



(DRAFT)

**REFRIGERATION COMMITTEE (REF)
MINUTES**

*Winter Meeting
January 30th, 2011*

These minutes have not been approved and are not the official, approved record until approved by this committee.

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**PRINCIPAL MOTIONS FROM WINTER MEETING
LAS VEGAS JANUARY 30th, 2011**

No.	Page No.	Motion
1	1	The minutes of the June 27 th , 2010 meeting in Albuquerque be approved.
2	2	Changes to the REF MOP (Appendix 3) and REF reference manual (Appendix 4) be approved as shown.
3	5	REF recommends that a seminar program for Montreal related to Advances and Trends in Natural Refrigerants and Technologies be submitted.
4	6	REF recommends to Honors and Awards Committee that they award Mark Cambria the Milton Garland Award for the Price Chopper Supermarket project.
5	7	REF recommends to CEC that ASHRAE co-sponsor with NIST a 2.5 day conference on refrigerants in late 2012 or early 2013 related to low GWP refrigerants.
6	11	REF recommends to Technology Council to reaffirm the existing Natural Refrigerants PD.
7	11	REF recommends to Technology Council to reaffirm the existing Ozone Depleting Substances PD
8	11	REF recommends to Technology Council to disband the Ozone Depleting Substances PD Committee tasked with revising the ODS PD.

**ACTION ITEMS FROM WINTER MEETING
LAS VEGAS JANUARY 30th 2011**

No.	Page No.	RESPONSIBILITY	SUMMARY	STATUS
1	2	Staff	Incorporate changes to Milt Garland & Comfort Cooling Awards, MOP, and Reference Manual. Post current versions on REF page of ASHRAE website	
2	2	Staff	Send form for nominating new REF committee members to current REF members.	
3	4	Gage	Send USGBC contact who'd indicated interest in RTAR-1634 to Scott and Anderson	
4	4	Anderson, Pearson, Scott	Continue to pursue opportunities (USGBC, UNEP, CEC, others) for co-funding of RTAR 1634	
5	4	Staff	Send contact information of those that volunteered to help develop WS 1634 to Doug Scott	
6	4	Gage, Scott, Siller, Anderson	Consider drafting a strategic goal related to refrigeration to incorporate into ASHRAE Strategic Plan	
7	4	Siller, Scott, Manole	Participate in CTTC/REF ad hoc committee	
8	5	Kazachki	Finalize and submit seminar program for Montreal on "advances and trends in natural refrigerants and technologies".	
9	6	Gage, Briley Committee	Write Insights article on this year's winner of George Briley Award	Done
10	6	Hinde, Scott, Anderson, Reindl (or Dettmers or Jekel), Manole, Royal	Develop TPS for Guideline on Commissioning of Refrigeration Systems	

**ACTION ITEMS FROM ANNUAL MEETING
ALBUQUERQUE JUNE 27th 2010**

No.	Page No.	RESPONSIBILITY	SUMMARY	STATUS
1	2	REF	Review ROB and MOP with regards to REF's stated scope. Is the scope too narrow, broad, or lacking in areas that should be addressed to make a Societal impact.	Complete
2	4	REF	Discuss and establish criteria for scope of Briley Award	Complete
3	4	Anderson	Send a letter and copy of Journal article to Briley to update him on George Briley award.	Ongoing
4	5	REF	Suggest other organizations outside US that could appoint a consultant to REF.	Complete
5	6	REF	Review draft Title, Purpose, and Scope of proposed commissioning guideline for development.	New action item assigned (LV-10)
6	6	Kazachki	Ask speakers of recent/future REF sponsored programs in their PowerPoint presentations can be posted on REF webpage.	Complete
7	6	REF	Suggest speakers to Kazachki for Las Vegas program on natural and low GWP refrigerants.	Complete
8	7	REF	Review MBO list for assignments	Complete

LIST OF APPENDICES

Appendix 1:	REF Agenda for Las Vegas
Appendix 2:	TC Liaison report summary
Appendix 3:	MOP changes
Appendix 4:	Reference Manual changes
Appendix 5:	Werkema Refrigerant Issues presentation
Appendix 6:	RTAR 1634
Appendix 7:	CTTC report
Appendix 8:	2010-2011 MBO's
Appendix 9:	Draft Title, Purpose, Scope (TPS) Commissioning Guideline
Appendix 10:	Brainstorming Presentation

LIST OF ACRONYMS

ABQ	-	Albuquerque
AEDG	-	Advanced Energy Design Guide
AMORTS	-	Assistant Manager of Research and Technical Services
AASA	-	ASHRAE Associate Society Alliance
BOD	-	Board of Directors
CEC	-	California Energy Commission
CEC	-	Conferences and Exposition Committee
CFC	-	Chlorofluorocarbon
CNV	-	Chair Not Voting
CV	-	Chair Voting
CTTC	-	Chapter Technology Transfer Committee
DOE	-	Department of Energy
EPA	-	Environmental Protection Agency
EUI	-	Energy Usage Index
EX-O	-	Ex-Officio
GCCA	-	Global Cold Chain Alliance
GWP	-	Global Warming Potential
HCFC	-	Hydrochlorofluorocarbon
HFC	-	Hydrofluorocarbon
HVAC	-	Heating, Ventilation, and Air Conditioning
IAQ	-	Indoor Air Quality
IARW	-	International Association of Refrigerated Warehouses
IIAR	-	International Institute of Ammonia Refrigeration
IIR	-	International Institute of Refrigeration
LEED	-	Leadership in Energy and Environmental Design
MOP	-	Manual of Procedures
MBO	-	Management by Objective
NIST	-	National Institute for Technology and Standards
ODS	-	Ozone Depleting Substances
PAOE	-	Presidential Award of Excellence
PD	-	Position Document
RAC	-	Research Administration Committee
REF	-	Refrigeration Committee
RETA	-	Refrigerating Engineers and Technicians Association
RSES	-	Refrigeration Services and Engineering Society
RTAR	-	Research Topic Acceptance Request
RVC	-	Regional Vice Chair
SPC	-	Standard Project Committee
TAC	-	Technical Activities Committee
TC	-	Technical Committee
UNEP	-	United Nations Environment Program
USGBC	-	United States Green Building Council
USNC	-	United States National Committee
WS	-	Work Statement

MINUTES
REFRIGERATION (REF) COMMITTEE
JANUARY 30th, 2011
LAS VEGAS, NV

MEMBERS PRESENT:

Cynthia Gage, *Chair*
Doug Scott, *Vice Chair*
Pradeep Bansal
Marc Chasserot
Ted Hansen
Todd Jekel
Georgi Kazachki
Cesar Lim
Dan Manole
Norbert Mueller
Andy Pearson
Kent Anderson, *Consultant*
Don Siller, *Consultant*
Bill Bahnfleth, *Coord. Officer*
Samir Traboulsi, *BOD Ex-O*

GUESTS:

Roberto Aguilar
Bruce Badger
JoJo Castro
Hugh Crowther
Dan Dettmers
Tim Dwyer
Steven Freidman
Bruce Griffith
David Hinde
Mo Hosni
Glenn Hourihan
Corey Lassiter
Jim McClennan
Ross Montgomery
Doug Reindl
Richard Royal
Chris Seeton
Eric Smith
Paul Sullivan
Ron Vallort
Tom Werkema
Bill Williams

MEMBERS NOT PRESENT:

Donald Hay

ASHRAE STAFF:

Tony Giometti
Steve Hammerling, *AMORTS*

1.0 CALL TO ORDER AND ROLL CALL

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

2.0 REVIEW OF AGENDA

The agenda distributed prior to the meeting (**Appendix 1**) was reviewed. No changes were made but the order may be switched as time and schedules dictate.

3.0 APPROVAL OF MINUTES

It was moved (PB) and seconded (CL) that,

1. The minutes of the June 27th, 2010 meeting in Albuquerque be approved.

MOTION 1 PASSED: 8-0-0 CNV

4.0 CHAIR REPORT

4.1 Motions from Last Meeting

Three motions from the REF meeting in ABQ required approval from a higher committee:

- Reaffirmation of *Ammonia as a Refrigerant* PD with minor, editorial corrections – This motion was approved by Technology Council and the BOD. The updated PD was posted at www.ashrae.org/aboutus/page/335.
- Changes to the Milt Garland & Comfort Cooling Awards – This motion was approved by Technology Council and sent to Honors & Awards committee. These procedures will be moved to REF Reference Manual so changes in the future will not need approval from higher committees.
- Addition of Consultants to REF ROB – This motion passed Technology Council but was withdrawn before being made to the BOD. It was withdrawn as the number of consultants wasn't listed and there are other rules in the ROB for adding consultants. This topic will be readdressed in Brainstorming on agenda.

4.2 New Information Items for REF

- TC Liaison Report
Staff worked with Gage to update TC Liaison report summary (**Appendix 2**). Looking for comments. Topic to be discussed in Brainstorming as well.
- Refrigerant Management Ad Hoc Committee
TC 3.8 was asked to lead an ad hoc committee develop a refrigerant management plan. The stated scope is:
Develop a concept for a national refrigerant management program and specify actions which ASHRAE can take to support development of the program. The Scope is limited to all CFC, HCFC and HFC refrigerants.
Lim is a volunteer on this committee. Their first meeting is tomorrow morning.
- *Refrigerants and the Built Environment* PD meeting in LV
A committee to develop this PD will be chaired by Bill Walter and is meeting for first face to face in Las Vegas. Gage and others from REF are on committee. REF is co-cognizant with TC 3.1.
- DOE Roadmap for Next Generation, Low-GWP Refrigerants – presentation Tuesday morning
The goal is to update attendees on efforts to date and to develop a roadmap for the DOE on a research agenda. The presenters are looking for input from audience members so REF members are encouraged to participate.
- REF MOP and Reference Manual
The Operations Subcommittee of Technology Council initiated an effort to update Committee MOP's and reference manuals. Tech Council effort to redo MOP/Ref. Manuals. These changes were distributed prior to the meeting for the committee to review.

It was moved (CL) and seconded (GK) that,

2. Changes to the REF MOP (**Appendix 3**) and REF reference manual (**Appendix 4**) be approved as shown.

MOTION 2 PASSED: 8-0-0 CNV

Action Item 1 – Staff – Incorporate changes to Milt Garland & Comfort Cooling Awards, MOP, and Reference Manual. Post current versions on REF page of ASHRAE website

- Request for Liaison to RAC
Gage discussed RAC liaison to REF with RAC chair Jim Braun. Section 10 Research Liaison Roberto Aguilar was appointed as RAC liaison to REF to help with REF research issues.

4.3 Membership Update

Gage introduced new member to REF, Mr. Teddy Hansen with KPI Engineering. Hansen replaces Stephen Friedman on the committee.

Gage asked REF for suggestions on who could participate on REF next year. See www.ashrae.org/members/page/275 to submit nominations.

Action Item 2 – Staff – Send form for nominating new REF committee members to current REF members.

4.4 Other

Werkema delivered a presentation (**Appendix 5**) to REF titled Refrigeration Committee Issue Update. Highlighted key points:

- No climate bill in US as Waxman/Markey House bill ended with 2010
- Green Climate fund established. \$100B by 2020
- Technology Executive Committee is all political committee
- Kyoto Protocol ends 2012 and the future beyond that is uncertain
- Cap and trade legislation effectively dead
- Oct. 2010 Senate Draft legislation proposes phase-out schedule
- Most activity is within EPA

REF thanked Werkema for presentation.

5.0 VICE CHAIR REPORT

5.1 Fiscal Report

Scott noted he'd attend fiscal subcommittee meeting tomorrow. There is a small static budget for REF primarily to cover committee travel and staff. Scott noted the Refrigerants Conference may eventually require fiscal support.

Gage noted there should be adequate budget for web/phone conferencing that could increase if there are additional REF members, consultants, liaisons, etc. that result from brainstorming discussions.

Anderson noted the DOE is paying US dues to the USNC/IIR. ASHRAE has decided to stop the secretariat service. DOE may not continue to pay dues so REF may wish to consider overseeing and requesting a budget to do if appropriate. Suggested leaving as a priority level 3 for now (wait and see).

5.2 1634-RTAR

REF submitted RTAR-1634, Guide for Sustainable Refrigerated Facilities and Refrigeration Systems, (**Appendix 6**) to the Research Administration Committee (RAC). RAC approved this RTAR at their Winter Meeting on Saturday with comments to be considered in the development of the Work Statement. In brief, RAC noted that REF should obtain co-funding, provide some clarification on tasks needed (what info is available already, what needs to be developed), and include a specific list of deliverables.

The estimated budget for the project was \$300k. REF is also working to secure significant co-funding on the project. The United Nations Environment Program

(UNEP) and United States Green Building Council (USGBC) have been identified as possible sources of co-funding. Pearson noted that UNEP may augment funding but their focus is primarily for projects in developing regions. Anderson and Pearson will help develop the proposal to UNEP in next couple weeks.

Jekel, Pearson, Castro and Hinde agreed to help Anderson and Scott to develop Work Statement. Aguilar will help as liaison to RAC.

Action Item 3 – Gage – Send USGBC contact who'd indicated interest in RTAR-1634 to Scott and Anderson

Action Item 4 – Anderson, Pearson, Scott – Continue to pursue opportunities (USGBC, UNEP, CEC, others) for co-funding of RTAR 1634

Action Item 5 – Staff – Send contact information of those that volunteered to help develop WS 1634 to Doug Scott

6.0 OTHER REPORTS

6.1 BOD Ex-Officio / Coordinating Officer

BOD Ex-O Traboulsi noted he would take issues heard here and specifically those in Brainstorming issue discussion to Technology Council. He as well as Crowther, Montgomery and Bahnfleth on the Council have heard the issues.

Traboulsi noted having a productive committee review with REF leadership and will report to BOD.

Traboulsi commented on the ASHRAE Strategic Planning noting there are not any specifically refrigeration strategies in the plan, perhaps due to lack of many refrigeration experts in leadership. The plan is on continuous maintenance so REF may wish to consider suggesting some refrigeration strategies or goals for the plan.

Action Item 6 – REF – Consider drafting a strategic goal related to refrigeration to incorporate into ASHRAE Strategic Plan

Coordinating Office Bahnfleth thanked REF for their work highlighting activities to promote the R in ASHRAE including PDs in progress, refrigerant management ad hoc, scope and committee discussions, etc.

Gage thanked Bahnfleth and Technology Council for MBOs and efforts to help REF.

6.2 CTTC Liaison

Siller attended CTTC meetings as REF liaison to committee. The REF report to CTTC is included with these minutes as **Appendix 7** and will be included on the CTTC website. CTTC formed an ad hoc with REF representatives to determine resources and implement programs to enhance chapter activities in refrigeration. (awards, programs, standards, everything else). The ad hoc could help with a grass roots survey in refrigeration.

Action Item 7 – Siller, Scott, Manole – Participate in CTTC/REF ad hoc committee.

6.3 Consultant Report

Anderson noted that issues he's been working on including the ASHRAE Refrigerants Conference, RTAR-1634, and Commissioning Guideline are discussed elsewhere on the agenda.

6.4 Programs

Kazachki noted that REF co-sponsored Seminar 22, *Vapor-Compression Cycles, Systems and Components with Natural Refrigerants* and 40, *Advancing Energy Efficiency in Commercial Refrigeration* for Las Vegas. Kazachki thanked all who helped in presentation or review of programs. Kazachki noted that REF was added to the drop down box on the program submission form so they can now be selected as a program sponsor.

Gage noted that these presentations could be posted on the REF page of the ASHRAE website if presenters grant permission.

Several other refrigeration related programs in Las Vegas were in a Refrigeration Update track and are listed below:

- Seminar 3: Low GWP Refrigerant Options for Unitary Equipment
- Seminar 6: Building a Sustainable Future by Removing Barriers for Low GWP Refrigerants
- Seminar 11: Cradle to Grave Refrigerant Management
- Forum 4: The Technical Basis of the Federal Walk In Efficiency Standard
- Conference Paper Session 7: Heat Transfer, Heat Exchanger Analysis and High Efficiency Compressor
- Conference Paper Session 14: Absorption and Alternate Refrigeration Technologies

REF discussed options for future programs including a program on new refrigerants. Topics included direct effects of leakage vs. energy performance, natural refrigerants, recent advances in technology for low GWP refrigerants, new A2L designation, hydrocarbons, refrigeration experiences in Canada, CO2 heat pumps, market developments, and global warming.

It was moved (NM) and seconded (CL) that,
3. REF recommends that a seminar program for Montreal related to Advances and Trends in Natural Refrigerants and Technologies.

MOTION 3 PASSED: 9-0-0, CNV

BACKGROUND: Speakers to be developed and submitted at a later date.

Action Item 8 – Kazachki –finalize and submit program for Montreal related to Advances and Trends in Natural Refrigerants and Technologies.

Anderson noted that there will be a refrigeration track at the next Winter meeting and then in San Antonio. Wade Conlan is on the committee as well and is chair of the refrigeration track for Chicago. Anderson and Dan Dettmers will be helping Conlan in that role.

6.5 Other

Vallort reported as liaison to GCCA. He reported that the GCCA was working with the USGBC for LEED criteria for processing plant and refrigerated warehouses. Due to interaction, USGBC changed their mind on treating ventilation of refrigerated spaces as a high-occupancy IAQ issue. Scott noted many refrigerated buildings have gotten LEED points but due to lack of such guidance, designers must define separate baseline for each project.

Scott commented on the federal requirements for walk in coolers. Forum 4 at this meeting was related to subject. He reported that under the federal standard walk-ins less than 3000ft² will soon fall under federal standard. ASHRAE was not involved in the initial development

but TC's 10.7 and/or 10.5 can be aware or perhaps participate. Scott raised the topic at Section 10 breakfast but more discussion and action is needed.

7.0 BRILEY AWARD PRESENTATION

The 3rd annual George C. Briley Award for the best refrigeration-related article published in the ASHRAE Journal was presented to Richard Royal at the Refrigeration Committee meeting for his article titled "*Heat Recovery in Retail Refrigeration*" published in the February 2010 (Vol. 52 (2)) edition of the ASHRAE Journal.

Action Item 9 – Gage/Briley Committee – Write Insights article on this year's winner of George Briley Award.

8.0 2010-2011 MBOS

A status report on the 2010-2011 Society Year's Management by Objectives (MBO) will be reported to Technology Council and is included with these minutes as **Appendix 8**.

9.0 UNFINISHED BUSINESS

9.1 Briley Award Criteria

Gage noted that changes to the procedure and criteria were incorporated earlier in the Reference Manual approvals. Changes included the presentation date and an updated definition of the desired scope in Eligibility. See **Appendix 4** for detailed changes.

9.2 Milt Garland Award

There was discussion related to the nominations received for the Milton Garland Award.

It was moved (NM) and seconded (PB) that,

4. REF recommends to Honors and Awards Committee that they award Mark Cambria the Milton Garland Award for the Price Chopper Supermarket project.

MOTION 4 PASSED: 9-0-0, CNV

EDITOR'S NOTE: This recommendation was later changed to give the award to John Bittner as he was identified as the appropriate lead project designer. A letter ballot recommendation was sent to Honors and Awards Committee for their consideration and was approved.

9.3 Comfort Cooling Award

No nominations for the REF Comfort Cooling Award were received.

9.4 Commissioning Guideline

REF discussed the possibility of an ASHRAE Commissioning Guideline for refrigeration systems. REF affirmed the need for such a document so Scott requested volunteers to author a draft Title, Purpose, and Scope. A draft (**Appendix 9**) was discussed at the ABQ meeting.

Action Item 10 - Hinde, Scott, Anderson, Reindl (or Dettmers or Jekel), Manole, Royal - Develop TPS for Guideline on Commissioning of Refrigeration Systems

9.5 Refrigerants Conference

Anderson summarized efforts to date to organize an ASHRAE/NIST conference on refrigerants (new generation of low GWP refrigerants) in next 12-18 months. NIST and ASHRAE did three of these conferences in the late '80's and 90's.

The conference would need to be scheduled to avoid the IIAR conference, ASHRAE Annual meeting, Purdue conferences, and Holland conference as well. Early fall 2012 or spring 2013 might work best to avoid conflicts.

CEC member Mo Hosni addressed the committee. He noted a subcommittee of CEC on specialty conferences can help do market studies, scout timing and locations of specialty conference. This subcommittee is now working on a Spring 2012 NZEB conference. Hosni noted his subcommittee is here for REF to assist in any planning and is a resource if needed or desired.

It was moved (PB) and seconded (CL) that,

5. REF recommends to CEC that ASHRAE cosponsor with NIST a 2.5 day conference on refrigerants in late 2012 or early 2013 related to the new generation of low GWP refrigerants.

MOTION 5 PASSED: 9-0-0, CNV

Action Item 10 – Bansal, Mueller, Lim, Scott, Anderson, others - Volunteer to help organize a refrigerants conference.

10.0 BRAINSTORMING

Incoming Technology Council Chair Ross Montgomery lead a REF Brainstorming session. Technology Council members Crowther and Traboulsi participated as well. Montgomery used presentation (**Appendix 10**) to guide the discussion.

Stated goals of meeting:

1. Review the REF Committee's activities as outlined in the MOP, and enhance the MOP with new ideas and duties.
2. Point out positive areas that REF already contributes and has to offer ASHRAE members
3. Identify ways to make the support of Refrigeration by ASHRAE more effective.

Quick review of what REF is doing:

- Handbook coordination
- Awards
- Refrigeration Management Ad Hoc
- PD's
- Section 10 programs

The scope of REF notes that *the Refrigeration Committee shall encourage advancement of refrigeration technology and its application*. What is "refrigeration" and "refrigeration technology"? REF can develop a formal definition or scope to communicate to Tech Council and Membership. What do these terms mean?

REF responded "refrigeration technology" can be broadened from current practice or activities. This should include components, whole systems, new and existing refrigerants, all applications (heat pumps).

General comments from the discussion included:

- refrigerant technology should include heat pump applications
- should include component system and whole system
- 3 chapters in refrigerants in Fundamentals volume should be in Refrigeration volume of handbook.
- hoping scope of committee can broaden

- Should include existing and new refrigerants.
- Anderson viewed refrigeration as key to all ASHRAE processes, of interest to all HVAC engineers. The challenge is getting members basic refrigeration info, Royal noted a key job task his employer was to teach refrigeration to his mechanical HVAC engineers
- Scope should include TCs REF interacts with now and TCs REF should be interacting with?
- Should include refrigeration process
- Should include refrigeration technologies
- Should include application and use of refrigerants, and fundamentals
- Hourihan asked if broadening the REF scope would make things more difficult given that REF currently focuses on applications and less on fundamentals.
- Can policy be included in the scope?

Montgomery brought up Item A1.1 from the REF MOP:

The Committee shall promote refrigeration education and development at the chapter, regional and international levels of the Society.

Presentation slide refers to various developmental, educational and international activities in ASHRAE and characterizes the number of refrigeration related activities.

What more can be done to meet these needs?

Responses and comments from the discussion included:

- A1.1 refers to professional development, not technology research and development
- Could ASHRAE promote **some sort of refrigeration certification**? The past proposal was deemed too broad or that there was not enough of a market.
- Refrigeration commissioning guide could serve as basis for certification program. Current Cx certification is much broader
- Castro noted that in region 13 there are only 2 refrigeration chairs. This suggests that interest in subject is low. Therefore, **promotion of REF and refrigeration** should be primary interest with certification a secondary interest.
- **Refrigerant labeling**? Beyond standard 34. Labeling products.
- LEED certification and related ASHRAE design guidance information on refrigeration is not robust. **Can we enhance ASHRAE materials for LEED program?**
- Need to inform membership on how and why to improve refrigeration side of their operations
- PAOE points are an opportunity to promote refrigeration activity at chapter level. There are some points for awards, refrigeration meetings currently but **REF should focus recommendations to committee that recommends PAOE** points to President.
- Distinguished Lecturer list is short on refrigeration speakers. **REF can help to nominate speakers or volunteer themselves.**
- Gage noted REF should have a **task to summarize things offered through** programs, RP, and products. Should include ad hoc committees, PDs, conferences, broader issues, etc.
- Anderson noted CTTC is key committee in getting word out on what we do offer related to refrigeration.

Discussion on A1.2 from the REF MOP:

The Committee shall recommend more projects and programs related to refrigeration.

- Can the **wording of A1.2 be changed** to better capture what the committee does?
- A1.2 should include cross TC and efforts outside current TC structure to coordinate, motivate, and advocate refrigeration.
- Are there new projects/products and programs that REF should develop?
- Are there existing projects, products and programs REF should be a part of (AEDGs, 90.1, 189.1, 100, etc.)?

Discussion on A1.3 from the REF MOP:

The Committee shall assist and maintain liaison with ASHRAE chapters and other general committees within ASHRAE regarding refrigeration subjects.

- REF has liaison role with CTTC now. Should there be liaisons or consultants with RAC, CEC, Handbook, TAC, Members Council, ad hoc committees, Standards, Special Projects, building performance metrics, AEDGs, EUI group, etc?
- What groups should REF be working with to assure refrigeration issues are adequately addressed?
- What should REF members' roles be? Should they be specific to these liaison or consulting tasks?
- Are more REF members (voting or nonvoting) needed to perform these tasks?
- Recent change to include liaison with ASHRAE chapters.
- International organizations too? REF members asked to participate with other associations and develop activities to coordinate ASHRAE and those groups.
- Crowther noted much work related to energy and EUI – refrigeration needs to be represented in these ad hocs.
- REF should request to participate and be involved in these other efforts (listed above).

Discussion on A1.4 from the REF MOP:

The Committee shall assist and advise the TCs and TGs with refrigeration-oriented goals in recruiting qualified members and carrying out their tasks.

- Is this too limiting?
- This be broadened to SPC's (15, 34, 90.1, 100, 189.1, beyond?)
- This should include groups coordinating technical efforts listed above too (ad hoc committees, EUI, Special projects, building performance metrics, AEDGs)
- Discussion on how TCs can get information to REF. Sluga's liaison worksheet was a tool to help do this. This spreadsheet is being updated. Siller noted TC chairs in Section 10 fill out TC activity sheet for TAC and agreed to share within section. Perhaps REF can get these as well. Staff can help collect these from TCs and send to REF.
- Anderson noted the best use of liaison report would be to help TCs solve issues. Also, REF should determine how we can best get chapters this information effectively.
- Gage – this would be good tool to show chapters the various refrigeration activities.

Discussion on A1.5 from the REF MOP:

The Committee shall maintain contact and encourage technology transfer liaison with ASHRAE chapters, associated other refrigeration oriented international and technical societies and cooperating technical societies regarding refrigeration subjects.

- The Liaison role with chapters was moved to A1.3 but the discussion took place here.
- 14 regions. 5 have REF RVC's but 2 are now vacant.
- Should regional RVCs serve on REF as done in past?
- Siller is liaison to CTTC and asks what can be done to increase chapter interest in refrigeration? CTTC formed an ad hoc with REF representatives to determine resources and implement programs to enhance chapter activities in refrigeration. (awards, programs, standards, everything). Possible grass roots survey in refrigeration. Siller, Scott, Manole agreed to participate in ad hoc
- Can REF do a Society level award for best refrigeration related chapter?
- Should REF expand role with sister societies (IIR, IAR).
- Can reps from other orgs come to REF to work with ASHRAE?
- How can REF reach out to these sister societies?
- Perhaps a role stronger than liaison (consultant?) should be defined

- Can or should REF coordinate with associate societies (AASA, RSES, RETA, IARW)?
- Pearson noted AASA meets at ASHRAE Winter Meetings and may have an interest in this as the group is seeking a mission. Pearson can serve as link.
- There is a Society level liaison report to President for societies we have official society level liaisons to. We should bring refrigeration related reports back to REF.
- Focus on refrigeration societies.
- Provide and volunteer to these ASES associations, not vice versa
- A title stronger than liaisons (consultant) might be helpful in getting dialogue
- Gage noted REF should review previously rejected consultant request to see what can be done
- Kazachki noted we need to increase the number of refrigeration experts in ASHRAE leadership (Technology Council and BOD). Vallort suggested contacting chapters for nominations.
- Brief discussion on TC's which REF should be working with.
- TCs with refrigeration aspects listed in Appendix A of presentation.
- TC 8.9 (residential refrigerator/freezers) should be in section 10. Should this TC include beverage and vending machines?
- There is an overlap in TC 3.4 & 10.10
- Should be action item to review list and make recommendations, look at consolidation of section 10 TCs

Summary of ways to improve ASHRAE's support for the advancement of refrigeration and refrigerant science and technology.

- Reorganization of TC section assignments.
- More PAOE for refrigeration activities (talk to President Elect and Treasurer) (See REF Operations D2.2a)
- Work towards grass root RVC involvement in REF – Add RVCs at region level
- Work with TC 3.01 to get more involvement of expertise in natural refrigerants
- Sponsor a Refrigeration conference
- Add refrigeration topics to Strategic Plan (SP being re-developed now by Planning Committee-this is a good time to send suggestions to PLC) “ 1.7 Pursue enhanced research and operations regarding refrigeration technology and refrigerant management.”
- Add refrigerants and all related works to REF committee scope
- Increase DLs about Refrigeration.
- More meeting days at A/W

REF devoted significant time to a brainstorming session to examine REF's scope, as well as to maximize REF's role and increase awareness of refrigeration issues to ASHRAE leadership and members. A subcommittee of REF has been tasked to draft a detailed but broader ranging REF scope as well as to design a path to implement some changes to help REF work effectively with Society committees such as RAC, CEC, Members Council, TAC and CTTC. Another ad hoc committee has been established with CTTC to identify better interface opportunities with the chapters. REF will develop a proposal that may include additional voting members and/or formal liaisons to better enable REF to serve as a resource to membership, ASHRAE leadership, and ASHRAE committees on refrigeration related issues.

11.0 NEW BUSINESS

Gage noted she'd been asked for REF's opinion on what should be done with [Natural Refrigerants PD](#). The new Refrigerants in the Built Environment will be considering all refrigerants and it was asked if REF thought the new PD could replace this or not. REF discussion confirmed the need for the Natural Refrigerants now and likely after the new PD is produced.

It was moved (CL) and seconded (MC) that,

6. REF recommends to Technology Council to reaffirm the existing Natural Refrigerants PD.

MOTION 6 PASSED: 9-0-0, CNV

Montgomery noted earlier that due to changes in the PD procedures, the [Ozone Depleting Substances PD](#) would automatically retire after this meeting as it has been more than 36 months since its last approval. The current ODS PD committee had recommended they be disbanded pending development of the new Refrigerants in the Built Environment PD.

It was moved (DS) and seconded (MC) that,

7. REF recommends to Technology Council to reaffirm the existing *Ozone Depleting Substances* PD.

MOTION 7 PASSED: 8-0-0, CNV

BACKGROUND: The ODS PD is scheduled to retire after the Winter meeting. REF agreed it should be reaffirmed and reevaluated after the development of the new Refrigerants in the Built Environment PD.

It was moved (AP) and seconded (DS) that,

8. REF recommends to Technology Council to disband the *Ozone Depleting Substances* PD Committee tasked with revising the ODS PD.

MOTION 8 PASSED: 8-0-0, CNV

BACKGROUND: Consistent with their own recommendation, the ODS PD Committee should be disbanded pending the development of the new Refrigerants in the Built Environment PD.

12.0 ACTION ITEM REVIEW

Action Items will be distributed after meeting.

13.0 NEXT MEETING

The next meeting of REF will take place in Montreal, Quebec on June 26th, 2011. Gage will determine need for interim conference call and schedule as needed.

14.0 ADJOURNMENT

The REF meeting was formally adjourned at approximately 12:15 p.m.

Refrigeration Committee Meeting Agenda
Sunday, January 30th, 2011 --- 8:00 AM – 12:00 PM
Las Vegas Convention Center – N254

- 1.0 CALL TO ORDER
- 2.0 INTRODUCTIONS
- 3.0 Werkema – Issues report
- 4.0 APPROVAL OF MINUTES- Annual Meeting – Albuquerque, NM June 27th, 2010
- 5.0 REVIEW OF AGENDA
- 6.0 CHAIR’S REPORT – Gage
 - 6.1 Motions from Last Meeting Requiring Higher Body Approval
 - 6.1.1 Reaffirmation of *Ammonia as a Refrigerant* PD with minor, editorial corrections - approved
 - 6.1.2 Changes to the Milt Garland & Comfort Cooling Awards - approved
 - 6.1.3 Addition of Consultants to REF Rules of the Board (ROB) - rejected
 - 6.2 New Information Items for REF
 - 6.2.1 TC Liaison Report
 - 6.2.2 Refrigerant Management Ad Hoc Committee
 - 6.2.3 *Refrigerants and the Built Environment* PD meeting in LV
 - 6.2.4 DOE Roadmap for low-GWP Refrigerants – presentation Tuesday morning, LVCC N256
 - 6.2.5 REF MOP and Reference Manual
 - 6.2.6 Request for Liaison to RAC
 - 6.3 Membership Update – Ted Hansen; call for recommendations
 - 6.4 Other
- 7.0 VICE CHAIR’S REPORT – Scott
 - 7.1 Fiscal Report
 - 7.2 1634-RTAR, Guide for Sustainable Refrigerated Facilities and Refrigeration Systems
- 8.0 OTHER REPORTS
 - 8.1 BOD EX-Officio/Coordinating Officer (Traboulsi/Bahnfleth)
 - 8.2 CTTC Liaison - Siller
 - 8.3 Consultant Report – Anderson
 - 8.4 Programs - Kazachki
- 9.0 BRILEY AWARD PRESENTATION
- 10.0 2010-2011 MBOs
- 11.0 UNFINISHED BUSINESS
 - 11.1 Briley criteria
 - 11.2 Milt Garland award
 - 11.3 Commissioning Guideline
 - 11.4 Refrigerants Conference - Anderson
- 12.0 BRAINSTORMING – Montgomery, Crowther, Gage
 - 12.1 See additional materials
- 13.0 NEW BUSINESS
 - 13.1 *Natural Refrigerants* PD
 - 13.2 Ventilation of Refrigerated Spaces – Scott
 - 13.3 CO2 pipe break - Scott
 - 13.4 Safety Standards for Refrigerants – Pearson
- 14.0 ACTION ITEMS REVIEW
- 15.0 NEXT MEETING – Montreal, Quebec, June 26th, 2011
- 16.0 ADJOURNMENT

Committee No./Name	Handbook Chapters (2010-2007)	ASHRAE Standards	Outside Liaisons	Programs			Active Research	TRPs ready for Bid	WS's in development	RTAR's accepted w/ req'd	RTAR's in development	Recently Completed Research
				Albuquerque June 2010	Las Vegas	January 2011						
REF - Refrigeration Committee	-	-	-	Seminar 40	Seminar 22 - Vapor-Compression Cycles, Systems and Components with Natural Refrigerants Seminar 40 - Advancing Energy Efficiency in Commercial Refrigeration	-	-	-	-	-	1634-RTAR, Guide for Refrigerated Facilities and Systems*	-
TC 1.3 - Heat Transfer & Fluid Flow	F2 - Thermodynamics and Refrigeration Cycles F3 - Fluid Flow F4 - Heat Transfer F5 - Two Phase Flow F6 - Mass Transfer F33 - Physical Properties of Materials	-	-	Seminar 60	Seminar 44 - Micro/Nano Fluids and Systems in HVAC&R	1352-RP 1444-RP	1556-TRP	-	-	-	-	1270-RP 1280-RP
TC 3.1 - Refrigerants & Secondary Coolants	F29 - Refrigerants F30 - Thermophysical Properties of Refrigerants F31 - Physical Properties of Secondary Coolants (Brines)	Standard 34 - Designation and Safety Classification of Refrigerants Standard 177P - Method of Test for Measuring Fractionated Compositions of Refrigerant Blends Guideline 6 - Refrigerant Information Recommended for Product Development and Standards	-	Seminar 40	Seminar 6 - Building a Sustainable Future by Removing Barriers for Low GWP Seminar 11 - Cradle to Grave Refrigerant Management Seminar 22 - Vapor-Compression Cycles, Systems and Components with Natural Refrigerants	1484-RP 1507-RP 1583-RP	1580-TRP 1584-TRP	-	-	-	-	-
TC 3.2 - Refrigerant System Chemistry	R05 - Component Balancing in Refrigeration Systems	Standard 97 - Sealed Glass Tube Method to Test the Chemical Stability of Materials for Use Within Refrigerant Systems Standard 175P - Metal Pressure Vessel Method to Test Materials Used in Refrigeration Systems Standard 177P (Co-CI) - Method of Test for Measuring Fractionated Compositions of Refrigerant Blends	-	-	-	1409-RP	1410-TRP	-	-	-	-	-
TC 3.3 - Refrigerant Contamination Control	R07 - Control of Moisture and Other Contaminants in Refrigeration Systems	Standard 95 - Method of Testing Desiccants for Refrigerant Drying Standard 63.1 - Method of Testing Liquid-Line Refrigerant Driers Standard 63.2 - Method of Testing Liquid-Line Filter-Drier Filtration Capability Standard 78 - Method of Testing Flow Capacity of Suction Line Filters and Filter-Driers	-	-	-	-	1495-TRP	-	-	-	-	-
TC 3.8 - Refrigerant Containment	R09 - Refrigerant Containment, Recovery, Recycling, and Reclamation	Standard 147 - Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment and Systems Standard 173P - Method of Test to Determine the Performance of Halocarbon Refrigerant Leak Detectors Standard 196P - Method of Test for Measuring Refrigerant Leak Rates	-	-	Seminar 11 - Cradle to Grave Refrigerant Management	-	-	-	-	-	1599-RTAR	-
TC 8.1 - Positive Displacement Compressors	R08 - Equipment and System Dehydrating, Charging and Testing S37 - Compressors S42 - Liquid-Chilling Systems	Standard 23.1 - Methods of Testing for Performance Rating Positive Displacement Refrigerant Compressors and Condensing Units That Operate at Subcritical Temperatures of	-	Seminar 50	Seminar 22 - Vapor-Compression Cycles, Systems and Components with Natural Refrigerants	-	-	-	-	-	-	-
TC 8.2 - Centrifugal Machines	S37 - Compressors S42 - Liquid-Chilling Systems	Standard 30 - Methods of Testing Liquid Chilling Packages Standard 184P - Method of Test for Field Test of Liquid-Chilling Packages Guideline 22 (Co-CI) - Instrumentation for Monitoring Central Chilled Water Plant Efficiency	-	-	-	1476-RP	-	-	-	-	-	-
TC 8.3 - Absorption & Heat Operated Machines	F2 - Thermodynamics and Refrigeration Cycles R18 - Absorption Equipment	Standard 40 - Methods of Testing for Rating Heat Operated Unitary Air-Conditioning and Heat-Pump Equipment Standard 182 - Method of Testing Absorption Water-Chilling and Water-Heating Packages	-	-	Seminar 46 - Achieving Zero Energy Design with Absorption Cooling	-	1462-TRP	-	-	-	-	-
TC 8.4 - Air-to-Refrigerant Heat Transfer Equipment	R14 - Forced Circulation Air Coolers S22 - Air-Cooling and Dehumidifying Coils S26 - Air-Heating Coils S38 - Condensers	Standard 20 - Methods of Testing for Rating Remote Mechanical-Draft Air-Cooled Refrigerant Condensers Standard 25 - Methods of Testing Forced Convection and Natural Convection Air Coolers for Refrigeration Standard 33 - Methods of Testing Forced Circulation Air Cooling and Air Heating Coils	-	-	Seminar 31, TC Forum - Next Generation Heat Exchangers for Net-Zero Design	1589-RP	1564-TRP	1535-RTAR	1577-RTAR	-	-	-
TC 8.5 - Liquid to Refrigerant Heat Exchangers	S38 - Condensers S41 - Liquid Coolers	Standard 22 - Methods of Testing for Rating Water-Cooled Refrigerant Condensers Standard 24 - Methods of Testing for Rating Liquid Coolers Standard 30 (Co-CI) - Methods of Testing Liquid Chilling Packages Standard 181P - Methods of Testing Liquid-to-Liquid Heat Exchangers for Heating, Air-Conditioning, and Refrigeration Applications	-	Seminar 60	Seminar 44 - Micro/Nano Fluids and Systems in HVAC&R	1316-RP 1345-RP	-	-	-	-	-	1394-RP
TC 8.9 - Residential Refrigerators & Food Freezers	R17 - Household Refrigerators and Freezers	-	-	-	-	1320-RP	-	-	-	-	-	-
TC 10.1 - Custom Engineered Refrigeration Systems	R04 - Liquid Overfeed Systems R05 - Component Balancing in Refrigeration Systems R13 - Secondary Coolants in Refrigeration Systems R45 - Concrete Dams and Subsurface Soils R46 - Refrigeration in the Chemical Industry R50 - Terminology of Refrigeration	Standard 15 - Safety Standard for Refrigeration Systems	-	Seminar 53	-	-	-	1434-RTAR	-	-	1514-RTAR 1513-RTAR	-
TC 10.2 - Automatic Ice-making Plants and Skating Rinks	R43 - Ice Manufacture R44 - Ice Rinks	-	-	-	-	-	-	-	-	-	-	-
TC 10.3 - Refrigerant Piping	R01 - Halocarbon Refrigeration Systems R02 - Ammonia Refrigeration Systems R03 - Carbon Dioxide Refrigeration Systems R10 - Insulation Systems for Refrigerant Piping	-	B31.5 IIAR Piping	-	-	1327-RP 1356-RP w/TC 1.8	-	-	-	-	1569-RTAR 1513-RTAR	-
TC 10.4 - Ultra Low Temperature Systems & Cryogenics	R47 - Cryogenics R48 - Ultralow Temperature Refrigeration R49 - Biomedical Applications of Cryogenic Refrigeration	-	-	-	-	1472-RP	1602-TRP	-	-	-	-	-
TC 10.5 - Refrigerated Distribution and Storage Facilities	R21 - Commodity Storage Requirements R23 - Refrigerated Facility Design	-	-	Seminar 43	Forum 4 - The Technical Basis of the Federal Walk-In Efficiency Standard	-	-	-	-	-	1434-RTAR	-



ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

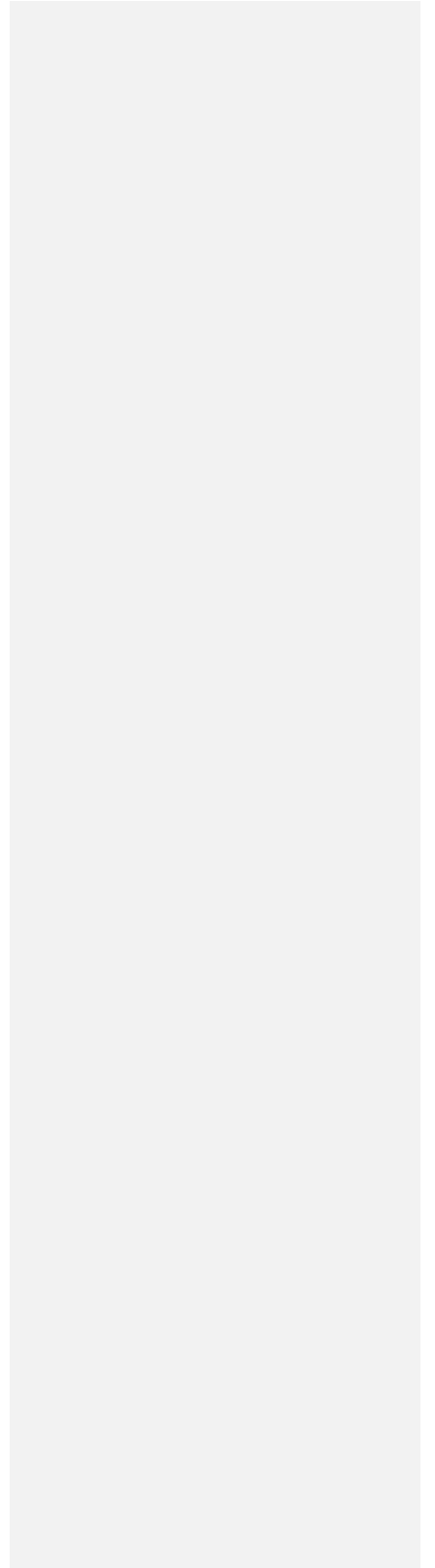
MANUAL OF PROCEDURES

for

REFRIGERATION COMMITTEE

REF Minutes 11.W – Appendix 3

REVISED: 2010 – Fall Draft



MANUAL OF PROCEDURES FOR REFRIGERATION COMMITTEE

FOREWORD

The Refrigeration Committee (REF) is a General Standing Committee of the Society and operates under the direction of the Board of Directors and Technology Council. The [Rules of the Board \(ROB\)](#) for the Refrigeration Committee (REF) is its constitution. Proposed changes to the [ROB](#) and its appendices must be approved by the Board of Directors.

This Manual of Procedures (MOP) [describes mandatory operational rules and interpretations of policy that the REF body must operate under to achieve their assigned responsibilities. It is designed to complement the ROB by providing methods and procedures under which to operate.](#) The MOP, and revisions thereto, following approval by the Committee, shall be submitted to Technology Council or designated council subcommittee for approval. [\(ROB 96-02-18-07\)](#)

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APPENDICES

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~~APPENDIX B — Suggested MBO Format~~

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~~APPENDIX D — Guidelines for Awards~~

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Comment [CG1]: This section is new and has yet to be clarified.

SECTION A - REFRIGERATION COMMITTEE - GENERAL

Part 1 Responsibilities/Duties

The Refrigeration Committee shall encourage advancement of refrigeration technology and its application. (ROB 520-160-002)

- A1.1 The Committee shall promote refrigeration education and development at the chapter, regional and international levels of the Society.
- A1.2 The Committee shall recommend projects and programs related to refrigeration to Technology Council.
- A1.3 The Committee shall maintain liaison with ASHRAE Chapters and other general committees within ASHRAE regarding refrigeration subjects.
- A1.4 The Committee shall assist and advise the TCs and TGs with refrigeration-oriented goals in recruiting qualified members and carrying out their tasks.
- A1.5 The Committee shall maintain contact and encourage technology transfer ~~liaison~~ with ~~ASHRAE chapters, associated~~ other refrigeration-oriented international and technical societies ~~and cooperating technical societies regarding refrigeration subjects.~~
- A1.6 The Committee shall assist CTTC, as appropriate, for refrigeration-oriented activities.

Part 2 Membership

A2.1 General Information

- Committee members should be refrigeration-oriented persons.
- Membership should include a cross-section of the refrigeration industry.
- Committee members are selected by the President Elect and approved by the BOD.
- Service on this committee for the members is intended to be for a 3-year term.
- Service on this committee for the Chair, Vice Chair, BOD ex-officio and Coordinating Officer is intended to be for a one-year term.
- The Chair of the Committee is a non-voting member of, and reports for the Committee to, Technology Council.

A2.2 Composition

- The Refrigeration Committee shall consist of 12 voting members including the Chair, and a Vice Chair.
- Non-voting board ex-officio and a coordinating officer shall be assigned
- One member of the committee shall serve as a liaison to the Chapter Technology Transfer Committee.
- Non-voting consultants as appropriate.

Part 3 Meetings

- A3.1 The Committee shall have two (2)-scheduled meetings annually at the Society Winter and Annual meetings. Additional electronic meetings may be held at the call of the Chair.

SECTION B - CHAIR, VICE CHAIRS AND STAFF LIAISON

Part 1 Selection

- B1.1 The Chair and Vice Chair of REF are nominated by the President-elect of the Society from the current membership of REF and approved by the Board of Directors to serve one-year terms commencing at the close of the next annual meeting of the Society.

Part 2 Responsibilities of the Chair

- B2.1 Preside over all meetings of the Refrigeration Committee.
- B2.2 Coordinate and direct the activities of the Vice Chair and those of the ~~voting~~ members.
- B2.3 The Chair shall organize REF subcommittees as necessary to satisfy the needs of the committee as indicated in the REF Reference Manual.
- B2.3 Prepare the agenda for all Refrigeration Committee meetings.
- B2.4 See that minutes are recorded for all Refrigeration Committee meetings.
- B2.5 Prepare reports to be submitted to Technology Council at each Council meeting.
 - Included in the Annual Meeting report shall be a final report of the committee's MBOs . A copy of the MBOs shall also be sent to the Refrigeration BOD Ex-O and to AMORT.
 - The Annual Meeting report shall also include the MBOs prepared by the incoming chair (See B3.7). These two reports on MBOs will show the council what the committee accomplished during the Society year that is ending and what is planned for the upcoming year.
- B2.6 Annually submit to the President-Elect of ASHRAE recommendations for a Chair, a Vice Chair, and replacement members for any members who are leaving the committee for any reason.
- B2.7 Recommend one member of the committee to serve as a consultant of the CTTC committee.
- B2.8 Appoint liaisons to TCs, TGs, SSPCs and any other refrigeration-related committees.
- B2.9 Appoint at the final meeting of the Fiscal Year a mentor for each new incoming member

of the committee. See Refrigeration Committee Reference Manual.

- B2.10 Prepare and submit material for the Members First Newsletter highlighting REF developments and activities after the Winter and Annual Meetings.

Part 3 Responsibilities of the Vice Chair

- B3.1 In the absence of the Chair, assume the chair at scheduled or called meetings of the Refrigeration Committee.
- B3.2 In the event the Chair is unable to perform the duties of that office, assume all duties of the Chair until a successor is selected.
- B3.3 The Vice Chair shall serve as a member of the Planning Subcommittee of Technology Council.
- B3.34 In consultation with the Technology Council, the REF Committee, the Director of Technology, and the AMORT, the Vice Chair shall prepare recommended budgets for the operation of the REF Committee for the coming fiscal year for consideration by the REF Committee and Technology Council. Details can be found in the Technology Council MOP and/or Reference Manual.
- Periodically, the Vice Chair shall review with the AMORT expenditures and budget allocations and shall take any action he/she deems necessary, in cooperation with the Executive Vice President and the Director of Technology, to stay within the established budget.
- B3.45 Encourage refrigeration technology transfer within the Society by working with the Research Administration Committee Research Liaisons, and with the Technical Activities Committee Section Heads, particularly Section 10, to stimulate: (a) programs at Society Meetings, (b) research projects and (c) technical committee membership.
- B3.56 Be responsible for regular review of the Refrigeration Committee's Rules of the Board Procedures and make recommendations for revisions.
- ~~B3.6 Maintain contact with and encourage refrigeration technology transfer between ASHRAE and other refrigeration oriented societies.~~
- B3.7 Management By Objectives,(MBO)
Prior to the Society annual meeting, the committee vice chair or the individual who will be the next year's chair will prepare MBOs for the REF committee for the next year and present these objectives to the REF committee for review at the committee meeting held

Comment [CG2]: Edited into A1.5 and deleted here.

during the Society annual meeting. The MBOs will be included in the REF committee's report to the Technology Council at the annual meeting as an information item, and a copy of the MBOs will be sent to the Refrigeration BOD Ex-O and AMORT headquarters staff (Assistant to the BOD). A suggested format for committee MBOs can be found in the Reference manual.

B3.98 Perform other duties, which may be assigned by the Chair.

Part 4 Responsibilities of the Staff Liaison

B4.1 Attend all meetings of the committee.

B4.2 Perform assignments made by the Chair.

B4.3 Prepare draft of minutes, submitting to Chair and Vice Chair for comments.

B4.4 Update Rules of the Board and Manual of Procedures at the direction of the Committee. When appropriate, distribute to Committee members for review and possible update.

~~B4.5 Distribute minutes, Rule of the Board, Manual of Procedures and other background information to new committee members.~~

B4.5 Distribute materials to the members for regular meetings of the Committee.

- o To all members, minutes of prior meeting, agenda for current meeting, ASHRAE travel voucher, and other pertinent information.
- o To new committee members, Rules of the Board, Manual of Procedure, Reference Manual and other background material.

B4.6 The staff liaison shall assist with budget preparation.

B4.7 The staff liaison shall distribute the MBOs.

B4.8 The staff liaison shall review the ASHRAE Journal for the prior society year to identify (in consultation with the Chair) qualified refrigeration articles for the George Briley Award.

B4.9 The staff liaison shall procure all awards given by the Refrigeration Committee and shall mail awards to any winners not present at the Society meeting.

B4.10 The staff liaison shall maintain and distribute the TC Activities Report.

SECTION C - DUTIES OF VOTING MEMBERS

Part 1 Responsibilities

- C1.1 Attend all meetings of the Refrigeration Committee.
- C1.2 Encourage Refrigeration Committee formation and activity in each chapter through liaison with CTTC. One member shall also serve as a liaison to the Chapter Technology Transfer Committee.
- C1.3 Recommend, via the President-Elect Advisory Committee, criteria for Chapter Refrigeration activities in the Presidential Award of Excellence program.
- C1.4 Report regional activities at the Annual and Winter meetings of the Refrigeration Committee.
- C1.5 Assist and advise the TCs, TGs and SSPCs with refrigeration-oriented goals in recruiting qualified members and carrying out their tasks.
- C1.6 Voting members may be required to serve as Committee Liaisons. (See Section D)
- C1.7 Annually, determine the winners of the REF Awards
- Milton W. Garland award
 - Refrigeration Comfort Cooling award
 - George Briley ASHRAE Journal Article Award
- C1.8 Sponsor or cosponsor programs at Society meetings on refrigeration to educate ASHRAE members as specified in A1.1.

SECTION D – COMMITTEE LIAISONS

Part 1 Selection

- D1.1 The Refrigeration Committee shall provide liaisons to represent the Refrigeration Committee at CTTC, TCs, TGs, SSPCs and other refrigeration related ASHRAE activities such as programs and workshops.

Part 2 Duties

- D2.1 The liaisons will provide a written report to the Refrigeration Committee on all pertinent refrigeration-related issues and information as related to the other committees. ~~There will be reports to the Refrigeration Committee during~~ These reports shall be presented at the Annual and Winter meetings. A summary of the activities of each liaison shall be included with the Refrigeration Committee minutes. ~~The report will highlight~~

~~refrigeration items and issues.~~

- D2.2 The members appointed to CTTC will assist chapter and regional activities in the field of refrigeration.
- Provide recommendations to the Refrigeration Committee for PAOE point criteria in refrigeration for the President-Elect Advisory Committee.
 - Assist all CTTC RVCs with CRC workshop materials and presentations pertaining to refrigeration.

- D2.3 Liaise with other Society Committees (see A1.3) and identify refrigeration related speakers/presenters for their programs when requested. ~~Assigned liaisons shall monitor and track refrigeration programs at each Society Annual and Winter Meeting. This shall require that the liaison work in cooperation with refrigeration oriented technical committees and the ASHRAE program committees. The technical committees who fail to sponsor a program, at any meeting, shall be urged to arrange a program for the following year.~~

Part 3 Liaison Reports

- ~~D3.1 The liaisons shall report to the Refrigeration Committee at each Annual and Winter Meeting.~~

SECTION E – Consultants

Part 1: Selection

Comment [CG3]: This was moved to D 2.1.

Comment [CG4]: New section. To be clarified.

REFERENCE MANUAL
FOR
REFRIGERATION COMMITTEE

REVISED: 12/3/2010

FORWARD

The Reference Manual, contains guidelines, procedures, sample documents and other tools that the council or committee uses in its day-to-day operation. The Reference Manual ensures consistency in the operation of the REF and serves as an educational tool for new members. The Reference Manual is an internal document of the REF and requires the approval of this committee only

Comment [PG1]: Found in ROB 1.100.002

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~~SECTION ? **Guidelines for Awards**~~

SECTION **E** **Milton W. Garland Commemorative Refrigeration Award for Project Excellence**

SECTION **F** **Refrigeration Comfort Cooling Award for Project Excellence**

Comment [CG2]: Both of these award procedures were updated at the last annual meeting.

SECTION **G** **George Briley Award**

SECTION **?** **Position Documents**

SECTION A: ABBREVIATIONS AND ACRONYMS

<u>AMORT</u>	<u>Assistant Manager of research and Technology</u>
<u>CRC</u>	<u>Chapter Regional Conference</u>
<u>CTTC</u>	<u>Chapter Technology Transfer Committee</u>
<u>BOD</u>	<u>Board of Directors</u>
<u>REF</u>	<u>Refrigeration Committee</u>
<u>MOP</u>	<u>Manual of Procedures</u>
<u>MOR</u>	<u>Manager of Research</u>
<u>ROB</u>	<u>Rules of the Board</u>
<u>RVC</u>	<u>Regional Vice-Chair</u>
<u>SSPC</u>	
<u>TC</u>	<u>Technical Committee</u>
<u>TG</u>	<u>Task Group</u>
<u>TRG</u>	<u>Technical Resource Group ??</u>

SECTION E-B – REVISIONS TO RULES AND PROCEDURES

(This Section is for Informational Purposes Only)

Part 1: Revisions to Rules of the Board

BE1.1 Proposed changes (additions and deletions) to Rules of the Board (ROBs) shall be submitted by committees, councils and Board members. Changes proposed by a committee shall be submitted through the body to which it reports; councils and Board members may submit proposed changes directly to the Board of Directors.

Comment [PG3]: The old text came from the BAR which is no longer in existence. I changed it to the current text from the ROB.

EB1.2 To propose a change to an existing ROB

Present the current ROB with changes marked by double underlining to designate words proposed to be added and strikethrough to designate words proposed to be deleted. A proposed change, as a minimum, shall include the complete ROB number (e.g., 2.106.001.2), the proposed change(s) marked as indicated above, and the reason(s) for the change(s).

EB1.3 To propose a new ROB, present the wording for the new rule and include a statement indicating a recommended placement of the new rule within the ROB organization.

Examples:

It is recommended that this rule be placed in ROB Volume 1, Policies.

It is recommended that this rule be placed in ROB Volume 2, Publishing and Education Council.

EB1.4 To propose rescinding an existing ROB, include in the recommendation the ROB volume in which the rule is located, the rule number or other identification code, and the wording of the rule to be rescinded.

EB1.5 Proposed changes to Society-wide policies and procedures (e.g., Travel Reimbursement Policy, Election and Appointment Procedures) shall follow the same procedure as for changes to ROB's.

Part 2 Revisions to Manuals of Procedures (MOP)

EB2.1 Revisions to this MOP must be approved by this committee and by Technology Council or designated council subcommittee.

SECTION C: MANAGEMENT BY OBJECTIVES

~~If any committee does not submit its objectives to the council at the annual meeting, the assigned DAL (BOD Ex Officio) is responsible for contacting the incoming committee chair and working with him/her to complete objectives.~~

~~Staff (Assistant to the BOD) will send copies of objectives to the BOD Ex Officio, committee staff liaison and council staff liaison. Staff liaisons will send objectives to committee and council members.~~

C.1 Each objective should be measurable and should include a projected completion date, fiscal impact (if any) and other information that would clarify the intent of the objective. If an objective is to be assigned to a specific member or subcommittee of the committee, this should also be included. See Figure C.1 for suggested format.

C.2 MBO reports shall be provided at the Society Winter and Annual Meetings.

o A status report of the objectives will be included in the committee report submitted to the council at the Society winter meeting, and a copy of the objectives will be sent to headquarters staff (Assistant to the BOD).

o A final report of the objectives MBO's will be included in the committee report submitted to the council at the Society annual meeting, and a copy of the objectives MBO's will be sent to headquarters staff (Assistant to the BOD). The report on objectives MBO's will show the council what the committee accomplished during the Society year that is ending

o The objectives MBO's prepared by the committee vice chair for the next year (or by the individual who will be the next year's chair) will also be included in this report. The report on objectives MBO's will show the council what is planned for the upcoming

|
| year.

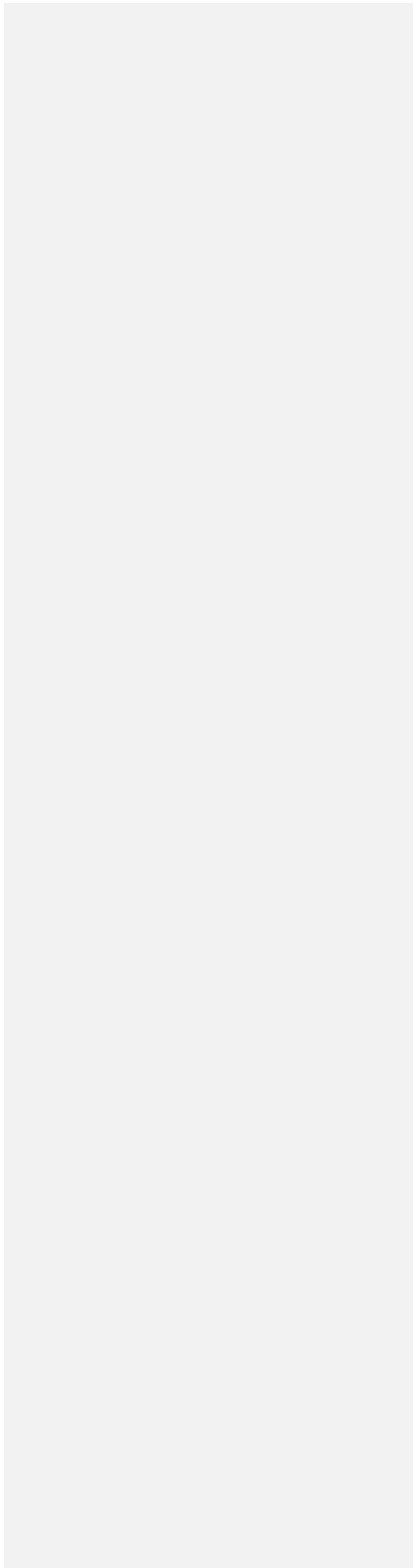


FIGURE C.1
SUGGESTED MBO FORMAT

OBJECTIVES

_____ Committee

Chairman: _____

Society Year: 200____ - 200____

Date: _____

Objective	Planned Completion Date	Fiscal Impact	Responsibility	Program Approved	Cost Budgeted	Status

- List objectives, not action items or ongoing committee activities such as updating the committee’s MOP.
- State objectives in clear, concise, measurable language. If necessary, cite sub-tasks and interim steps as a means of measuring objective completion.
- Cite both the completion dates for the overall objective as well as individual sub-tasks.
- State fiscal impact in dollars, man-hours, or man-trips. State whether the program has been approved by the council and whether its cost has been included in the budget.
- State the primary responsible individual, subcommittee, or body.
- Report a brief but complete statement of status. Cite completion date if objective is fulfilled.

SECTION D: MENTORING PROGRAM

(From ROB Appendix D)

During the final meeting of the Fiscal Year, the Committee Chair shall appoint an incumbent to be the mentor for each new member. The mentor will be responsible for the following tasks: Before the next committee meeting, the mentor should contact the new member by telephone, letter, fax or email to introduce himself/herself and explain the new relationship and its purpose.

The mentor should make every effort to update the new member on:

1. Committee or chapter functions, focus and objectives.
2. Review the Rules of the Board (ROB) and Manual of Procedures (MOP) with the new member.
3. Discuss the typical meeting format and member duties and responsibilities.

The mentor should plan to meet the new member before the respective meeting is scheduled to start and introduce him/her to the chair and early arriving members. The mentor should also introduce the new member with pertinent data such as:

1. Member's field of expertise and employer
2. Chapter and city of the new member
3. Former chapter, region and Society positions previously held by the new member

The new member will be sent a copy of the group Rules of the Board (ROB), Manual of Procedures (MOP) and a copy of the most recent meeting minutes to acquaint him/her with the function and focus of the group. The new member should be encouraged to develop a rapport with other members to effectively work with fellow members to maximize productivity.

The chair of the committee shall have the following responsibilities:

1. Assign a mentor to each incoming new member of the group prior to the first meeting.
2. Assure that the time allotted at the beginning of the first meeting is sufficient for proper introduction of the new member by the assigned mentor.
3. Assess at a later meeting the effectiveness of the mentor/new member relationship.
4. Provide any assistance to enhance the mentor/new member relationship.

Completion date: The relationship terminates at the end of the new member's first year in the group.

Mentoring Program (ROB 100-128-003)

Comment [PG4]: This is the procedure from the old BAR

~~During the final meeting of the Fiscal Year, the Board of Directors/Board of Governors, Council or Committee Chair shall appoint an incumbent to be the mentor for an incoming member. A mentor should be appointed for each new member. The mentor will be responsible for the following tasks:~~

- ~~• Before the next meeting of the Board of Directors/Board of Governors, Council or Committee Meeting, the mentor should contact the new member by telephone, letter, fax or~~

~~email to introduce himself/herself and explain the new relationship and its purpose.~~

- ~~The mentor should make every effort to update the new member on:~~
 1. ~~Board of Directors/Board of Governors, Council, Committee or Chapter functions, focus and objectives.~~
 2. ~~Review the Board Approved Rules (BAR) and Manual of Procedures (MOP) with the new member.~~
 3. ~~Discuss the typical meeting format and member duties and responsibilities.~~
- ~~The mentor should plan to meet the new member before the respective meeting is scheduled to start and introduce him/her to the chair and early arriving members. The mentor should also introduce the new member with pertinent data such as:~~
 1. ~~Member's field of expertise and employer~~
 2. ~~Chapter and city of the new member~~
 3. ~~Former chapter, region and Society positions previously held by the new member~~
- ~~The new member will be sent a copy of the group Board Approved Rules (BAR), Manual of Procedures (MOP) and a copy of the most recent meeting minutes to acquaint him/her with the function and focus of the group. The new member should be encourage to develop a rapport with other members to effectively work with fellow members to maximize productivity.~~

~~The chair of the Board of Directors/Board of Governors, Council, Committee or chapter shall have the following responsibilities:~~

1. ~~Assign a mentor to each incoming new member of the group prior to the first meeting.~~
2. ~~Assure that the time allotted at the beginning of the first meeting is sufficient for proper introduction of the new member by the assigned mentor.~~
3. ~~Assess at a later meeting the effectiveness of the mentor/new member relationship.~~
4. ~~Provide any assistance to enhance the mentor/new member relationship.~~

APPENDIX C

Page 2

Completion date: The relationship terminates at the end of the new member's first year in the group.

Process of Measurement at the Society and Regional Level:

Measurement	Actual %	Tool	Responsible Party
1. Each Board of Directors/Board of Governors, Council, Committee will include the mentoring program in their Manual of Procedures (MOP).		MOP	Committees/Council
2. The Committee Management by Objectives (MBO) should include an objective for mentoring which will be reported to the Council at each meeting.		MBO	Committees/Council
3. The mentoring program will be monitored to determine its effectiveness through the MBO process.		MBO	Council
4. The Councils at each annual meeting will include in their report to the Board of Directors the status of that Council's mentoring program.		BOD Report	Council

Process of Measurement at the Chapter Level:

Comment [PG5]: This section is not needed at all.

~~Focus and measurement will be accomplished using the Presidential Award of Excellence (PAOE) program. Points will be awarded based on a chapter submitting an effective plan to accomplish mentoring of new members. Short term results will be measured by PAOE compliance. Long term measurement would be completed by retention % reduction for new members who have belonged to the Society for less than two years.~~

Measurement	Actual %	Tool	Responsible Party
1. Percent of chapters having a mentoring program in place as reported by PAOE		PAOE Report	Membership Promotion Committee
2. Retention decrease of new members		Membership Report	Membership Committee

GUIDELINES FOR NEW AWARDS

ROB 2.411.003.2

Comment [PG6]: This is found in ROB 2.411.003.2 and you should probably refer the user to it rather than insert it in its entirety. This version is probably outdated as there are some small wording differences.

All requests or suggestions for new awards, revisions to current awards, or award deletions shall be forwarded to the Honors and Awards Committee for review and recommendation before being forwarded to the BOD for review and approval.

ASHRAE awards are grouped into the following categories, each of which has their defined forms of award:

1. Personal Honors
2. Personal Awards for General Society Activities
3. Personal Awards for Specific Society Activities
4. Paper Awards
5. Society Awards to Groups or Chapters

Awards will normally carry the name of an ASHRAE activity (e.g., Distinguished Service Award, Fellow, Journal Papers Award, etc.) No business, product, or commercial name shall be used for an award. Only in very exceptional instances may consideration be given to naming the award for an individual member.

Proposers of awards shall submit a detailed description, including the name of the award, the suggested category for the award, the reason for establishing the award, and the proposed selection and awarding process to the Honors and Awards Committee.

Proliferation of awards that would tend to detract from the worth of existing awards must be avoided. The award must first be considered as applying to an important field of ASHRAE related activity; the name of the award would then add prestige.

**SECTION E: MILTON W. GARLAND COMMEMORATIVE REFRIGERATION
AWARD FOR PROJECT EXCELLENCE**

1. The award shall be known as the Milton W. Garland Commemorative Refrigeration Award for Project Excellence.
2. The award shall be made to both the designer and the owner of a non-comfort cooling refrigeration application that incorporates new technology in a unique manner.
3. Submission must be received by the Refrigeration Committee staff liaison (tse@ashrae.net) by May 1st to be considered for that year's competition. The Refrigeration Committee shall select three members who have at least two years of service on the Committee to be the judges of the projects. The award will be presented at the Winter Meeting. Chapters should submit copy to Chapter Technology Transfer Committee (CTTC) Regional Vice-Chair (RVC) for informational purposes as well.
4. The winning recipient selected by the Refrigeration Committee from the Chapter nominees shall receive the following:
 - A. The designer shall receive a plaque at a Society Winter Meeting.
 - B. The project's owner shall receive a plaque to be presented at a refrigeration program meeting of the chapter.
 - C. The chapter nominating the winning project shall receive a felt patch to go on the chapter award banner. Patch will be presented at the CRC following the Society award presentation.
 - D. All chapters submitting a nomination shall be awarded ribbons at the following year's CRC.
 - E. The documentation accompanying the nominated and the winning projects will be made available to the *ASHRAE Journal* and to *Insights*.
5. The chapter's eight (8) page submittal shall be as follows:
 - A. The front cover shall be the submission form.
 - B. The second 8 ½ x 11" page shall contain no more than a two paragraph overview of the project with a brief explanation of the factors supporting the nomination.
 - C. The next four 8 ½ x 11" pages shall contain a description of the project typed in 12 point font. The page shall be double-spaced with ¾" left and right margins, and 1" top and bottom margins.

- D. The last two pages of the project shall consist of two 8 ½ x 11" sheets containing drawings, plans, schematics, or pictures of the project which will give the judges a clear understanding of the merits of the project.
- 6. The selection criteria shall be re-evaluated by the Society Refrigeration Committee every thirty-six (36) months beginning with the date of acceptance of this criteria.

ELIGIBILITY

1. Refrigeration shall be defined as any use of mechanical refrigeration machinery for application other than human comfort. In general, this will be for food processing and preservation as well as industrial applications. It could also apply to refrigeration used in manufacturing processes, life support in extreme environments, recreational facilities, or other non-comfort cooling applications.
2. All projects must be submitted within the thirty-six (36) preceding months of the initial operation date of the system.
3. The Milton W. Garland Commemorative Refrigeration Award is open to all who think their projects or other projects with which they are familiar have achieved some distinction. Projects may be submitted by the designers, architects, engineers, owners, or suppliers. The nominator must inform and have approval from the owner of the installation that the entry may be published. The owner's name may be withheld for privacy.
4. A release must be obtained from the owner of the project.
5. Each Chapter may only have one submittal and may devise their own method(s) for selecting their submission.
6. There must be an ASHRAE linkage to the nominee (the prime designer is a member, the installer is a member, the firm is Golden Circle, or the owner, supplier, etc., is a member).
7. The scoring of the project at the Society level will be per Appendix A, Scoring Chart.

MILTON GARLAND AWARD SUBMISSION FORM

1. Name of building or project:

Location:

Chapter Submitting:

Initial Date of Operation:

2. Linkage (ASHRAE member with significant role in project):

a. Name:

Last

First

Middle

Membership Number:

b. Address (including country):

City

State/Province

Zip/Country Code

c. Office Telephone:

d.

E-mail address:

e. Company:

f. Member's Role in Project:

3. Designer (if different from above)

a. Name:

Last

First

Middle

ASHRAE Membership Number (if applicable):

b. Address (including country):

City

State/Province

Zip/Country Code

c. Telephone: Office

d.

E-mail address:

e. Company:

4. Owner's release:

I certify that I am the owner or the authorized representative of this project, and hereby grant permission to ASHRAE to use all the enclosed data and information in the judging and subsequent publicity of this project.

Typed Name:

Signature:

Date:

(Signatures must be on form submitted to ASHRAE)

Title:

Company:

City

State/Province

Zip/Country Code

Office Telephone:

d.

E-mail address:

**SCORING CHART
FOR
MILTON W. GARLAND COMMEMORATIVE REFRIGERATION AWARD**

		Evaluation	Points		
Problem	A1. Complexity of Problem			A. Problem	
				Ext. Difficult	100%
				Very Difficult	75%
				Difficult	50%
Subtotal: PROBLEM - Maximum 20 Points		Sum =		Not Difficult	30%

Concept	B1. Concept - Maximum 10			B. Concept	
				Superior	100%
	B2. Integrated Design - Maximum 5			Excellent	67%
				Very Good	53%
	B3. Sustainability - Maximum 5			Good	47%
	B4. Originality – Maximum 10			Fair	33%
Subtotal: CONCEPT - Maximum 30 Points		Sum =			

Solution	C1. Performance Criteria Achieved - Maximum 30			C. Solution	
				Superior	100%
	C2. Energy Effectiveness - Maximum 5			Excellent	67%
				Very Good	53%
	C3. Budget Restrictions - Maximum 5			Good	43%
	C4. Ease of Maintenance - Maximum 10			Fair	33%
Subtotal: SOLUTION - Maximum 50 Points		Sum =			
DISCRETIONARY BONUS - Maximum 10				*	
GRAND TOTAL					

Reasoning for Bonus:

SECTION F: REFRIGERATION COMFORT COOLING
AWARD FOR PROJECT EXCELLENCE

1. The award shall be known as the Refrigeration Comfort Cooling Award for Project Excellence and will encourage those studying it to expand their interest in and appreciation for comfort cooling applications.
2. The award shall be made to both the designer and the owner of a comfort cooling refrigeration application which highlights innovation and/or new technologies.
3. Submission must be received by the Refrigeration Committee staff liaison (tse@ashrae.net) by May 1st to be considered for that year's competition. The Refrigeration Committee shall select three members who have at least two years of service on the Committee to be the judges of the projects. The award will be presented at the Winter Meeting. Chapters should submit copy to Chapter Technology Transfer Committee (CTTC) Regional Vice-Chair (RVC) for informational purposes as well.
4. The winning recipient selected by the Refrigeration Committee from the Chapter nominees shall receive the following:
 - A. The designer shall receive a plaque at a Society Winter meeting.
 - B. The project's owner shall receive a plaque to be presented at a refrigeration program meeting of the chapter.
 - C. The chapter nominating the winning project shall receive a felt patch to go on the chapter award banner. Patch will be presented at the CRC following the Society award presentation.
 - D. The documentation accompanying the nominated and the winning projects will be made available to the Journal and to the Insights.
5. The chapter's eight (8) page submittal shall be as follows:
 - A. The front cover shall be the submission form.
 - B. The second 8-1/2" x 11" page shall contain no more than a two paragraph overview of the project with a brief explanation of the factors supporting the nomination.
 - C. The next four 8-1/2" x 11" pages shall contain a description of the project typed in 12 point font. The page shall be double-spaced with 3/4" left and right margins, and 1" top and bottom margins.
 - D. The last two pages of the project shall consist of two 8-1/2" x 11" sheets containing drawings, plans, schematics, or pictures of the project which will give the judges a clear understanding of the merits of the understanding of the merits of the project.

REFRIGERATION COMFORT COOLING AWARD FOR PROJECT EXCELLENCE

6. The selection criteria shall be re-evaluated by the Society Refrigeration Committee every thirty-six (36) months beginning with the acceptance of this criteria.

ELIGIBILITY

1. Refrigeration shall be defined as any mechanically produced cooling utilization project comfort cooling applications.
2. All projects must be submitted within thirty-six (36) months of the initial operation date of the system.
3. The Refrigeration Comfort Cooling Award is open to all who think their projects or other projects with which they are familiar have achieved some distinction. Projects may be submitted by the designers, architects, engineers, owners, or suppliers. The nominator must inform and have approval from the owner of the installation that the entry may be published. The owner's name may be withheld for privacy.
4. A release must be obtained from the owner of the project.
5. Each Chapter may have only one submittal and may devise their own method(s) for selecting their submission.
6. There must be an ASHRAE linkage to the nominee (the prime designer is a member, the installer is a member, the firm is Golden Circle, or the owner, supplier, etc., is a member). Please specify on form.
7. The scoring of the project at the Society level will be per the "Scoring Chart".

**SCORING CHART
FOR
REFRIGERATION COMFORT COOLING AWARD**

		Evaluation	Points		
Problem	A1. Complexity of Problem			A. Problem	
				Ext. Difficult	100%
	Subtotal: PROBLEM - Maximum 20 Points	Sum =		Very Difficult	75%
				Difficult	50%
			Not Difficult	30%	

Concept	B1. Concept - Maximum 10			B. Concept	
				Superior	100%
	B2. Integrated Design - Maximum 5			Excellent	67%
				Very Good	53%
	B3. Sustainability - Maximum 5			Good	47%
				Fair	33%
	B.4 Originality – Maximum 10				
	Subtotal: CONCEPT - Maximum 30 Points	Sum =			

Solution	C1. Performance Criteria Achieved - Maximum 30			C. Solution	
				Superior	100%
	C2. Energy Effectiveness - Maximum 5			Excellent	67%
				Very Good	53%
	C3. Budget Restrictions - Maximum 5			Good	43%
				Fair	33%
		C4. Ease of Maintenance - Maximum 10			
	Subtotal: SOLUTION - Maximum 50 Points	Sum =			
	DISCRETIONARY BONUS - Maximum 10			*	
	GRAND TOTAL				

Reasoning for Bonus:

COMFORT COOLING AWARD SUBMISSION FORM

1. Name of building or project:

Location:

Initial Date of Operation:

Chapter Submitting:

2. Linkage (ASHRAE member with significant role in project):

a. Name:

Last

First

Middle

Membership Number:

b. Address (including country):

City

State/Province

Zip/Country Code

c. Office Telephone:

d.

E-mail address:

e. Company:

f. Member's Role in Project:

3. Designer (if different from above)

a. Name:

Last

First

Middle

ASHRAE Membership Number (if applicable):

b. Address (including country):

City

State/Province

Zip/Country Code

c. Telephone: Office

d.

E-mail address:

e. Company:

4. Owner's release:

I certify that I am the owner or the authorized representative of this project, and hereby grant permission to ASHRAE to use all the enclosed data and information in the judging and subsequent publicity of this project.

Typed Name:

Signature: _____ Date: _____
(Signatures must be on form submitted to ASHRAE)

Title:

Company:

City

State/Province

Zip/Country Code

Office Telephone:

E-mail address:

REFRIGERATION COMFORT COOLING AWARD FOR PROJECT EXCELLENCE

SECTION G: GEORGE C. BRILEY ASHRAE JOURNAL ARTICLE AWARD

1. PURPOSE.

The purpose of the George C. Briley ASHRAE Journal Article Award is to recognize annually an individual for his/her excellence in contribution to the ASHRAE Journal with an article(s) related to refrigeration. The award will serve to heighten general membership awareness of, and interest in, Journal articles related to refrigeration.

Fellow/Life Member ASHRAE member George C. Briley, P.E. is an exceptional ASHRAE member. He has made significant contributions to the ASHRAE Journal. Mr. Briley has published nearly thirty articles related to refrigeration applications in the ASHRAE Journal, including a stretch of two years with an article on various refrigeration applications each month.

2. AWARD PRESENTATION.

The George C. Briley ASHRAE Journal Article Award shall be presented annually but may be omitted if a suitable candidate is not identified. During the ASHRAE Winter Meeting, the George C. Briley ASHRAE Journal Award is presented at the REF Committee meeting. A plaque with the recipient's name, year, and article title will be presented to the lead author. Certificates will be presented to co-authors.

An announcement about the award recipients shall be prepared and submitted to ASHRAE Insights by the Briley Award Subcommittee.

3. ELIGIBILITY.

The award is open to ASHRAE members who have published at least one refrigeration related article in the ASHRAE Journal over the past Society Year. Current REF members are not eligible for receipt of the George C. Briley ASHRAE Journal Article Award.

Topics appropriate for the George C. Briley ASHRAE Journal Article Award include refrigerants, refrigeration system chemistry (e.g. lubricants, contaminants, etc.), project-specific engineered refrigeration systems (including comfort cooling systems), and refrigeration applications (excluding comfort cooling).

4. JUDGING.

After June, ASHRAE Staff will review the previous Society Year's ASHRAE Journal and compile a list of eligible articles. These will be sent to the REF chair to identify eligible articles for REF's consideration.

The chair will appoint a subcommittee of REF to judge the articles after the ASHRAE Annual Meeting. The rating form shown below shall be used for judging the articles with the highest average score winning the award.

George C. Briley Journal Article Award

Rating Articles: Please rate the issue's articles using the following scale:
5 = excellent, 4 = very good, 3 = good, 2 = adequate, 1 = poor

Provide comments for each article as appropriate

<u>Title</u>	<u>Technical Content</u>	<u>Quality of Presentation</u>	<u>Usefulness of Information</u>	<u>Average Score</u>
Vol. x No. a - Article 1				
	General Comments:			
Vol. x No. b - Article 2				
	General Comments:			
Vol. x No. c - Article 3				
	General Comments:			
Vol. x No. d - Article 4				
	General Comments:			

REFRIGERATION COMFORT COOLING AWARD FOR PROJECT EXCELLENCE

Refrigeration Committee Issue Update

January 30, 2011
Tom Werkema

Climate Change - International

- 5 Meetings plus Meeting of Parties
 - Cancun, December
 - Most positions entrenched
 - Discussion on land use, land use change & forestry
 - Discussions on Financial Contributions
- US Position
 - No mandate other than Waxman/Markey House bill
 - WM died with year-end 2010
- 2011 – Meeting of Parties in Durban, South Africa
 - Likely at least two additional meetings—one in Bonn, Germany

Climate Change – Cancun Agreements

- Near unanimous – Bolivia overruled
 - “consensus does not mean unanimity”
- Country Pledges under Copenhagen Accord (2009) placed in text
 - Acknowledges efforts insufficient to keep warming below 2°C
- Establishes Green Climate Fund - \$100b by 2020
 - “...variety of sources, public and private, bilateral and multilateral, including alternative sources.”
- Establishes Technology Executive Committee
- Does not address emission long term goal, target year
- Includes lofty intentions, limited detail
- Fate of Kyoto Protocol uncertain
 - Japan, Russia will not participate in Second Period
 - Japan postponed emissions trading to next parliament
 - Uncertainty for continued emissions trading, CDM

International Trade Issues

- US – Carbon tariffs to “level playing field”
 - 10 D’s sent concern letter to Obama in Spring
- China Appeals to Exclude Exports in Climate Deal
- Kyoto agreement discord may again lead EU consideration of border adjustments
 - French leadership?
- Montreal Protocol negotiated with WTO to “ban trade with non-Parties” for Ozone Depleting Substances

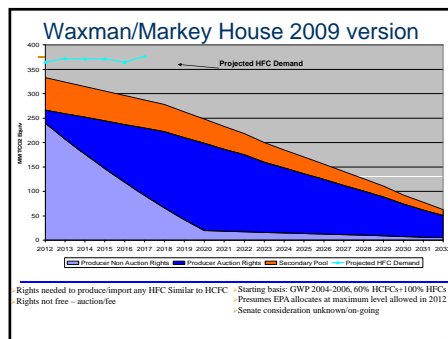
Congress Climate Change

- President Obama conceded cap & trade is dead
 - “We may end up having to do it in chunks, as opposed to some sort of comprehensive omnibus legislation.”
- Republicans focused on EPA GHG Regulations
 - Does Administration offer to delay in exchange for clean energy??
- Senate has drafted HFC legal text – but not introduced
- Does HFC industry proceed independent of other climate legislation?

Senate: 53 D 47 R House: 197 D 242 R
re-election 23 D 10R

Montreal Protocol

- US, Canada, Mexico introduced HFC Amendment – again in 2010
 - India strong opposition, China less
 - Workshop in India on Feb 18, 2011
 - 91 Countries signed interest in continuing discussions
 - 40 countries in 2009
- Multistakeholder Meeting in Washington January 20
 - Support for new Amendment in 2011
 - US non committal



Summary

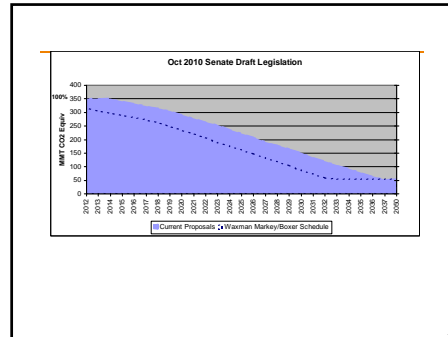
	House Waxman Markey/Boxer	Senate Proposal
Status	Passed 2009	Maybe introduced in 2011
Volume	New 333 MMT CO2 equiv in 2012	150% Market Demand (=300 MMT CO2 equiv) in 2014
Baseline Year	2009	2008-2009 HFC/HCFE production
Chemicals Regulated	HFC and 3 HFO - GWP Pool (not chemical specific)	
Distribution	Auction and Fees	Fees Only
Participants	Producers/Importers and Secondary Pool	Producers/Importers
Reserves	From Secondary Pool	Separate reserves for new entrants
15% Mn Level Reached	Year 2033	Year 2037

Nov 2010 Senate Draft Legislation

- Clean Air Act Amendments – Title VI
 - (section 619 – HFCs)
 - Establishes two Class II lists HCFCs, HFCs
 - Initial HFCs: 23, 32, 41, 125, 134, 134a, 143, 152, 152a, 227ea, 236cb, 236fa, 245ca, 245fa, 365mfc, 43-10mce
 - Includes HFO-1234yf and HFO-1234ze
 - EPA may add chemicals up to 6 carbons, that contain hydrogen & fluorine and may contain oxygen
 - Used as substitutes for Class I or Class II

Nov 2010 Senate Draft Legislation

- Begins Jan. 1, 2014
- Producers/Importers must have allowances for each MT CO₂ eq
- Fees:
 - \$1/MT CO₂ eq
 - \$0.20/ MT CO₂ eq per year increase thru 2019
 - Inflation adjustment 2020 and thereafter



Nov 2010 Senate Draft Legislation

- Starting point: EPA establish in 2013 based on "representative" annual consumption
 - Applies in 2014
- Allowance baseline 2004, 2005, 2006 average HFCs + HCFCs*60%, GWP weighted
- Banking allowed
- EPA may not allocate all allowances

Nov 2010 Senate Draft Legislation

- Strategic Reserve
 - Contains lump sum of 0.75% of total HFC allocations for 2014-2019
 - "technology readiness assessment"
 - In 2014, 2020, 2029
 - Petition showing market inability to meet phase down
- New Entrant Reserve
 - Any left over allocations each year
 - Available by petition to producers/importers
 - Must show significant action after 2004, 5, 6 to produce or import in "substantial quantities"
 - After applicable year, either retired by EPA or deposited into Strategic Reserve (2014-2019 only)

Nov 2010 Senate Draft Legislation

- Other Clean Air Act provisions will apply to HFCs
 - SNAP
 - Technician certification
 - Recovery, recycle
 - No venting rules

State "Patch Work" Initiatives

- Western Climate Initiative
 - Cap & Trade-rules published
 - Oct 29, 2010
 - Commences 2012 utilities
 - Oil refineries 2015
- RGGI
 - Auctions at Utility for Pollution rights
 - Plants >25MW
 - 188 M Short Ton cap
 - (-2.5%/year beginning 2015)
- Midwestern GHG accord
 - Most Governor D's replaced by R's
 - Establish reduction targets and time frames, tracking system
 - Develop cap-and-trade mechanism, carbon fuel standards

States

- California
 - Resolution 23, defeated on November ballot; Repeal AB 32, Climate Change Legislation, until unemployment < 5.5%
 - Air Resources Board released cap & trade allocation design
 - "full steam ahead"
 - On-line in 2012
 - Published Refrigeration rules for A/C and large Refrigeration Systems
 - Registration
 - Certified technicians
 - No venting
 - Monitoring
- Massachusetts
 - 25% below 1990 by 2020 – preparing regulations

US EPA – Major Activity

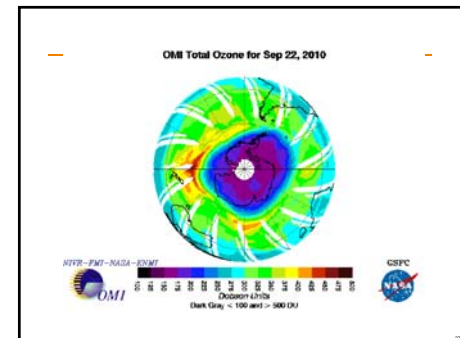
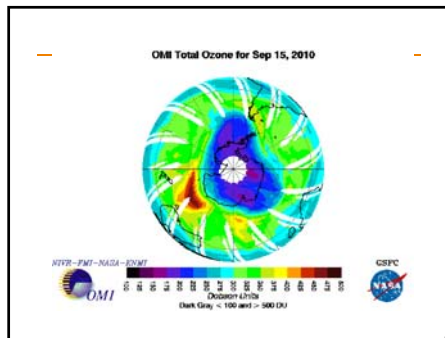
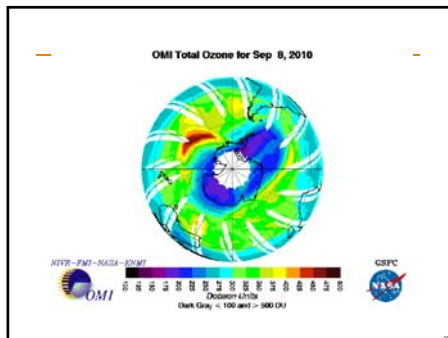
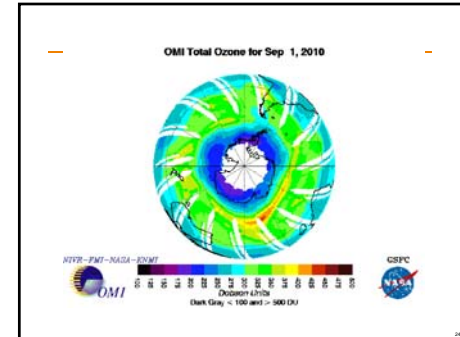
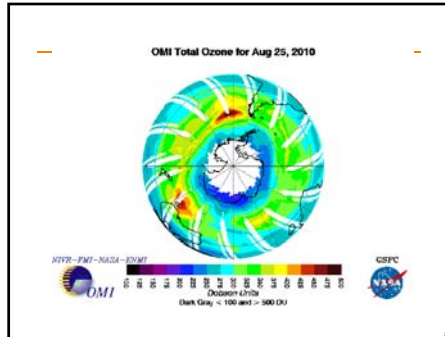
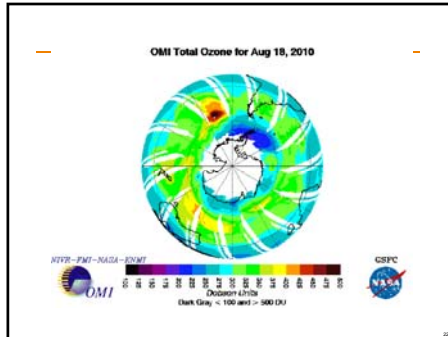
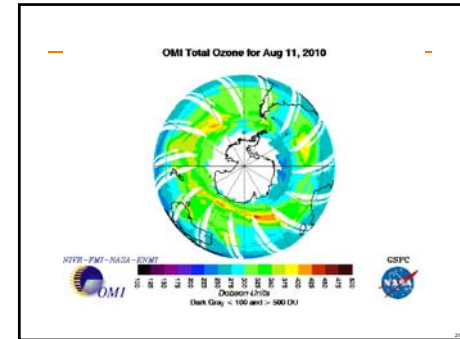
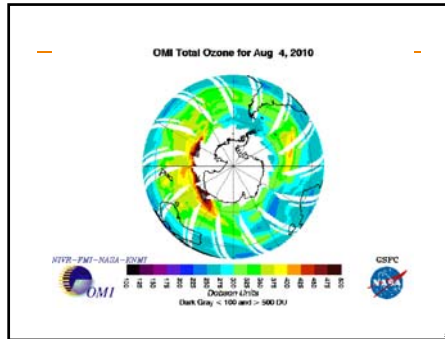
- Published "endangerment" Final Rule Dec 7, 2009
 - 25,000 MT CO₂e, not 250 MT hazardous pollutant
 - 18 States support, 11 States against
- Determined GHG subject to Clean Air Act in January, 2011 (3/29/10)
- Auto GHG standards for cars and "light-duty trucks" thru 2016 (4/1/10)
 - 62 MPG in 2025
- Tailoring rule (5/13/10) Air Permits
 - Covers new facility 100,000 MT CO₂e emission 1/1/11
 - Covers increases at existing facilities by 75,000 MT CO₂e 7/1/11
- GHG Reporting Rule
 - 25,000 MT CO₂e /yr
 - First reports due March 30, 2011 for 2010 calendar year
 - Also covers HFCs
- Confidential Business Information – August, 2010
 - FTC disagreed with EPA

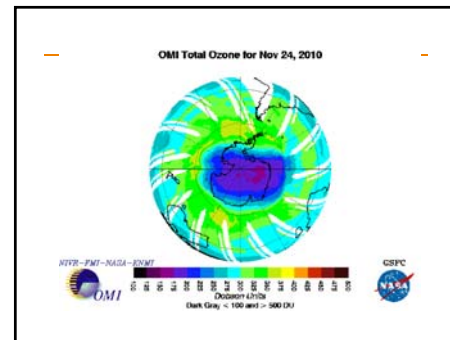
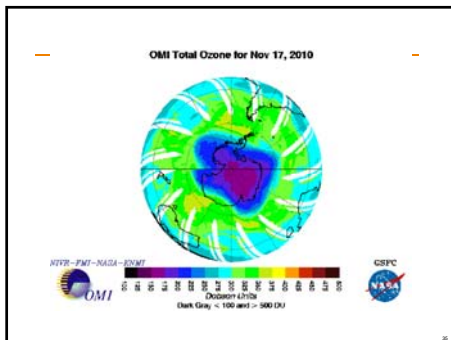
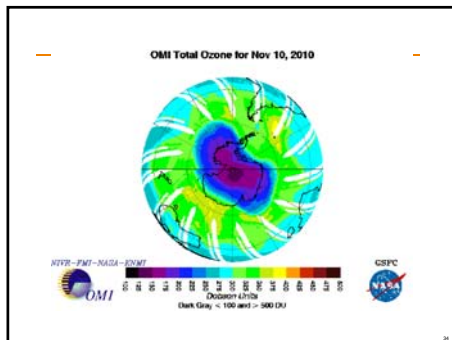
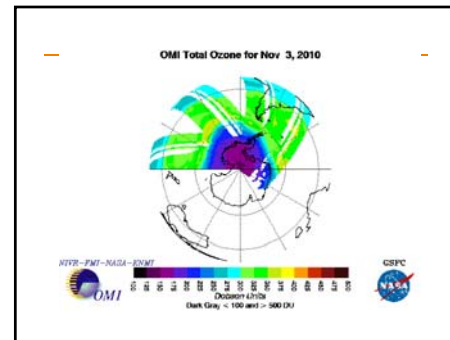
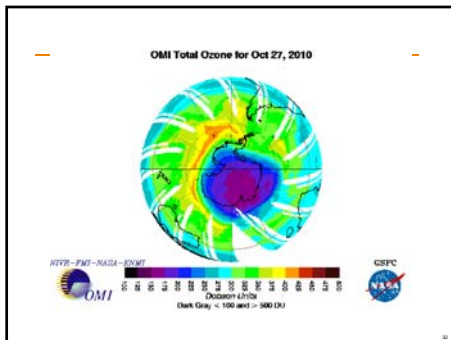
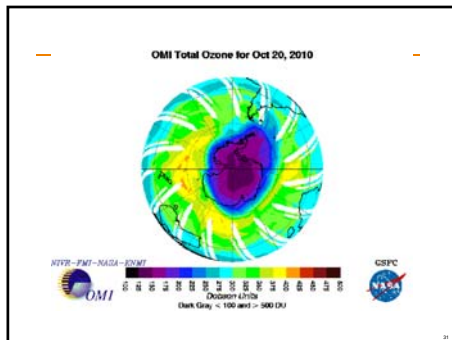
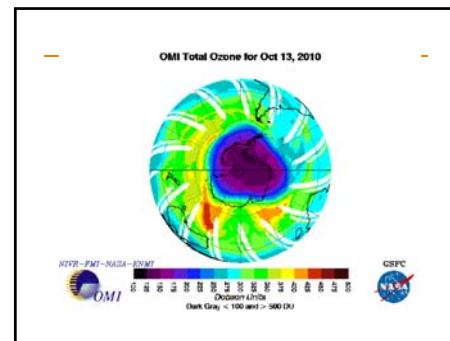
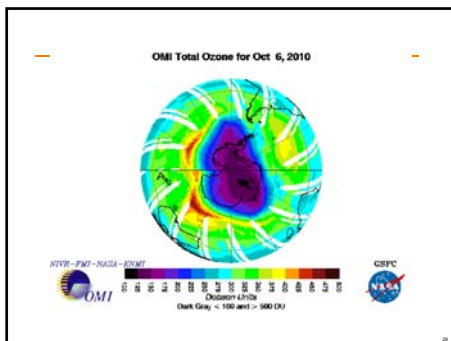
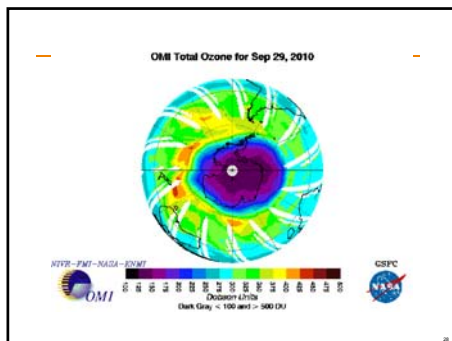
US EPA – Major Activity

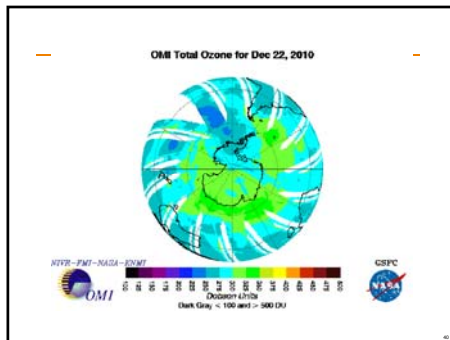
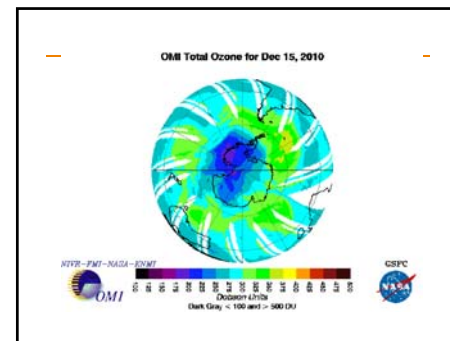
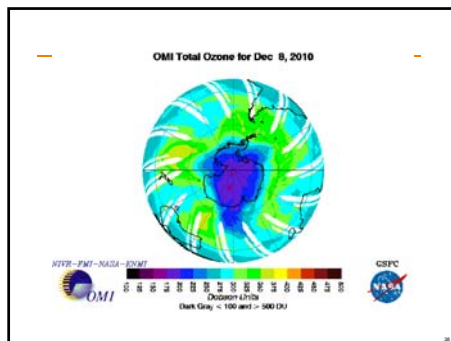
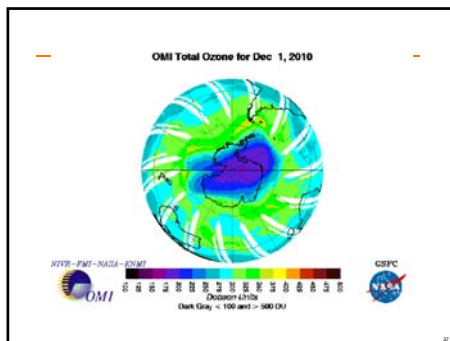
- Clean Water Act applicability for GHGs
 - Fifth consulting group meeting 9/10
 - Regulations forthcoming
- Power Plants GHG Reduction – July 2011 proposal, May 2012 final
 - Oil Refineries – December 2011 proposal, November 2012 final
- 2nd US Circuit Court of Appeals – allow GHG emitters to be sued
 - "public nuisance"
 - Administration weighed in against appeals court in decision in appeal to Supreme Court
 - EPA Regs mean no need for Courts
 - Possible Congressional action would preclude
 - Supreme Court undecided, to date, on accepting case
- 156 lawsuits filed on the major EPA regulations
 - Advocacy groups, businesses, trade associations, gov't entities
 - Likely to continue for next 24 months
 - Envois lined up to fight against legal challenges
 - US Circuit Court of Appeals for the District of Columbia declined to establish injunction
 - Temporary stay for Texas (Jan 7)

Europe

- Review of Fgas Regulation 842/2006
 - Commission proposal by 4/7/2011
 - Consultant Technical Study nearing completion; includes HFO availability
- Expected Considerations
 - Policy, use prohibitions and scenarios
 - International consumption reduction arrangement (& scenarios)
 - Commission will provide report under Regulation Article 10(2) by May 2011 and determine legislative changes need
- Expected Outcomes
 - Revised regulation: 2013/14 implementation, earliest July 2013
 - Further HFC bans
 - Foam blowing, domestic refrigeration???
 - Overall phase-down and quota system with 30% reduction by 2020
 - Base year 2005-2007







RESEARCH TOPIC ACCEPTANCE REQUEST (RTAR) FORM 1634-RTAR
Sponsoring TC/TG/SSPC: Refrigeration Committee (REF)

Title:

Guide for Sustainable Refrigerated Facilities and Refrigeration Systems

Applicability to ASHRAE Research Strategic Plan:

The proposed Guide will support four of the eleven Goals in the ASHRAE Research Strategic Plan 1010-2015.

“Goal 1: Maximize the actual operational energy performance of buildings and facilities.” Refrigeration systems generally operate year-round and must maintain design storage or product temperatures at all times, resulting in large safety factors, often with attendant inefficiencies during “average” operation. For refrigerated warehouses, food processing facilities and supermarkets, refrigeration is commonly the largest energy end-use. In a global context, refrigeration is increasing rapidly as modern “cold chains” are being built in developing countries to feed an increasingly urban population. The Guide will describe improved design techniques, examine the use of performance modeling tools, and address benchmarking and performance measurement methods, all of which help to maximize energy efficiency.

“Goal 2: Progress toward Advanced Energy Design Guides (AEDG) and cost-effective net-zero-energy (NZE) buildings.” The design of refrigeration systems and refrigerated facilities is commonly performed by design-build contractors or owner staff and a small number of specialized engineers, with existing codes primarily addressing safety, not energy efficiency. This is fundamentally different from commercial buildings and HVAC design, with its large A&E community and extensive code-prescribed design framework. The Guide will provide analysis methods and metrics as well as case study examples that support progress towards net-zero-energy design, and will also address the inherent thermal storage capability in refrigerated storage facilities (i.e. Needed Research example 4).

“Goal 8: Facilitate the use of natural and low global warming potential (GWP) synthetic refrigerants and seek methods to reduce their charge.” The Guide will include design and analysis guidance and examples of reduced charge systems using indirect fluids such as glycol or phase-change CO₂, as well as methods for using natural or low GWP refrigerants in low charge systems or non-traditional applications. A methodology to evaluate direct (leakage) and indirect (energy use) global warming impact of alternative refrigeration designs will be included.

“Goal 10: Significantly increase the understanding of energy efficiency, environmental quality and the design of buildings in engineering and architectural education.” The Guide will be suitable for use by engineering programs, training courses and technology design competitions. The content would be usable to students studying the design, interactions and performance of refrigerated facilities and refrigeration systems. Sustainable design and the need to improve utilization of global food sources are two topics of high interest and attraction to many engineering students, and new engineers entering the industry are “in tune” with the use of computerized simulation and analysis methods.

Research Classification:

Technology Transfer

TC/TG/SSPC Vote:

Email ballot with one of twelve voting members not responding)
10-0-0 CNV

Reasons for Negative Votes and Abstentions:**Estimated Cost:**

\$300,000
\$30,000 budgeted for 2011-2012.

Estimated Duration:

24 months

The Workstatement will define the deliverables that can be provided with the initial \$30,000 funding, as well as the cost and schedule for the entire project. The Workstatement will define expected in-kind and volunteer contributions in addition to the activities funded by the proposed \$300,000 budget.

RTAR Lead Author:

Doug Scott
dscott@vacomtech.com

Expected Work Statement Lead Author:

Doug Scott
dscott@vacomtech.com

Co-sponsoring TC/TG/SSPCs and votes:

N/A

Possible Co-funding Organizations:

Potential co-funding sources will be identified prior to the Winter meeting in Las Vegas.

Potential in-kind contributions include:

- Field research and data collection by California utilities focused on facility loads and system efficiencies. A significant amount of existing data collection may be available from PG&E.
- Corporations (supermarket and refrigerated warehouse examples) providing access to electronic monitoring systems to obtain performance data as well as information concerning loads and operating characteristics at their facilities. Several existing installation with real time performance monitoring would very likely provide data use in development of metrics and case studies.
- Example simulation studies and sample input files, libraries and output files from DOE2.2R and EnergyPlus simulation runs.

Other organizations also consider this to be an important topic and essential within their own organization. IIAR has expressed interest in being involved with the proposed Guide as well as noting they may also produce work of a similar nature. IARW (GCCA) has broad interest in design, construction and operation of cold logistics facilities, and counts as members many of the companies who would benefit from the proposed Guide. GCCA likely has similar interests and may have work underway that could be complimentary to the proposed Guide. Since ASHRAE has an MOU with GCCA a coordination call with GCCA would be beneficial once the RTAR is approved, to identify possible financial support for elements of most interest to GCCA and discuss possible contribution from IARW members, such as operating data for case studies and development of performance metrics.

Application of Results:

The proposed Guide will not directly affect existing Handbook or other publications. The Guide will reference Handbook chapters as appropriate to maintain continuity and context. The intent of the Guide will be to thoroughly explain the subject matter without repeating detailed information that already exists in other readily available ASHRAE publications. The information in the Design Guide would be suitable for use in an ASHRAE short course or e-Learning program.

Refrigeration Handbook Chapter 5 (Component Balancing in Refrigeration Systems) could very likely be rewritten with a broader scope and more modern analytical basis using information developed for the Guide. Elements from the Guide may also be used in future updates to Refrigeration Chapter 23 (Refrigerated-Facility Design) and Chapter 24 (Refrigerated-Facility Loads) for consistency and/or where the Guide shows the need for expanded technical content.

While refrigeration systems and facilities have not been subject to building efficiency standards in the past, this is changing. Recent Federal Walk-in appliance standards for Walk-in Coolers and Freezers have become law and state (i.e. California) building standards for refrigerated warehouses have now taken effect. In spite of the existent

difficulties (e.g. lack of component standards and most systems custom-designed from components) additional standards for warehouses, walk-ins and supermarket refrigeration systems are being advanced. The Guide will bring forward new system design methodology and analysis methods for refrigeration systems and refrigerated facilities, contributing to a more informed approach to appliance and building standards.

ASHRAE Standards for refrigeration equipment have not been widely utilized by industry (e.g. Standards 20, 22, 23, 25, and 64). No ASHRAE or AHRI standards for refrigeration condensers, evaporator coils or condensing units are referenced in manufacturers' literature. Only commercial refrigeration compressors are tested to standards and published with certified ratings (with a very important discrepancy between rated and applied conditions). The recent work to develop a Federal Walk-in Cooler and Freezer energy performance standard as required by the Energy Independence and Security Act of 2007 (EISA), suffered from the lack of appropriate existing standards or sufficient technical involvement to fully address the interactions between refrigeration system components. This standards-making for refrigeration equipment and systems is occurring with limited ASHRAE involvement. While the Guide will not discuss standards directly, it will seek to educate and explain the complexities and interactions that exist with a component-based systems and related controls, in contrast to packaged equipment.

State-of-the-Art (Background):

ASHRAE, through the AEDG series and other publications as well as the ASHRAE energy standards, has provided extensive information for sustainable design of commercial buildings. Even though they have high energy intensity and operation continuously, refrigerated facilities and refrigeration systems have not been addressed. Energy and building codes generally treat refrigeration as "process loads" (the California Title 24 standard for Refrigerated Warehouses is a recent exception). The Guide will provide information suitable for use in ASHRAE learning materials and programs, though ASHRAE Learning Institute, Workshops or other channels. The Guide will be valuable to international members, particularly in developing countries with rapid cold chain development.

The ASHRAE "Design Essentials for Refrigerated Storage Facilities" completed under RP-1214 provides an introduction and overview of refrigerated warehouse construction features and will be complimentary with the proposed Guide. Past ASHRAE research has examined design refrigeration loads, component performance and methods for improving energy efficiency. Less work has been undertaken to evaluate refrigeration system interactions, energy optimization methods and performance metrics from a life-cycle perspective.

A large gap exists between system design practice, focused on peak design loads, and operating performance in facilities, which is often, at best, evaluated on a very simplified kWh/SF basis. The Guide intends to "fill-in" this gap in terms of conceptual discussion, technical methods, metrics and examples.

The current design practice for refrigerated facilities and systems reflects several inherent characteristics:

- Perishable product requires 100% design including worst-case weather and load conditions.
- Loads and operations change over time and many facilities operate for decades.
- Many refrigeration system components (e.g. evaporators, condensers, condensing units) are not rated to a published standard and ratings are not certified, unlike most packaged HVAC equipment. There is no established method for evaluating components when combined as a system.
- For components that are rated to a standard and certified (e.g. commercial refrigeration compressors), the rating point is often different from the common-practice operating conditions, and no adjustment factors or design methodology has been advanced by industry to address these discrepancies. Several examples of this issue were presented in a January 2010 Seminar in Albuquerque titled "Ratings vs. Actual Performance in Refrigeration Systems".

Based on the preceding factors, system designs often replicate what worked on prior projects, use rules-of-thumb, or rely on individual expertise gained through many years of work in a particular industry sector. Load calculations and equipment selection methods remain very conservative to allow for these unknown factors; in system operations, equipment performance, as well as current and future owner expectations. Owners and contractors are naturally risk-averse when design must maintain conditions in spite of numerous unknowns.

Energy modeling is almost never used as part of the design process for a refrigerated facility unless funded by utility

programs or (recently) required for LEED certification. Consequently, investment choices are more likely to be determined on the basis of first cost and/or expert opinion than through life-cycle analysis.

Technical analysis of refrigeration systems has not kept pace with modern business practice, which in other disciplines requires precise and measurable performance to support marginal financial analysis, as well as metrics to manage ongoing operating costs on the basis of expected vs. actual performance.

The use of the refrigeration cycle for heating or dual use (cooling and heating) has gained attention in recent years, including industrial and commercial systems using natural refrigerants (ammonia and CO₂), with potentially large benefits in both operating costs and total-carbon reduction. The use of both heating and cooling energy streams from a refrigeration system may be one of the most tangible opportunities to reduce total energy consumption in commercial and industrial facilities. The refrigeration system design practice and analysis methods which will be described in the Guide are directly applicable to these “high lift” refrigeration and heat pumping systems. The opportunities for energy savings could remain unrealized unless the required engineering methods are advanced.

Rapid change has occurred in the global “food chain”; from food production and processing, to logistics and distribution, to retailing. Corporations are becoming much more sophisticated and analytical in order to remain competitive and meet demands of their customers. Expectations include: more precise technical tools to accomplish stringent design practice where each design option must be justified financially; methods and targets for measurement of actual performance vs. expectations; and a means to accomplish continuous process improvement.

The existing energy modeling tools for refrigeration systems include the following:

- DOE2.2R, originally developed in 2000 by J.J. Hirsch & Associates. DOE2.2R uses traditional text-based model development and requires a high skill level. A refrigeration version of the eQUEST graphical interface is available but lacks automated refrigeration system development wizards and component libraries necessary for broad use as a routine analysis tool.
- EnergyPlus 6.0 (2010), developed by DOE has recently incorporated supermarket refrigeration capability.
- EPRI Supermarket Simulation Tool 3.0, developed in 2000, but apparently no longer supported by EPRI.

The existing refrigeration simulation tools and needs were discussed in a June 2009 ASHRAE Forum titled “What is Needed for the Advancement of Refrigeration Computer Simulation”. Input from the Forum was considered in development of this RTAR.

The development and use of commissioning for refrigeration systems and refrigerated facilities lags behind commissioning of HVAC systems and commercial buildings. Commissioning, when employed, is often limited to post-startup fine tuning. ASHRAE Guideline 0 and Guideline 1 do not address refrigeration systems explicitly. The available technical methods for commissioning for commercial and industrial refrigeration systems are very limited and do not have a clear relationship to system performance or energy efficiency metrics. The CIBSE Commissioning Code R:2002 for Refrigerating Systems is the only commissioning guide for refrigeration systems identified to date, and does not include procedures related to defining or testing system efficiency.

The Guide will provide information usable in developing refrigeration commissioning procedures; to more effectively define initial owner needs, relationship of system design practice to owner requirements, technical methods for validating component and system operation, and overall performance vs. design expectations.

The recent Federal Walk-in Cooler and Freezer performance standard development is instructive. Misunderstanding in regulatory efforts that consider refrigeration systems as a single “appliance” will potentially result in a failure to realize the intended efficiencies of the regulations. The Guide will help provide a better understanding of refrigeration system component, interactions and related system engineering.

Advancement to the State-of-the-Art:

The Design Guide is expected to provide a conceptual framework, specific analytical methods and examples to encourage technical improvement in several areas:

- Advance the use of mass flow based refrigeration system design and system balance calculations, both for

large complex industrial system and for commercial systems (e.g. supermarkets) with accurate methods for factors such as productive and non-productive superheat impacts, and understanding of system balance at off-design and part load conditions.

- Establish a greater emphasis on system operation throughout the year and incorporation of annual energy modeling in design decision-making; allowing broader and more frequent consideration of fundamental design choices and component options as part of life-cycle alternatives analysis.
- Promote a renewed examination of heat recovery and heat pumping potential from refrigeration systems, including a analytical methods to compare heat pumping as an alternative to conventional heating and cogeneration plants, from both site and source energy perspectives.

Supermarkets and similar commercial refrigeration systems once used heat recovery whenever possible; with heat recovery in all US supermarkets meeting at least two-thirds of annual heating needs in the 1970's and 80's. Since then, heat recovery has declined markedly, due to increased refrigerant cost and concern for refrigerant leakage, as well as changes in store demographics (e.g. growth of big box supermarket retailers). Current heat recovery likely accounts for 10% or less of national store heating needs. Heat recovery has similarly declined in other industrial and commercial applications with available heat from refrigeration. System design options will be described in the Guide to achieve heat recovery with little or no impact on refrigerant charge. In addition, an analytical framework will be provided to compare the total impact of electric and thermal energy use, as well as the impact of refrigerant emissions on a total-carbon footprint for a facility [The analysis technique will focus on the methodology and provide an example, rather than seek to determine exact indirect or direct carbon conversion factors].

Large energy savings are possible through application of improved system design practice; use of new system types and technologies which are currently cost effective using a life-cycle perspective; employing advanced control strategies; and incorporating real-time performance monitoring to achieve continuous energy improvement. Compared with current standard practice, the potential savings through use of advanced energy efficient refrigeration systems and control methods can reach 20-50% in refrigerated warehouses and 20-35% in retail food stores.

Commercial building code compliance is often achieved through use of a performance option, where the building meets or is better than a minimum “energy budget” defined through energy simulation using prescriptive efficiencies for various building and system elements. Owners, contractors and engineers generally feel strongly that a performance path should be available, allowing trade-offs between various design choices. New code requirements (e.g. California Title 24 standards for refrigerated warehouses and those proposed for supermarkets) typically begin with mandatory requirements and evolve toward a performance method as technical information and methods allow. The Guide would begin to examine the numerous and essential topics which require research and/or improved test and rating standard before a performance option could be used for facilities with refrigeration.

Justification and Value to ASHRAE:

ASHRAE members involved with refrigerated facility design, construction or operation will utilize the Guide to address the increasing common expectation that the facility design process explicitly consider “sustainability”. The owner interest may take the form of LEED certification, desire for a more holistic design and commissioning process, or simply the expectation to predict and deliver lower energy use and lower operating cost.

The Guide will include a significant amount of guidance in the form of examples, case studies and simplified “how to” tools. The Guide is expected to be of interest and be utilized by many individuals who may not currently be ASHRAE members but who are involved in refrigeration, potentially increasing ASHRAE membership, particularly in developing and recently developed countries.

Wherever possible, new methodology advanced in the Guide will be provided electronically (e.g. Excel spreadsheet), either on a CD provided with the Guide, or as a download from ASHRAE. Users can gain immediate utility without additional training or building their own tools. An example of the intent: The explanation of mass-flow based system design and an example spreadsheet would allow a supermarket chain to specify that their refrigeration systems be designed by their system vendors (or consulting engineers) following the “ASHRAE mass-flow based design methodology”.

The Guide will emphasize ASHRAE’s role in refrigeration, particularly related to sustainability, research and advancement of standards for components and systems. With regulatory attention turning to refrigeration efficiency, the technical rigor offered through ASHRAE involvement gains greater importance.

The Guide will consider global needs in developing and recently developed countries with a high rate of “food chain” growth, notably India and China. These areas will see a high rate of near-term growth and also often include expansion by major international food chain firms and retailers as well as firms based in the developing countries. Facility and system design, refrigerant choices and other policies often are viewed with a “clean sheet” in these countries, offering a timely opportunity for ASHRAE to provide valuable guidance.

Objectives:

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 often 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.

“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.

The Guide will consist of five primary sections:

1. Refrigerated Facility Design and Cooling Loads
2. Refrigeration System Components and System Design
3. Controls and Control Strategies
4. Energy Modeling and Performance Analysis
5. Commissioning, Operations and Benchmarking

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 phase-out of HCFC-22 and the phase-down of HFC refrigerants provide opportunities for change to more sustainable alternatives; however alternatives can often be less efficient and more costly to operate. The Guide will provide a consistent method to compare direct and indirect greenhouse gas (GHG) contribution, as well as provide example system alternatives (e.g. low charge systems, ammonia or indirect CO₂) that reduce HFC exposure without excessive increased energy cost.

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.

The project deliverable will be a hardbound ASHRAE book, similar to the ASHRAE GreenGuide. A CD will be included with the Guide (or offered as a download from ASHRAE), including electronic versions of tables and spreadsheets for increased utility and flexibility.

Key References:

ASHRAE January 2010 Seminar: “Ratings vs. Actual Performance in Refrigeration Systems”.

ASHRAE June 2009 Forum: “What is Needed for the Advancement of Refrigeration Computer Simulation”.

ASHRAE Green Guide, The Design, Construction and Operation of Sustainable Buildings, Second Edition 2006.

CIBSE Commissioning Code R:2002, The Chartered Institute of Building Services Engineers London, 2002.

ASHRAE “Design Essentials for Refrigerated Storage Facilities” completed under RP-1214

CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011

ASHRAE Refrigeration Committee (REF)
Report to Chapter Technology Transfer Committee
2011 Winter Meeting, Las Vegas

REF Consultant: Donald A. Siller, P.E.
Donsiller@aol.com

January 28, 2011

CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011

TOPICS

- Refrigeration Update
- Related Society Activities
- Sister Organizations
- Chapter Program Support
- Refrigeration Awards
- Chapter Interest in Refrigeration

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CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011

- Refrigeration Update
 - Green Chill Webinar – Thurs., 8/19/10, 3 – 4:30 p.m.
 - Sponsor: EPA Green Chill
 - Title: Ammonia Systems for Supermarkets
 - Presenters:
 - Kelly Witman – Director EPA Green Chill Advanced Refrigeration Partnership
 - Caleb Nelson – Group Manager for CTA Architects Engineers Refrigeration Group
 - Bruce Badger – President, IIR
 - Eric Smith – Technical Director, IIR

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CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011

- Refrigeration Update
 - Seminar 22 (Advanced) – Monday, 1/31/11, 8 – 9:30 a.m.
 - Sponsors: REF, TC 3.1 (Refrigerants & Secondary Coolants) TC 8.1 (Positive Displacement Compressors)
 - Title: Vapor – Compression Cycle Systems and Components with Natural Refrigerants
 - Topics:
 - New CO₂ Compressor Design
 - Natural Refrigerants in Supermarket Refrigeration
 - Lab Testing and Evaluation of a Transcritical CO₂ Retail Refrigeration System
 - Ammonia – The Natural Refrigerant

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CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011

- Refrigeration Update
 - DOE Information and Feedback Session – Tuesday, 2/1/11, 8:00 a.m.
 - Sponsor: DOE
 - Title: Roadmap for Next Generation Ultra-Low GWP Refrigerants
 - Goals:
 - Inform ASHRAE Members and get their Feedback on Issues relevant to the Industry
 - Define Research Needs and R & D Path to Facilitate Implementation of Low GWP Refrigerants

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CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011

- Refrigeration Update
 - Refrigeration Management Program
 - ASHRAE in cooperation with other organizations wants to help develop a Program to Manage Refrigerants throughout their Life Cycle.
 - Lesson from using CFC and HCFC Refrigerants that they can impact the environment
 - REF assisted in defining Scope, Objectives and Membership of an Ad Hoc Committee
 - Goals of Committee
 - Develop a concept for a National Refrigerant Management Program
 - Specify Actions ASHRAE can take to Support Development and Implementation of Program

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CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011

- Refrigeration Update
 - 2010 Refrigeration Volume of ASHRAE Handbook
 - Completely re-arranged and updated
 - Includes completely new chapter (R 03) titled, “Carbon Dioxide Refrigeration Systems”
 - Research Project is under development: “Guide for Sustainable Refrigerated Facilities and Refrigeration Systems”
 - RTAR will be submitted at ASHRAE Winter Meeting in Las Vegas

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CTTC REF Consultant Report 2010-11
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- Refrigeration Update
 - ASHRAE Guideline for Commissioning of Refrigeration Systems
 - REF developed a proposed Title, Purpose, and Scope for the Guideline
 - Guideline as proposed is intended to cover Refrigerating Systems used in Air Conditioning Applications
 - Not intended to cover Refrigerating Systems used in Cold Storage, Low Temperature, Transport, Industrial or Process Applications

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- Related Society Activities
 - REF
 - ANSI/ASHRAE Std 15: Safety Standard for Refrigeration Systems
 - Refrigeration Technical Committees, (10) Section 10 TC's
 - Refrigeration Handbook
 - Refrigeration Standards
 - Refrigeration Research
 - Refrigeration Programs

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- Related Society Activities
 - Other Refrigeration Related TC's
 - TC1.3: Heat Transfer and Heat Flow
 - TC3.1: Refrigerants and Secondary Coolants
 - TC3.8: Refrigerant Containment
 - TC8.1: Positive Displacement Compressors
 - TC8.2: Centrifugal Machines
 - TC8.3: Absorption and Heat Operated Machines
 - TC8.5: Liquid to Refrigerant Heat Exchangers
 - TC8.9: Residential Refrigerators and Freezers

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- Sister Organizations
 - IIAR
 - Primary Members: End User Mgmt., Contractors, Engineers, Manufacturers, (Companies) Academics, Reps, Wholesalers
 - Focus: Education, Design – Natural Refrigerants (NH₃, CO₂)
 - Annual Meeting: March 27 – 30, 2011, Orlando, Florida
 - RETA
 - Primary Members: Operators, Technicians, End Users, Contractors, (Individuals) Engineers, Academics, Manufacturers, Reps, Wholesalers
 - Focus: Education, Training – Industrial Refrigeration
 - Local Chapter Meetings and Annual Meeting
 - RSES
 - Primary Members: Service Technicians, End Users, Contractors, (Individuals) Manufacturers, Reps, Wholesalers
 - Focus: Education, Training – Commercial Refrigeration
 - Local Chapter Meetings and Annual Meeting
 - Others – ACCA, ASTI, IIR, GCCA/IARW/WFLO

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CTTC REF Consultant Report 2010-11
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- Chapter Program Support
 - Updated List of Speakers on Refrigeration Topics
 - Posted on REF Webpage
 - Example of Speakers List
 - Link to REF page and Refrigeration Speakers List
 - <http://www.ashrae.org/members/page/797>
 - REF will Update and Expand Content on REF webpage to make it more useful

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ASHRAE Refrigeration Speakers List

Name	Topic*	Organization	Chapter	Travel?	Honorarium?
Region I					
Marvin Timm	Safe Use of CO ₂ 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	CIACO	Toronto		
Region III					
Mike Gatz	VFD's and Motor Control	Schneider Electric and HVAC/R and Piping	Lehigh Valley (Allentown, PA)	Yes	
John Anastro	Ammonia Chillers	Johnson Controls/Frick	Baltimore	Yes	None
John Kellwach	Low Charge Ammonia Chillers	EVAPCO, Inc	Central Pennsylvania	Yes	None
Dr. Reinhard Rademacher	System Integration COP plus Refrigeration Energy Efficiency	University of Mayland	National Capital	Yes	Travel Reimbursement
Region IV					
Georg Kasacki	Conceptual and Design Considerations for "Green" Utility, Distributed, & Centralized DX & SC Refrigeration & AC Refrigerants, Secondary Coolants & Components in Synergy for Efficient & Trouble-free Operation of Utility, Distributed, & Centralized DX & SC Refrigeration & AC Troubleshooting – The Art of Resolving a Violated Synergy in Refrigeration & AC Units & Systems	Cryotherm	Atlanta	Yes	\$2,000 plus travel
Region V					
Bob Usher	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

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Region VI					
David Rabolt	Industrial Refrigeration Systems Safety including PPE, ANSI/ISO Standards, etc.	University of Wisconsin - Madison	Madison (WI)	Yes	Travel Reimbursement
Danny Habel	Supermarket Refrigeration Systems Energy Savings Techniques for Commercial Refrigeration Systems	Refrigeration Corp.	St. Louis	Yes	None for local travel. Travel expenses outside local area.
Ron Vahles	Project Management and Design of a Refrigerated Warehouse The Future of Refrigeration Refrigeration Load Calculations Project Management and Design of a FOOD Processing Plant	Vallet & Associates	Illinois		None
Dr. Fajr Harja	Microchannel Heat Exchangers Transcritical and Other CO ₂ Systems Ultra Low Charge Ammonia Systems	University of Illinois	Central Illinois	Yes	Contact Lecturer Travel Reimbursement
Region VII					
Region VIII					
Zahid Arab	Heat Exchangers Low Charge Chillers and Condensers	Bocthem	Dallas	Yes	
Donald Hay	The application of VFDs with Refrigeration Compressors 2010 Winter Olympics Heat Recovery Project	TECEIR	Monterey, MX	Yes	None
Region IX					
Region X					
Region XI					
Ben Winkler	Two-Phase Flow and Gravity Liquid Separators Hydraulic Shock Phenomena	Niantia USA	Highland (Seattle, WA)	Yes	None but possibly travel cost reimbursement
Jim Conner	Energy Management with Microprocessor Controls in Industrial Refrigeration Electronic Control Systems for Industrial Refrigeration	LOGIX	Seattle	Yes	None

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Region XII					
Arthur Garbato	Ultra-low Temperature Cryovents	Air Service Inc.	Chatt Stream (West Palm Beach, FL)		
Jeff Wick	Thermosiphon System Design	Frees-Pro Inc	Jacksonville	Yes	None for local travel. Travel expenses outside local area.
Region XIII					
Prof. Pradeep Bansal	Canada Refrigeration Systems Cooling Item Transfer of CO ₂ at Low Temperature	University of Auckland, NZ		Yes	\$7,000 plus travel
Region A1 Large					
Anders Lindborg	Risk Analysis for Ammonia Refrigeration Ammonia Refrigerant Skills	Ammonia Partnership AB	Subregion II (Sweden)	Yes	Travel Reimbursement
Dr. Andy Pearson	Ammonia Carbon Dioxide	Star Refrigeration	Subregion C (UK)	Yes	Contact Lecturer

* Blue – Industrial Refrigeration
Yellow = Commercial/Residential Refrigeration
White = Both

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**CTTC REF Consultant Report 2010-11
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- Refrigeration Awards
 - "George C. Briley ASHRAE Journal Award"
For best refrigeration related article published during preceding Society Year, presented at REF Meeting in Albuquerque
 - David Hinde – "Carbon Dioxide in North American Supermarkets"
 - "Milton W. Garland Commemorative Refrigeration Award for Project Excellence" presented at Plenary Session in Albuquerque
 - Tom Dosch, P.E., San Diego Chapter – "Innovative Cold Storage Enterprises ICE II" Project
 - "Refrigeration Comfort Cooling Award for Project Excellence"
 - No Nominations

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**CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011**

- Refrigeration Awards
 - REF needs help from CTTC RVC's to encourage Refrigeration Award Nominations for Project Excellence Awards
 - REF streamlined Nomination Submittal Process
 - Chapter submits Nomination to REF at tse@ashrae.net
 - Deadline May 1 for judging
 - Chapter submits copy of Nomination to CTTC RVC for information
 - Only One Nomination per Chapter
 - New Cover Form must be submitted, including contact information for Owner/End User, Designer, and Chapter, as well as the required Owner/End User Release
 - Project Designer receives Plaque at Winter Meeting
 - Project Owner receives Plaque at Chapter "R" Meeting
 - Chapter receives Patch for Award Banner at CRC

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**CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011**

- Advance Chapter Interest in Refrigeration
 - Society Distinguished Speakers List (DSL)
 - REF Speakers List
 - IIAR Annual Meeting Programs
 - RETA Annual Meeting Programs
 - Recommend to Member Services Subcommittee to increase emphasis on PAOE Points for Refrigeration related activities to advance Chapter member interest in Refrigeration

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**CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011**

- **Advance Chapter Interest in Refrigeration**
 - REF will develop a new Refrigeration TC Activities Report, add to Webpage, and include:
 - Cognizant TC for Refrigeration Handbook Chapters
 - Cognizant TC for Refrigeration Standards
 - TC Sponsored Refrigeration Research Projects
 - TC Sponsored Refrigeration Programs
 - Hyperlinks to connect to TC Webpage, to Bookstore/ purchase Documents, and to Meeting Program/ Topics and Speakers.

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**CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011**

- **Advance Chapter Interest in Refrigeration**
 - REF Plans to Conduct Survey of Chapters
 - **Goals:**
 - Determine gaps in Society's Refrigeration related products (Handbook, Guidelines, Standards, Training)
 - Determine other support REF can provide to Chapters

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**CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011**

- **Advance Chapter Interest in Refrigeration**
 - REF needs help from CTTC RVC's
 - How best to Survey, and Communicate with Chapters?
 - How best to Encourage Chapter Member Reviews of Refrigeration Handbook, Refrigeration Standards and Guidelines?
 - How best to generate Requests from Chapters for Refrigeration Programs?
 - REF needs CTTC RVC's help to reach our Grassroots

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**CTTC REF Consultant Report 2010-11
ASHRAE Winter Conference – Las Vegas 2011**

Thank you

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REF MBO's – C. Gage, Chair 2010-2011

OBJECTIVE		Strategic Direction	Responsibility	Planned Completion	Status
1.0	Perform a gap analysis on ASHRAE Refrigeration products and services	1&2			
1.1	Identify existing Refrigeration-related products and services (education, certification, standards, guidelines, publications, webinars, documents)		Jekel, Hay, Kazachki	Oct'10	
1.2	Survey Technical Committees for needs		Liaisons	Feb'11	
1.3	Solicit input from ASHRAE regions, chapters, and members		Gage & Staff	Feb'11	
1.4	Identify needs for International members/chapters	4.14	Chasserot, Lim, Bansal	Dec'10	
1.5	Identify gaps appropriate for ASHRAE and develop recommendations		Scott, Mueller, Manole, Friedman	May'11	
2.0	Enhance communications with members/chapters				
2.1	Expand content on Refrigeration Committee webpage including links to ASHRAE refrigeration resources	3.4	Lim, Manole	Jan'11	
2.2	Review and update refrigeration materials available on society website for chapter use	3.4	Hay, Friedman, Chasserot	May'11	
2.3	Coordinate appropriate communication vehicle with CTTC and initiate	3.2	Siller, Scott	Dec'10	
2.4	Ensure recognition of members at the chapter level*	3.1	Gage	Dec'10	
3.0	Advance interest in Refrigeration	3.2			
3.1	Develop presentation on importance/challenges of Refrigeration for Student Activities Webpage	3.2	Mueller, Jekel, Bansal	Draft: Winter Final: Jun'11	
3.2	Develop engagement with YEA	3.2	Friedman	Feb'11	
4.0	Support and coordinate Society refrigeration activities				
4.1	Organize programs on sustainable refrigeration for annual and semi-annual meetings	1.8	Kazachki	on-going	
4.2	Promote and solicit entries for refrigeration awards: Garland, Comfort Cooling, and Briley		Awards^	on-going	
4.3	Review assigned Society position papers/statements/documents and initiative revisions, as needed		All	on-going	

Notes:

* Although both the Milt Garland and Comfort Cooling awards state that patches will be awarded to winning chapters this is not happening, nor are the building owners receiving their plaques.

^Awards: (Briley) Bansal, Manole, Friedman (MG&CC) Kazachki, Hay, Mueller

ASHRAE Guideline for Commissioning of Refrigeration Systems

(proposed)

1.0 Scope

This ~~Code~~ Guideline deals with the work involved in the commissioning of refrigerating plant and systems used in air conditioning applications. This ~~Code~~ Guideline is not intended to cover refrigerating systems as used for cold stores (??), low temperature applications (??), transportation (??), or industrial and process work (??).

This ~~Code~~ Guideline represents standards of good practice which are presented in the form of recommendations and guidance generally accepted within the building engineering services industry.

Compliance with the ~~Code~~ Guideline does not confer immunity from relevant statutory and legal requirements.

~~With the issue of the 2002 edition of Building Regulations Approved Documents L1 and L2(1,2), commissioning is a requirement for all building services works approved under the Regulations. Compliance with this Code should satisfy Building Control Officers that the relevant requirements of the Building Regulations in respect of commissioning of refrigeration plant and systems have been met.~~

2.0 Purpose

The ~~Code~~ Guideline is intended to be used as:

- a guide to good practice for the commissioning of refrigeration plant and systems in air conditioning
- a tool to assist the definition of commissioning procedures to be performed
- a guide for designers, manufacturers, contractors and clients to enable commissioning to be achieved in partnership
- a basis for the preparation of commissioning specifications
- a standard with which the refrigeration manufacturer and installer is expected to comply
- a guide to provide the general commissioning specialist with an understanding of these particular procedures. It is essential that the various checks described in the ~~Code~~ Guideline are carried out in the stated chronological order, and that all ancillary equipment is checked in accordance with the other ~~CIBSE~~ ASHRAE Commissioning ~~Codes~~ Guidelines.

The ~~Code~~ Guideline is equally applicable to new-build and retrofit applications; for example, following major maintenance or replacement of components such as compressors.

Presentation to Refrigeration Committee (To Facilitate Discussion and Feedback) 2011 Winter Meeting, Las Vegas Nevada

**Ross D. Montgomery & Hugh Crowther &
Samir Traboulsi**
Technology Council



Goals of this meeting:

- Review the REF Committee's activities as outlined in the MOP, and enhance the MOP with new ideas and duties.
- Point out positive areas that REF already contributes and has to offer ASHRAE members
- Identify ways to make the support of Refrigeration by ASHRAE more effective.
- Give us YOUR Feedback



Point out areas where REF is already contributing

- Refrigeration Handbook
- 2-large Society awards, Comfort Cooling and Milt Garland (+ Technology Awards by CTTC) to administrate
- Cold Chain concepts and marketing tracts
- Refrigerant Management Ad Hoc Plans and Issues, such as reclaim, tracking, etc.(Ad Hoc is working now)
- New/Existing refrigerant-related Position Document(s)
 - Ammonia as a Refrigerant,
 - Natural Refrigerants,
 - Ozone Depleting Substances,
 - Refrigerants and Their Use in the Built Environment
-



Structure a discussion on REF role within ASHRAE

- **Refrigeration Committee** encourages the advancement of refrigeration technology and its application.
- What does "refrigeration technology" include?
- Tech Council questions whether it should include not only equipment, but also refrigerants and their applications.??? > **Should it be components, systems, materials (refrigerants) and applications – the whole nine yards?:**
- Lets Discuss??



- **A1.1 The Committee shall promote refrigeration education and development at the chapter, regional and international levels of the Society.**

- Development
 - 283 DL topics: 22 refrigeration
 - Refrigeration Speakers list: 26 speakers/50 topics
 - Hosting a successful Refrigeration Chapter Meeting (promote more at chapters)
 - PAOE points: 25 for refrigeration meeting, 50 for Milt Garland or Comfort Cooling submission
- Education
 - 0 Refrigeration-related certification programs (need to suggest)
 - 0 ASHRAE Education products(chapter, instructor-led, in-company, group learning)
 - Self-directed 1 out of 8
 - On-line: 2 of 18 e-learning courses and 12 of 153 modules
 - Webcasts: 17 of 9 (Ground-source heat pumps)
 - REF list of training programs (need a better more comprehensive listing)
- International has unmet requests for refrigeration DLs.



- **Is there more we can do to meet these needs?**

- **A1.2 The Committee shall recommend more projects /products and programs related to refrigeration**

- **CAN WE DEFINE OUR ROLE BETTER. ?**
- Wording does not adequately capture what we do. E.g, Needs which cross multiple TCs (design guides) or falls between TCs (commissioning guideline), position documents, etc.
- We can play stronger by coordinating, motivating, advocating the Refrigeration role inside and outside of Society
- **Who do we target to give this to ? (TechC and CEC? PubEd C?)**



- **A1.3 The Committee shall assist and maintain liaison with other general committees within ASHRAE regarding refrigeration subjects. See REF Operations (B3.4)**

-
- CTTC. Now RAC? What about others? (Standards, TAC, Special projects, building performance metrics, CEC?)
- **Should this be done through “consultants” versus voting members?** Should REF members roles be specific to this task?



- **A1.4 The Committee shall assist and advise the TCs and TGs with refrigeration-oriented goals in recruiting qualified members and carrying out their tasks. See REF operations (D1.1, D2.1, D2.3, D3.1)**

- **Is this our only role with TCs?** Inconsistent with the liaison roles in REF manual.
- What about SPC's?(15,34,etc)(stretching to 90,100,189??)



- A1.5 The Committee shall maintain liaison with ASHRAE chapters (See REF Operations C1.2, C1.4, D2.2), associated international societies and cooperating technical societies (See REF operations B3.7) regarding refrigeration subjects.
- Of the 14 ASHRAE Regions, 5 have REF RVCs (though 2 are vacant.)
- What role should REF serve with the chapters and regions? Should we have RVCs at regions again that serve on REF committee?
- How should REF coordinate with sister societies (IIAR and IIR) and associate societies (AASA, RSES)?



• Structure a discussion on REF role within ASHRAE

- Refrigeration Committee encourages the advancement of refrigeration technology and its application.
- Which TC's should REF cover? >> See Appendix A (next slide) Let's pick them>>>>



APPENDIX A:

- **SECTION 3.0-MATERIALS AND PROCESSES**
 - 3.1 Refrigerants and Secondary Coolants
 - 3.2 Refrigerant System Chemistry
 - 3.3 Refrigerant Contaminant Control
 - 3.4 Lubrication
 - 3.8 Refrigerant Containment
- **SECTION 8.0-AIR-CONDITIONING AND REFRIGERATION SYSTEM COMPONENTS**
 - 8.3 Absorption and Heat Operated Machines
 - 8.7 Variable Refrigerant Flow (VRF)
 - 8.8 Refrigerant System Controls and Accessories
 - 8.9 Residential Refrigerators and Food Freezers
- **SECTION 10.0 REFRIGERATION SYSTEMS**
 - 10.1 Custom Engineered Refrigeration Systems
 - 10.2 Automatic Ice making Plants and Skating Rinks
 - 10.3 Refrigerant Piping
 - 10.4 Ultra-Low Temperature Systems and Cryogenics
 - 10.5 Refrigerated Distribution and Storage Facilities
 - 10.6 Transport Refrigeration
 - 10.7 Commercial Food and Beverage Cooling Display and Storage
 - 10.8 Refrigeration Load Calculations
 - 10.9 Refrigeration Application for Foods and Beverages
 - 10.10 Management of Lubricant in Circulation



• Summary of ways to improve ASHRAE's support for the advancement of refrigeration and refrigerant science and technology.

- Reorganization of TC section assignments.
- More PAOE for refrigeration activities (talk to President Elect and Treasurer) (See REF Operations D2.2a)
- Work towards grass root RVC involvement in REFC - Add RVCs at region level
- Work with TC 3.01 to get more involvement of expertise in natural refrigerants
- Sponsor a Refrigeration conference
- Add refrigeration topics to Strategic Plan (SP being re-developed now by Planning Committee-this is a good time to send suggestions to PLC) " 1.7 Pursue enhanced research and operations regarding refrigeration technology and refrigerant management.
- Add refrigerants and all related works to REF committee scope
- Increase DLs about Refrigeration.
- More meeting days at A/W



