

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

MEMBERS

Argentina and Brazil
Britain and Ireland
Canada
Czech Republic
Denmark
France
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Japan
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United States of America

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EXECUTIVE SECRETARY

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**Minutes
of the
General Meeting
of the
International Association for the Properties of
Water and Steam**

**Berlin, Germany
11 September 2008**

Prepared by: Barry Dooley



**Minutes of the
General Meeting
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International Association for the Properties of
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Berlin, Germany
11 September 2008**

Thursday, 11 September 2008. 9:05am

IAPWS President Cooper opened the General Meeting and welcomed the 81 people in attendance. He explained the background to the General Meeting of IAPWS in that it has always been recognized that it is an opportunity for people attending the ICPWS to observe the workings of the IAPWS organization.

1. Adoption of Agenda

A preliminary agenda had been circulated to all IAPWS members and had been placed on the IAPWS website by the Executive Secretary in May 2008. Copies of this agenda were also available for everybody at the meeting. There were no suggested changes to the agenda and thus the President requested that it be adopted. It forms Attachment 1 of these minutes.

2. President's Report on Activities of IAPWS 2004-2008

President Cooper next provided his report on IAPWS and EC activities since the last General Meeting in Kyoto, Japan in August 2004:

- 2.1 Membership. The National Committee of Greece had become a Full Member of IAPWS. A National Committee from Switzerland had been formed and had become an Associate Member of IAPWS.
- 2.2 Working Group (WG) Activities. The TPWS WG had produced many IAPWS Releases and Supplementary Releases and had developed a major interaction with with the oceanographic and seawater community. WG IRS had continued to work on calculations for industrial steam plants. PCAS had been very active on accelerating chemistry issues of importance to the physical chemistry community. WG PCC had continued identifying the important deficiencies in generating plant cycle chemistry.
- 2.3 Annual Meetings. Attachment 2 delineates the locations of the annual meetings of the EC and the past presidents.
- 2.4 IAPWS Awards. The third IAPWS Gibbs Award was presented to Professor Wolfgang Wagner at the current ICPWS. The following people

- 2.5 had been made IAPWS Honorary Fellows since the last General Meeting: Rukes (2005), Bellows and Dooley (2006), Palmer (2007) and Svoboda (2008). The following people had received the Helmholtz Award: Molinero (2005), Xiang (2006), Meier (2007), and Yoshii (2008).
- 2.6 IAPWS Products. The President next delineated the Releases, Supplementary Releases, Guidelines, Advisory Notes and ICRNs that were currently in existence and made note of those issued since the last General Meeting. These are provided in Attachments 3 - 7. He also indicated that these products are listed on the IAPWS Web site (www.IAPWS.org). The President particularly made mention of the new Release on Seawater as being a good collaboration with the oceanographic community. He also wished to inform the General Meeting that the first of a new IAPWS product called Technical Guidance had been approved at the 2008 EC Meeting.
- 2.6 Collaborations with Other Organizations. The President mentioned the collaboration with IAPSO on the Seawater Release, and with the IAT of IUPAC on the 2008 Release on Viscosity.
3. Executive Secretary's Report on Activities of IAPWS 2004-2008
- The Executive Secretary provided information on the IAPWS financial situation. The record of the two IAPWS Bank Accounts was presented.
- The Executive Secretary also indicated that the IAPWS Financial records had been audited and approved each year by VDI in Germany and Mr. Miyagawa in Japan.
- The IAPWS Dues Structure had remained the same.
4. Statutes and By-Law Changes

The President asked Harvey to briefly overview the suggested changes. Harvey (Chairman of Statutes and By-Laws Committee) explained that membership in IAPWS is by country and that each country has one representative on the Executive Committee (EC). The EC can change the By-Laws but currently the Statutes can only be changed by a General Meeting. The major suggested change in the Statutes is to change the authority for changing the Statutes to the EC and that the vote must be at a General Meeting. It is also suggested that an IAPWS Member defaulting on dues should become an Associate Member after three years. The EC can grant exceptions. Suggested changes in the By-Laws will allow electronic approval of documents by WGs and the development of a procedure for making minor revisions to ICRNs without delaying approval of the document by a year. The President asked if there were any objections to these suggested changes.

There were no objections so he announced that the General Meeting accepted the new Statutes and By-Laws unanimously.

5. Selection of Host Country and Year for the 16th ICPWS

The President next raised the issue of the location for the next ICPWS and indicated that the BIAPWS National Committee was next in line to host the conference. He then asked the Chairman of BIAPWS to provide a few words. Rudge indicated that it was 50 years since the conference had been held in the UK/Ireland and that BIAPWS have a desire to hold the next ICPWS in the UK in 2013. The National Committee is exploring the situation and will respond to the Executive Secretary of IAPWS by January 2009.

6. Proposed Activities During Period to Next ICPWS

The President indicated that he was confident that one of the major changes in IAPWS will be the expansion of the seawater activities to desalination and to the power industry for cooling water. He also thought that the new Technical Guidance documents to be issued by PCC will become a major force in the world of power plant chemistry.

7. New Business

The President requested if there were any items of new business. None were raised.

8. Adjournment

The General Meeting adjourned at 9:34am.

**AGENDA
for the
GENERAL Meeting
of
IAPWS**

Berlin, Germany. 11 September 2008

Thursday, 11 September 2008. 9:00am

Opening Remarks and Welcome by IAPWS President

1. Adoption of Agenda
2. President's Report on Activities of IAPWS 2004-2008
 - 2.1 Membership
 - 2.2 Working Group Activities
 - 2.3 Annual Meetings
 - 2.4 IAPWS Awards (Gibbs, Helmholtz and Honorary Fellow)
 - 2.5 IAPWS Products (Releases, Guidelines, Advisory Notes, ICRNs)
 - 2.6 Collaboration with Other Organizations
 - 2.7 Other
3. Executive Secretary's Report on Activities of IAPWS 2004-2008
 - 3.1 Financial, Auditors and Dues
4. Statutes and By-Laws Changes
5. Selection of Host Country and Year for the 16th ICPWS
6. Proposed Activities during Period to Next ICPWS
7. New Business
8. Adjournment

IAPWS Annual Meetings and ICPWS

<u>Place</u>	<u>Year</u>	<u>ICPWS</u>	<u>President</u>
Giens, France	1974	8th ICPWS	Vodar (France)
Ottawa, Canada	1975		Kestin (USA)
Kyoto, Japan	1976		Kestin (USA)
Moscow, USSR	1977		Bradly (UK)
Washington, USA	1978		Bradly (UK)
Munich, Germany	1979	9th ICPWS	Grigull (Germany)
London, UK	1980		Grigull (Germany)
Prague, Czechoslovakia	1981		Tanashita (Japan)
Ottawa, Canada	1982		Tanashita (Japan)
Tokyo, Japan	1983		Sytchev (USSR)
Moscow, USSR	1984	10th ICPWS	Sytchev (USSR)
Washington, USA	1985		Hill (Canada)
Dusseldorf, Germany	1986		Hill (Canada)
Reading, UK	1987		Grigull (Germany)
Vancouver, Canada	1988		Grigull (Germany)
Prague, Czechoslovakia	1989	11th ICPWS	Pichal (Czechoslovakia)
Buenos Aires, Argentina	1990		Pichal (Czechoslovakia)
Tokyo, Japan	1991		Levelt Sengers (USA)
St. Petersburg, Russia	1992		Levelt Sengers (USA)
Milan, Italy	1993		Cooper (UK)
Orlando, USA	1994	12th ICPWS	Cooper (UK)
Paris, France	1995		Watanabe (Japan)
Fredericia, Denmark	1996		Watanabe (Japan)
Erlangen, Germany	1997		Fernandez-Prini (Argentina)
London, UK	1998		Fernandez-Prini (Argentina)
Toronto, Canada	1999	13th ICPWS	Tremaine (Canada)
Prague, Czech Republic	2000		Tremaine (Canada)
Gaithersburg, USA	2001		Rukes (Germany)
Buenos Aires, Argentina	2002		Rukes (Germany)
Vejle, Denmark	2003		Watanabe (Japan)
Kyoto, Japan	2004	14 th ICPWS	Watanabe (Japan)
Santorini, Greece	2005		Marsik (Czech Republic)
UK	2006		Marsik (Czech Republic)

Attachment 2

Switzerland	2007	15 th ICPWS	Cooper (BIAPWS)
Germany	2008		Cooper (BIAPWS)
The Netherlands	2009		Friend
	2010		Friend

CURRENT IAPWS RELEASES (September 2008)

- Release: "IAPWS Formulation 2008 for the Thermodynamic Properties of Seawater". (September 2008).
- Revised Release: "IAPS Formulation 1985 for the Thermal Conductivity of Ordinary Water Substances". (September 2008). (September 1998). (This is a revision of the corresponding release of September 1998, which replaced the original Release of November 1985).
- Revised Release: "The Pressure along the Melting and Sublimation Curves of Ordinary Water Substance". (September 2008). (This Revised Release replaces the corresponding release of September 1993, which replaced the original Release of 1989).
- Release: "The IAPWS Formulation 2008 for the Viscosity of Ordinary Water Substance". (September 2008). (This release replaces the corresponding Revised Release of August 2003).
- Revised Release: "IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam". IAPWS-IF97. (August 2007). (*The revision only relates to the extension of region 5 to 50 MPa*). (This is a revision of the 1997 release, which replaced the 1967 IFC Formulation for Industrial Use). *NOTE: This release has been supplemented by additional "backward" equations for $p(h,s)$ in Regions 1 and 2, $T(p,h)$, $v(p,h)$, $T(p,s)$, $v(p,s)$ in Region 3, $p(h,s)$ in Region 3 with auxiliary equations for independent variables h and s , and $v(p,T)$ in Region 3.*
- Release: "The Ionization Constant of H_2O ". (August 2007) (This release replaces the release on the Ion Product of Water Substance of May 1980)
- Revised Release: "Viscosity and Thermal Conductivity of Heavy Water Substance". (August 2007). (This is a revision of the 1984 release).
- Release: "An Equation of State for H_2O Ice Ih". (September 2006).
- Revised Release: "IAPS Formulation 1984 for the Thermodynamic Properties of Heavy Water Substance". (July 2005) (This Revised Release replaces the corresponding release of September 1984).
- Release: "The Refractive Index of Ordinary Water Substance as a Function of Wavelength, Temperature and Pressure." (September 1997) (This release replaces the corresponding release of 1991).
- Release: "The Static Dielectric Constant of Ordinary Water Substance for Temperatures from 238 K to 873 K and Pressures up to 1000 MPa.". (September 1997). (This release replaces the corresponding release of 1977).
- Release: "The IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use." (September 1996) (This release replaces the corresponding release of 1984).
- Release: "Surface Tension of Heavy Water Substances ". (September 1994). (This is a revision of the 1985 Release).
- Release: "Surface Tension of Ordinary Water Substance". (September 1994). (This is a revision of the 1976 Release).
- Release: "Values of Temperature, Pressure and Density of Ordinary and Heavy Water Substances at their Respective Critical Points". (September 1992) (This is a revision of the 1983 Release).

CURRENT IAPWS SUPPLEMENTARY RELEASES (September 2008)

- Supplementary Release: "Properties of Liquid Water at 0.1 MPa". (September 2008).
- Supplementary Release: "Backwards Equations for Specific Volume as a Function of Pressure and Temperature $v(p,T)$ for Region 3 of the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam". (July 2005).
- Supplementary Release: "Backward Equations $p(h,s)$ for Region 3, Equations as a Function of h and s for the Region Boundaries, and an Equation $T_{\text{sat}}(h,s)$ for Region 4 of the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam". (September 2004).
- Revised Supplementary Release: "Backward Equations for the Functions $T(p,h)$, $v(p,h)$ and $T(p,s)$, $v(p,s)$ for Region 3 of the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam". (September 2004). (This replaces the corresponding supplementary release of August 2003)
- Supplementary Release: "Backwards Equations for Pressure as a Function of Enthalpy and Entropy $p(h,s)$ to the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam". (September 2001).
- IAPS Supplementary Release: "Saturation Properties of Ordinary Water Substance". (September 1992).
(This is a revision of the 1986 Release).

CURRENT IAPWS GUIDELINES (September 2008)

- Guideline: “The Henry’s Constant and Vapor-Liquid Distribution Constant for Gases in H₂O and D₂O at High Temperatures”. (August 2004). (This guideline replaces a gas solubility guideline issued in 1993 and a distribution constant guideline issued in 1998)
- Guideline: “Tabular Taylor Series Expansion (TTSE) Method for Calculation of Thermodynamic Properties of Water and Steam Applied to IAPWS-95 as an Example”. (August 2003).
- Guideline: “The Use of Fundamental Physical Constants and Basic Constants of Water”. (This Guideline is reviewed annually and updated as necessary. Original Issue September 2001. Latest revision July 2005).
- Guideline: “IAPWS Formulation 2001 for the Thermodynamic Properties of Ammonia-Water Mixtures”. (September 2001).
- Guideline: “The Critical Locus of Aqueous Solutions of Sodium Chloride”. (September 2000).
- Guideline: "Solubility of Sodium Sulfate in Aqueous Mixtures of Sodium Chloride and Sulfuric Acid from Water to Concentrated Solutions, from 250°C to 350°C". (September 1994). (This is a revision of the 1990 Guideline).
- Guideline: "Electrolytic Conductivity (Specific Conductance) of Liquid and Dense Supercritical Water from 0°C to 800°C and Pressures up to 1000 MPa". (May 1990).

CURRENT IAPWS ADVISORY NOTES (September 2008)

- Revised Advisory Note No. 3: “Thermodynamic Derivatives from IAPWS Formulations”. (August 2007)
- Advisory Note No. 2: “Roles of Various IAPWS Documents Concerning the Thermodynamic Properties of Ordinary Water Substance”. (This Advisory Note is reviewed annually and updated as necessary. Original was September 2004./ Latest revision July 2005)
- Advisory Note No. 1: “Uncertainties in Enthalpy for the IAPWS Formulation 1995 for the Thermodynamic Properties of Ordinary Water Substance for General and Scientific Use (IAPWS-95) and the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam (IAPWS-IF97)”. (August 2003).

IAPWS CERTIFIED RESEARCH NEEDS (ICRNS) (September 2008)**Active ICRNs**

10. pH Measurements and Potentiometric Studies of Supercritical Aqueous Solutions. Issued May 1996. Extended to September 2009. IAPWS Contacts: S. Lvov and D. Palmer.
13. Surface Tension of Aqueous Solutions. Issued September 1998. Extended to September 2009. IAPWS Contacts: T. Nemec and F. Marsik.
14. Thermophysical Properties of Humid Air and Combustion-Gas Mixtures. Issued July 2002. Extended to September 2008. IAPWS Contacts R. Span and M. Hiegemann.
15. Thermodynamic Properties of Metastable Steam. Issued July 2002. Expires September 2008. IAPWS Contact: B. Rukes.
16. Thermophysical Properties of Seawater. Issued August 2007. Expires August 2010. IAPWS Contact: R. Feistel.
17. Research on Amines for the Power Industry. Under preparation. IAPWS Contact: E. Maughan.
18. Decomposition of Ion Exchange Resins. Issued September 2006. Expires September 2009. IAPWS Contact: K. Daucik.
19. Improved Coolant Sampling and Analysis of Low Concentration Metals (Fe, Cu, Co, etc.,). Issued September 2006. Expires September 2009. IAPWS Contact: D. Lister.
20. Sensors for use at Elevated Temperature in the Plant Cycle of the Power Industry. Issued September 2006. Expires September 2009 IAPWS Contacts: E. Maughan and S. Lvov.
21. Thermophysical Properties Associated with Ultra-supercritical Coal-Fired Steam Generators. Under preparation. IAPWS Contact: D. Palmer and B. Dooley
22. Steam Chemistry in Turbine Phase Transition Zone. Under preparation. IAPWS Contact. M. Stastny.

IAPWS CERTIFIED RESEARCH NEEDS (ICRNS) (September 2008)**Closed and Expired ICRNs**

1. Evaluation of Binary Nucleation Models. Issued September 1993. Closed August 2004. Closing Statement required. IAPWS Contact: F. Sigon.
2. Solubility of Sodium Sulphate in Superheated Steam. Issued September 1993. Expired September 2001. IAPWS Contact: K. Daucik. Closing Statement, October 2001.
3. Solubility of Spinels in the Chemical Conditions of Nuclear Reactors. Issued September 1993. Expired September 1996. Closing statement prepared. IAPWS Contacts: D. You.
4. Interaction Between Sodium Salts (Phosphates, Sulfates, Silicates, Borates) and Transition Metal Oxides. Issued September 1993. Closed September 1996. IAPWS Contact: J. Stodola.
5. Origin, Behaviour, and Fate of Organics in the Power Cycle. Issued September 1993. Closing Statement September 2006. IAPWS Contact: E. Maughan.
6. Thermophysical Properties of Ammonia-Water Mixtures. Issued June 1994. Closed September 2002. IAPWS Contact: W. Parry. Closing Statement, July 2002.
7. Carryover Coefficients of Salts and Metal Contaminants in Boiler Water. Issued June 1994. Expired June 1997. Closed September 1999. IAPWS Contact: P. Tremaine.
8. Development of an Accurate External Reference Electrode for Use in High Temperature and High Pressure Aqueous Solutions. Issued August 1994. Expired August 1997. Closed September 1998. IAPWS Contact: S. Lvov.
9. Thermodynamic Models for Transition-Metal/Water Systems under Steam Generator Conditions. Issued September 1994. Closed September 2000. IAPWS Contact: P. Tremaine
11. Properties of Salts in Steam. Issued May 1996. Closed September 2001. IAPWS Contacts: D. Palmer and R. Fernandez-Prini. Needs Closing Statement.
12. Kinetics of the Oxygen and Hydrogen Electrode Reactions in Subcritical and Supercritical Aqueous Systems. Issued September 1998. Closed September 2001. IAPWS Contacts: S. Lvov and D. Macdonald. Needs Closing Statement.