

**AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS,
INC.**

**1791 Tullie Circle, N.E./Atlanta, GA 30329
404-636-8400**

TC/TG/TRG MINUTES COVER SHEET

(Minutes of all TC/TG/TRG Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/TRG NO. TC 8.5 DATE December 1, 2007

TC/TG/TRG TITLE Liquid to Refrigerant Heat Exchangers

DATE OF MEETING Monday, June 25, 2007 LOCATION Long Beach, CA

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
James Bryan	2006	Parviz Payvar	2005	Scott MacBain
Axel Kreigsmann	2004	Art Fovargue	2005	Steven Szymurski
Steve Eckels	2004	Jamal Yagoobi	2004	Jon Hartfield
Mahesh Valiya-Naduvath	2004	Samuel Yana-Motta	2005	Trevor Houk
John Thome	2003			Omar Abdelaziz
Ben Dingel	2003			Justin Kauffman
Kash Oza	2004	<i>Corresponding Members:</i>		Dominic Kolandayan
		Keith Starner	1999	Mustafa K. Yanik
<i>Corresponding Members:</i>		Michael Ohadi	2001	Tom Ortiz
Ken Schultz	2003	Olivier Pelletier	2004	Anthony Jacobi
Satheesh Kulankara	2003	Saunders Smith	2006	Liping Liu
Zahid Ayub	2005	William McQuade	2002	Qin Wang
Harry Li	2005	Allison Andrews	2005	Massoud Neshan
Joe Huber	2003	Ty Newell	2005	
Andreas Knoepfler	2006	Jim Bogart	2006	
Dan Kihm	2006	Amir Jokar	2005	
		Josua Meyer	2005	
		Petur Thors	2005	

DISTRIBUTION

All Members of TC/TG/TRG plus the following:

TAC SECTION HEAD:	Vinod Gupta
TAC CHAIR:	Craig Wray
ASHRAE MANAGER OF RESEARCH AND TECHNICAL SERVICES:	Michael R. Vaughn, P.E.
ALL COMMITTEE LIAISONS AS SHOWN ON TC/TG/TRG ROSTERS:	William Walter —Handbook Liaison Michael Martin—Standards Liaison Lynn Werman—Program Liaison Ron Bailey —RAC Research Liaison Michael Middleton—Chapter Technology Transfer Liaison

ADDITIONAL DISTRIBUTION

MANAGER OF STANDARDS	Claire Ramspeck
----------------------	-----------------

**AMERICAN SOCIETY OF HEATING, REFRIGERATION,
AND AIR-CONDITIONING ENGINEERS, INC.**

Minutes

Technical Committee 8.5

Liquid-to-Refrigerant Heat Exchangers

June 25, 2007

2007 ASHRAE Annual Meeting, Long Beach, CA, June 23-27, 2007

1. Call to Order and Reading of TC8.5 Scope

Chairman James Bryan called the meeting to order at 4:18 pm. The scope of TC 8.5 was read: "TC8.5 is concerned with the thermal and mechanical design, performance, and application of devices for accomplishing heat transfer between refrigerants (including secondary refrigerants) and liquids. Such devices include liquid cooled refrigerant condensers and refrigerant evaporators for cooling liquids".

2. Introduction of Members and Guests (Sign attendance sheet)

Members and guests introduced themselves. The following were present:

James Bryan (Chairman)	University of Missouri Dept. of Mech. & Aero. Engineering Columbia, MO 65211
Ben Dingel	Trane 3600 Pammel Creek Road La Crosse, WI 54601
Ken Schultz	Trane 3600 Pammel Creek Rd La Crosse, WI 54601
Steve Eckels	Kansas State University 64 Seaton Hall Manhattan, KS 66503
Zahid Ayub	Isotherm, Inc. 3305 Thorntree Ct. Arlington, TX 76001
Satheesh Kulankara	Johnson Controls 631 S. Richland Ave. 191A York, PA 17403
Mahesh Valiya-Naduvath	Johnson Controls 631 S. Richland Ave. 361A York, PA 17403
John Thome	Swiss Federal Institute of Technology (EPFL) Lausanne, Switzerland 1015
Joe Huber	Ketema LP 2300 W. Marshall Grand Prairie, TX 75051

Kash Oza	Standard Refrigeration Company 2050 N. Ruby Street Melrose Park, IL 60160
Harry Li	Carrier Corporation 9701 Old Stateville Rd Charlotte, NC
Axel Kriegsmann	Wieland-Werke AG Tannenwald Strasse 37 Donzdorf, Germany 73072
Dan Kihm	SWEP North America 3483 Satellite Blvd. Suite 210 Duluth, GA 30096
Andreas Knoepfler	Wieland-Werke AG Graf-Arco Str. 36 Ulm, Germany D-89079
Justin Kauffman	York/JCI 631 S. Richland Ave. York, PA 17406
Jon Hartfield	Trane 3600 Pammel Creek Road La Crosse, WI 54601
Dominic Kolandayan	ARI 4100 N. Fairfax Dr. #200 Arlington, VA 22203
Scott MacBain	Carrier P.O. Box 4808 Syracuse, NY 13221
Steven Szymurski	ARI/ARTI 4100 N. Fairfax Dr. #200 Arlington, VA 22203
Trevor Houck	SWEP N.A. Duluth, GA
Omar Abdelaziz	University of Maryland 3151 G.L. Martin College Park, MD 20742
Mustafa K. Yanik	Johnson Controls 631 S. Richland Avenur York, PA 17403
Tom Ortiz	HTRI
Anthony Jacobi	University of Illinois
Liping Liu	University of Illinois

8. Handbook Subcommittee Report

Subcommittee chairman Jim Bogart was absent. TC8.5 is responsible for two chapters in the HVAC Systems and Equipment Handbook – Chapter 35 Condensers and Chapter 37 Liquid Coolers. Due to a printing deadline for changes to existing chapters, the committee agreed to review changes proposed by Harry Li and Joe Huber via email, and to use an email ballot to approve the final version of the chapters by July 15.

9. Program Subcommittee Report

Subcommittee chair Amir Jokar was absent. TC8.5 co-sponsored Seminar 31 “Two-Phase Flow at Micro/Nano Scale” at this meeting. The session was well attended and well received.

It was suggested that a seminar focused on falling film evaporation be submitted for the January 2008 meeting in New York. Zahid Ayub, Tony Jacobi, and John Thome volunteered to present material. Ken Schultz and Ben Dingel agreed to at least consider presenting some falling film material. James Bryan volunteered to submit the appropriate information if Amir was not able to.

Future program ideas were also discussed. Dan Kihm expressed an interest in pursuing some sort of Seminar or Forum concerning fouling in various heat exchanger technologies and their application considerations.

At the New York meeting in January 2008, presentation material and audio recordings of Seminars and voluntary presentations will be compiled and available for purchase on DVD through ASHRAE. Many disadvantages of this practice were identified, focused mainly on the potential reluctance of presenters to share material since it will now be “published” in some form. A motion was made to strongly object to the policy of mandatory recording and publishing of Seminar presentation material as summarized by the the following statement from the committee: *“Technical Committee 8.5 strongly objects to the requirement of mandatory publication of presentation material and/or audio for Seminars. We recommend speakers should be given the option to opt-out of this requirement. The requirement undermines the ability to present timely and controversial research results. Further, this requirement discourages industry and/or government agencies from presenting sensitive material.”* The motion was passed unanimously [7-0-0] and supported vigorously by all in attendance.

10. Membership Subcommittee Report

Subcommittee chair Kash Oza reviewed the list of current members. The 11 voting members for the current Society year (through end of June 2007) are: James Bryan, Ben Dingel, Kash Oza, Jamal Yagoobi, John Thome (Int'l), Steve Eckels, Art Fovargue, Axel Kriegsmann (Int'l), Parvis Payvar, Mahesh Valiya-Naduvath, and Samuel Yana Motta.

Following this meeting, Ben Dingel and John Thome will be rolling off as members. Amir Jokar will become a voting member. Current corresponding members Ken Schultz and Harry Li also expressed interest in becoming voting members. Tom Ortiz will be added to the roster as a corresponding member. James noted he will check with the section head about making further adjustments to the official roster.

11. Standards Subcommittee Report

Current Standards Subcommittee chair Dan Kihm will be working with James Bryan on standards activities. No significant update to two currently active efforts was reported. The two ongoing efforts include: Formation of a new SPC (Standards Project Committee) tasked to create an ASHRAE Standard (method of test) to accompany ARI Standard 470-2001, Desuperheater/Water Heaters and the progress of SPC 181, “Method of Testing for Liquid to Liquid Heat Exchangers”.

12. Journal/Insights/Webmaster Subcommittee Report

Webmaster Joe Huber reported that he continues to update the committee website. It was brought up that of all the Technical Committees in all sections, the TC8.5 website was the only one that currently meets all of ASHRAE's stated website requirements. Great Job Joe!

Please contact Joe with any website errors or omissions. The URL for TC 8.5's website is: <http://www.tc85.ashraetcs.org/>.

13. Research Subcommittee Report

In addition to the discussion of specific research projects (see below), Research Subcommittee Chairman Ken Schultz reported on information shared at the Research Chair Breakfast (Secretary's note: some information provided after meeting):

- Noting a 25% and 40% decline in RTARs and WSs, respectively, submitted in 05-06 compared with the previous year, MORTS conducted a survey of research subcommittee chairs at the Dallas meeting. With 45 responses from the 99 committees/groups, the survey indicated the three highest ranked factors for the decline in RTARs to be: 1) members' lack of time to write RTARs (26%), 2) reluctance to write because authors are discouraged from bidding (26%), and 3) RTARs returned for arbitrary, unclear, and conflicting reasons (20%). Similarly, the three highest ranked factors for the decline in WSs are: 1) members' lack of time (32%), 2) reluctance to write because authors are discouraged from bidding (29%), and 3) lack of approved RTARs (27%).
- RAC is attempting to address the second and third concerns. It was noted that 82% of WSs were approved during the last go-around as were 72% of RTARs. In particular, it is being emphasized to RAC that the "T" in RTAR stands for "Topic" and that an RTAR doesn't have to be a mini-WS. RAC is also proposing to relax the policy on potential bidders participating in the development of RTARs and WSs. In particular, the rule that a participating author's bid be within 10% of the guideline price be relaxed or eliminated. It is judged that there are plenty of other checks in the system to prevent abuse. Finally, research funding levels are going to be stabilized and be more predictable. Funds are up 30% with \$200K surplus. There is \$6.5M in a reserve fund that will be used to keep funding levels stable over time.
- The Research Manual is still under revision. This is being done by Piotr Domanski.
- The next Research Advisory Panel has been set up with the objective to update the Research Strategic Plan by 2010 (to be done every 5 years). Jeff Spittler is the chair. Zahid Ayub is a member.
- It was noted that Direction #1 from the current Plan is "ASHRAE shall lead the advancement of sustainable building design and operations." Activities focused in this direction are good.
- Co-funding is available from several sources:
 - ARTI is currently cofunding ASHRAE work to the tune of \$365K
 - CEC/BERG (California Energy Commission/Building Energy Research Grant) program. Reviews accepted RTARs and selects projects of interest – no action needed by TC.
 - Collaborations with USGBC and CIBSE.
- RTARs and WS due May 15th, Aug 15th, and Dec 15th. WSs approved at Sep RAC meeting can go out for bid in October.
- Each TC is encouraged to have a Research Plan. This should be done for good planning and execution. It is suggested that the Plan be listed on the TC website as a way to attract potential collaborating TCs. However, this plan no longer needs to be filed with MORTS. The "Research Plan Priority" number on the RTAR and WS forms will be dropped.

Following is a summary of TC8.5 sponsored research projects and the status of each project.

1316-RP – Experimental Evaluation of the Heat Transfer Impacts of Tube Pitch in a Highly Enhanced Surface Tube Bundle

Current Status: Active

At the research review meeting, Steve Eckels presented an update and overview of the progression of this research project. Progress on reviewing relevant pool boiling literature was reported and a brief summary was presented. In addition, the pool boiling rig for establishing single tube performance is operational. Heat flux can range from 7-88 kW/m² (2-28 kBTU/hr-ft²) in this facility. Two sets of data with R134a and a 3/4" OD Turbo-BIIHP tube have been taken and reduced using inlet/outlet water temperatures and a Wilson Plot analysis. Results appear to agree reasonably well with previously published results for this tube. The planned instrumentation for determining local heat transfer coefficients consisted of using in-tube RTDs for establishing the water temperature profile, but to date the actual implementation has not yet provided a good representation of water temperature profile. A new design with the small RTDs extending into the water path will be attempted. The RTD insert also creates extremely high water-side pressure drop. It was suggested that the effect of pressure drop on the enthalpy change be checked to ensure accurate calculation of the heat transfer rate.

Assembly of the bundle facility is underway, but is being slowed by attention given to the pool boiling rig and in-tube RTD insert. Initial bundle data is expected by the next meeting. At the present pace, it is expected that the project will exceed the 30 month timeline projected by the work statement.

PMS members for this project are: Petur Thors (chair), Ben Dingel, Satheesh Kulankara, and Axel Kriegsmann. Kash Oza has expressed an interest in becoming part of the PMS on this project.

1324-RFP – Study of Single-Phase Flow-Induced Tube Vibration in Shell and Tube Heat Exchangers

Current Status: No response to RFP

A reworded RFP went out for bid on 15-Oct-2006. No bids were received. Ben Dingel reported that he phoned the two parties that had responded to the first RFP. Dr. Moretti of Oklahoma State University (emeritus) commented that the work requested was "too applied"; his interest was for projects of a more fundamental nature. In addition, Dr. Moretti had recently retired and wasn't interested in following up on the re-worded RFP. He also had the impression that the project was targeted to someone who already had the necessary equipment. Stan Kistler of HRTI commented that the project did not contain enough funds if an investigator didn't already have the necessary equipment.

Mahesh stated he could not afford to spend more time on the work statement, but still believes the project to have value. It was suggested that some further checking with potential bidders should be done to see if the project is of interest at an increased level of funding. John Thome made a motion to re-submit the existing RP-1324 work statement after changing the award amount from \$150,000 to \$190,00, if sufficient interest by potential bidders is expressed. The motion was seconded and passed unanimously [7-0-0].

1345-RFP – Waterside Fouling Performance of Brazed-Plate Type Condensers in Cooling Tower Applications

Current Status: No response to RFP

This project went out for bid on 15-Oct-2006. Similar to 1324-TRP, no bids were received. ARI continues to have interest in this project and is still holding the \$47K in co-funding they have offered. It seems that the original bidders list might have been off-target. Axel and Zahid offered to suggest other potential bidders. Ken volunteered to follow-up on this. Ben made a motion that 1345-TRP be resubmitted with an updated and expanded list of bidders compiled by Ken. The motion was seconded and passed unanimously [7-0-0].

1394-WS – Study of Carbon Dioxide Condensation in a Chevron Angle Plate Geometry Exchanger

Current Status: Response to RFP received

Following final approval of the work statement and release for bidding, four bids were received to 1394-RFP. These bids were reviewed and scored by the PES over the course of the past month by teleconference/netmeeting. The PES members are Zahid Ayub (chair), Joe Huber, and Jim Bogart. The PES presented the committee with their unanimous recommendation for awarding the project to the investigator with the highest scoring proposal. John Thome made a motion that the committee approve awarding of 1394-TRP according to the PES recommendations, with Steve Eckels seconding. The motion passed unanimously [7-0-0].

Fouling of Tube-in-Tube Type Condensers

This is the only remaining topic on TC 8.5's research priority list and is in need of an RTAR. HTRI has expressed interest in doing this project. ARI has indicated co-funding might also be available for this project.

1444-URP – Experimental Evaluation of Two-Phase Pressure Drops and Flow Patterns in U-Bends for R-134a, R-410A, and Ammonia

Current Status: Unsolicited Research Proposal submitted by John Thome, EPFL

TC 1.3 is taking the lead on review of this project. The potential investigator satisfactorily responded to questions and concerns raised by the PES assembled by TC1.3 and TC 1.3 voted (by email) to recommend the award of this project. Action by ASHRAE is pending. Co-sponsorship of this project by TC8.5 was not voted on at this meeting.

Future Research Projects

It was suggested that we set aside time during the TC 1.3/8.5 research meeting in New York to brainstorm and discuss potential new projects.

14. New Business

None – New issues were covered during the Chairman's comments or the appropriate subcommittee portion of the meeting.

15. Schedule Next Meeting

The next committee meeting will be held on January 22, 2007 at 4:15 PM in New York City, NY.

16. Adjourn

The meeting was adjourned by unanimous vote [7-0-0] at 6:30 pm.

**AMERICAN SOCIETY OF HEATING, REFRIGERATION,
AND AIR-CONDITIONING ENGINEERS, INC.**

Minutes

Technical Committee 8.5

Liquid-to-Refrigerant Heat Exchangers

June 25, 2007

2007 ASHRAE Annual Meeting, Long Beach, CA, June 23-27, 2007

1. Call to Order and Reading of TC8.5 Scope

Chairman James Bryan called the meeting to order at 4:18 pm. The scope of TC 8.5 was read: "TC8.5 is concerned with the thermal and mechanical design, performance, and application of devices for accomplishing heat transfer between refrigerants (including secondary refrigerants) and liquids. Such devices include liquid cooled refrigerant condensers and refrigerant evaporators for cooling liquids".

2. Introduction of Members and Guests (Sign attendance sheet)

Members and guests introduced themselves. The following were present:

James Bryan (Chairman)	University of Missouri Dept. of Mech. & Aero. Engineering Columbia, MO 65211
Ben Dingel	Trane 3600 Pammel Creek Road La Crosse, WI 54601
Ken Schultz	Trane 3600 Pammel Creek Rd La Crosse, WI 54601
Steve Eckels	Kansas State University 64 Seaton Hall Manhattan, KS 66503
Zahid Ayub	Isotherm, Inc. 3305 Thorntree Ct. Arlington, TX 76001
Satheesh Kulankara	Johnson Controls 631 S. Richland Ave. 191A York, PA 17403
Mahesh Valiya-Naduvath	Johnson Controls 631 S. Richland Ave. 361A York, PA 17403
John Thome	Swiss Federal Institute of Technology (EPFL) Lausanne, Switzerland 1015
Joe Huber	Ketema LP 2300 W. Marshall Grand Prairie, TX 75051

Kash Oza	Standard Refrigeration Company 2050 N. Ruby Street Melrose Park, IL 60160
Harry Li	Carrier Corporation 9701 Old Stateville Rd Charlotte, NC
Axel Kriegsmann	Wieland-Werke AG Tannenwald Strasse 37 Donzdorf, Germany 73072
Dan Kihm	SWEP North America 3483 Satellite Blvd. Suite 210 Duluth, GA 30096
Andreas Knoepfler	Wieland-Werke AG Graf-Arco Str. 36 Ulm, Germany D-89079
Justin Kauffman	York/JCI 631 S. Richland Ave. York, PA 17406
Jon Hartfield	Trane 3600 Pammel Creek Road La Crosse, WI 54601
Dominic Kolandayan	ARI 4100 N. Fairfax Dr. #200 Arlington, VA 22203
Scott MacBain	Carrier P.O. Box 4808 Syracuse, NY 13221
Steven Szymurski	ARI/ARTI 4100 N. Fairfax Dr. #200 Arlington, VA 22203
Trevor Houck	SWEP N.A. Duluth, GA
Omar Abdelaziz	University of Maryland 3151 G.L. Martin College Park, MD 20742
Mustafa K. Yanik	Johnson Controls 631 S. Richland Avenur York, PA 17403
Tom Ortiz	HTRI
Anthony Jacobi	University of Illinois
Liping Liu	University of Illinois

Qin Wang

University of Illinois

Massoud Neshan

1700 Rockridge CIR
Huntsville, AL 35802

3. **Establish Quorum Requirements**

Voting members present were: James Bryan, Ben Dingel, Kash Oza, John Thome, Steve Eckels, Axel Kriegsmann, and Mahesh Valiya-Naduvath. Members absent were: Jamal Yagoobi, Parvis Payvar, Art Fovargue and Samuel Yana Motta. With seven of eleven voting members present, the quorum was satisfied.

Votes below are listed as [for-against-abstain] and should add up to seven.

4. **Review/Approve Previous Meeting Minutes**

Minutes from the previous meeting were circulated prior to the meeting. A correction to add a missing PMS member from the ones listed for RP1316 was noted. The committee voted unanimously [7-0-0] to approve the minutes as circulated with the identified correction. Meeting minutes will become official and re-circulated.

5. **Chairman's Comments**

James Bryan shared a number of comments from the Chairman's breakfast meeting.

A new Task Group has been added to section 8 of ASHRAE Technical Activities. The Task Group is TG8, "Variable Refrigerant Flow", and is concerned with the design, performance, and application of variable refrigerant flow systems into commercial HVAC systems.

ASHRAE has offered to send letters of appreciation to supervisors and employers in order to thank them for supporting committee membership and attendance at meetings. A letter request sign-up form was circulated.

Money is currently available for research projects that can be approved through the ASHRAE research project initiation process. The current docket of projected research projects will not exhaust the current available funds.

Nominations for the Hightower Award to award an individual for TC/TG/TRG technical leadership are due (Sept. 1). James volunteered to assist in putting together the appropriate information if anyone had a suggestion for a suitable nominee.

6. **Section Head Comments**

None.

7. **Comments from Liasons (Handbook, Standards, Journal, Research, Program, TEGA, Technical Services, Refrigeration)**

Bill Walter, Handbook Liason, was present at the beginning of the meeting and raised the issue of completing updates to ASHRAE handbook chapters for which TC8.5 is responsible. In order to meet printing deadlines for the 2008 Systems and Equipment handbook, updates and chapter changes, as well as the appropriate review form need to be completed and provided to Bill by July 15. See next section for committee action item.

8. **Handbook Subcommittee Report**

Subcommittee chairman Jim Bogart was absent. TC8.5 is responsible for two chapters in the HVAC Systems and Equipment Handbook – Chapter 35 Condensers and Chapter 37 Liquid Coolers. Due to a printing deadline for changes to existing chapters, the committee agreed to review changes proposed by Harry Li and Joe Huber via email, and to use an email ballot to approve the final version of the chapters by July 15.

9. **Program Subcommittee Report**

Subcommittee chair Amir Jokar was absent. TC8.5 co-sponsored Seminar 31 “Two-Phase Flow at Micro/Nano Scale” at this meeting. The session was well attended and well received.

It was suggested that a seminar focused on falling film evaporation be submitted for the January 2008 meeting in New York. Zahid Ayub, Tony Jacobi, and John Thome volunteered to present material. Ken Schultz and Ben Dingel agreed to at least consider presenting some falling film material. James Bryan volunteered to submit the appropriate information if Amir was not able to.

Future program ideas were also discussed. Dan Kihm expressed an interest in pursuing some sort of Seminar or Forum concerning fouling in various heat exchanger technologies and their application considerations.

At the New York meeting in January 2008, presentation material and audio recordings of Seminars and voluntary presentations will be compiled and available for purchase on DVD through ASHRAE. Many disadvantages of this practice were identified, focused mainly on the potential reluctance of presenters to share material since it will now be “published” in some form. A motion was made to strongly object to the policy of mandatory recording and publishing of Seminar presentation material as summarized by the the following statement from the committee: *“Technical Committee 8.5 strongly objects to the requirement of mandatory publication of presentation material and/or audio for Seminars. We recommend speakers should be given the option to opt-out of this requirement. The requirement undermines the ability to present timely and controversial research results. Further, this requirement discourages industry and/or government agencies from presenting sensitive material.”* The motion was passed unanimously [7-0-0] and supported vigorously by all in attendance.

10. **Membership Subcommittee Report**

Subcommittee chair Kash Oza reviewed the list of current members. The 11 voting members for the current Society year (through end of June 2007) are: James Bryan, Ben Dingel, Kash Oza, Jamal Yagoobi, John Thome (Int'l), Steve Eckels, Art Fovargue, Axel Kriegsmann (Int'l), Parvis Payvar, Mahesh Valiya-Naduvath, and Samuel Yana Motta.

Following this meeting, Ben Dingel and John Thome will be rolling off as members. Amir Jokar will become a voting member. Current corresponding members Ken Schultz and Harry Li also expressed interest in becoming voting members. Tom Ortiz will be added to the roster as a corresponding member. James noted he will check with the section head about making further adjustments to the official roster.

11. **Standards Subcommittee Report**

Current Standards Subcommittee chair Dan Kihm will be working with James Bryan on standards activities. No significant update to two currently active efforts was reported. The two ongoing efforts include: Formation of a new SPC (Standards Project Committee) tasked to create an ASHRAE Standard (method of test) to accompany ARI Standard 470-2001, Desuperheater/Water Heaters and the progress of SPC 181, “Method of Testing for Liquid to Liquid Heat Exchangers”.

12. Journal/Insights/Webmaster Subcommittee Report

Webmaster Joe Huber reported that he continues to update the committee website. It was brought up that of all the Technical Committees in all sections, the TC8.5 website was the only one that currently meets all of ASHRAE's stated website requirements. Great Job Joe!

Please contact Joe with any website errors or omissions. The URL for TC 8.5's website is: <http://www.tc85.ashraetcs.org/>.

13. Research Subcommittee Report

In addition to the discussion of specific research projects (see below), Research Subcommittee Chairman Ken Schultz reported on information shared at the Research Chair Breakfast (Secretary's note: some information provided after meeting):

- Noting a 25% and 40% decline in RTARs and WSs, respectively, submitted in 05-06 compared with the previous year, MORTS conducted a survey of research subcommittee chairs at the Dallas meeting. With 45 responses from the 99 committees/groups, the survey indicated the three highest ranked factors for the decline in RTARs to be: 1) members' lack of time to write RTARs (26%), 2) reluctance to write because authors are discouraged from bidding (26%), and 3) RTARs returned for arbitrary, unclear, and conflicting reasons (20%). Similarly, the three highest ranked factors for the decline in WSs are: 1) members' lack of time (32%), 2) reluctance to write because authors are discouraged from bidding (29%), and 3) lack of approved RTARs (27%).
- RAC is attempting to address the second and third concerns. It was noted that 82% of WSs were approved during the last go-around as were 72% of RTARs. In particular, it is being emphasized to RAC that the "T" in RTAR stands for "Topic" and that an RTAR doesn't have to be a mini-WS. RAC is also proposing to relax the policy on potential bidders participating in the development of RTARs and WSs. In particular, the rule that a participating author's bid be within 10% of the guideline price be relaxed or eliminated. It is judged that there are plenty of other checks in the system to prevent abuse. Finally, research funding levels are going to be stabilized and be more predictable. Funds are up 30% with \$200K surplus. There is \$6.5M in a reserve fund that will be used to keep funding levels stable over time.
- The Research Manual is still under revision. This is being done by Piotr Domanski.
- The next Research Advisory Panel has been set up with the objective to update the Research Strategic Plan by 2010 (to be done every 5 years). Jeff Spittler is the chair. Zahid Ayub is a member.
- It was noted that Direction #1 from the current Plan is "ASHRAE shall lead the advancement of sustainable building design and operations." Activities focused in this direction are good.
- Co-funding is available from several sources:
 - ARTI is currently cofunding ASHRAE work to the tune of \$365K
 - CEC/BERG (California Energy Commission/Building Energy Research Grant) program. Reviews accepted RTARs and selects projects of interest – no action needed by TC.
 - Collaborations with USGBC and CIBSE.
- RTARs and WS due May 15th, Aug 15th, and Dec 15th. WSs approved at Sep RAC meeting can go out for bid in October.
- Each TC is encouraged to have a Research Plan. This should be done for good planning and execution. It is suggested that the Plan be listed on the TC website as a way to attract potential collaborating TCs. However, this plan no longer needs to be filed with MORTS. The "Research Plan Priority" number on the RTAR and WS forms will be dropped.

Following is a summary of TC8.5 sponsored research projects and the status of each project.

1316-RP – Experimental Evaluation of the Heat Transfer Impacts of Tube Pitch in a Highly Enhanced Surface Tube Bundle

Current Status: Active

At the research review meeting, Steve Eckels presented an update and overview of the progression of this research project. Progress on reviewing relevant pool boiling literature was reported and a brief summary was presented. In addition, the pool boiling rig for establishing single tube performance is operational. Heat flux can range from 7-88 kW/m² (2-28 kBTU/hr-ft²) in this facility. Two sets of data with R134a and a 3/4" OD Turbo-BIIHP tube have been taken and reduced using inlet/outlet water temperatures and a Wilson Plot analysis. Results appear to agree reasonably well with previously published results for this tube. The planned instrumentation for determining local heat transfer coefficients consisted of using in-tube RTDs for establishing the water temperature profile, but to date the actual implementation has not yet provided a good representation of water temperature profile. A new design with the small RTDs extending into the water path will be attempted. The RTD insert also creates extremely high water-side pressure drop. It was suggested that the effect of pressure drop on the enthalpy change be checked to ensure accurate calculation of the heat transfer rate.

Assembly of the bundle facility is underway, but is being slowed by attention given to the pool boiling rig and in-tube RTD insert. Initial bundle data is expected by the next meeting. At the present pace, it is expected that the project will exceed the 30 month timeline projected by the work statement.

PMS members for this project are: Petur Thors (chair), Ben Dingel, Satheesh Kulankara, and Axel Kriegsmann. Kash Oza has expressed an interest in becoming part of the PMS on this project.

1324-RFP – Study of Single-Phase Flow-Induced Tube Vibration in Shell and Tube Heat Exchangers

Current Status: No response to RFP

A reworded RFP went out for bid on 15-Oct-2006. No bids were received. Ben Dingel reported that he phoned the two parties that had responded to the first RFP. Dr. Moretti of Oklahoma State University (emeritus) commented that the work requested was "too applied"; his interest was for projects of a more fundamental nature. In addition, Dr. Moretti had recently retired and wasn't interested in following up on the re-worded RFP. He also had the impression that the project was targeted to someone who already had the necessary equipment. Stan Kistler of HRTI commented that the project did not contain enough funds if an investigator didn't already have the necessary equipment.

Mahesh stated he could not afford to spend more time on the work statement, but still believes the project to have value. It was suggested that some further checking with potential bidders should be done to see if the project is of interest at an increased level of funding. John Thome made a motion to re-submit the existing RP-1324 work statement after changing the award amount from \$150,000 to \$190,00, if sufficient interest by potential bidders is expressed. The motion was seconded and passed unanimously [7-0-0].

1345-RFP – Waterside Fouling Performance of Brazed-Plate Type Condensers in Cooling Tower Applications

Current Status: No response to RFP

This project went out for bid on 15-Oct-2006. Similar to 1324-TRP, no bids were received. ARI continues to have interest in this project and is still holding the \$47K in co-funding they have offered. It seems that the original bidders list might have been off-target. Axel and Zahid offered to suggest other potential bidders. Ken volunteered to follow-up on this. Ben made a motion that 1345-TRP be resubmitted with an updated and expanded list of bidders compiled by Ken. The motion was seconded and passed unanimously [7-0-0].

1394-WS – Study of Carbon Dioxide Condensation in a Chevron Angle Plate Geometry Exchanger

Current Status: Response to RFP received

Following final approval of the work statement and release for bidding, four bids were received to 1394-RFP. These bids were reviewed and scored by the PES over the course of the past month by teleconference/netmeeting. The PES members are Zahid Ayub (chair), Joe Huber, and Jim Bogart. The PES presented the committee with their unanimous recommendation for awarding the project to the investigator with the highest scoring proposal. John Thome made a motion that the committee approve awarding of 1394-TRP according to the PES recommendations, with Steve Eckels seconding. The motion passed unanimously [7-0-0].

Fouling of Tube-in-Tube Type Condensers

This is the only remaining topic on TC 8.5's research priority list and is in need of an RTAR. HTRI has expressed interest in doing this project. ARI has indicated co-funding might also be available for this project.

1444-URP – Experimental Evaluation of Two-Phase Pressure Drops and Flow Patterns in U-Bends for R-134a, R-410A, and Ammonia

Current Status: Unsolicited Research Proposal submitted by John Thome, EPFL

TC 1.3 is taking the lead on review of this project. The potential investigator satisfactorily responded to questions and concerns raised by the PES assembled by TC1.3 and TC 1.3 voted (by email) to recommend the award of this project. Action by ASHRAE is pending. Co-sponsorship of this project by TC8.5 was not voted on at this meeting.

Future Research Projects

It was suggested that we set aside time during the TC 1.3/8.5 research meeting in New York to brainstorm and discuss potential new projects.

14. New Business

None – New issues were covered during the Chairman's comments or the appropriate subcommittee portion of the meeting.

15. Schedule Next Meeting

The next committee meeting will be held on January 22, 2007 at 4:15 PM in New York City, NY.

16. Adjourn

The meeting was adjourned by unanimous vote [7-0-0] at 6:30 pm.