



REFRIGERATION COMMITTEE (REF) MINUTES

TABLE OF CONTENTS

Page No.

1.0	CALL TO ORDER AND ROLL CALL.....	2
2.0	APPROVAL OF MINUTES.....	2
3.0	REVIEW OF AGENDA.....	2
4.0	CHAIRMAN’S REPORT	2
5.0	VICE CHAIRMAN’S REPORT	3
6.0	POSITION DOCUMENTS (PD).....	4
7.0	REFRIGERATION AWARDS	4
8.0	BOD EX-OFFICIO/COORDINATING OFFICER	5
9.0	SUBCOMMITTEE REPORTS.....	5
10.0	CHAPTER TECHNOLOGY TRANSFER COMMITTEE (CTTC) LIAISON	7
11.0	NEW BUSINESS	8
12.0	NEXT MEETING.....	8
13.0	HANDOVER TO NEW CHAIR	8
14.0	ADJOURNMENT	8

**PRINCIPAL MOTIONS
JUNE 21st, 2009**

No.	Page No.	Motion
1	1	That the minutes of the January 25, 2009 REF meeting in Chicago be approved.
2	5	REF recommends that TechC Special Projects subcommittee approve a proposed special project titled "Guide for Sustainable Refrigerated Facilities and Systems."
3	6	REF recommends that a seminar program for Orlando on Natural Refrigerants be approved and submitted to the Program committee as first priority.

**ACTION ITEMS FROM WINTER MEETING
LOUISVILLE JUNE 21st 2009**

No.	Page No.	RESPONSIBILITY	SUMMARY
1	3	Gage, Chasserot	Follow up with Fred Turner on REF award ASHRAE Journal articles.
2	3	Staff	Assure that ASHRAE conference programs use the current description of the Milt Garland Award
3	4	Gage	Distribute Refrigeration Speakers list to chapters using CTTC newsletters.
4	5	Sluga	Determine if the TC liaison procedure is achieving its purpose, and how it can be improved.
5	5	Anderson	Evaluate the current international organization liaison MBO and determine how to modify or implement it.
6	6	Chasserot, Kazachki	Organize a natural refrigerant seminar program for the Orlando meeting.
7	7	Gage	Contact ASHRAE Journal editor Fred Turner to recommend a series or "track" for regular articles on natural refrigerants.
8	7	Chasserot, Mueller, Gage	Identify authors and develop ASHRAE Journal articles on natural refrigerants.

**ACTION ITEMS FROM WINTER MEETING
CHICAGO JANUARY 25th 2009**

No.	RESPONSIBILITY	SUMMARY	STATUS
1	Anderson	Send letter following up with Gordon Holness and PAOE subcommittee chair on refrigeration activity requirements for PAOE eligibility.	Complete
2	Anderson	Lead effort to survey the need for a commissioning guideline on refrigeration systems. Develop TPS as appropriate.	Ongoing
3	Scott/Gage	Develop 1- page summary for building owners and chapters to promote ASHRAE, the benefits of submitting for a REF award, the importance of refrigeration, etc.	Complete
4	Anderson	Appoint award judging panel the REF Awards prior to the Annual meeting.	Ongoing
5	Staff	Update Reference Manual to show changes to Briley Award procedures.	Complete

No.	RESPONSIBILITY	SUMMARY	STATUS
6	Siller/Anderson	Update George Briley on the establishment and inaugural award of the George Briley Journal award.	Complete
7	Staff	Procure plaque and notification letters for winners of George Briley Award	Complete
8	REF	Forward speaker nominations for the Distinguished Lecturer Program to Ron Vallort.	Complete
9	TC Liaisons	Request and recruit TC member participation for the refrigeration speakers list.	Complete
10	Fricke/Anderson	Explore option for Tech Council to fund and proceed with refrigeration webinar with REF as lead.	Complete
11	TC Liaisons	Return TC Liaison checklist forms to Sluga.	Complete
12	Staff	Establish a password protected FTP site for posting and access to CO ₂ chapter materials.	Complete
13	REF	Provide input on the 2010-2015 strategic research plan to Ayub.	Ongoing

**ACTION ITEMS FROM ANNUAL MEETING
SALT LAKE JUNE 22th 2008**

No.	RESPONSIBILITY	SUMMARY	STATUS
8	Sluga	Distribute 2010 introductory chapter outline to REF.	Delete

LIST OF APPENDICES

Appendix 1:	REF Agenda for Louisville
Appendix 2:	2008-2009 MBO status report
Appendix 3:	Natural Refrigerants PD press release, 3/5/09
Appendix 4:	Refrigeration Award article, ASHRAE Insights - March 2009
Appendix 5:	ASHRAE Refrigeration Awards press release, 6/20/2009
Appendix 6:	Refrigeration Speakers List, June 2009
Appendix 7:	Special Project Submittal Form, 10 June 2009
Appendix 8:	ASHRAE Strategic Plan - July 10, 2008

LIST OF ACRONYMS

ALI	-	ASHRAE Learning Institute
AMORTS	-	Assistant Manager of Research and Technical Services
ASHRAE	-	American Society of Heating, Refrigerating, and Air-conditioning Engineers
BOD	-	Board of Directors
CNV	-	Chair Not Voting
CV	-	Chair Voting
CO ₂	-	Carbon Dioxide
CRC	-	Chapter's Regional Conference
CTTC	-	Chapter Technology Transfer Committee
DSL	-	Distinguished Speaker List
GCCA	-	Global Cold Chain Alliance
IARW	-	International Association of Refrigerated Warehouses
IAR	-	International Institute of Ammonia Refrigeration
MBO	-	Management by Objective
NEBB	-	National Environmental Balancing Bureau
ODS	-	Ozone Depleting Substances
PAOE	-	Presidential Award of Excellence
PD	-	Position Document
PDC	-	Professional Development Course
RAP	-	Research Advisory Panel
REF	-	Refrigeration Committee
RSES	-	Refrigeration Services and Engineering Society
RVC	-	Regional Vice Chair
SDL	-	Self Directed Learning
TC	-	Technical Committee
TechC	-	Technology Council
TEGA	-	Technology, Energy and Government Affairs Committee
TPS	-	Title, Purpose, Scope

**MINUTES
REFRIGERATION (REF) COMMITTEE
JUNE 21, 2009
LOUISVILLE, KY**

MEMBERS PRESENT:

Don Siller, Chair
Kent Anderson, Vice Chair
Brian Fricke
Cynthia Gage
Georgi Kazachki
Norbert Mueller
Doug Scott
John Sluga
Art Garbarino, Consultant
Andy Persily, Coordinating Officer
Costas Balaras, BOD Ex-Officio

MEMBERS ABSENT:

Donald Hay, Incoming Member
Bruce Nelson
Jim Shepherd
Ron Vallort

GUESTS:

Marc Chasserot, *Incoming Member*
Andy Pearson, *Incoming Member*
Tom Werkema, *Incoming BOD Ex-O*
Bruce Badger
Pradeep Bansal
Julian deBullet
Bruce Griffith
Patrick Hughes
Dick Rademacher
Doug Reindl
Chris Seeton
Mark Spatz
Bill Williams

ASHRAE STAFF:

Steve Hammerling, AMORTS

1.0 CALL TO ORDER AND ROLL CALL

Chair Don Siller called the meeting to order at 8:00 a.m. Members, incoming members, and guests introduced themselves.

2.0 APPROVAL OF MINUTES

Siller referred to the draft minutes from Chicago distributed earlier. Anderson noted that the name of Mike Dolim from NEBB was misspelled on page 3, and should be corrected in the minutes.

It was moved and seconded that,

1. The minutes of the January 25th, 2009 meeting in Chicago be approved, as amended.

MOTION 1 PASSED: 8-0-0 CNV

3.0 REVIEW OF AGENDA

The agenda distributed prior to the meeting was reviewed. No additions or revisions were suggested. The agenda is included with these minutes as **Appendix 1**.

4.0 CHAIRMAN'S REPORT

4.1 Disposition of REF Motions from Last Meeting

Siller noted that there were no REF motions from the previous meeting that required approval from a higher committee.

4.2 New Action Items for REF

Technology Council (TechC) has requested REF input for ideas to reduce the ASHARE budget or raise ASHRAE revenues. Siller noted the REF budget is primarily fixed but that it might be possible to reduce travel, however teleconference expenses would likely increase.

Siller submitted material for Technology Council's Members First newsletter. This newsletter is distributed to all chapter presidents and is available [here](#). The newsletter article included material on the new CO₂ Handbook chapter, REF's position document activities, and the proposed new "Guide for Sustainable Refrigeration Facilities & Systems".

A special project proposal to develop a "Guide for Sustainable Refrigerated Facilities and Systems" document was prepared and submitted to the TechC Special Projects subcommittee. REF will discuss the proposal later on the agenda.

4.3 Management by Objectives (MBO)

The status of current committee MBO's will be covered as REF goes through the agenda. An MBO status report on 2008-2009 Society Year MBO's (**Appendix 2**) will be reported to Technology Council.

4.4 Other

Siller noted that REF members could request that an Employer Thank You letter be sent from ASHRAE prior to July 1.

REF reviewed action items from past meetings to determine the status. All Action Items were reported complete, except for items # 2, 4, and 13 from Chicago.

5.0 VICE CHAIRMAN'S REPORT

5.1 2009- 2010 MBO's

Anderson reported that he has drafted a list of preliminary MBO's for next year. There will be three to five major MBO's, including the following:

- A guide on refrigeration sustainability – REF will discuss the special project later on the agenda.
- Improve chapter and grass roots refrigeration activities
- Develop a refrigeration newsletter for the membership and chapters. Anderson will solicit input from all REF members on this effort.
- Establish a more formal liaison relationship with international refrigeration organizations. Investigate inviting them to attend REF meetings. Werkema noted that BOD level liaisons may already exist with some organizations.
- Commissioning guideline for refrigeration.

REF members provided additional input for new MBO's. Several members expressed concerns with the limited refrigeration programs at the ASHRAE meetings. There could be an MBO to work with the Program Committee to develop more refrigeration programs.

Werkema suggested identifying which objectives of the [ASHRAE Strategic Plan](#) that each committee MBO supports. Anderson will finalize the 2009-2010 MBO's and submit them to Technology Council.

5.2 Fiscal report

Anderson noted there is little information to report on the REF budget. There are limited discretionary funds available to REF; there is enough money budgeted for the committee's various awards.

5.3 ASHRAE Refrigeration Commissioning Guideline

Anderson reported that Action Item #2 for REF to coordinate possible development of an ASHRAE guideline on refrigeration commissioning is ongoing. The scope of the guideline could be very large if it covered all refrigeration-related applications, but perhaps a broad guideline with more detailed sub-guidelines would be possible. It was reported that RSES

and NEBB have started a joint effort to develop a new refrigeration commissioning 'procedure' document. A title, purpose, and scope (TPS) for a new ASHRAE guideline would need to be developed and submitted to the Standards Committee. Werkema suggested that ASHRAE can either do these commissioning guidelines, or they likely will be done by other refrigeration organizations. If ASHRAE does not take the initiative someone else will lead the effort.

Gage noted that TC 10.7, Commercial Food and Beverage Cooling Display and Storage, would be discussing a commissioning guideline for their application. Other Section 10 TC's have been asked to include a discussion on the need for an ASHRAE refrigeration commissioning guideline on their agendas at this meeting.

6.0 POSITION DOCUMENTS (PD)

6.1 Natural Refrigerants

This PD was approved by the BOD and has subsequently been posted and publicized though the ASHRAE website. In response to ASHRAE's 3/5/09 press release (**Appendix 3**), the REF Chair received a letter from Greenpeace indicating their support of the Natural Refrigerants Position Document (PD). Kent Anderson, REF Vice Chair, as well as ASHRAE staff in Washington DC, have met with Greenpeace to discuss how they may help accomplish the goals stated in the PD, and explore other opportunities for them to work with ASHRAE.

Chris Seeton commented that the Society of Automotive Engineers (SAE) felt the PD should have a more limited scope, i.e. cover only stationary applications.

6.2 Ozone Depleting Substances (ODS)

PD Committee Chair Julian deBulles reported that the current PD is being reviewed by a newly appointed committee. Writing assignments have been made and a draft is anticipated prior to the Orlando meeting.

7.0 REFRI GERATION AWARDS

Cynthia Gage summarized efforts to publicize the George Briley, Comfort Cooling and Milt Garland Awards. An article was published in the March 2009 issue of ASHRAE Insights (**Appendix 4**) to coincide with the start of the spring Chapter Regional Conference (CRC) schedule. A press release announcing the current Refrigeration Award winners was also released (**Appendix 5**).

Gage noted that building owners were omitted from the latest award submissions package. To help promote the awards to owners and encourage them to allow submission of their projects, REF needs to assure their inclusion. Gage noted that Fred Turner was agreeable to including articles in the ASHRAE Journal on the winning projects.

Action Item #1: Gage – Follow up with Fred Turner on REF award ASHRAE Journal articles.

Art Garbarino noted that the description of the Milt Garland Award in the Louisville meeting program was incorrect; it referred to the previous award procedures.

Action Item #2: Staff – Assure that the ASHRAE conference programs use the current description of the Milt Garland Award.

Marc Chasserot asked if an award should be developed for natural refrigerant applications or research. Andy Pearson cautioned against a proliferation of awards and it was noted that natural refrigerant applications can qualify for the current REF awards. Werkema commented that ASHRAE

should focus on the application and design, as opposed to the type of refrigerant or chemical used, and not promote one refrigerant over the other.

7.1 Milt Garland & Comfort Cooling Awards

The Milton W. Garland Refrigeration Award for Project Excellence was presented to Cesar Luis Lim at the Plenary Session.

The Comfort Cooling Award for Project Excellence was presented to Russell L. Heiken at the Plenary Session.

7.2 ASHRAE Journal Article Award

Don Siller presented the inaugural George C. Briley Award for the best refrigeration-related article, published in the August 2007 ASHRAE Journal, to Douglas Reindl. Reindl accepted the award on behalf of himself and Todd Jekel for their article titled “Heat Recovery in Industrial Systems”.

Steve Hammerling reported that changes to the Briley Award have been incorporated into the REF Reference Manual.

8.0 BOD EX-OFFICIO/COORDINATING OFFICER

BOD Ex-Officio Costas Balaras thanked REF for an exciting and productive year. Balaras emphasized the need to build refrigeration activities at the chapter level with a focus on distribution of materials. He applauded efforts in this direction such as the refrigeration speaker list, design guides, and seminar development. Balaras thanked the committee for their participation and their guidance to the Society.

Coordinating Officer Andy Persily thanked REF for their contributions over the last Society Year. Persily noted that the ASHRAE BOD is seeking input from all committees on bottom-up planning ideas for ASHRAE’s Strategic Plan. This topic appears later on the agenda, but Technology Council is looking for areas such as technology, industry, etc. that should be the focus of the ASHRAE BOD in the future, if not currently represented in plan.

9.0 SUBCOMM ITTEE REPORTS

9.1 Functional

There were no changes to the REF Manual of Procedures (MOP) or Rules of the Board (ROB). Changes have been made to the REF Reference Manual to incorporate changes to the Briley Award voting procedures.

9.2 Education

Brian Fricke and Doug Reindl plan to attend the Professional Development Committee (PDC) meeting tomorrow. That committee is best suited to provide the necessary marketing and platform for a refrigeration webinar; Fricke will see if this program can get on their schedule. The format could simply be a video with audio, or preferably a PowerPoint presentation with audio. Fundamentals of Refrigeration, or an overview, is the likely topic.

Werkema noted that the CTTC will be doing webinars as an alternative to satellite broadcasts in the future. There were 17,000+ participants for the last satellite broadcast. REF could contact CTTC (Bill Williams) to discuss refrigeration topics as a possible broadcast.

Gage reported that she has updated the refrigeration speakers list (**Appendix 6**) based on contacts with TC’s and requests for speakers. The list still needs work and more speakers as

there are gaps in topics and locations of speakers. Staff will post the list on the REF website page. Notices for ASHRAE Insights and publication in the CTTC newsletter are planned.

Action Item #3: Gage –Distribute Refrigeration Speakers list to chapters using CTTC newsletters.

9.3 Liaisons

John Sluga provided an update on REF liaisons with refrigeration related TC's. He commented that liaisons are needed from the committee for several technical committees, and he asked for volunteers to serve in that capacity. REF should also review our TC liaison program to determine if it still is serving a useful purpose.

Action Item #4: Sluga – Determine if the TC liaison procedure is achieving its purpose, and how it can be improved.

Anderson commented that he plans to develop an MBO for next year to address ASHRAE liaisons with other refrigeration organizations. The current MBO, 1(j), identifies several organizations outside the US, but not groups such as IIAR, RSES, IARW, NEBB, etc. who are involved with refrigeration. Clarification on why these organizations were selected is needed and a determination made on whether or not this objective is still appropriate. Current REF liaison activities focus only on technical committees within ASHRAE.

Action Item #5: Anderson – Evaluate the current international organization liaison MBO and determine how to modify or implement it.

9.4 Publications

John Topliss has completed a draft of the new CO₂ chapter for the Handbook and distributed it widely for review. TC 10.3 is the cognizant committee for the chapter and received a copy to consider for approval at this meeting. TC 10.3 members had some suggested edits so their Handbook subcommittee will revise it as appropriate at a meeting later today: 1 p.m., in the Archibald room. TC 10.3 will approve the chapter for inclusion in the 2010 Handbook prior to the Handbook deadline.

Doug Scott updated the committee on the special project for a refrigeration “Green Guide”. There have been several conference calls since the Winter meeting to develop a formal proposal for a guide. A draft proposal was e-mailed to REF prior to the meeting for review and is included as **Appendix 7**. The draft was sent to the Special Projects subcommittee of Technology Council prior to the meeting as well; Anderson and Scott will present the proposal to Special Projects tomorrow. Scott noted that the focus is on refrigerated facilities and warehouses, not process refrigeration systems or supermarket/display applications, although the proposed scope is not necessarily the final intended result. Bruce Badger suggested discussing the project further with IARW and IIAR to ensure that the resulting document is not written so that it can be codified.

It was moved and seconded that,

2. REF recommends that TechC Special Projects subcommittee approve a proposed special project titled ““Guide for Sustainable Refrigerated Facilities and Systems.”

MOTION 2 PASSED: 8-0-0, CNV

There is an ongoing TC action item related to developing an outline for a new introductory chapter for the 2010 Refrigeration Handbook. Sluga noted that the Handbook Committee is significantly reorganizing the handbook, and the new chapter should avoid the problem in the 2006 Handbook where the first chapter is on Liquid Overfeed Systems.

9.5 Program

Georgi Kazachki noted that REF is sponsoring Seminar 57, Systems with Natural Refrigerants: Components and Field Experience, at the Louisville meeting. He noted there are four very good speakers for the Wednesday afternoon program:

- Commercial Applications for CO₂ – D. Hinde
- Field Monitoring & Evaluation of a Large CO₂/NH₃ Refrigeration System – R. Hoest
- Mechanical and Thermal Aspects of CO₂/NH₃ Cascade Condensers - Z. Ayub
- Performance of CO₂ Heat Pump Water Heater – Y. Hwang

Several other refrigeration related programs in Louisville were sponsored by Section 10 TC's and are listed below; there were more refrigeration-related presentations sponsored by other sections and committees:

- Seminar 33 - Current and Future Options for Simulation of Refrigerated Facilities
- Forum 8 - What Is Needed for the Advancement of Refrigeration Computer Simulation?
- Session 8 (Transactions) - Advanced Refrigeration System and Open Front Supermarket Display Case Component Technologies
- Session 19 (Transactions) - Emerging Applications in Low Temperature Refrigeration and Cryogenics

It was moved and seconded that,

3. REF recommends that a seminar program for Orlando on Natural Refrigerants be approved and submitted to the Program Committee as first priority.

MOTION 3 PASSED: 8-0-0, CNV

Action Item #6: Chasserot, Kazachki – Organize a natural refrigerant seminar program for the Orlando meeting.

Anderson requested that Kazachki assist in organizing programs for a refrigeration track at the Las Vegas and Montreal meetings.

9.6 Research

A committee called the Research Advisory Panel (RAP) is updating the ASHRAE research plan for 2010-2015. There are eleven members on the committee, including former REF Chair Zahid Ayub. One of the draft goals is 'natural refrigerants and system charge reductions'. REF members can provide input on the plan to Ayub. More information on the 2010-2015 research plan is available at www.ashrae.org/research. See Action Item #13 from the Chicago meeting.

10.0 CHAPTER TECHNOLOGY TRANSFER COMMITTEE (CTTC) LIAISON

Current CTTC Vice-Chair Bill Williams addressed REF on liaison activities with CTTC. Williams reported that CTTC is enthusiastic about helping in any way possible to get refrigeration resources and activities to ASHRAE chapters. Williams gave a brief history of the changes in REF's role and position in ASHRAE at the grass roots level, and the prior involvement of TEGA, now CTTC. Since CTTC has a good deal of responsibilities on its plate, including assisting chapters in refrigeration activities, Regional Vice Chairs for refrigeration are needed to help with the work load, and perhaps

only 60 of the chapters have Refrigeration Chairs. Williams invited REF to work closely with CTTC to get the word out to chapters on refrigeration speakers (including those on the DSL), technical programs, etc. that REF can make available for chapter programs.

11.0 NEW BUSINESS

Siller noted that Technology Council is asking REF to discuss and provide input on the Society Strategic Plan (**Appendix 8**). TechC has requested that REF review the [Strategic Plan](#) and help identify technical issues that may be of interest to the BOD. REF discussed and identified the following, to be included in the REF report to Technology Council:

- ASHRAE should strive to develop and disseminate technical information on HFO refrigerants, to specifically address when these new refrigerants are and are not appropriate for use.
- ASHRAE should focus on a new dawn for refrigerants with vigorous and objective investigation of natural refrigerant use, including research, technical programs, ASHRAE Journal articles, etc.

Chasserot noted that the field of natural refrigerants is constantly changing and the recently approved PD will be out of date shortly, if it is not already outdated. Anderson suggested that a REF sponsored specialty conference on refrigerants, natural refrigerants, or refrigerant applications may be an option the committee could explore. ASHRAE has sponsored several such conferences in the past that were very successful.

Action Item #7: Gage – Contact ASHRAE Journal editor Fred Turner to recommend a series or “track” for regular articles on natural refrigerants.

Action Item #8: Chasserot/Mueller/Gage – Identify authors and develop ASHRAE Journal articles on natural refrigerants.

12.0 NEXT MEETING

The next meeting of REF is scheduled for Sunday, January 24th, 2010 in Orlando, FL. Technology Council will hold Technology Weekend in the fall, but REF will not meet; conference calls will be scheduled, as needed.

13.0 HANDOVER TO NEW CHAIR

13.1 Closing Remarks

Siller presented Certificates of Appreciation to those rolling off REF, including Brian Fricke and Art Garbarino. Siller also recognized Jim Shepherd and Bruce Nelson for their past contributions as they are also rolling off of the committee, but were not in attendance.

Incoming REF Chair Kent Anderson presented a Certificate of Appreciation to Don Siller for his service as Chair of REF over the last Society Year. REF applauded Siller for his accomplishments. Anderson welcomed Marc Chasserot and Andy Pearson, both in attendance, as new committee members for the next Society Year.

13.2 Subcommittee Assignments

Anderson will contact members about subcommittee appointments and will announce those assignments.

14.0 ADJOURNMENT

The REF meeting was adjourned at 12:00 p.m.

Refrigeration Committee Meeting Agenda
ASHRAE Annual Meeting - Louisville, Kentucky

- 1.0 CALL TO ORDER
- 2.0 ROLL CALL & INTRODUCTIONS
- 3.0 APPROVAL OF MINUTES- Winter Meeting – Chicago, IL, January 25th, 2009
- 4.0 REVIEW OF AGENDA
- 5.0 CHAIRMAN’S REPORT – *Siller*
 - 5.1 Disposition of Motions from Last Meeting Requiring Higher Body Approval
 - 5.1.1 (No motions required higher approval)
 - 5.2 New or Carryover Action Items Assigned REF by Tech. Council
 - 5.2.1 AI# 6 Chi - Send three new ideas for additional budget cuts or revenue increases to Persily by February 15
 - 5.2.2 AI# 18 – Chi - Submit reports for Members First newsletter to Tom Watson by Feb. 20, 2009
 - 5.2.3 Carryover AI# 8 ATL - Submit approach to developing an Advanced Energy Design Guide for refrigeration to the Special Projects subcommittee.
 - 5.3 2008-09 MBO’s – Final Report (*Attachment A*)
 - 5.4 Information Items
 - 5.4.1 Employer Thank You letter
 - 5.5 Other
- 6.0 VICE-CHAIRMAN’S REPORT – *Anderson*
 - 6.1 2009-10 MBO’s
 - 6.2 Fiscal report
 - 6.3 ASHRAE Refrigeration Commissioning Guideline
 - 6.4 Other
- 7.0 POSITION DOCUMENTS
 - 7.1 Natural Refrigerants
 - 7.1.1 Greenpeace
 - 7.2 Ozone Depleting Substances
- 8.0 REFRIGERATION AWARDS (MBO’s 1b, 2e) - *Shepherd*
 - 8.1 Milt Garland Award
 - 8.2 Comfort Cooling Award
 - 8.3 ASHRAE Journal Award
 - 8.3.1 Award Presentation
- 9.0 BOD EX-OFFICIO – *Balaras*
- 10.0 COORDINATING OFFICER – *Persily*
- 11.0 SUBCOMMITTEE REPORTS
 - 11.1 Functional
 - 11.1.1 MOP & ROB
 - 11.2 Education (MBOS’s 1c, 1d, 1g, 2b, 2c)
 - 11.2.1 Webinar/Professional development course
 - 11.2.2 Refrigeration Speaker list
 - 11.3 Liaisons (MBO’s 1f) – *Sluga*
 - 11.4 Publications (MBOS’s 1h)
 - 11.4.1 CO₂ chapter status - *Topliss*
 - 11.4.2 Introductory Refrigeration chapter for 2010 Handbook – *Sluga*
 - 11.4.3 Special Project – Green/Design Guide- *Anderson/Scott*
 - 11.5 Program (MBOS’s 1i, 1j, 2d)
 - 11.5.1 Louisville program
 - 11.5.2 Future programs
 - 11.6 Research (MBO’s 1e, 3a-3d)
 - 11.7 International – *Hay*
- 12.0 CTTC LIAISON – *Garbarino*
- 13.0 UNFINISHED BUSINESS
- 14.0 NEW BUSINESS
 - 14.1 Tech Council Strategic Planning (*Attachment B*)
- 15.0 NEXT MEETING – Orlando, FL, January 24th, 2010
- 16.0 RECAP
- 17.0 HANDOVER TO NEW CHAIR – D. Siller & K. Anderson
 - 17.1 Closing Remarks
 - 17.2 Announce Subcommittee Assignments
 - 17.3 Strategic Planning for SY09-10
- 18.0 ADJOURNMENT

No	Objective/Goals	Completion Date	Fiscal Impact	Responsible Person(s)	Status
1.	Increase REF Committee Activity Level and Visibility				
	a. Assign each REF member to at least (1) goal, and encourage quarterly progress reports and participation in quarterly conference calls.	06/08	None	All REF	Complete
	b. Publicize the George Briley ASHRAE Journal Award and encourage refrigeration related articles published in the Journal, through Insight announcements.	Quarterly	\$200	Gage, Bevington	Complete
	c. Publicize, develop and deliver Webinar to increase awareness and interest in refrigeration.	06/09	UK	Fricke, Reindl, Halel	Ongoing
	d. Assist in reviewing the Self-Directed Learning Course (SDL) on Refrigeration.	UK	UK	Vallort, Nelson	Complete
	e. Work with RAC to improve communications with Section 10 TC's and streamline process of generating and approving RTAR's and WS's.	01/09	None	Siller, Anderson	Complete
	f. Work with TAC to improve communications between REF and refrigeration related TC's, and Projects (SDL).	06/09	None	Siller, Anderson	Complete
	g. Develop the Scope for a refrigeration related topic for the 2009 Student Design Competition, and forward it to Student Activity Committee.	06/09	UK	Nelson, Ayub, Reindl,	Not completed
	h. Coordinate development of a chapter on CO ₂ to be published in 2010 Handbook, and communicate information to All Section 10 TC's, and TC 3.2, 3.3, 3.4.	06/09	None	Topliss, Siller, Anderson, Halel	Complete
	i. Promote 'Green Refrigeration' through programs at the Winter Meeting in Chicago and the Annual Meeting in Louisville.	01/09, 06/09	UK	Kazachki, Gage	Complete
	j. Liaison with C-Dig, Eurammon, and other international bodies involved in natural refrigerants.	06/09	None	Hay, Ayub,	Ongoing
	k. Maintain and update the REF website.	01/09, 06/09	None	Staff	Complete
	l. Liaison with TC's on refrigeration related research and programs.	01/09, 06/09	None	Sluga, All REF	Complete
2.	Support Chapter Refrigeration Activities				
	a. Submit recommendations to incoming President for 2009-2010 Refrigeration PAOE points and emphasize that refrigeration be included in a separate category.	01/09	None	Anderson, Vallort	Complete
	b. Update list of speakers on refrigeration topics.	01/09	None	Gage, Fricke	Complete
	c. Expand Distinguished Lecturer List to include at least (6) additional experts on refrigeration.	01/09	None	Vallort, Siller	DSL at max. size
	d. Publicize refrigeration programs and speakers through Insight announcements.	Quarterly	None	Gage, Bevington, Vallort	Complete
	e. Publicize the Milton W. Garland Commemorative Refrigeration Award for Project Excellence, and the Refrigeration Comfort Cooling Award for Project Excellence, through Insight announcements.	Quarterly	\$400	Gage, Bevington, Vallort	Complete
3.	Develop a Plan for Sustainable Refrigerated Building and System Design				
	a. Coordinate the development of an RTAR to establish 'Benchmarks for Energy Efficiency and other aspects of Sustainability in Refrigerated Storage Facilities.'	01/09	UK	Scott, Nelson, Ayub	Complete Goal was changed to develop SP - 'Guide for Sustainable Refrig. Facilities & Systems.
	b. Coordinate the development of an RTAR for a 'Design Guide for Energy Efficient, Sustainable Refrigerated Storage Facility.'	01/09	UK	Vallort, Scott, Ayub	
	c. Coordinate the development of an RTAR for a 'Design Guide for Energy Efficient, Sustainable Refrigeration Systems.'	06/09	UK	Scott, Nelson, Kazachki	
	d. Coordinate the development of RTAR's for the research necessary to support the above 'Design Guides.'	06/09	UK	Scott, Nelson, Ayub	

ASHRAE Position Document Outlines Commitment to Natural Refrigerants

For Release:

March 5, 2009

Contact: Jodi Dunlop

Public Relations

678-539-1140

jdunlop@ashrae.org

ATLANTA – In a new position document, ASHRAE outlines its support for research, assessment and strategic growth in the use of natural refrigerants such as ammonia, carbon dioxide, hydrocarbons, air and water in refrigeration systems and technologies.

ASHRAE's Position Document on Natural Refrigerants can be read at www.ashrae.org/positiondocuments.

As the industry searches for alternatives that have low global-warming potential, natural refrigerants are gaining increased interest. These refrigerants offer the potential to improve the environmental performance of refrigeration systems, according to ASHRAE.

"In light of the current global scenario, ASHRAE's response to the demand for environmental sustainability is to promote the development of systems that use natural refrigerants, safely, economically and efficiently," Bill Harrison, ASHRAE president, said.

With this position document, ASHRAE demonstrates its commitment to:

- the application of natural refrigerants
- the development of strategic relationships to advance natural refrigerants
- the consideration of natural refrigerants in existing and new guidelines, codes and standards
- the provision of guidance and education to policy makers and the public
- the creation and dissemination of methods and tools for environmental assessment of refrigeration systems
- the publication of technical information highlighting best practices from a safety, reliability and efficiency standpoint
- the promotion of authoritative information on natural refrigerants through seminars and publications

ASHRAE, founded in 1894, is an international organization of some 50,000 persons. ASHRAE fulfills its mission of advancing heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education.

Milton W. Garland, "Mr. Refrigeration," worked for Frick until he was 104.



Now Time to Prepare CRC Refrigeration Award Nominations

As the annual Chapter Regional Conferences approach, now is the time to prepare award nomination packages for the Milt W. Garland Commemorative Refrigeration Award for Project Excellence and the Refrigeration Comfort Cooling Award for Project Excellence. Project nominations must be submitted within 36 months of the initial operation date of the system.

The Milt W. Garland Commemorative Refrigeration Award recognizes a non-comfort cooling refrigeration application that incorporates new technology in a unique manner. Refrigeration applications that qualify for this award include food processing, food preservation, industrial refrigeration, refrigeration manufacturing processes, life support in extreme environments, recreational facilities, and other non-comfort cooling applications.

The Refrigeration Comfort Cooling Award recognizes a comfort cooling refrigeration application which highlights innovation and/or new technologies.

For the winning projects:

- The designer receives a plaque at the Society Annual Conference;
- The project's owner receive a plaque at a chapter meeting, and
- The nominating chapter receives a felt patch to go on the chapter award banner. Both awards require that the chapter submit nominations to be judged at the regional CRC.

Award nominations must then be received no later than Nov. 1.

Complete details on eligibility and the application process for these awards can be found at the Refrigeration Committee Web page at www.ashrae.org/refrigeration.

Electronic Voting, From Page 1

questing a paper ballot.

This year, the membership will vote to elect members to the ASHRAE Board of Directors and to vote on two proposed changes to the ASHRAE bylaws.

Information about nominees and the proposed bylaw changes will be published in the April issue of *ASHRAE Insights*.

ASHRAE Publishes Load Calculation Manual

Guidance to help designers improve the performance and efficiency of design as it relates to load calculations is contained in a new book from ASHRAE.

The *Load Calculation Applications Manual* focuses on two methods for calculating cooling loads in nonresidential buildings—the heat balance method and the radiant time series method (RTSM).

Author Jeffrey Spittler noted that understanding these methods is crucial when answering three primary design questions: What is the required equipment size? How do the heating/cooling requirements vary spatially within the building? and What are

the relative sizes of the various contributors to the heating/cooling load?

"Cooling load calculations are performed primarily to answer the first and second questions, providing a basis for specifying the required airflow to individual spaces within the building," said Spittler. "Answers to the third question help designers make choices to improve the performance or efficiency of the design."

The new manual features in-depth examples, as well as brings together the latest data for building materials, windows, weather and internal heat gains, according to Spittler. The accompanying CD contains spreadsheets

to compute factors needed by the RSTM and compute cooling loads with the RSTM.

The manual is the fourth in a series of load calculation manuals published by ASHRAE, including the first and second editions of *Cooling and Heating Load Calculation Manual* as well as *Cooling and Heating Load Calculation Principles*.

The cost of *Load Calculations Applications Manual* is \$97 for ASHRAE members. To order, contact ASHRAE Customer Service at 1-800-527-4723 (United States and Canada) or 404-636-8400 (worldwide), fax 404-321-5478, or visit www.ashrae.org/bookstore.



ASHRAE Exhibits at Chillventa

NUREMBERG, Germany—ASHRAE recently exhibited at the Chillventa trade fair held in Nuremberg where ASHRAE President Bill Harrison met with officials of the German Association of Air Conditioning and Refrigeration (DKV) and fair organizers from Nurnberg Messe (NM). Pictured (from left) are Alter Hufnagel, NM; Harrison; Irene Reichert, DKV; Bernd A. Diederichs, NM; Frank Rinne, DKV; Carmen Stadtlaender, DKV; Michael Arneemann, DKV; ASHRAE Director of Communications and Publications Steve Comstock; Gabriele Hannwacker, NM; Achim Zeller, DKV; and Rainer M. Jakobs, DKV.

ASHRAE Updates Guidance for Buildings in Hot and Humid Climates

Expanded and revised guidance on keeping heat and humidity out of buildings in hot and humid climates is contained in a new book from ASHRAE.

The second edition of *The ASHRAE Guide for Buildings in Hot and Humid Climates*, is expanded from 124 to 316 pages and based on years of questions and suggestions from practicing architects, engineers and building managers who work in hot and humid climates, according to author Lew Harriman, Member ASHRAE.

The book includes four new chapters to guide architectural design toward reduced energy consumption, reduced mold risk and lower-cost mechanical systems. The HVAC&R design section also has been expanded. Six new chapters help system designers quantify and reduce cooling

and dehumidification loads, design more economical ventilation systems and save more than 25% of annual HVAC&R energy through low-cost sealing of air distribution components.

Suggestions for contractors are also provided to reduce mold risk and prevent scheduling problems through simple improvements to jobsite practices as well as through modern drying technology.

The cost of *The ASHRAE Guide for Buildings in Hot and Humid Climates, Expanded Second Edition*, is \$99 for ASHRAE members.

To order, contact ASHRAE Customer Service at 1-800-527-4723 (United States and Canada) or 404-636-8400 (worldwide), fax 404-321-5478, or visit at www.ashrae.org/bookstore.

Registration Open for IAQ Satellite Broadcast/Webcast

Registration is now open for the free April 22 satellite broadcast and webcast, *Clean, Lean, and Green—IAQ for Sustainable Buildings*.

Interested persons may register online at www.ashrae.org/iaqbroadcast.

This program is sponsored by ASHRAE's Chapter Technology Transfer Committee with support from the U.S. Environmental Protection Agency.

Broadcast presenters and their topics are:

- Martha Hewett, director of research, Center for Energy & Environment, Minneapolis—*Practical, Proven Strategies to Deliver Better IAQ*.
- Hoy Bohanon, owner and manager of Bohanon Engineering, Winston-Salem, N.C.—*Improving Your IAQ and Reducing Your Energy Costs through HVAC Design*.
- H.E. "Barney" Burroughs, owner and CEO of Building Wellness Consultancy, Atlanta—*Keeping Buildings Clean: Avoiding and Building Control of Contaminants to Attain and Maintain IAQ Acceptability*.
- George DuBose, certified general contractor, Liberty Building Forensics Group, Orlando, Fla.—*Avoiding Costly IAQ Problems in the Building Envelope*.
- John McFarland, director of engineered systems, WorkingBuildings, Atlanta—*Integrating Good IAQ into the Design & Construction Process*.

There is no fee for registration.

For more information, call 678-539-1139 or e-mail ashrae-satellitebroadcast@ashrae.org.

Lenssen Named ASHRAE Top New Face of Engineering

Mark Lenssen, P.E. is ASHRAE's top nominee for the New Faces of Engineering recognition program.

The program, part of National Engineers Week and cosponsored by ASHRAE, promotes the accomplishments of young engineers by highlighting their engineering contributions and the resulting impact on public welfare. The program targets those age 30 and younger.

Lenssen, along with the top nominees from each engineering society represented on the National Engineers Week committee, appeared in a full-page ad in *USA Today* during National Engineers Week, Feb. 15–21.

ASHRAE received 19 nominations for the program.

Lenssen is an energy management engineer with Puget Sound Energy, Bellevue, Wash.

He holds a Bachelor in Mechanical Engineering from the University of Washington, Seattle.

"I am honored to be selected as this year's New Face for ASHRAE," he said. "This is a wonderful opportunity to highlight energy efficiency since it is such an important avenue for how we as a Society are going to reduce our buildings' impact on the environment. ASHRAE provides me with opportunities to meet and network with fellow engineers, designers and contractors to ensure that I stay in touch with the latest technology, design challenges, and installa-

tion methods. I look forward to being a part of the Young Engineers in ASHRAE committee and hope my background in energy efficiency allows me to contribute in a meaningful way to the group's goals."

Lenssen is dedicated to helping commercial and industrial facilities become more environmentally sustainable and reduce their carbon footprint. Over the last 2.5 years, he supported over 100 projects to improve energy efficiency and save

more than 7.5 million kWh and 170,000 therms per year. Based on local carbon emissions for delivered kilowatt hours and therms, these combined savings equal over 5,000 tons of carbon dioxide per year, or the

equivalent of 2.7 average cars off the road each day. He is responsible for managing financial incentives for the utility's Energy Conservation Program. He conducts energy audits to analyze how customers' heating, cooling, lighting, production, and other energy-consuming systems operate and then provides cost-effective energy efficiency upgrade recommendations. Lenssen's recommendation to owners include high-efficiency boilers, new lighting systems, building control systems, and new or retrofitted air compressors, fans, and pumps with variable-speed drives to reduce energy consumption at part loads. To date, Lenssen is responsible for providing nearly \$2 million in energy efficiency incentives to energy consumers.



Lenssen



News

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS

1791 Tullie Circle, NE • Atlanta, GA 30329-2305 • 404-636-8400 • www.ashrae.org

For Release:
June 20, 2009

Contact: Wendy Angel
Public Relations
678-539-1216
wangel@ashrae.org

Maitland Engineer Earns ASHRAE Membership Award

LOUISVILLE – Russell L. Heiken, P.E., has been awarded the American Society of Heating, Refrigerating and Air-Conditioning Engineers' (ASHRAE) Refrigeration Comfort Cooling Award for Project Excellence, which recognizes innovation and/or new technologies.

The award was presented at the Society's 2009 Annual Conference held here June 20-24.

Heiken is executive vice president, X-nth, Maitland, Fla.

The project involved installation of a Standard 90.1-required economizer at the Carlisle Regional Medical Facility. A water-side economizer was selected due to the required pressure relationships, as well as the added duct, louver, exhaust fans and ceiling space for more than 20 air-handling units. The system does not lose cooling ability when changing from full plate and frame heat exchanger to cooling with a chiller and the PFHX. The predicted energy savings are some \$45,000 versus a system without an economizer, less than a two-year payback while still providing accurate temperature and humidity control.

ASHRAE, founded in 1894, is an international organization of some 50,000 persons. ASHRAE fulfills its mission of advancing heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education.

###



News

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS

1791 Tullie Circle, NE • Atlanta, GA 30329-2305 • 404-636-8400 • www.ashrae.org

For Release:

June 20, 2009

Contact: Wendy Angel

Public Relations

678-539-1216

wangel@ashrae.org

Manila Engineer Earns ASHRAE Refrigeration Award

LOUISVILLE – Cesar Luis dL. Lim, PME, has received the Milton W. Garland Commemorative Refrigeration Award for Project Excellence from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

The award was presented at the Society's 2009 Annual Conference held here June 20-24. The award recognizes the designer and owner of a non-comfort cooling refrigeration application that highlights innovation and/or new technologies. It is named in recognition of ASHRAE Fellow Milton Garland, known as "Mr. Refrigeration" for his work with refrigeration systems.

Lim is a consultant, SPTG/CTG, San Miguel Corp., metro Manila, Philippines.

This project involved refrigeration modernization of the San Fernando Brewery. The plant now operates on an efficient two-temperature system, and issues with an ammonia leak were corrected using innovative clamp-on laser-welded cooling panels for the cylindro-conical tanks. The plant has reduced its electric consumption by more than 10 percent, and the frequent ammonia charge of 6 metric tons per month was eliminated. Most importantly, the plant now attains the required temperature needed to cool the five million barrels of beer produced at the plant each year.

ASHRAE, founded in 1894, is an international organization of 55,000 persons. Its sole objective is to advance through research, standards writing, publishing and continuing education the arts and sciences of heating, ventilation, air conditioning and refrigeration to serve the evolving needs of the public.

ASHRAE Refrigeration Speakers List

Name	Topic*	Organization	Chapter	Travel?	Honorarium?
Region I					
Martin Timm	Safe Use of CO2 and Liquid Nitrogen as Refrigerants	Praxair Inc.	Niagara Frontier (Buffalo, NY)	Yes	None for short distances.
Region II					
Ted Martin	Energy Efficient Ice Rinks, Ski Slopes and Luge Runs	CIMCO	Toronto		
Region III					
Mike Gaza	VFD's and Motor Control	Schneider Electric and HVAC/R and Pumping	Lehigh Valley (Allentown, PA)	Yes	
John Ansbro	Ammonia Chillers	Johnson Controls/Frick	Baltimore	Yes	None
	Low Charge Ammonia Chillers				
John Kollasch	Evaporative Condensers	EVAPCO, Inc.	Central Pennsylvania	Yes	None
Dr. Reinhard Radermacher	System Integration	University of Maryland	National Capital	Yes	Travel Reimbursement
	CHP plus Refrigeration				
	Energy Efficiency				
Region IV					
Georgi Kazachki	Conceptual and Design Considerations for “Green” Unitary, Distributed, & Centralized DX & SC Refrigeration & AC	Cryotherm	Atlanta	Yes	\$2,000 plus travel
	Refrigerants, Secondary Coolants & Components in Synergy for Efficient & Trouble-free Operation of Unitary, Distributed, & Centralized DX & SC Refrigeration & AC				
	Troubleshooting –The Art of Revealing a Violated Synergy in Refrigeration & AC Units & Systems.				
Region V					
Bob Utter	Back to Basics: Compressors	Innovative Thermal Solutions	Detroit	Yes	Contact Lecturer
Jim Young	Proper Design and Installation of Insulation	ITW Insulation Systems	Eastern Michigan	Yes	Travel Reimbursement
Norbert Mueller	Water as Refrigerant (R718): Advantages and Challenges, Performance Comparison with other Refrigerants, Current and Future Technological Solutions	Michigan State University	Western Michigan	Yes	Contact Lecturer

Region VI					
Doug Reindl	Industrial Refrigeration Systems	University of Wisconsin - Madison	Madison (WI)	Yes	Travel Reimbursement
	Safety Including: PSM, ASHRAE Standard 15				
Danny Halel	Supermarket Refrigeration Systems	Hussman Corp.	St. Louis	Yes	None for local travel. Travel expenses outside local area.
	Energy Savings Techniques for Commercial Refrigeration Systems				
Ron Vallort	Project Management and Design of a Refrigerated Warehouse	Vallort & Associates	Illinois		None
	The Future of Refrigeration				
	Refrigeration Load Calculations				
	Project Management and Design of a Food Processing Plant				
Dr. Pega Hrnjak	Microchannel Heat Exchangers	University of Illinois	Central Illinois	Yes	Contact Lecturer Travel Reimbursement
	Transcritical and Other CO2 Systems				
	Ultra Low Charge Ammonia Systems				
Region VII					
Region VIII					
Zahid Ayub	Heat Exchangers	Isotherm	Dallas	Yes	
	Low Charge Chillers and Condensers				
Donald Hay	The application of VFDs with Refrigeration Compressors	TECSIR	Monterrey, MX	Yes	None
	2010 Winter Olympics Heat Recovery Project				
Region IX					
Bryan Becker	Supermarket Refrigeration: Open and Doored Refrigerated Display Cases	University of Missouri – Kansas City	Kansas City	Yes	Contact Lecturer Travel Reimbursement
	Design Essentials for Refrigerated Storage Facilities				
	Cooling and Freezing Times of Foods and Thermal Properties of Foods				
Brian Fricke	Supermarket Refrigeration: Open and Doored Refrigerated Display Cases	University of Missouri – Kansas City	Kansas City	Yes	Contact Lecturer Travel Reimbursement
	Design Essentials for Refrigerated Storage Facilities				
	Cooling and Freezing Times of Foods and Thermal Properties of Foods				

Donald Fenton	An Overview of the ASHRAE 15 User's Manual	Kansas State University	Kansas City	Yes	Contact Lecturer Travel Reimbursement
Region X					
Region XI					
Bent Wiencke	Two-Phase Flow and Gravity Liquid Separators	Nestle USA	Puget Sound (Seattle, WA)	Yes	None but possibly travel cost reimbursement
	Hydraulic Shock Phenomena				
Jim Conant	Energy Management with Microprocessor Controls in Industrial Refrigeration	LOGIX	Seattle	Yes	None
	Electronic Control Systems for Industrial Refrigeration				
Region XII					
Arthur Garbarino	Ultra-low Temperature	Air Service Inc.	Gulf Stream (West Palm Beach, FL)		
	Cryogenics				
Jeff Welch	Thermosiphon System Design	Freeze-Pro Inc.	Jacksonville	Yes	None for local travel. Travel expenses outside local area.
Region XIII					
Prof. Pradeep Bansal	Cascade Refrigeration Systems	University of Auckland, NZ		Yes	\$2,000 plus travel
	Boiling Heat Transfer of CO2 at Low Temperature				
Region At Large					
Anders Lindborg	Risk Analysis for Ammonia Refrigeration	Ammonia Partnership AB	Subregion B (Sweden)	Yes	Travel Reimbursement
	Ammonia Refrigerant Spills				
Dr. Andy Pearson	Ammonia	Star Refrigeration	Subregion C (UK)	Yes	Contact Lecturer
	Carbon Dioxide				

* Blue = Industrial Refrigeration

Yellow = Commercial/Residential Refrigeration

White = Both/general



**SUBMITTAL FORM FOR A PROPOSED SPECIAL PROJECT
TO BE CONSIDERED BY SPECIAL PROJECTS SUBCOMMITTEE**

1. Submitter Submittal

Date: June 10, 2009

Refrigeration Committee

Prepared by: Doug Scott

dscott@vacomtech.com

(909) 392-6704

2. Cognizant / Sponsoring Committee(s):

REF, TC10.1, TC10.5

3. Proposed Project & Scope Overview:

This Special Project is proposed to develop a **“Guide for Sustainable Refrigerated Facilities and Systems”**.

The Guide is intended to encompass refrigerated storage spaces and associated refrigeration systems, spanning a size range from large refrigerated warehouses that commonly use built-up ammonia systems of several thousand horsepower, to walk-in boxes utilizing multiple small “split-system” refrigeration units.

“Sustainable” facilities and systems require consideration of fundamental design choices such as facility orientation, utilization of the building site and work-flow options; building design including insulation, door design and locations, infiltration management and methods to reduce internal cooling loads; cooling system design options including refrigerant choice, system configuration (two-stage, single-stage, split-systems, “rack” systems, indirect options, etc.), condenser and evaporator selections, including part-load optimization and system balance topics; control systems for energy efficiency and load management; on-site energy and resource options such as PV generation, water re-use and heat recovery; and other operational topics. All of these topics are intended to be related, as consistently as possible, with the life-cycle costs and environmental impact of owning and operating the subject facilities.

Information in the Guide will be used for design of new facilities, expansions and remodels, as well as providing guidance on improvements and operating methods that may also be applied to existing facilities.

The Guide will consist of five primary sections:

1. Facility Design and Cooling Loads
2. Refrigeration Systems and Controls
3. Energy and Performance Analysis
3. Operations and Benchmarking
4. Advanced Topics

The phase-out of HCFC-22 and the expected phase-down of HFC refrigerants provide opportunities for change to more sustainable alternatives. These are also as threats, in that less efficient systems may be used unless more efficient (and sustainable) alternatives are emphasized. The Guide will provide a consistent method to compare direct and indirect greenhouse gas (GHG) contribution, as well as provide system alternatives (e.g. low charge systems, ammonia or indirect CO₂) that reduce HFC exposure without increased energy cost.

SUBMITTAL FORM FOR A PROPOSED SPECIAL PROJECT

The fact that nearly all refrigeration systems are custom engineered and constructed of components, rather than being sold as “packages”, is a fundamental characteristic of this industry and is important concept in developing the Guide. The information provided and methods defined will be “actionable”; that is, consistent with the questions and options that are considered by designers, contractors and operators.

4. Intended Audience:

The Guide will serve designers, contractors and operators of refrigerated facilities and industrial and commercial refrigeration systems. The intent is that this Guide will be of broad interest in this sector – in addition to designers, contractors, and operators, it will also be of value to utilities, policy makers and others involved in the energy efficiency and sustainability “business”. Refrigeration systems are now evaluated as part of the efficiency potential in LEED certified projects, rather than a “pass through” process load. The phase-out of HCFCs and the phase-down of HFCs increases the search for alternatives and the realization of how differently refrigeration is accomplished in other parts of the world are expected to create a high level of interest. State and Federal efficiency regulations (new to the refrigerated warehouse industry), pressure by local jurisdictions to provide “green” content beyond codes, and corporate adoption of sustainable policies are changing the design premise from “rule of thumb” to a greater focus on energy analysis and life-cycle optimization.

5. Expected Project Deliverables:

The project deliverable will be a hardbound ASHRAE book, such as the ASHRAE GreenGuide, first published in 2003. A CD would be included with the Guide, including electronic versions of tables and spreadsheets for increased utility and flexibility.

Separate from the published Guide book and CD, a roadmap document would be completed that defines the anticipated improvements in a successive edition completed within approximately three years, along with enhancements in the electronic tools associated with the Guide. The subject improvements would coordinate with, or recommend, expected research and standards actions and maintain support for relevant components in ASHRAE’s Research Strategic Plan.

The information in the Guide would be suitable for use in an ASHRAE short course or e-Learning program, although separate course materials are not part of the Special Project deliverables.

6. Anticipated Project Timeline:

An overall project duration of 24 months is anticipated, as follows:

- June 2009: Submit to ASHRAE Special Projects Committee
- September 2009: Issue RFP for project work
- November 2009: Complete co-funding commitments
- December 2009: Award project
- December 2010: Draft Guide Document
- April 2011: Approval of Final Document
- June 2011: Publish Guide

SUBMITTAL FORM FOR A PROPOSED SPECIAL PROJECT**7. Estimated Total Project Cost:**

The estimated cost of the Guide project is \$305,000, based on approximately 1.5-2.0 man-years of work.

Additional costs not included in the above total are costs for ASHRAE project management staff, and costs for document editing, preparation and publication.

8. Cost Breakdown

Committee Travel/Meetings: \$5,000

Contractor Work: \$300,000

Other (please specify): Estimated ASHRAE staff costs and document production costs are not included.

9. Identified Co-Funding: No firm funding commitments have been obtained.

10. Source of Co-Funding:

11. Required ASHRAE Funding:

(Note: 9 = 6 - 8)

12. Additional Potential Co-Funding Sources:

(List all that apply)

Global Cold Chain Alliance (International Association of Refrigerated Warehouses): A letter of support is pending from GCCA. The GCCA may wish to include a more global perspective, potentially including Chinese translation.

International Institute of Ammonia Refrigeration (IIAR): A letter of support is pending from IIAR.

California Utilities: PG&E and SCE have active refrigeration-related programs and are interested in the Guide as a means to help address energy efficiency goals, and improve information outreach, particularly with the new Title 24 Refrigerated Warehouse code requirements. The utilities are currently operating under bridge (temporary) funding, until the 2009-2011 program budgets are approved. Direct funding through the Energy Design Resources program is possible, if the Guide can be provided as an EDR resource. In-kind funding is possible in the form of field studies and data collection, focused on benchmarking and performance measurements. The proviso on utility funding is that the Guide cannot be sold at a profit, since ratepayer funds cannot be used to “make money” for ASHRAE.

California Energy Commission: TBD

Northwest Energy Efficiency Alliance (NEEA): TBD

Wal-Mart: Funding may be available once ASHRAE has approved project.

Target: Funding may be available once ASHRAE has approved project.

SUBMITTAL FORM FOR A PROPOSED SPECIAL PROJECT**13. Proposed Committee Membership:**

The purpose (and membership) of the Special Project committee will be discussed in the February conference call. See Discussion Topics.

Chair: Kent Anderson

Vice Chair: TBD

Members and/or Associations to be represented (please list):

Prospective Members (subject to understanding how project will be managed and agreement to serve):

Kent Anderson, Incoming Chairman Refrigeration Committee, IAR President Emeritus

Don Siller, Current Chairman Refrigeration Committee, Chairman TC 10.0

Doug Scott, Member Refrigeration Committee, Chairman TC 10.1

Ron Vallort, Member Refrigeration Committee, Liaison GCCA/IARW

TC 10.5 representative (Refrigerated Distribution and Storage Facilities)

TC 10.7 representative (Commercial Food & Beverage Display & Storage Equipment)

TC 2.8 representative (Building Environmental Impacts and Sustainability)

Supporting Information for ASHRAE Special Project Submittal
“Guide for Sustainable Refrigerated Facilities and Systems”

June 10, 2009

The following additional information is in support of the project description in the ASHRAE Special Projects Submittal Form.

General Intent

1. The Guide will emphasize new information and will not be an edited compilation of information available elsewhere. For usability and consistency, certain existing ASHRAE information will be included, with the assumption that user will have access to common ASHRAE resources such as ASHRAE Handbooks.
2. The Guide will describe fundamental concepts, particularly concerning sustainability, but will assume a technically qualified audience and will provide design practitioners and operators with actionable methods and detailed design information.
3. The project committee will provide guidance on elements of the Guide that, for whatever reason, cannot realistically be addressed beyond an introductory level.
4. The Guide will utilize mini case studies and periodic “question and answer” sections where appropriate, such as emphasizing key topics and addressing departures from historical design practice.

Facility and Refrigeration System Scope and Emphasis

1. A common example of a large “refrigerated warehouse” today is a facility with 150,000 to 500,000 SF of area, 40-50 ft ceilings, with a central ammonia plant with 5-8 large screw compressors, evaporative condensers, penthouse located evaporators and a central computer control system. These facilities are a key target of this Guide and it is believed that even those being built today can be operated with dramatically less energy, even approaching net-zero energy in many instances.
2. In addition to large facilities with ammonia central plants, smaller facilities exist and are being built, in greater number. These facilities commonly use air-cooled split systems, small built-up systems or parallel (multiplex) compressor “racks”, and utilize HCFC-22 or HFC refrigerants. The Guide will include non-retail facilities such as small food and beverage distributors, food processors, etc., which often have multiple coolers and freezers totaling 5,000 to 50,000 SF, using relatively small (e.g. less than 100 HP) compressors, in various system configurations.
3. Air-cooled single compressor split systems, with electric defrost evaporators for low temperature applications, are widely utilized in small refrigerated warehouses, and are also applied with large numbers units spread over the roof of large warehouses. These systems provide low first-cost but in most cases are very expensive to operate. Efficiency ratings (or even input power) are generally not provided by equipment manufacturers. Federal and/or state efficiency standards are being considered. The relative inefficiency, coupled with the expected phase-down of HFC refrigerants, creates a need to define energy efficient and sustainable alternatives that are cost-effective.
4. The primary focus of the Guide will be refrigerated storage facilities. However, since central refrigeration plants very often serve both refrigerated spaces and process cooling loads, the Guide will

also address plant design and efficiency implications related to process loads (e.g. blast freezers, beef chill rooms and produce pre-coolers) that can range from nearly continuous fixed loads (e.g. spiral freezers) to batch loads with relatively low load factors (due to seasonal or intermittent use) or with very high transient peak loads.

5. While retail stores would not be included, the refrigeration systems topics related to parallel racks would be fully applicable to supermarket systems (parallel racks are used by almost every chain). An intended benefit of this approach to the Guide is that the advancements in technology and efficiency that may be achieved in supermarket systems (which enjoy the benefit of repetitive applications) may be a very attractive choice to many small and medium size warehouse operations, as an alternative to air cooled split-systems.
6. Analysis of system types and recommendations will be addressed in three general categories:
 - Large – built-up central plants, often ammonia with screw compressors.
 - Intermediate – engineered parallel compressor systems, with high efficiency but for smaller loads.
 - Small – “catalog” packaged condensing units.

Future Edition:

Design of dedicated process cooling loads such as spiral freezers, blast tunnels, vacuum-cooling systems, hydro-coolers, etc., will be addressed a future edition.

Sustainability Concepts

1. To bring the concept of sustainability to the design of refrigerated facilities and systems requires greatly increased attention to holistic design (addressing the interactions between various design elements and operating choices) and analysis over the life-cycle of the facility. This is a significant departure from historical practices of individual design disciplines and trades being largely separate, and of design based only on peak load.
2. The guide will include annual operating energy use as much as possible comparing design choices, rather than treating energy analysis as a separate detached effort. Energy analysis is an integral component of sustainable design.
3. The USGBC LEED rating system will be addressed, with a detailed explanation of how to maximize performance in areas most relevant to refrigerated facilities. A case study for a LEED certified refrigerated warehouse will be included. Since most large refrigeration plants utilize evaporative condensers and consume large quantities of water, water efficiency will be included.
4. HFC refrigerants are High-global warming potential (GWP) greenhouse gases (GHG), with a direct contribution to global warming, in addition to that caused by energy use. The Guide will include analysis methods allowing comparison of HFC systems (with both a direct effect due to leakage rates and energy use) with alternative non-HFC systems, in terms of overall GHG impact.

Facility Design and Design Process

1. The Guide will include a general background in sustainability and a theory-of-design section that addresses the mind-set of the designer and owner. Using an example project, the involvement and responsibilities of the owner and the various project participants will be explained.
2. The design of the building structure will include building orientation, thermal envelop, coordination of spaces at varying temperatures and dock areas, as well as material handling and racking choices that impact on energy efficiency. A case study example will be included to compare a compact high-rise freezer with a conventional low-rise freezer using normal aisles and material handling equipment, in terms of energy, construction materials and capital cost.
3. Lighting systems, lighting controls and skylights in dry storage areas will be addressed and evaluated.
4. The Guide will explain how to evaluate and coordinate design loads vs. equipment size, with respect to allowing for down-time, serviceability and future growth, while still maintaining efficient operation over the life of the facility. For example, sizing vessels and mains for expansion without necessarily sizing all components at that capacity; compressor capacity for reliability (extra capacity or swing compressors) as distinct from expected operating capacity; air units (if properly sized and applied) don't necessarily need to be oversized for the same reason as other components.

Cooling Loads

1. Cooling load calculations will be covered comprehensively, with incorporation of relevant recent ASHRAE research. A detailed explanation will be included to explain different calculation methods and compare the differences between the total of non-coincident loads (typical current practice) and the peak total load that reaches equipment (addressing coincident peak and the effects of thermal mass and time delays).
2. The topic of safety factor and equipment operating hours will be addressed, including methods and examples to increase clarity regarding safety factor to accommodate additional load or unknowns vs. sizing or run-time considerations driven by the need to defrost or potential equipment outages. For example, it is common to see 18-hour operation recommended for air-cooled split-systems, in addition to an allowance for safety factor. The Guide will suggest methods with greater precision and relevance to actual load requirements and system characteristics.
3. Calculation of infiltration loads will receive extensive treatment, including the effect of multiple openings (i.e. on different walls) coupled with wind-driven dynamic pressure, with examples of how different building configurations can reduce annual energy use.
4. The Guide will address defrost loads, including development of defrost efficiency metrics and examples of the impact of defrost control options on annual energy usage – since conventional defrost controls are set for the “worst case” condition, with excessive defrosting during most of the year. Both hot gas and electric defrost will be evaluated.

Air Circulation and Air Unit Design

1. Air circulation and air unit design is a topic requiring significant new effort. The Guide will explain new concepts and provide methods and metrics for evaluation of air distribution, by decoupling the quantity of air circulated, the effectiveness of air-distribution and the associated power. Recommendations will be provided for explicit selection of air units based on two parameters: required airflow and cooling capacity; compared with the common practice of selecting for cooling capacity and allowing airflow to be a consequence of the closest cooling capacity (potentially with excess or sub-optimal airflow).

2. The use of penthouses and will be evaluated, in terms of increased energy vs. building construction cost and other considerations, along with potential design improvements to improve energy efficiency of penthouse-located air units.

Future Edition:

A future edition may address incorporation of research concerning advanced methods for air requirements for circulation vs. coil capacity (which becomes more important as loads are reduced), and potentially providing different circulation rates for the building load and the evaporator coil.

Refrigeration Systems

1. Refrigeration system design in the guide will emphasize mass-flow design principles instead of design based on cooling capacity, providing greater design accuracy, particularly with staged systems and systems incorporating advanced efficiency features. This method will include the effect of return gas temperature (RGT) on system performance and on rated compressor performance, with distinct examples for industrial and commercial compressors. In the latter instance, the rating basis of 65°F return gas temperature (all assumed to be productive cooling) is an especially significant cause for error that can be addressed and result in more accurate sizing and more efficient system design.
2. The guide will provide an explanation and examples of compressor and heat rejection design to optimize average conditions, rather than only at peak design, including condenser topics, such as system effects with multiple condensers and explanation of condenser performance outside the region for correction factors provided in condenser catalogs.
3. Specific efficiency metrics will be provided for condensers and air units, which can be adopted from California efficiency program base case standards (and now entering LEED baselines), but have not been used in general practice and require explanation and examples.
4. The impact of hot gas defrost on the refrigeration system will be evaluated in detail, including recommendations for efficient piping, controls and operations for common system configurations.
5. Example system configurations using natural refrigerants and low charge designs with secondary loops will be shown as alternatives to conventional HFC systems and HCFC-22 systems (which have a significant existing footprint in large industrial applications). A key objective is to demonstrate options that are energy efficient, such as ammonia and CO₂ phase-change secondary as an option to HFC and glycol for a central plant system that would formerly have used recirculated HCFC-22, or a low charge HFC commercial system with glycol or CO₂ secondary fluid, including a comparison of energy usage.

Controls

1. The Guide will examine energy efficient control strategies including floating head pressure (various methods including variable speed fan control), variable speed air unit fan control, suction pressure automation, variable speed compressor control, subcooling and flash cooling methods, heat recovery, lighting control. Examples will be provided, including calculation of annual savings.
2. Methods for optimizing balance between system components will be described, with examples provided for explanation of concepts. System balance and control topics are generally applicable to both new and existing facilities, and will be described accordingly.

Energy and Performance Analysis

1. Analysis of energy usage and thus system performance at part-load and off-design conditions is a fundamental requirement of sustainable design and operation. The Guide will include an explanation of commonly available energy analysis tools that can be used for refrigerated warehouses and a description of the typical inputs, variables, equipment definitions, control strategies, etc. that can be evaluated. Example reports and results summaries will be provided highlighting the information available from the analysis tools. Additional methodologies and examples of calculations for facility life-cycle cost and carbon footprint will be included.

Future Edition:

A future edition may include enhanced simulation tool examples and incorporation of “tool kits” developed through other research.

Operations and Benchmarking

1. Information will be incorporated on the general concept of benchmarking; methods applied to refrigeration systems or other sorts of built-up end-use systems, and how ASHRAE and other organizations have approached benchmarking in HVAC applications. The first edition of the Guide will provide strong background, concept and guidance in benchmarking of refrigerated facilities and systems but will not include the study scope necessary to establish benchmarks or best practice values.
2. Benchmarking methods will be developed and defined to address facility loads and system efficiency as two concepts, which can be utilized separately or can be combined. That is, the benchmarking methodology will include a loads metric (e.g. ton-hours as a function of certain building and operating parameters) and a separate system efficiency metric (e.g. kWh per ton-hours) with normalization and application methods to suit the nature and use of a particular facility and basic system type.
3. Energy efficiency metrics can be applied at a high level or they can be employed with greater accuracy at an end-use or system level, as shown in these examples:
 - a. Energy usage per unit of size or throughput (i.e. vs. like facility)
 - b. High level system efficiency in engineering measures (e.g. kWh/Ton-Hr)
 - c. Effectiveness indicators (e.g. weighted average part-load ratio)
 - d. Specific end use intensity measures (e.g. design lighting W/SF and period kWh/SF)

Future Edition:

A future edition may include additional benchmarking content resulting from separate research, and potential incorporation of work performed under California PIER projects (i.e. study completed in 2008 that evaluated 42 refrigerated warehouses and included development of a web-based benchmarking tool), with the assistance of IARW and its members, and/or with field performance studies undertaken by California utilities. The deliverable for a future edition could include a spreadsheet or web based tool

allowing entry of utility and system information with reporting of key metrics vs. normalized peer facilities.

Advanced Topics

Codes and Standards:

1. The Guide will, where applicable, anticipate certain performance metrics that will become relevant in terms of component and system efficiencies, such as condenser specific efficiency, evaporator coil power per unit of capacity, and compressor part load performance. Until now, many of these metrics are unpublished or utilize inconsistent rating assumptions. Providing example calculations for component specific performance and methods for system performance calculations will serve, at minimum, to demonstrate the need for associated testing and published information from manufacturers.
2. The Guide will, in general terms but not necessarily specifics, address the facility, equipment design, performance and control requirements contained in the California Title 24 Code for Refrigerated Warehouses as well as the current Federal Standard for Walk-in Freezers and Coolers.

TC 10.5 has a proposed effort to investigate a standard for design and construction of refrigerated storage and distribution facilities.

**Technology Council: Strategic Planning Input Process
May 24, 2009**

Action item from Chicago, January 2009

9. Persily Work with Sheila Hayter, Bill Murphy, David Knebel and Tom Watson on Strategic Planning process for Council.

Background

In addition to having periodic planning meetings for the Council and “reacting” to assignments from Strategic Plans developed at the BOD level, it is important for the Council to have a mechanism for strategic issues to move up from the Committees and Councils into the BOD planning processes. There may be a number of such issues that ASHRAE volunteers “in the trenches” may be aware of and more familiar with than members of the BOD. Example of such issues may include:

- New HVAC&R technologies that may have a big impact on the industry or the membership.
- New organizations being developed that present opportunities or potential challenges to ASHRAE.
- New activities being pursued by an outside organization that presents an opportunity or potential challenge to ASHRAE.
- State, local or international government activities that present opportunities or potential challenges to ASHRAE.

The goal of this effort is to provide more bottom-up input into BOD planning efforts, which ideally will result in more relevance of these BOD efforts to the Committees and Councils and more buy-in by these bodies. It should also help the BOD obtain information, and take action, in a more timely manner. As usual, after we succeed in Tech Council, we can share with the others.

Mechanism

Standing committees would set aside time, perhaps 15 to 20 min, at each meeting to collect such issues. They would be included in their report to Tech Council (under the heading, Strategic Issues for Council Consideration), in each case with the name of a contact person who can provide background as the issue works its way up through the ASHRAE leadership.

Technology Council would then discuss these issues at their meeting and perhaps add additional issues with which the BOD may need to be aware. The discussion at the Council level should take no more than 30 min. The Council list will be included in its report to the BOD, under the heading Strategic Issues for Council Consideration. These issues would be included in the written report to the BOD presented at each meeting, rather than “buried” in the Information Items report to the BOD.

In between meetings, Committee members should be encouraged to inform their Committee chair of any such issue that may merit attention at a higher level in the Society. The committee chair will forward these reports to the Council chair as they arise, who will then inform ExCom as needed. Similarly, Council members will inform the Council chair of any such issues with which they become aware, and the chair will communicate the issue on to ExCom as appropriate.