

Minutes of PCC meeting, August 28, 2004.

Agenda approved as modified. (Modified agenda attached as PCC Attachment B.)

James Bellows volunteered as clerk of minutes.

Minutes of previous meeting approved.

International collaborations:

- Procedure reviewed
- Possibilities in Nuclear task force
- Possibilities in Environmental task force
- Possibilities in Metastable task force
- Michael Rziha and Shunsuke Uchida will generate a proposal for an international collaboration on FAC

Priority list

Problems suggested:

1. Formation and Exfoliation Mechanism of Scale (oxide films) of Steam lines
Important new topic
2. Mechanism and Influence of Cu Deposition
This is essentially a solved problem from a scientific viewpoint
3. Behavior of TOC (total organic carbon) in Steam Lines of USC Plants
4. Mechanism of Decomposition of Ion-exchange Resin
Operating conditions, quality control of resin; leak rates are slow, but sulfate is one of the products
5. Development of High Temperature Sensors
6. Improved analysis of low concentration of Fe ion
Is the ionic iron the problem
7. Corrosion mechanisms that are related to the presence of contaminants in steam/water circuits
8. The relationships between the chemistry of the contaminants and their concentration at point of measurement
9. The quantification of risk
10. The appreciation of the fate of corrosion products
11. **Economically viable solution for improved steam/water separation in HRSGs**
Is this a monitoring issue? Is a standard the real need? Is the accurate measurement the real issue? Michael Rziha and Bobby Svoboda with Jim Bellows—See PCC 2004 ATTACHMENT A
12. Improvement of heat transfer in condensers—dropwise vs filmwise condensation
13. Corrosion interaction between materials and supercritical water/steam—influence of supercritical parameters—effect on protective layers—also effect of radiation
14. Deposition of contaminants and corrosion products in steam and water circuits—involves super-saturation, mass transfer, adsorption, crystal nucleation, deposit re-dissolution, scouring and exfoliation
15. Otakar's list (Bellows talk to Dan Friend for list)

Bold item in suggestions taken for action as a trial of the new procedure

Review of environmental effects task force

(Ask Mr. Okita for electronic copy. Not available as of September 2, 2004.)

Attachment 9

Additional issues for PCC

1. Steam cooling
2. Steam injection
3. SCWO
4. SCR, SNCR?
5. Erosion and corrosion

Review of nuclear task force

(See accompanying copy of power point slides)

[JCB personal notes: One PWR has injected noble metals into the primary to reduce corrosion. In BWRs, hydrogen peroxide is important, but is lost by conversion to oxygen in sample line, leading to difficulties in knowledge. Need theoretical model of water radiolysis for controlling hydrogen injection; hydrogen promotes cracking. Often use Ti sample lines since Co is critical analysis and stainless steel leaches Co at similar concentrations.]

Additional issues for PCC

4. Relationship between species at beginning of hot sample line and the species at the cooled end.

Agreement: Andre Zeijnsinck and Jim Bellows will get all the lists together and make a unified list to be distributed.

Topics for next year

Nuclear chemistry

- Sampling
- Differences and common ground
- Amine chemistry

Combined cycle chemistry

- Cycling
- Common problems

IRCNs

- Evaluation of Binary Nucleation Models—close with a statement that the sponsor is no longer active in IAPWS and the matter is closed.
- Origin and fate of organics—Andre Zeijseink will close this
- Surface tension of aqueous solutions—Fabio and Gabrielli, who is sponsor—Andre will check minutes for other actions with respect to it—possibly close with “no longer active” statements

See *PowerPlant Chemistry* July 2004 for EN12952-12:2003 “Recommendations for Treatment of water for steam boiler.”

IAPWS MEETING KYOTO, 2004 / PCC

Proposal for new Task group within PCC:

GUIDELINE FOR DETECTION AND DETERMINATION OF MECHANICAL CARRY OVER

Mechanical carry over in drum boilers has a significant impact on steam purity, as well as on the lifetime of SH-tubes.

Recent experiences reported to PCC demonstrates that mechanical carryover is often detected too late.

Reasons for this are, among others,

- Lack of monitoring device and possibilities (design of sampling system)
- Lack of up to date procedures
- Rarely included in plant chemistry control procedures

Therefore it is proposed to settle a task group which elaborates a guideline for detection and determination of mechanical carry over.

- Routine checks for mechanical carry over are required, since efficiency of demisters may degrade by time (e. g. by mechanical defects, wear).
⇒ A minimum frequency for check on mechanical carryover shall be recommended.
- Chemistry of boiler water may also influence the mechanical carryover.
⇒ Adequate information in this respect shall be given.
- Maintenance work may effect the performance of demisters desired or accidentally (e. g. unwanted damages during maintenance work in boiler drums).
⇒ Recommendation shall be given to re-check on mechanical carryover when works had been performed in boiler drums.
- Method description for performing the check on mechanical carryover shall be prepared and shall include recommendations such as
 - Minimum requirements for sampling systems (sampling location, on line monitoring device, sampling probes, etc.).
 - Analytical methods and suggestions for possible tracer selection (e. g. Na_3PO_4 , NaOH , LiOH , ^{24}Na , Li_2CO_3 , etc.).
 - Evaluation of gained values.

PCC Attachment A

- Recommendations for quick cross check / diagnosis shall be given, such as using cation conductivity, Na-monitoring, temperatures.
- Target levels for mechanical carryover shall be described (➔ boiler specification, ABMA, etc.).



August 29, 2004

The International Association for the Properties of Water and Steam

<http://www.iapws.org>

Working group 'Power Cycle Chemistry (PCC)

IAPWS PCC WG Meetings in Kyoto, Japan

August 29, 2004

Starting time 10:30-16:30, including lunch 12:00-13:30

1. Amendments/Adoption of Agenda
2. Election of Clerk of Minutes
3. Approval of Minutes of 2003 Meeting in Vejle, Denmark, action points
4. International Collaborations, the process
5. Priority List Review, progress on ICRN's, selection of an ICRN and drafting of an x year research plan, responses BIAPWS and Japanese committees
5a (PCC-response to Nuclear committee and 14:30 Environmental committee)
6. IAPWS Certified Research Needs, Closing statements
7. European Standard STANDARD EN12952-12:2003 " Recommendations for Treatment of water for steam boiler
8. Development of a PCC- corrosion-risk assessment guide (UK proposal)
9. Improvement of Fe-analysis in low ppb level (Japanese proposal)
10. Guidelines from EBA, discussion of draft guideline for boiler water (Daucik, Svoboda)
11. Membership
12. Next year's topics
13. Election of Officers
14. Preparation of the Report to EC
15. Miscellaneous and Adjournment

For more information:

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