

Minutes
of
Industrial Requirement and Solutions Working Group (WG IRS)
Buenos Aires, Argentina, July 22 – 25, 2002

*Note: Joint session with WG TPWS

Joint meeting of TPWS and IRS was opened by TPWS chairman Daniel Friend at 10:30 on July 22, 2002. After chairman Friend had introduced the TPWS business in the week, Ingo Weber started with opening remarks and agenda as a role of IRS chairman instead of Kiyoshi Miyagawa this time.

1. Opening Remarks, Adoption of Agenda

As Kiyoshi Miyagawa was absent because of health matter, Ingo Weber was taking Miyagawa's place as the IRS chair during the meeting in Buenos Aires.

Chairman Weber described the proposed agenda for the week. The original No.8 "ICRN" subject was moved to No.4 and "ICRN for Combustion Gases" was added to it.

"Structure" was added after No.9 for the discussion over the questionnaire made by Anneke Sengers. (See attachment A)

2. Appointment of Clerk of Minutes

Chairman Weber appointed Nobuo Okita to act as clerk of the minutes.

3. Approval of Minutes of Gaithersburg, September 2001

Minutes were accepted without dissent.

Dan Friend acted as the chair for the items No.4 to No.10.

*4. *ICRN for Metastable Steam Region and Combustion Gases*
See TPWS minutes

*5. *Discussion of uncertainties in IAPWS formulations (h, etc)*
See TPWS minutes

*6. *Progress Report of the Evaluation Task Group for the "Documentation and Software of TTSE Method applied to IAPWS-95 as an example"*

Mr. Weber presented the report entitled "Documentation and Software of TTSE Method applied to IAPWS-95 as an Example" for the evaluation of accuracy and calculation speed compared with IAPWS-95. (Report available from Ingo Weber)

Summary: Accuracy meets requirements of the development of IAPWS-IF97, and speed is more than 100 times faster than IAPWS-95.

Attachment 5

The authorization of the report was discussed and concluded as follows on Monday and Tuesday.

- a) Editorial Committee is to review the report. Some additions were made for clarification on Tuesday.
- b) On Tuesday, joint meeting was held for voting if they recommend to the EC to accept it.

Result: WGs reached unanimous agreement with 4 abstentions that WGs recommend to the EC to accept the TTSE product.

- c) Software-download issue is to be discussed at the EC meeting on Friday, therefore, WG only focused on the technical aspect and considered software aspect to be clarified by EC.
- d) In case the software-download issue is not settled by EC, the documentation may subject to be amended in accordance with the decision of EC.

The amendment of the documentation is to be carried out by the Editorial Committee. The WG decided that there is no further acceptance needed in the case of changes to the document.

7. **Report of the Informal Survey to ensure the need of industry for IAPWS-IF97 backward equation in Region 3*

Okita presented the survey results entitled same as above which Miyagawa had collected and evaluated. (Survey available from Ingo Weber)

Summary: Needs for $T, v(p, h)$ and $T, v(p, s)$ for the region 3 of IAPWS-IF97 are strong. The deviation 25mK is acceptable.

Needs for $h(p, T)$, $v(p, T)$ and other functions are not very strong.

8. **Progress Report of the Task Group for the Development of IAPWS-IF97 backward equation in Region 3.*

Prof. Kretzschmar presented a report entitled “Task Group - Supplementary Backward Equations for Region 3 of IAPWS-IF97” for new backward equations in region 3, namely, $T(p, h)$, $v(p, h)$, $T(p, s)$ and $v(p, s)$. (Report available from Ingo Weber)

K. Knobloch presented a report entitled “Proposal – Supplementary Release on Backward Equations for Functions $T(p, h)$, $v(p, h)$ and $T(p, s)$, $v(p, s)$ for the Critical and Supercritical Regions to the IAPWS Industrial Formulation 1997 for the Thermodynamic Properties of Water and Steam“. (Report available from Ingo Weber)

Summary: Supplementary release on the new backward equations mentioned above has been proposed and the equations are ready for evaluation by IAPWS so that they can reduce computing time of process calculations with sufficient numerical consistency.

K. Knobloch and I. Stocker were proposed to be further members.

The WGs set up an evaluation task group. Membership of the evaluation task group and schedule are as follows.

- a) Miyagawa, Okita, Gallagher and Weber were nominated as the member of Evaluation Task group. Miyagawa is the chairman of the task group.

b) Schedule,

(1) Evaluation report to TG and WG by March, 2003.

(2) Draft Release to WG and Editorial Committee by April, 2003

(3) Final Release to executive secretary for distribution to the National Committees by June, 2003

*9. *Discussion of status of Skeleton Tables*

See TPWS minutes

*10. *Structure*

See TPWS minutes

11. Membership

Prof. Span was nominated as a new member for IRS.

12. Other Business

Mr. Miyagawa was nominated as a member of Gibs Award Committee.

13. Preparation of Report to Executive Committee

Preparation of the report to the Executive Committee was undertaken by the chair and the clerk of minutes.

14. Adjournment

The meeting was adjourned by I. Weber at 15:00 on July 25.

**Agenda
of
Industrial Requirements and Solutions Working Group
Buenos Aires, Argentina, July 21. - 27. 2002**

1. Opening Remarks, Adoption of Agenda
2. Appointment of Clerk of Minutes
3. Approval of Minutes of Gaithersburg, September 2001
4. *ICRNs
 - Metastable Steam Region
 - Real-gas Properties of Combustion Gases
5. *Discussion of uncertainties in IAPWS formulations (h, etc.)
6. *Progress Report of the Evaluation Task Group for the “Documentation and Software of TTSE Method applied to IAPWS-95 as an example”
7. *Report of the Informal Survey to ensure the need of industry for IAPWS-IF97 backward equations in Region 3
8. *Progress Report of the Task Group for the Development of IAPWS-IF97 backward equations in Region 3
9. *Discussion of status of Skeleton Tables
10. *IAPWS structure
11. Membership
12. Other Business
 - Gibbs Award Committee
13. Preparation of Report to Executive Committee
14. Adjournment

*Note: The items 4 to 10 will be discussed at the joint session with WG TPWS.