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2. Establish Quorum Requirement

Voting members A. Fovargue, K. Starner, M. Ohadi, S. Moeykens, S. Oza, J. Huber, Z. Ayub, M. Chyu, N. Gupte, N. Hanna, P. Payvar, M. Spatz, and P. Thors (13 of 13 were present)

3. **Review/Approve Boston Meeting Minutes**

A motion was made by M. Spatz, seconded by N. Hanna and unanimously approved to accept the minutes.

4. **Chairman's Comments**

A. Fovargue noted that he turned in the roll-over roster for 1999 which is effective July 1, 1998. Mark Spatz will become chairman, Mike Ohadi will be Program Subcommittee, Neel Gupte will be Handbook Subcommittee Chairman, and Nabil Hanna will be Standards Subcommittee Chairman.

He recognized Keith Starner for being selected an ASHRAE Fellow.

From the chairman's Breakfast he reported that the program for Toronto is due February 13. The TEGA (Technology, Energy, Government Affairs) Liaison noted they are working to improve technology transfer between the TC's and the chapters and are seeking input from the chapters. A call for ASME papers on Renewable Energy Resources has been published. Jim Heldenbrand, Manager of Standards, is retiring and will be replaced by Claire Ramspeck, current manager of Technical Services. They are seeking applications for the Manager of Technical Services position.

5. **Section Head's Comments**

None.

6. **Comments from Liaisons (Handbook, Standards, Journal, Research, Program)**

Sam Moody, refrigeration emphasized that refrigeration wants to take a more active role and is interested in TC 8.5 activities and what they can do to help.

Brad Gustafson- Handbook reported that June '98 is the target to have preliminary handbook drafts to the reviewers. They need to receive changes from reviewers in January '99, but can accept the changes for the handbook sections that TC 8.5 is responsible for as late as April.

Gren Yuil - RAC Research commented that if the TC keeps him informed with Work Statement drafts as they progress, he will be able to better represent the TC as R&T reviews the Work Statement. Work Statements to be considered by the R&T in March are due February 15. Approve Work Statements could go out for bids following the June meeting "Advanced Concept" research projects (up to 3 years in length) are being encouraged. \$300,000 has been budgeted for the first year. The procedure is the same as for other projects. A one page summary should be prepared as the first step. In addition, funding is now available for Technology Transfer projects. Along with the Research Plan, each TC now needs to submit a one page Research Strategy, each year. A. Fovargue noted that other new liaison's are: Jerry Groff- Journal/Insight and Tom Logan - Program.

7. **Handbook Subcommittee Report**

M. Ohadi noted that the TC will need to begin the revision process for the Liquid Cooler and Water-Cooled Condenser sections this year.

8. Program Subcommittee Report

M. Ohadi reported that the procedure now required that reviewers of papers either accept as is or indicate that changes are required and they will review again. Sometimes papers don't get revised in time. For Toronto expects 6 papers for a Symposium: "Thermal and Fluid Characteristics in HVAC and Refrigeration Heat Exchange Processes." Plans also include Seminars: "Heat Exchanger and Device Miniaturization" and Flow Visualization of Refrigerants and Heat Transfer Processes."

9. Membership Sub-Committee Report

S. Oza reported that Ram Laks has become a Corresponding Member and won't be able to attend in the near future. Steve Memory - Modine and Louay Chamra - Mississippi State University would like to become members. He will also send an application form to James Bryan who is receiving his Ph.D. from Texas A & M. The committee voted unanimously to accept John Judge as a member.

10. Standards Sub-Committee Report

S. Moeykens reported that SPC 24 voted to forward the revised version of the standard for public review. Comments on standard 22 - Method for Testing and Rating Water-Cooled Condensers have been received from the PPIS. There are 20 comments including changes to the references. He will need to review the comments to determine the extent of re-writing required. He has also received a request for a standard for the installation of coils. This will be handled by TC 8.4.

11. Journal/Insight Article Subcommittee

J. Huber reported he received the list of topics for '98. None are directly related to TC 8.5 interests but Gas Cooling (Feb), Cooling Towers (May), Chiller Controls (July), How do new Refrigerants affect Codes (Nov) may be of interest to individuals. The editorial calendar for 1998 is on the Web page.

12. Research Sub-Committee Report

K. Starner reported we have three projects in the current plan. "Experimental determination of the effect of oil on heat transfer in flooded evaporators with HFC 410a and HFC 507" and "Experimental evaluation of the heat transfer impacts or the use of an immiscible and insoluble lubricant/refrigerant pair" are on the prioritized list. "Water side fouling inside smooth and augmented condenser tubes in cooling tower water applications" is on the non-prioritized list. He thought a field survey of condenser water chemistry might qualify as a Technology Transfer project. S. Moeykens noted that the work/statement for the flooded evaporator with 410A and 507 project above is written and partially reviewed by A. Fovargue and J. Judge. J. Seyed-Jagoobi will send K. Starner a copy of the one page summary of the project he sent to K. Starner last August.

13. 751-RP: Effect of Oil on Heat Transfer in Flooded Evaporators

A. Fovargue reported a matrix of tests with R22, R123 and R134a on finned tube and R123 and R134a on enhanced tubes was complete (R22 tests with no oil were the base line). Some concern has been expressed about variations in the row-by-row performance measured for the latest R134a data. P. Payvar commented that he has reviewed his notes. He confirmed that he had 15% inlet quality, ruling out subcooling as a problem. He is skeptical that damage to the external surface could result in the variation measured. He will recheck his calibration and instrumentation; retest the instrumented tubes, in the bundle, one at a time; and report the results to the PMS.

14. 752-RP: Heat Transfer - Brazed Plate HX's (rev. 6/15/98)

A. Fovargue reported that after the committee voted in Boston to terminate the project, he notified the Manager of Research, ASHRAE, by letter of that decision. He then presented it to the R & T, who wanted to salvage the project. W. Seaton asked the TC and PMS to continue the project and they agreed. A. Fovargue wrote two additional letters; one defining the technical requirements for completing the work, the second describing TC 8.5's commitment to the project. These letters were approved 12-0-1 abstention and forwarded to the principal investigator, who has confirmed that he can complete the project to the TC's satisfaction. The plan includes re-testing with R22 and R134a, which will be completed in May, 1998. The R22 data will be completed and reported to the PMS by March 1998.

15. 857-RP: EHD Enhancement in Evaporating Refrigerants

J. Larson reported that long term effects testing began in December. Convective boiling work is complete except for tests to quantify the effect of oil on EHD enhancement. Tests included R134a and R404A with both smooth and Microfin tube. The three main results were: a) EHD enhancement is greater for R134a than R404a, b) the level of enhancement depends on operating conditions (under some conditions, EHD can suppress the heat transfer coefficient), and c) EHD enhancement and delta-P depend on the relationship of EHD force to flows momentum. A theoretical analysis was reported that demonstrates that the calculated ratio of (EHD force)/(momentum of the flow) has the same trend over the range of quality, as do the heat transfer enhancements and delta-P increases due to EHD. The project has a no cost extension through March 1998 and an extension until June 1998 will be requested. The plan includes completion of convective oil effects tests in February and long term effects by May. K. Starner commented that he would like to know more about the observed behavior that higher EHD currents are measured at the start of a test, which decrease and stabilize over time. J. Seyed-Yagoobi commented that this is thought to involve electrostatic precipitation of impurities in the refrigerant.

16. 922-RP: EHD Enhancement in Condensing Refrigerants

P. Thors reported the project is on schedule. In-tube testing is complete for 1/2" corrugated tubes showing EHD effects over the range of mass flow, heat flux, quality, and temperature. Maximum enhancement ratios of 5.8 for R404A and 3.2 for R407C are reported. The plan includes completion of testing for R134a with the corrugated tube. Modeling has begun with a review of existing correlations. Initial model is based on a single component model. Use of a correlation based on a mixture will be investigated. M. Ohadi commented that since the correlation is "semi-empirical" it probably isn't too important if the basis is a single component or a mixture correlation. The external condensation facility is complete and operating. Testing can be done with any inclination from horizontal to vertical. Initial results give enhancement ratios up to 10, with low power. The work will continue with all proposed refrigerants on smooth and enhanced tubes.

17. 984-TRP: Effects of Inundation and Oil on Condensing R-134a

J. Huber reported that the literature search is complete and 80% of the articles are in hand. Wilson plots for the single tube samples and fabrication of the single tube test section are complete. Parts for the large bundle test section have been received. The plan is to produce an oil fog using a nozzle, but a compressor is being piped into the loop, as a backup. J. Larson may be consulted regarding design of the condenser liquid outlet and the o-ring seals between tubes and tube sheets.

18. New Business

K. Starner commented that we need to improve our discipline to keep the research project reviews on time. M. Ohadi suggested a format of 20 minutes for presentations followed by 10 minutes for questions, for each project. He requested that PMS members get copies of the presentations prior to coming to the conference. We concluded that we would select a moderator (and timekeeper) for the next session.

19. Schedule Next Meeting and Adjourn

The next meeting will be 4:15 PM Monday, June 22, 1998, at the ASHRAE summer meeting in Toronto, Canada. The motion to adjourn was made to J. Huber, seconded by M. Spatz. The meeting was adjourned at 6:40 PM.