Hugues	Arcis	United Kingdom National Nuclear Laboratory	UK	IAPWS Meeting
Carl	Atkinson	EDF Energy	UK	BIAPWS Symposium
Angus	Barnes	Veolia Water Tech	UK	BIAPWS Symposium
John	Batterbee	SCCL	UK	BIAPWS Symposium
Chris	Bell	Ovivo UK Ltd	UK	BIAPWS Symposium
Steven	Berry	Ovivo UK Ltd	UK	BIAPWS Symposium
Nickvinder	Bhath	Ecolab Purolite	UK	BIAPWS Symposium
Haroon	Bhatti	HACH LANGE Ltd	UK	BIAPWS Symposium

Thomas	Blank	SWAN Analytische Instrumente	Switzerland	IAPWS Meeting
Shannon	Boshell	Nalco	UK	BIAPWS Symposium
Michael	Brand	Uniper UK Ltd	UK	BIAPWS Symposium

David	Broster	Veolia Water Tech	UK	BIAPWS Symposium
Meaghan Cher	Budworth	Ecolutia Services	UK	BIAPWS Symposium
Shiraz	Butt	Ecolutia Services	UK	BIAPWS Symposium
Justin	Caillet	h2o facilities sa	Switzerland	BIAPWS Symposium
Ian	Cammack	RWE Generation UK	UK	BIAPWS Symposium
Sabrina	Campbell	Uniper UK Limited	UK	BIAPWS Symposium
Archie	Castle	EP Lynemouth Power	UK	BIAPWS Symposium
Sharat	Chandrasekhar	US	IAPWS Meeting	
Olivia	Collier	EDF Energy	UK	BIAPWS Symposium
Jacy	Conrad	Idaho National Laboratory	US	IAPWS Meeting
William	Cook	University of New Brunswick	Canada	IAPWS Meeting
Jeff	Cooper	UK	IAPWS Meeting	
Ludwin	Daal	BlueXPRT bv	The Netherlands	IAPWS Meeting
Andre	de Bache	Kurita Europe GmbH	Germany	IAPWS Meeting
David	De Vos	LABORELEC	Belgium	IAPWS Meeting

Huyen	Dong	Waltron Bull & Roberts LLC	USA	IAPWS Meeting
Barry	Dooley	IAPWS	UK	IAPWS Meeting
Calum	Dowling	VPI Energy	UK	IAPWS Meeting
Zoltán	Farkas	Swan Analytical Instruments	Switzerland	BIAPWS Symposium
Peter	Fear	METTLER TOLEDO UK	UK	BIAPWS Symposium
James	Finch	Lowe Engineering Ltd	UK	BIAPWS Symposium
Olly	Fountain	Veolia	UK	BIAPWS Symposium
Daniel	Friend	IAPWS	USA	IAPWS Meeting
Ryan	George	EDF Energy	UK	BIAPWS Symposium
Paolo Alberto	Giuliano Albo	INRiM	Italy	IAPWS Meeting
Rebecca	Green	RWE Generation UK	UK	BIAPWS Symposium
Tom	Grime	EDF Energy	UK	BIAPWS Symposium
Lukasz	Grzybowski	Uniper Technologies Limited	UK	IAPWS Meeting
Derek	Hall	Penn State	USA	IAPWS Meeting
Dominic	Hall	Watergen	UK	BIAPWS Symposium
James	Hallatt	Ecolutia Services	UK	BIAPWS Symposium
Allan	Harvey	National Institute of Standards and Technology	USA	IAPWS Meeting

Daniel	Harvey	EDF Energy	UK	BIAPWS Symposium
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Wolfgang	Hater	Wolfgang Hater Training and Consulting	Germany
David	Hayhurst	Purolite	UK
Jan	Hrubý	Institute of Thermomechanics of the Czech Academy of Sciences	Czechia
Taro	Ichihara	Mitsubishi Heavy Industries Power IDS Co Ltd	Japan
Ourania	Ioannidou	PPC Group	Greece
Will	Jenner	NSI Mobile Water Solutions (Nijhuis Saur Industries)	UK
Mayu	Jobe	Tokushima University	Japan
Baptiste	Journaux	University of Washington Seattle	US
Jake	Kapur	RWE Pembroke Power Station	UK
Jordan	Karp	ESB	Ireland
Yohei	Kayukawa	National Institute of Advanced Industrial Science and Technology	Japan
Liz	Kellett	RWE Generation UK	UK
Oscar	Kimura	Swan Analytical Instruments	Switzerland
Hans-Joachim	Kretzschmar	KCE-ThermoFluidProperties UG	Germany
Matthias	Kunick	Zittau/Goerlitz University of Applied Sciences	Germany
Katy	Laing	METTLER TOLEDO UK	UK
Benedikt	Lea	Ruhr-University Bochum	Germany
Neil	Lebbem	RWE Staythorpe Power Station	UK

Arja	Lehikoinen	Valmet Technologies Oy	Finland
Levie	Lensun	H2O Facilities SA	Switzerland
Christopher	Liebenau	Dr. Thiedig GmbH & Co KG	Germany
David	Little	Nalco Water	USA
Hugh	Lloyd	BIAPWS	UK
William	Lorenz	VPI Energy	UK
Jonathan	Lowe	HACH LANGE Ltd	UK
Tristan	Mann	HACH LANGE Ltd	UK
Lukau	Manzambi	Uniper	UK
Jónas	Markússon	Varma og vélaverk	Iceland
Philip	Martin	Dupont Water Solutions	UK
Chloe	Martin	HACH LANGE Ltd	UK
Jessica	Mason	EDF Energy	UK
Duncan	McAllister	Australian Association for the Properties of Water and Steam	Australia

Paul	McCann	RWE Generation UK	UK
Ghinwa	McGill	UKNNL	UK
Chris	Mead	Swan Analytical UK Ltd	UK
Karsten	Meier	Helmut-Schmidt-Universität / Universität der Bundeswehr Hamburg	Germany

Didier	Menoud	h2o facilities sa	Switzerland
Pascal	Menoud	h2o facilities sa	Switzerland
Rezwan	Miah	Amentum	UK
Eve	Millar	EP Lynemouth Power	UK
David	Mogridge	EPUKI	UK
Shintaro	Mori	Kurita Water Industries Ltd	Japan
Ryan	Morris	Amentum	UK
Oliver	Morrissey	Veolia	UK
Justyna	Musial	Nijhuis Saur Industries	UK
Povilas	Nalivaika	Seabank Power Ltd	UK
Monika	Nielsen	Ørsted Bioenergy & Thermal Power	Denmark
George	Nixon	Deep Water Blue	UK
Maria del Mar	Nogales Lopez	SWAN Analytical Instruments	Switzerland
Adam	Novy	Doosan Škoda Power a.s.	Czech Republic
Michael	Parker	West Burton Energy	UK
Reiner	Pawellek	Iqony Solutions GmbH	Germany
Abra	Penezic	SWAN Analytical Instruments	Switzerland
Ed	Pike	Veolia Water Tech	UK

Karl	Pollitt	RWE Generation UK	UK
Petra	Raab	Lanxess Deutschland GmbH	Germany
Howard	Ramsden	Purolite	UK
Aurel	Ranniste Sachssendahl	Siemens Energy Global GmbH & Co. KG	Germany
James	Rosie	Sunresin New Materials Co Ltd	China
Stephen	Scott	ESB	UK
Anthony	Senécat	LABORELEC	Belgium
Seishi	Shimizu	University of York	UK
Jennifer	Shin	Canadian Nuclear Laboratories	Canada
Mike	Sinfield	H2O Innovation	UK
Amy	South	Nalco	UK
Robert	Stancombe	NSI Mobile Water Solutions (Nijhuis Saur Industries)	UK
Lukas	Staub	Waltron	USA
Lucy	Stennett	EDF NNB	UK
Irina	Stoican	FINEAMIN	Switzerland
Vlad	Strelko	Lanxess Ltd	UK
Adrian	Stubbs	SCCL	UK
Robert	Svoboda	Svoboda Consulting	Switzerland

Zofia	Szczepaniak	SCCL	UK
Andrzej	Tadeusiak	ESB	Ireland
Sheau Yuan	Tan	Thornton Mettler Toledo	Malaysia
John	Taylor	NSI Mobile Water Solutions (Nijhuis Saur Industries)	UK
Alice	Thomas	EDF Energy	UK
Griff	Tilley	Veolia/BIAPWS Chair-Elect	UK
Pamela	Tinlin-Dixon	Swan Analytical UK Ltd	UK
Mark	Tucker	Kurita	UK
Jani	Vuorinen	Teollisuuden Vesi Oy	Finland
Kazuhiro	Wada	Toshiba Corporation	Japan
Ronny	Wagner	REICON Wärmetechnik und Wasserchemie Leipzig GmbH	Germany
Saskia	Watkins	EDF Energy Generation	UK
Tapio	Werder	PPCHEM AG	Switzerland
Maggie	Whitford	RWE Generation UK	UK
James	Wilby	Holtec Britain	UK
Luke	Williams	RWE Pembroke Power Station	UK
Luke	Wood	EDF Energy	UK
Cerys	Woodward	Uniper	UK
Ken	Yoshida	Tokushima University	Japan
Rodzers	Zalitis	Uniper	UK