



(DRAFT)

**REFRIGERATION COMMITTEE (REF)
MINUTES**

*Annual Meeting
June 27, 2010*

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

TABLE OF CONTENTS

Page No.

1.0 CALL TO ORDER AND ROLL CALL.....1

2.0 REVIEW OF AGENDA.....1

3.0 APPROVAL OF MINUTES.....1

4.0 REPORTS1

5.0 STRATEGIC PLANNING2

6.0 POSITION DOCUMENTS (PD).....3

7.0 REFRIGERATION AWARDS4

8.0 SUBCOMMITTEE/PROJECT REPORTS5

9.0 UNFINISHED BUSINESS.....7

10.0 NEW BUSINESS7

11.0 NEXT MEETING.....7

12.0 ADJOURNMENT.....7

PRINCIPAL MOTIONS
JUNE 27th, 2010

No.	Page No.	Motion
1	1	The minutes of the January 24th, 2010 meeting in Orlando be approved.
2	3	REF recommends to Technology Council that the Ammonia as a Refrigerant Position Document (PD) be reaffirmed with minor, editorial corrections as shown in Appendix 5 .
3	4	REF recommends that Technology Council approve changes to the REF MOP as shown in Appendix 6 .
4	5	REF recommends to Technology Council that they recommend to the BOD approval of changes to the REF Rules of the Board (ROB) as shown in Appendix 7 .
5	6	REF recommends that a seminar program for Las Vegas related to Natural and Low GWP Refrigerants be approved and submitted as first priority.

ACTION ITEMS FROM ANNUAL MEETING
ALBUQUERQUE JUNE 27th 2010

No.	Page No.	RESPONSIBILITY	SUMMARY
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.
2	4	REF	Discuss and establish criteria for scope of Briley Award
3	4	Anderson	Send a letter and copy of Journal article to Briley to update him on George Briley award.
4	5	REF	Suggest other organizations outside US that could appoint a consultant to REF.
5	6	REF	Review draft Title, Purpose, and Scope of proposed commissioning guideline for development.
6	6	Kazachki	Ask speakers of recent/future REF sponsored programs in their PowerPoint presentations can be posted on REF webpage.
7	7	REF	Suggest speakers to Kazachki for Las Vegas program on natural and low GWP refrigerants.
8	7	REF	Review MBO list for assignments

**ACTION ITEMS FROM ANNUAL MEETING
ORLANDO JANUARY 24th 2010**

1	2	Werkema, Chasserot, Anderson	Work with Anderson to determine if item can be on agenda and prepare presentations for Albuquerque on Copenhagen accord as appropriate.	complete
2	4	Chasserot, Siller, Vallort, Pearson, Anderson	Review Ammonia PD to update references other editorial updates for the Annual meeting.	complete
3	4	Staff	Send PD request forms and documents to REF	complete
4	4	Chasserot	Consider the proposal of new PD's to Technology Council for New Mexico meeting.	complete
5	4	Staff	Compile list of chapter refrigeration contacts for distribution of information on REF awards.	complete
6	4	Gage/Staff	Review award processes to see if they can be streamlined	complete
7	5	Anderson/Staff	Notify all Milt Garland applicants of results.	complete
8	5	Anderson	Draft proposal for liaisons to REF for consideration at Annual meeting.	complete
9	6	Staff	Review and summarize educational programs related to refrigeration for Annual meeting.	complete
10	6	Staff	Send DSL list to REF and request nominations to Gage	complete
11	6	Gage	Collect suggestions and volunteers from REF for DSL list	complete
12	6	Anderson	REF to consider looking into developing recorded presentations for refrigeration issue updates.	complete
13	7	Chasserot, Gage	Develop program for Las Vegas on Kyoto/Montreal impacts. Explore co-sponsorship with TC 2.5 and Advocacy Committee	complete
14	7	Anderson	Discuss idea of conference with CEC chair.	complete
15	8	Chasserot	Add ASHRAE to ammonia21.com directory	complete

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

No.	RESPONSIBILITY	SUMMARY	STATUS
2	Anderson	Lead effort to survey the need for a commissioning guideline on refrigeration systems. Develop TPS as appropriate.	complete

LIST OF APPENDICES

Appendix 1:	REF Agenda for Albuquerque
Appendix 2:	2009-2010 MBO's final report
Appendix 3:	PEAC presentation
Appendix 4:	Werkema Refrigerant Issues presentation
Appendix 5:	Ammonia as a Refrigerant PD
Appendix 6:	Awards MOP changes
Appendix 7:	ROB changes
Appendix 8:	Liaison Report
Appendix 9:	Draft Title, Purpose, Scope (TPS) Commissioning Guideline
Appendix 10:	2010-2011 MBO's

LIST OF ACRONYMS

ALI	-	ASHRAE Learning Institute
ABQ	-	Albuquerque
AMORTS	-	Assistant Manager of Research and Technical Services
ACCA	-	Air Conditioning Contractors of America
ASHRAE	-	American Society of Heating, Refrigerating, and Air-conditioning Engineers
BOD	-	Board of Directors
CEC	-	California Energy Commission
CNV	-	Chair Not Voting
CV	-	Chair Voting
CRC	-	Chapter's Regional Conference
CTTC	-	Chapter Technology Transfer Committee
DSL	-	Distinguished Speaker List
EQ	-	Energy Quotient
EUI	-	Energy Usage Index
EX-O	-	Ex-Officio
FMI	-	Food Marketing Institute
GWP	-	Global Warming Potential
HVAC	-	Heating, Ventilation, and Air Conditioning
HVAC&R	-	Heating, Ventilation, Air Conditioning, and Refrigeration
IARW	-	International Association of Refrigerated Warehouses
IDLH	-	Immediately Dangerous to Life or Health
IIAR	-	International Institute of Ammonia Refrigeration
IIR	-	International Institute of Refrigeration
MBO	-	Management by Objective
NEBB	-	National Environmental Balancing Bureau
NIOSH	-	National Institute for Occupational Safety and Health
NIST	-	National Institute for Technology and Standards
NREL	-	National Renewable Energy Laboratory
ODS	-	Ozone Depleting Substances
PAOE	-	Presidential Award of Excellence
PEAC	-	President-Elect Advisory Committee
PD	-	Position Document
RAC	-	Research Administration Committee
REF	-	Refrigeration Committee
RETA	-	Refrigerating Engineers and Technicians Association
RSES	-	Refrigeration Services and Engineering Society
RVC	-	Regional Vice Chair
SSPC	-	Standing Standard Project Committee
TC	-	Technical Committee
TPS	-	Title, Purpose, Scope

MINUTES
REFRIGERATION (REF) COMMITTEE
JUNE 27, 2010
ALBUQUERQUE, NM

MEMBERS PRESENT:

Kent Anderson, *Chair*
Cynthia Gage, *Vice Chair*
Todd Jekel
Georgi Kazachki
Cesar Lim
Andy Pearson
Doug Scott
John Sluga
Ron Vallort
Don Siller, *Consultant*
Tom Watson, *Coord. Officer*
Tom Werkema, *BOD Ex-O*

MEMBERS NOT PRESENT:

Marc Chasserot
Donald Hay
Norbert Mueller

GUESTS:

Pradeep Bansal, *Incoming Member*
Steven Freidman, *Incoming Member*
Dan Manole, *Incoming Member*
Masood Ali
Bruce Badger
Hugh Crowther
Bruce Griffith
David Hinde
Glenn Hourihan
Travis Lumpkin
Bill Mohs
Bruce Nelson
Kent Perkins
Doug Reindl
Eric Smith

ASHRAE STAFF:

Steve Hammerling, *AMORTS*

1.0 CALL TO ORDER AND ROLL CALL

Chair Kent Anderson 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 was reviewed. The following items were added:

- 5.0 – Strategic Planning
 - 5.1 – Refrigeration Committee
 - 5.2 - Research Plan

The agenda is included with these minutes as **Appendix 1**.

3.0 APPROVAL OF MINUTES

Anderson referred to the draft minutes from Orlando distributed prior to the meeting.

It was moved (RV) and seconded (CG) that,

1. The minutes of the January 24th, 2010 meeting in Orlando be approved.

MOTION 1 PASSED: 8-0-0 CNV

4.0 REPORTS

4.1 Chair - Anderson

No other REF motions from the previous meeting that required approval from a higher committee. BOD is awaiting the minor editorial corrections to the Ammonia as a Refrigerant position document (PD). This is on REF agenda for later.

There have been developments related to the new Refrigerants PD that will be discussed later in meeting.

A final report on the 2009-2010 Society Year's Management by Objectives (MBO) will be reported to Technology Council and is included with these minutes as **Appendix 2**.

4.2 Vice- Chair - Gage

Gage noted that there was nothing on the REF budget to report with little discretionary funds available to REF.

MBO's for the next Society Year will be discussed under New Business on agenda.

4.3 BOD Ex-Officio - Werkema

Werkema presented a PowerPoint for the President-Elect Advisory Committee (PEAC) (**Appendix 3**) to REF. Highlights includes:

- 189.1 now alternate compliance to ICC
- 60 90.1 addenda considered at this meeting. On target for 90.1-2010 October 2010 publication
- Building EQ in US/Europe. Involving building owners. ~10 buildings with asset rating signed up
- ASHRAE grown in membership in last 3 years. Primary area of growth is international.
- Energy targets – tech council report on EUI included refrigeration load equipment. Hugh notes involved in NREL report and noted 'not known'

Werkema presented an issues update (**Appendix 4**) on recent climate change meetings highlighting issues of interest to REF.

REF thanked Werkema for presentations.

5.0 STRATEGIC PLANNING

5.1 Refrigeration Committee

The subject of a ASHRAE sponsored refrigeration conference was raised. Anderson spoke with the current CEC chair who noted the next couple of years were booked with topical conferences but after that might be a possibility. Werkema had initially suggested looking into this as a topical conference. Anderson noted now is a good time in the refrigerant world as the HFC transition represents the 3rd transition in the refrigerants industry. It was noted NIST and IIR may have an interest in helping organize. NIST co-sponsored last refrigerant conferences in late 80's/early 90's. Werkema suggested trying to help garner Technology Council support, then forming a subcommittee to assist in promoting and eventual planning of such a conference.

Anderson helped lead a discussion about Society wide conversations within ASHRAE on REF activities. Technology Council chair Watson asked REF to have a conversation on what REF can accomplish for ASHRAE.

Action Item 1 – 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.

5.2 Research Plan

Anderson noted that the ASHRAE 2010-2015 Strategic Research Plan is up for final approval by the BOD at this meeting. He asked REF to think about how REF can help to assist in addressing refrigeration related goals in the plan for a discussion during the research subcommittee item on the agenda.

6.0 POSITION DOCUMENTS (PD)

6.1 Ammonia

Anderson was requested by Technology Council that REF recommend a reaffirmation, retirement, or revision of the Ammonia as a Refrigerant PD. In Orlando, REF recommended a reaffirmation with minor, editorial corrections to be suggested in New Mexico.

Anderson submitted a marked up version of the PD to REF (**Appendix 5**) noting that changes were editorial and updates to existing references. Anderson highlighted the IDLH change by NIOSH (300 to 500 ppm), updates to UNEP and ASHRAE research figures. ASHRAE Handbook chapter numbers needed to be updated as well.

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

2. REF recommends to Technology Council that the Ammonia as a Refrigerant Position Document (PD) be reaffirmed with minor, editorial corrections as shown in **Appendix 5**.

MOTION 2 PASSED: 8-0-0 CNV

BACKGROUND: As cognizant committee of the PD, REF was asked if the PD should be revised, reaffirmed, or retired. REF noted that the PD should be reaffirmed with minor, editorial corrections and updates.

6.2 Natural Refrigerants

No action is required at this time as it was last approved in January of 2009. The development of the proposed Refrigerants PD may impact this PD as well.

6.3 Ozone Depleting Substances (ODS)

The development of the Ozone Depleting Substances (ODS) PD is awaiting the development of the new Refrigerants PD. This new PD may supersede or somehow incorporate the ODS PD so development is essentially on hold.

6.4 New Refrigerants PD

Anderson reported that the chair for the developing Refrigerant PD is likely to be appointed in Albuquerque. The chair of the committee is likely to be SSPC 34 chair, Bill Walter. A list of 15 potential PD committee members is available. The chair will select members. Some REF members were on the recommended list. The new PD will review a plan for what to do with the existing PD's on refrigerants (Ammonia, Natural Refrigerants, and Ozone Depleting Substances). The PDC will likely be meeting at ASHRAE meetings so REF members can attend and participate. REF is co-cognizant with TC 3.1.

6.5 Other

Chasserot had previously expressed an interest in PD's on refrigerants such as CO₂, water, and hydrocarbons. He'd submitted some requests for REF to consider in Albuquerque but it was felt more appropriate to let the new Refrigerants PD develop. REF may wish to consider development of an Emerging Issue Brief on these topics, similarly to what is done by the Environmental Health Committee (EHC) on various topics they feel the BOD should be aware of.

7.0 REFRIGERATION AWARDS

7.1 Milt Garland Award

The Milton W. Garland Refrigeration Award for Project Excellence was presented to Tom Dosch, PE at the Plenary Session.

REF discussed submitted changes to the procedures for the Milton Garland and Comfort Cooling Awards intended to streamline the submission process and garner more award nominations.

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

3. REF recommends that Technology Council approve changes to the REF MOP as shown in **Appendix 6**.

MOTION 3 PASSED: 9-0-0, CV

BACKGROUND: Changes were made to focus CTTC, chapter and regions on the promotion of the award as opposed to judging. The current process is streamlined with the proposed changes making things easier to monitor and get flow through the process.

Hammerling reported that staff would now procure Refrigeration Awards given to the winning project chapter and owner. This had been handled by a former member of REF and the task has not been done since they rolled off the committee.

7.2 Comfort Cooling Award

No Comfort Cooling Award was presented at Annual Meeting. Changes to the submission and judging process approved previously will help avoid this situation in the future.

7.3 ASHRAE Journal Award

The 2nd annual George C. Briley Award for the best refrigeration-related article published in the ASHRAE Journal, was presented to David Hinde at the Refrigeration Committee meeting. A photo was taken of the presentation to accompany a future article in the ASHRAE Insights.

Gage noted REF should have a discussion on the scope of this award. What is appropriate to consider 'refrigeration'? Staff prepared a list of 9 papers from Journal on anything related to refrigeration in Society Year 2009-2010. There were 4 HVAC chiller articles, 2 on refrigerants, and 3 on refrigeration applications. REF should develop a definition of scope. It was noted that Briley's actual Journal articles focused only on refrigerant and refrigeration applications.

Action Item 2 – REF – discuss and establish criteria for scope of Briley Award

Anderson noted having spoken with Jim Shepherd recently and that George Briley is doing well. Anderson will update Briley on most recent George Briley award winner.

Action Item 3 – Anderson – send a letter and copy of Journal article to Briley to update him on George Briley award.

8.0 SUBCOMMITTEE/PROJECT REPORTS

8.1 Functional

Anderson had an action to consider methods to implement formal liaison relationships with other refrigeration organizations. Anderson noted he wished to model these relationships after those between the Research Administration Committee (RAC) and various groups that actually participate on RAC.

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

4. REF recommends to Technology Council that they recommend to the BOD approval of changes to the REF Rules of the Board (ROB) as shown in **Appendix 7.**

MOTION 4 PASSED: 9-0-0 CV

BACKGROUND: REF normally has a consultant, who may serve as the CTTC Liaison. Allowing additional non-voting consultants from other organizations in the field of refrigeration to serve as non-voting members of the committee would provide valuable input to REF. Those consultants should be formally recognized as members in the ROB.

FISCAL IMPACT: None. Representatives of other refrigeration organizations would not qualify for travel reimbursement.

8.2 Education

REF discussed ways to make refrigeration a bigger part of chapter meetings. Current DSL has a limited number of refrigeration related speakers. The primary Chapter requests for refrigeration-related speakers have been international. A broader DSL list and emphasis in PAOE points for refrigeration chapter meetings would be helpful. REF also discussed the need to generate requests from the Chapters at the grassroots level.

8.3 Liaisons

Assuming REF's ROB change for consultant is approved, REF discussed organizations that could be given consultant formal roles. These would be organizations that REF would benefit from liaising and working with. Suggested groups included RETA, IIAR, IIR, IARW, RSES, ACCA, and FMI.

Action Item 4 – REF – Suggest other organizations outside US that could appoint a consultant to REF.

Sluga sent the TC Liaison report (**Appendix 8**) prior to the meeting. Sluga is rolling off committee so REF will want to review procedure for updating and seek to optimize level of feedback and information available for TC's. REF discussed various avenues to do this as well as specific improvements. Staff could help to institutionalize process by helping participate in the process.

8.4 Publications

Anderson reported that a chapter R03 - Carbon Dioxide Refrigeration Systems is now included in the 2010 Refrigeration volume of the Handbook. This chapter and the Refrigeration volume of the Handbook are currently available. The volume underwent a complete rearrangement. Anderson thanked those involved in the development of the chapter.

Scott summarized the proposed special project for a Design Guide for Sustainable Refrigerated Facilities and Systems. The project was approved with no funding to allow REF

to seek co-funding. A number of contacts have been made and despite some interest with CEC, IAR, and FMI, to date no co-funding has been obtained. Scott and Anderson will continue to seek co-funding from various groups to continue as special project or possibly as ASHRAE research. Scott will discuss further with Special Projects subcommittee of Technology Council on Monday.

REF discussed the development of an ASHRAE guideline related to commissioning of refrigeration systems. Reindl noted that the traditional commissioning process does not apply well to commercial and industrial refrigeration systems. However, ASHRAE may develop such a commissioning guideline as part of the 1.X series. This format would be a framework or skeleton procedure that allows owners and designers to address areas that can and should be addressed for the specific building or system. Most on committee felt need for such a guideline. NEBB is developing a guideline on the subject that Anderson noted would not conflict with a potential ASHRAE guideline. Jekel recommended that REF lead development of such a document before others lead the way and dictate how it will be done. Anderson distributed a draft (**Appendix 9**) based on a CIBSE document.

Action Item 5 – REF –review draft TPS of commissioning guideline for development.

8.5 Program

Kazachki noted that REF sponsored Seminar 41, Natural Refrigerants: A Roadmap to Refrigeration for the Future in Albuquerque.

Several other refrigeration related programs in Albuquerque were sponsored by Section 10 TC's and are listed below. There were more refrigeration-related presentations sponsored by other sections and committees.

- Seminar 44: Energy Efficiency Impacts of New Codes and Standards for Refrigerated Facilities
- Seminar 51: Electrical Safety and Regulatory Requirements and Application for Positive Displacement Compressors
- Seminar 54: Ratings vs. Actual Performance in Refrigeration
- Seminar 53: Introducing the 2010 Refrigeration Handbook, now with CO2!
- Seminar 61: Refrigeration Systems Using Environmentally-Friendly Refrigerants
- Conference Paper Session 13: Latest Research on Refrigeration Systems and Components

Gage noted that these presentations could be posted on the REF page of the ASHRAE website if presenters grant permission. Perhaps REF sponsored program presenters could be asked if this was okay.

Action Item 6 – Kazachki – ask speakers of recent/future REF sponsored programs if their PowerPoint presentations can be posted on REF webpage.

REF discussed options for future programs including a program on natural and low global warming potential (GWP) refrigerants.

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

5. REF recommends that a seminar program for Las Vegas related to Natural and Low GWP Refrigerants be approved and submitted as first priority.

MOTION 5 PASSED: 8-0-0, CNV

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

Action Item 7 – REF – suggest speakers to Kazachki for Las Vegas program on natural and low GWP refrigerants.

8.6 Research

The Research Advisory Panel's (RAP) draft ASHRAE research plan for 2010-2015 is being considered for approval at this meeting. The published plan is available at www.ashrae.org/docLib/20100621_StrategicNavigationBrochure.pdf. Goals #8 and #9 are most relevant to refrigeration activities:

- #8 - Facilitate use of natural and GWP refrigerants Natural/Low GWP Refrigerants and develop methods to reduce refrigerant charge.
- #9 – Support the development of improved HVAC&R components ranging from residential through commercial to provide improved system efficiency, affordability, reliability and safety.

REF can play a role in developing ideas for research projects and coordinating Section 10 TC's to develop research that involves a multi-disciplined approach. Sluga's TC Liaison chart can help to inform TC's of projects. Anderson identified Todd Jekel as REF's Section 10 research guru who could assist in developing this coordinated approach.

9.0 UNFINISHED BUSINESS

Anderson noted no unfinished business from this meeting. Anderson recognized outgoing members John Sluga and Ron Vallort with Certificates of Appreciation for their service to REF. Anderson turned the meeting over to incoming Chair Cynthia Gage for Society Year 2010-2011.

10.0 NEW BUSINESS

Gage thanked Anderson for his efforts as chair over the last Society Year and presented him with a Certificate of Appreciation.

Gage noted her MBO's for the 2010-2011 Society Year were emailed prior to the meeting and will be included in the minutes as **Appendix 10**. Various assignments were made to committee members. Gage asked committee members to review and contact her with any questions or comments they might have.

Action Item 8 – REF – Review MBO list for assignments

11.0 NEXT MEETING

Gage noted that Technology Council plans to have their Technology Weekend meetings as phone conference or webinar meetings in October. Standing Committees will be asked to report before this time. REF may have a phone conference in September in preparation of that meeting.

12.0 ADJOURNMENT

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

Refrigeration Committee Meeting Agenda
Sunday, June 27th, 2010
8:00 AM – 12:00 PM
Hyatt Regency Hotel- Sender o II (1)

- 1.0 CALL TO ORDER/ INTRODUCTIONS/OPENING COMMENTS
- 2.0 REVIEW OF AGENDA
- 3.0 APPROVAL OF MINUTES- Winter Meeting –Orlando, FL January 24th, 2010
- 4.0 REPORTS
 - 4.1 Chair – Anderson
 - 4.2 Vice Chair – Gage
 - 4.3 Coordinating Officer – Watson
 - 4.4 BOD Ex-Officio - Werkema
- 5.0 POSITION DOCUMENTS
 - 5.1 Ammonia
 - 5.2 Natural Refrigerants
 - 5.3 Ozone Depleting Substances
 - 5.4 New Refrigerants PD
 - 5.5 Other
- 6.0 REFRIGERATION AWARDS
 - 6.1 Milt Garland Award
 - 6.2 Comfort Cooling Award
 - 6.3 ASHRAE Journal Award
- 7.0 SUBCOMMITTEE/PROJECT REPORTS
 - 7.1 Functional
 - 7.2 Education
 - 7.3 Liaisons
 - 7.4 Publications
 - 7.5 Program
 - 7.6 Research
- 8.0 UNFINISHED BUSINESS
- 9.0 NEW BUSINESS
- 10.0 NEXT MEETING – Las Vegas, NV January 30th, 2011
- 11.0 ADJOURNMENT



REFRIGERATION COMMITTEE MBO's – M. Kent Anderson, Chair 2009-2010

6/25/10

OBJECTIVE	Strategic Direction	Responsibility	Status
1.0 Develop an ASHRAE Guide for Sustainable Refrigeration Facilities and Systems 1.1 Request approval as a Special Project 1.2 Identify funding sources and potential co-sponsors 1.3 Create RTAR(s) to support the Guide 1.4 Propose the Guide project as a Special Project or research project with ASHRAE funding support	SD#1 - 1.1, 1.2, 1.6	Scott	Complete In-Process On Hold Jun-10
2.0 Enhance grassroots refrigeration activities and programs 2.1 Appoint REF Committee liaison to CTTC, and establish CTTC liaison with REF Committee 2.2. Review and update tools on refrigeration technology available for chapter use on society website 2.3 Submit recommendations for 2010-11 refrigeration PAOE criteria to President-Elect 2.4 Develop plan for enhancing chapter refrigeration activities jointly with CTTC	SD#2 - 2.2, 2.4 / SD#3 - 3.4	Anderson Committee Anderson Anderson/Crowley	Complete On Going Complete TBD
3.0 Support and coordinate Society refrigeration activities 3.1 Organize programs on sustainable refrigeration for annual and semi-annual meetings 3.2 Appoint a committee coordinator for a Society "refrigeration track" 3.3. Promote and solicit entries for refrigeration awards: Garland, Comfort Cooling, and Briley 3.4 Provide a recommendation on refrigeration educational programs that should be provided by ASHRAE 3.5 Review assigned Society position papers/statements/documents and initiative revisions, as needed	SD#2 - 2.1, 2.2, 2.4	Kazachki Anderson Gage Committee Committee	Complete Complete Complete Jun-10 Jan-10 & June-10
4.0 Establish a formal liaison program with key refrigeration technical organizations 4.1 Coordinate refrigeration Technical Committee programs, research projects and handbook revisions 4.2 Identify international organizations involved with sustainable refrigeration technology 4.3 Establish a mechanism for maintaining relationships with key technical organizations in the committee MOP	SD #4 - 4.2, 4.13	Sluga Committee Anderson/Gage	Jan-10 & June-10 Jun-10 On Going
5.0 Identify the appropriate role for ASHRAE in commissioning of refrigeration systems 5.1 Obtain input from refrigeration Technical Committees on the need for refrigeration commissioning programs 5.2 Identify current refrigeration commissioning projects and guideline activities 5.3 Manage ASHRAE liaison activities with other organization's refrigeration commissioning work 5.4 Provide a recommendation to Tech Council on the ASHRAE role in refrigeration commissioning	SD#1 - 1.1, 1.2, 1.3, 1.5	Committee Anderson Anderson/Vallort Vallort Anderson	Complete Complete On Going Jun-10
6.0 Develop a new communications vehicle for members/chapters on refrigeration technology 6.1 Establish a format, schedule and budget for the new communications vehicle 6.2 Publish at least two editions by June 2010	SD#3 - 3.1, 3.2, 3.3, 3.4	Committee	TBD Not Complete

Notes:



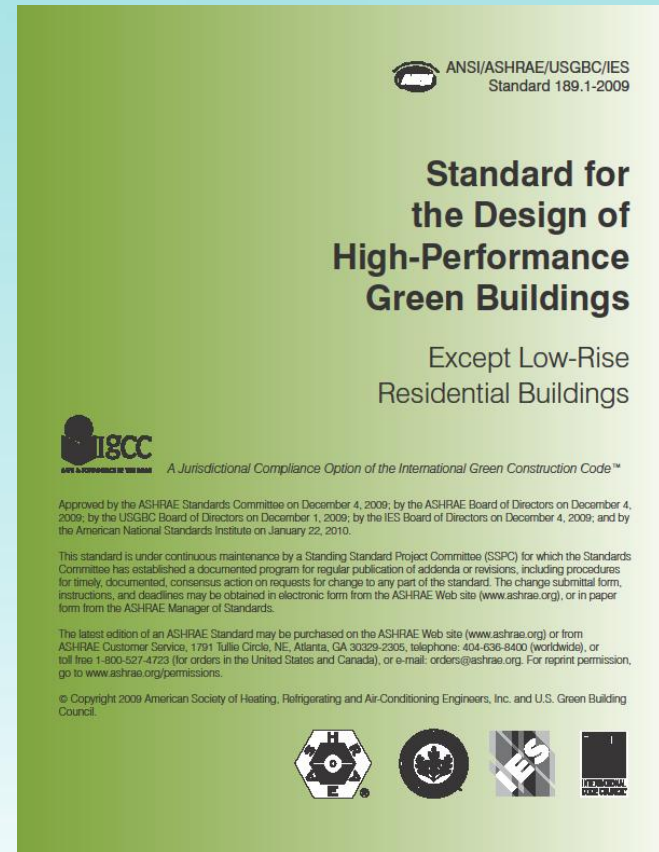
ASHRAE

Engineering the World We Live In

Presenter's Name, ASHRAE position

Green Building Standard


- Developed by ASHRAE, IES and USGBC
- Jurisdictional compliance option for International Green Construction Code – developed by ICC, ASTM International and AIA
- Attempts being made to align with Calif. green buildings standards code
- SPC working on interim addenda
- Membership call ended March 31; transition to SSPC effective July 1
- www.ashrae.org/greenstandard



ANSI/ASHRAE/USGBC/IES
Standard 189.1-2009

**Standard for
the Design of
High-Performance
Green Buildings**

Except Low-Rise
Residential Buildings





 **ICC**
A Jurisdictional Compliance Option of the International Green Construction Code™

Approved by the ASHRAE Standards Committee on December 4, 2009; by the ASHRAE Board of Directors on December 4, 2009; by the USGBC Board of Directors on December 1, 2009; by the IES Board of Directors on December 4, 2009; and by the American National Standards Institute on January 22, 2010.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site (www.ashrae.org), or in paper form from the ASHRAE Manager of Standards.

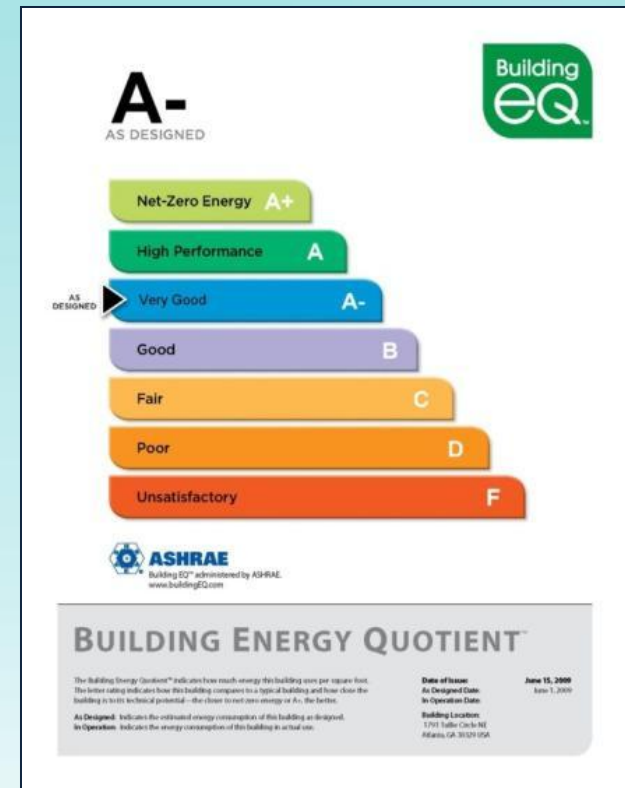
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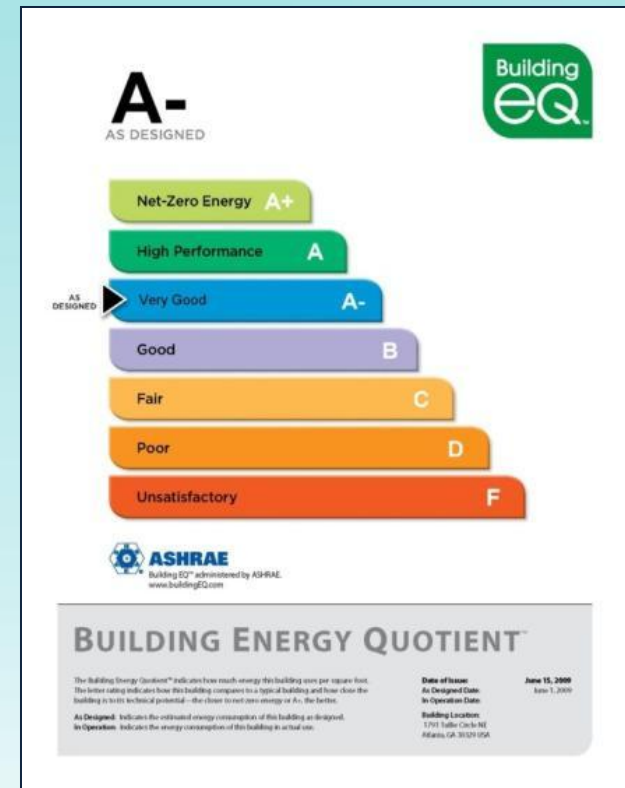
What's Your Building EQ?

- Operation pilot underway
- 25 buildings from 10 owners/operators
- 17 provisional assessors
- Operational assessments to be completed by May 30
- Assessments include
 - Building characteristics
 - Building energy quotient
 - System energy breakdown



What's Your Building EQ?

- Asset rating development being finalized
- Asset rating pilot to begin in summer 2010
- Seven buildings identified for pilot
- Full program launch scheduled for early 2011



www.buildingeq.com

35 Years of Energy Efficiency Standard 90.1

- 14 face-to-face meetings
- 5 webinars since fall 2009
- 5 subcommittees: conference calls average one/month
 - 150 conference calls total
- 118 addenda processed
 - 70 approved through March 15
- On target for approval shortly after this conference



Technology Council

- **Special Projects completed**
 - Energy Efficiency Guide for Existing Buildings: The Business Case for Building Owners & Managers
 - Indoor Air Quality Guide: Best Practices for Design, Construction Commissioning
 - Performance Measurements Protocols (June 2010)
- **Special Project Underway**
 - \$1.5 million NIST grant for ventilation and IAQ in retail stores research
 - Performance Measurements Best Practices

Technology Council

- Refrigeration Committee compiled list of speakers for chapter programs
 - amorts@ashrae.net
- Research Administration Committee
 - developed five-year strategic draft plan with 11 strategic goals
 - maximize building performance
 - energy efficiency
 - indoor air quality
- Environmental Health Committee - developing Emerging Issue Briefs
 - Finalized *Ventilation, Humidity Control and Health*

Technology Council

- **New position document to be developed, *Refrigerants and Their Use in the Built Environment***
- **Standards -100 being revised**
- **TAC: expediting updates to 8 current publications**
- **Standard User Manuals under development for 2010 versions of Standard 189.1, 90.1, 62.1 and 62.2**

Advanced Energy Guidance



- **More than 250,000 guides in circulation**
 - 80 percent US, 8 percent Canada, 12 percent outside North American
- **Small Healthcare Facilities completed, 30 percent improvement over 90.1-1999**
- **DOE recently approved AEDG 50 percent funding**
 - First guide to be small-med office
- **Available for free download at www.ashrae.org/freeaedg**

Publication/Education Council

- **New ASHRAE.org bookstore**
- **ASHRAE Handbook ONLINE**
- **Educational offerings tied to 189.1**
- **Enhancement of eLearning program**

Members Council

- **Society level continues to be relatively stable over 52,000 members**
- **Strong growth continues in developing economies membership**
- **Three new chapters, four sections, 13 student branches formed**





Government Affairs

- Focus on coalition building
- Leadership in High Performing Building Caucus
 - Participate in 6 other coalitions
- Zero Energy Commercial Building Consortium
 - Public/private partnership at DOE
- Drafted legislation for training in operations/maintenance
- 15 Hill visits in past year, focus on education for Hill
- Biweekly newsletter to 1,000 people (ASHRAE.org/advocacy)

ASHRAE Refrigeration Com. Issues Update

Tom Werkema
June, 2010



Climate International

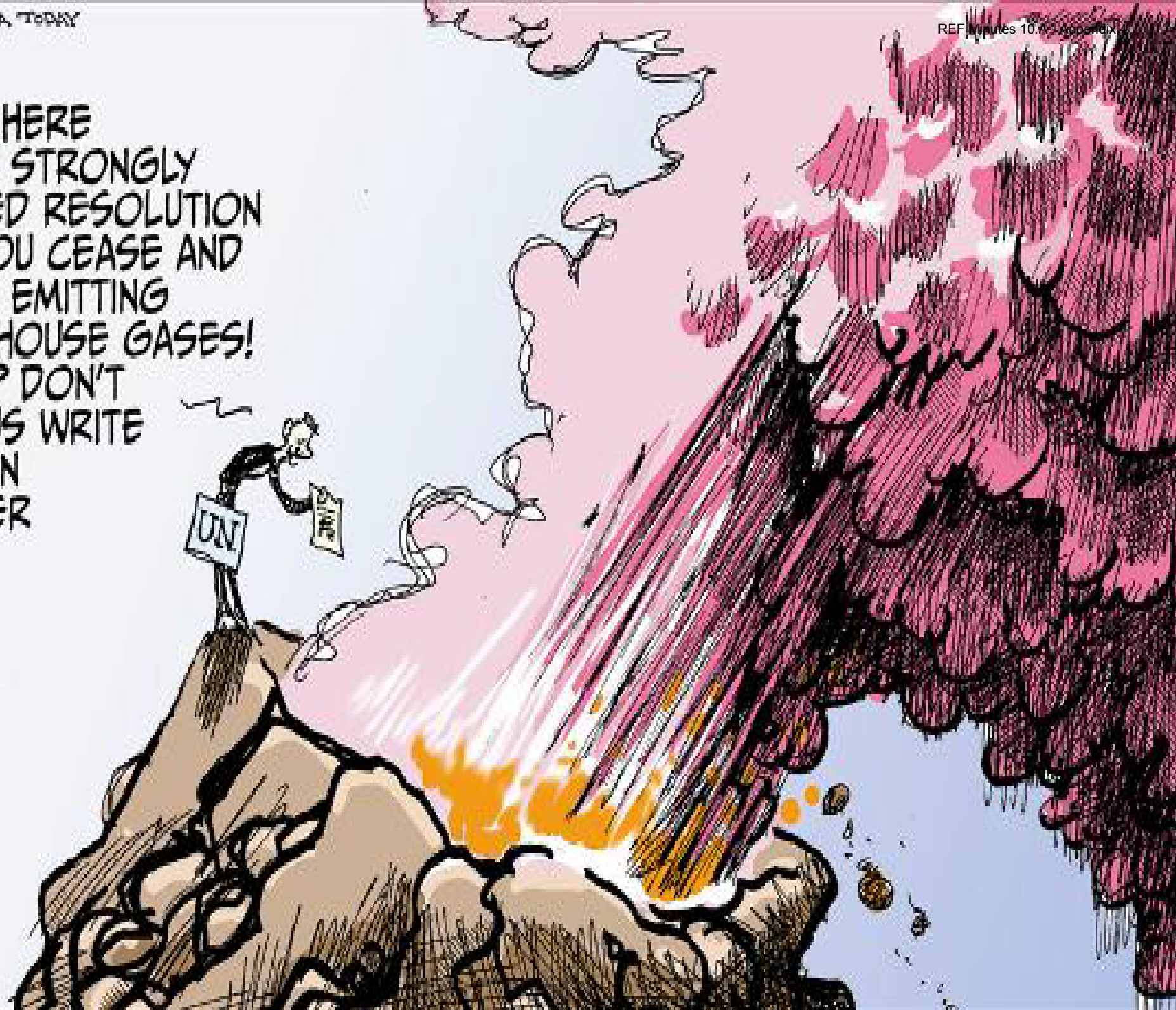




Climate Change 2010

- “Copenhagen Accord” agreed
 - 155 countries voluntarily committed = 85.05% of global emissions
 - \$30b financing over 3 years
 - Somewhat unclear how “fund” will be managed
 - US contribute 1/3rd
 - Agreement on forests, reforestation
- 2010: 5 meetings plus COP/MOP (Mexico)
 - Meetings early June in Bonn, Germany
- HFCs
 - [*“Urges Parties, without prejudice to the scope of the Convention and its related instruments, to pursue, under the Montreal Protocol on Substances that Deplete the Ozone Layer, the adoption of appropriate measures to progressively reduce the production and consumption of hydrofluorocarbons”,*]

I HAVE HERE
A **VERY** STRONGLY
WORDED RESOLUTION
THAT YOU CEASE AND
DESIST EMITTING
GREENHOUSE GASES!
HELLO? DON'T
MAKE US WRITE
AN EVEN
HARSHER
ONE!!!



Climate US



US EPA



- Published “endangerment” Final Rule
 - Potentially affects many major NA Plants, using Clean Air Act standards (NSR, PSD, TRI, etc.) to regulate emissions
 - 25,000 MT CO₂e, not 250 MT hazardous pollutant
 - 16 Lawsuits filed from 25+ Parties, 3 from States, none by ENGOs
 - 18 States support, 11 States against
 - EPA will not regulate stationary sources until 2011
- Tailoring rule published
 - 75,000 MT CO₂e/year stationary sources in 2011
 - Add currently non-permitted 100,000 MT CO₂e/year July, 2011
- GHG Reporting Rule Final –
 - Still negotiating on some in-process HFC flows
 - Monitoring plans must be on file by March 31, 2010
 - Reports due first quarter 2011, for 2010 data
- Opened comment period on Clean Water Act impact from GHG emissions

Europe



- Review of Fgas Regulation 842/2006
 - Commission proposal by 4/7/2011
 - Consultant Technical Study underway including on HFO availability
 - Expected Considerations
 - Policy scenarios
 - International consumption reduction arrangement (& scenarios)
 - Further use prohibitions
 - 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?

State/Regional Activity



ASHRAE Issue Update Winter, 2009



- RGGI – Regional Greenhouse Gas Initiative
 - Northeastern States
 - Utilities only
 - Continue quarterly auctions
- WCI – Western Climate Initiative
 - Several states have w/d
 - Oregon, California still committed

Assembly Bill 32: The California Global Warming Solutions Act of 2006



- September 2006: “The Time for Action is Now!”
- Sets in statute 2020 emission limit at 1990 level
- Now up for November Referendum vote

Montreal Protocol International



Montreal Protocol



- HFC Amendment – 2009 – proposed by Canada, US, Mexico
 - Blocked by China/India
 - China strongest
 - Ultimately, no decision
 - 2010 – discussions mid year in Geneva, November-Kampala
 - US reintroduced early May, supported by Canada, Mexico
 - Micronesia also introduced
 - Expect EU to not object
 - Expect China/India to object
 - HFC Industry fundamentally supports
 - 2014 earliest implementation





Miscellaneous

- First HCFC-22 smuggling case completed
 - Over 400,000 Kgs
 - 30 month prison term, \$1.3 M penalty
 - Several other cases pending
- Second sentence in April
 - related to above, but further down the commerce chain
 - 100,000 Kgs
 - 36 month prison term, fine

Ammonia as a Refrigerant

**Position Document
Approved by ASHRAE Board of Directors
January 17, 2002**

**Reaffirmed by ASHRAE Board of Directors
January 26, 2006**

Committee Roster

The 2002 ASHRAE Position Document on Ammonia as a Refrigerant was developed by the Society's Ammonia as a Refrigerant Position Document Committee.

Donald A. Siller, Chairman
President
Electro Motion Refrigeration Inc.
Chesterfield, Missouri

Kent Anderson
President International Institute of Ammonia Refrigeration Washington, D.C.

James J. Shepherd
Toromont Process Systems North Salt Lake, Utah

Ronald Strong, P. Eng.
R.H. Strong & Associates Inc. Delta, British Columbia

John R. Topliss
Refrigeration Components Canada Ltd. Delta, British Columbia

Ronald P. Vallort, P.E.
National Director, Food and Beverage Group Carter Burgess Warrenville, Illinois

William W. Seaton
Staff Liaison ASHRAE Atlanta, Georgia

Ammonia as a Refrigerant Position Document

Table of Contents

Executive Summary 1

1.0 Background/History of Use 2

2.0 Current Uses of Ammonia 2

3.0 Refrigeration Uses of Ammonia 2

4.0 Health and Safety 2

5.0 Environmental Aspects 3

6.0 Considerations of Ammonia as a Refrigerant 3

 6.1 Human Health and Environmental Safety 3

 6.2 Risk Assessment 3

7.0 ASHRAE Activities 3

 7.1 Policy 3

 7.2 Research 4

 7.3 Standards, Codes and Guidelines 4

 7.4 Technology Transfer and Education 4

8.0 References 5

Executive Summary

Globally, there is a growing interest in ammonia as a refrigerant. Restrictions on chlorine and fluorine containing refrigerants have focused attention on ammonia to emerge as one of the widely used refrigerants that, when released to the atmosphere, do not contribute to ozone depletion and global warming.

Ammonia is an efficient refrigerant used in food processing and preservation, as well as many other refrigeration and air-conditioning processes. Ammonia has desirable characteristics as a refrigerant, which have been well known for over a century. It is corrosive and hazardous when released in large quantities. Because of its irritating odor, persons will not voluntarily stay near concentrations that are health threatening. Although ammonia will burn in a narrow range of high concentrations, it is difficult to ignite and will not support combustion after the ignition source is withdrawn.

ASHRAE considers that the continued use of ammonia is necessary for food preservation and air conditioning. ASHRAE promotes a variety of programs to preserve the economic benefits of ammonia refrigeration while providing for the management of risks.

ASHRAE will:

- Promote authoritative information on ammonia by seminars and publications.
- Continue research on ammonia topics such as handling, application, operation, control of emissions and new technology.
- Maintain and develop standards and guidelines for practical and safe application of ammonia in refrigeration systems.
- Provide programs and publication of innovative designs and application of ammonia refrigeration.
- Advise governments and code officials with information regarding ammonia.

AMMONIA AS A REFRIGERANT POSITION DOCUMENT

1.0 BACKGROUND/HISTORY OF USE

Ammonia (chemical symbol NH_3 , United Nations Chemical I.D. #1005) is produced both naturally and as a byproduct of numerous man-made reactive processes. Large amounts of naturally occurring ammonia gas come from livestock animals, soil surfaces, and even the human body. Manmade processes that emit ammonia to the atmosphere include fuel combustion processes and sewage treatment plants.

The nitrogen component of ammonia was first recognized as an important fertilizer around 1840, and ammonia was first used as a refrigerant around 1850. Ammonia was first commercially produced in the United States about 1880 as a distillation by-product of the processing of coal to produce coke and coal gas.

The first direct synthesis commercial process was developed in Germany by Fritz Haber and Carl Bosch in 1913. The wide variety of uses for ammonia throughout agriculture and industry, combined with varied and highly efficient manufacturing processes, has kept the costs of commercially manufacturing ammonia low.

2.0 CURRENT USES OF AMMONIA

Ammonia is an alkaline, colorless chemical compound that is well recognized as the basis for household cleaning products, and also has many agricultural, industrial and commercial uses. It is available in four generally recognized grades - fertilizer, refrigerant, federal and metallurgical -depending on its level of purity.

Refrigeration grade ammonia is 99.98 percent pure and is relatively free of water and other impurities (maximum: 150 ppm water, 3 ppm oil, 0.2 ml/g non-condensibles). It is readily available, inexpensive, operates at pressures comparable with other refrigerants, and is capable of absorbing large amounts of heat when it evaporates.

Of the estimated 100 million metric tons of ammonia produced commercially throughout the world each year (14-16 million metric tons in the United States), over 80 percent is used for agricultural purposes. Some of the agricultural uses of commercial ammonia include:

- Direct injection into soil as a fertilizer (amount can be as much as 150 pounds annually per acre).
- Production of urea (colorless crystalline material that is a highly concentrated form of nitrogen fertilizer and a source of protein in livestock feeds).
- Pre-harvest cotton defoliant.
- Anti-fungal agent on certain fruits.

The remaining 20 percent of commercially manufactured ammonia is used for numerous industrial applications, such as:

- Direct injection in selective catalytic reduction control of nitrogen oxides for stack emissions.
- Direct injection of ammonium hydroxide for stack emissions to neutralize sulfur oxides from sulfur-containing fuels.
- Nitrogen component for the manufacture of explosives such as TNT and nitroglycerin.
- Closed-loop refrigerant in many industrial refrigeration systems.
- Neutralizing agent for acid constituents in sewage treatment plants.

Less than 2 percent of all the ammonia commercially produced in the world is used as a refrigerant.

3.0 REFRIGERATION USES OF AMMONIA

With increased regulation being placed upon the use of chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC) and hydrofluorocarbon (HFC) based refrigerants, and the pending phase-out of CFCs and HCFCs altogether, alternative refrigerants for use in existing refrigeration systems are actively being investigated. These alternative refrigerants must have thermodynamic characteristics similar to those of Halocarbons and be safe for humans and the environment.

Ammonia is one alternative refrigerant for new and existing refrigerating and air-conditioning systems. Ammonia has a low boiling point (-28°F @ 0 psig), an ozone depletion potential (ODP) of 0.00 when released to atmosphere, and a high latent heat of vaporization (9 times greater than R-12). In addition, ammonia in the atmosphere does not directly contribute to global warming. These characteristics result in a highly energy-efficient refrigerant with minimal environmental problems.

From a purely economic analysis, without unnecessary regulatory burdens, ammonia should find broader applications as a refrigerant than it currently enjoys.

Ammonia's use in the HVAC&R industry should be expanded as regulatory and code officials become informed of its relative safety. Applications for ammonia-based refrigeration systems include thermal storage systems, HVAC chillers, process cooling and air conditioning, district cooling systems, supermarkets, convenience stores, air conditioning for the International Space Station and Biosphere II, and increasing output efficiencies for power generation facilities.

4.0 HEALTH AND SAFETY

Ammonia is hazardous at high concentration levels. The National Institute for Occupational Safety and Health (NIOSH), in its [1997-2007](#) Pocket Guide¹, has set the immediately dangerous to life and health (IDLH) level, the level at which an individual could be exposed for 30 minutes without a respirator and not experience any lasting health effects, at ~~500~~ [300](#) parts per million. Ammonia's sharp, irritating, pungent odor actually helps reduce exposure to potentially dangerous concentrations. The average odor threshold is 5 ppm², well below concentrations that may cause harmful effects to the human anatomy.

The chart below, which is based on data from ATSDR ~~1990~~ [2004](#)³, shows the effects of various concentrations of ammonia.

Body Part	Concentration	Effect
Eyes	500 ppm and below	No permanent eye damage to even chronic exposure (see Ref 4)
Eyes	100-200 ppm	Eyes irritated (see Ref 4)
Skin	5000 ppm and above (vapor)	Full body chemical suit required (see Ref 2)
	Pure liquid	Second degree burns with blisters (see Ref 2)
Lungs	400 ppm	Immediate throat irritation (see Ref 2)
	1700 ppm	Cough (see Ref 2)
	2400 ppm	Threat to life after 30 minutes (see Ref 2)

The self-alarms property of ammonia is recognized by virtually all engineers, designers, technicians and mechanics that deal with and work on ammonia systems regularly. Thus, small leaks are repaired quickly and not neglected or dismissed as insignificant.

The threshold limit value (TLV) consists of two components -the time-weighted average (TWA)

concentration and the short-term exposure limit (STEL). The TWA is the time-weighted average concentration for a normal eight-hour work day and a 40-hour work week. The STEL is a 15-minute time weighted average exposure that should not be exceeded at any time during the work day, even if the eight-hour TWA is within the TLV. The TWA of ammonia is 25 ppm¹. The STEL for ammonia is 35 ppm¹.

Modern ammonia systems are fully contained closed-loop systems with fully integrated controls, which regulate pressures throughout the system. Also, every refrigeration system is required by codes, which are effective, mature, and constantly updated and revised, to have safety relief valves to protect the system and its pressure vessels from over-pressurization and possible failure. The most common and preferred method of release is by venting of the vapor from the relief valves to the atmosphere. Ammonia is lighter than air (molecular weight of ammonia is 17, molecular weight of air is 28).

5.0 ENVIRONMENTAL ASPECTS

Ammonia is not a contributor to ozone depletion, greenhouse effect or global warming.⁵ Thus, it is an environmentally friendly refrigerant. Ammonia has no cumulative effects on the environment and a very limited (a few days⁶) atmospheric lifetime. Because of the short lifetime of ammonia in the atmosphere, it is considered to be biodegradable. It is even used to reduce harmful stack gas emissions by injection into boiler and gas turbine exhaust streams.²

Ammonia may be released to the atmosphere by sources such as decaying organic matter, animal excreta, fertilization of soil, burning of coal, wood, etc., and by volcanic eruptions. Ammonia may be released to water as effluent from sewage treatment and/or industrial processes and as run-off from fertilized fields or areas of livestock concentrations. Ammonia may be released to soils from natural or synthetic fertilizer applications, livestock excrement, the decay of organic material from dead plants and animals, or from the natural fixation of atmospheric nitrogen.

6.0 CONSIDERATIONS OF AMMONIA AS A REFRIGERANT

While the benefits of ammonia as a refrigerant are well known (high energy efficiency, zero ODP, zero GWP, low TEWI, self-alarming pungent odor), barriers to expanding its use into HVAC&R applications must be addressed. These barriers, both real and perceived, generally relate to human health and environmental safety, and to ammonia refrigeration system installation cost.

6.1 Human Health and Environmental Safety

Anhydrous ammonia (Chemical Abstracts Service, CAS #7664-41-7) is currently classified by the U.S. Environmental Protection Agency (EPA) as an extremely hazardous substance (SARA7 Title III, Sec. 302). It is included on the following SARA Title III lists:

- Reportable Quantity List (Section 304) -Chemicals on this SARA Title III list require notification to EPA and state and local agencies of releases in excess of the reportable quantity (currently 100 pounds).
- Extremely Hazardous Substance List (Section 302) -Chemicals on this SARA Title III list, at facilities with quantities in excess of the Threshold Planning Quantity (TPQ), are subject to SARA Title III requirements, which mandates numerous reporting and planning provisions. The TPQ of ammonia is 10,000 pounds.
- Section 313 - Chemicals on this SARA Title III list are subject to the Emergency Planning and Community Right-to-Know Act of 1986 annual toxic release inventory reporting (Form R).

While the EPA addresses ammonia from the environmental perspective, the U.S. Occupational Health and Safety Administration (OSHA) addresses ammonia from the perspective of worker safety. OSHA defines ammonia as a hazardous material, and, depending on its use, imposes certain regulations on its use, storage, handling and occupational exposure.

EPA and OSHA classify all CFCs and HCFCs as hazardous substances, and thus the use of these refrigerants requires specific reporting and management practices comparable to ammonia.

6.2 Risk Assessment

All refrigerating systems require risk assessment; ammonia systems are not exceptions. OSHA's Process Safety Management (PSM), 29CFR1910.119, provides guidelines for a comprehensive program developed by employees and management at facilities to ensure that proper safety, maintenance and operating procedures are followed, and thereby minimizing potential hazards. This PSM incorporates ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems.⁸ Although it only affects plants with large refrigerant charges, its requirement for what if or hazop. analyses are directed towards reducing risks and promoting plant safety, so this PSM could be a good program for smaller plants also.

Facilities affected by OSHA's PSM are also affected by EPA's Risk Management Program (RMP), which is intended to prevent, detect and respond to accidental releases of hazardous chemicals and to inform local communities of the risks.

With an appropriate application of PSM and RMP programs to ammonia refrigeration systems, safety to individuals, communities and the environment is enhanced. However, the application of PSM and RMP programs must be refined and tailored to avoid imposing unreasonable and overly burdensome barriers on new and existing ammonia refrigeration systems.

7.0 ASHRAE ACTIVITIES

ASHRAE has a long history of involvement with the use of ammonia as a refrigerant, dating back to the earliest applications for refrigeration. ASHRAE has a significant role to play in encouraging the proper and safe use of ammonia in the following areas: policy; research, standards, codes and guidelines; and technology exchange and education.

7.1 Policy

ASHRAE's Ammonia as a Refrigerant Position Document emphasizes the important role that ammonia can play as an alternative to CFC, HCFC and HFC refrigerants. It also identifies ASHRAE's concerns about the use of ammonia and establishes what the Society will do to encourage and support its proper and safe use as a refrigerant.

Ammonia has been identified by the EPA⁹ as a viable alternative to currently used refrigerants because it does not deplete the ozone layer or contribute to global warming.

The United Nations Environmental Programme (UNEP) has identified ammonia as an excellent refrigerant for replacement of many current CFC and HCFC applications [[1992-2006 Technical Options Report](#)] as part of the reassessment of the Montreal Protocol. Other countries, notably Germany, have established policies to encourage and promote the use of ammonia, including the replacement of such HCFC refrigerants as R-22 for applications such as water chillers and commercial refrigeration systems for supermarkets.

Other international organizations have issued positions or statements of support for the use of ammonia as a refrigerant. These include the Australian Institute of Refrigeration, Air-Conditioning and Heating¹⁰, the International Institute of Refrigeration¹¹, the German Institute of Refrigeration¹², etc.

7.2 Research

ASHRAE is unique among technical engineering societies because it sponsors an extensive member-supported research program. In [2000-2001-2009-2010](#), the funding for ASHRAE research projects was over \$3 million. A significant portion of current projects relate to alternative refrigerants, including ammonia. In past years, ASHRAE has promoted several research projects related to various aspects of ammonia refrigeration. The most recent ASHRAE research plan [allocates 10 percent of Society research funding for environmentally safe materials, includes a goal 8 to facilitate the use of natural and low global warming potential \(GWP\) synthetic refrigerants and seek methods to reduce their charge](#); ASHRAE has had recent and/or current research projects that involve ammonia, including:

- 1). Condensation-Induced Hydraulic Shock Laboratory Study, \$81,800 project managed by TC 10.3 at Georgia Institute of Technology (970-RP).

- 2). Evaporation of Ammonia Outside Smooth and Enhanced Tubes with Miscible and Immiscible Oils, \$115,675 project managed by TC 1.3 at Texas Tech University (977-RP).
- 3). In-Tube Condensation of Ammonia in Smooth and Enhanced Tubes With and Without Miscible Oil, \$147,000 project managed by TC 1.3 at University of Illinois (1207-RP).

ASHRAE actively encourages the submission of proposals for new research projects related to refrigeration and other applications that relate to ammonia. Several future ammonia projects are included in the most recent research plan.

A number of other refrigeration-related organizations are interested in use of ammonia as a refrigerant. A general list of ammonia-related potential research projects has been developed.

7.3 Standards, Codes and Guidelines

ASHRAE plays a major role in development of voluntary standards and guidelines governing the application and use of refrigerants, including ammonia. In addition, other organizations adopt the technical requirements developed by ASHRAE into various codes and regulations.

The most important ASHRAE standards dealing with ammonia are ANSI/ASHRAE Standard 34-~~2004~~2007, Designation and Safety Classification of Refrigerants, and ANSI/ASHRAE Standard 15- ~~2004~~2007, Safety Standard for Refrigeration Systems.⁸ Standard 34 classifies ammonia as a Group B2 refrigerant, because of toxicity and flammability concerns. Standard 15 establishes the requirements for safely applying ammonia in refrigerating systems. In general, ammonia can be used in unlimited quantities in direct systems for industrial occupancies; however it must be used in indirect (secondary) systems for commercial and public occupancies, while its general use in small absorption equipment is unrestricted.

In addition, ASHRAE has issued recommendations on the recycling, recovery and reuse of refrigerants, including ammonia [ASHRAE Standard 147-2002].¹⁴ Standard 147 encourages the consideration of ammonia as an alternative to CFC and HCFC refrigerants, and contains information on the ozone depletion potential and global warming potential of ammonia and other commonly used refrigerants.

Other technical organizations have issued standards/ guidelines addressing the proper application of ammonia as a refrigerant. These standards/guidelines cover the design and installation of ammonia refrigeration systems [ANSI/IIAR 2-~~1999~~2008].¹⁵ International standards also address safety and application of ammonia [ISO 5149, Refrigeration Safety¹⁶; ISO 1662, Refrigerating Plants - Safety Requirements¹⁷; CEN EN 378, Refrigerating Systems Safety and Environmental Requirements¹⁸].

The proper application of ammonia as a refrigerant is governed by state and local building, mechanical and electrical codes. In the U.S., these codes are issued by various model code organizations such as ~~International Conference of Building Officials (ICBO), Building Officials and Code Administrators (BOCA), Southern Building Code Congress International (SBCCI)~~, International Code Council (ICC) and National Fire Protection Association (NFPA). Because of its classification as a hazardous chemical, ammonia is often specifically covered by various requirements in fire codes. The Code Interaction Subcommittee of ASHRAE's Standards Committee will review proposed fire and mechanical codes that could affect refrigeration applications. ASHRAE has established a policy to encourage adoption of ASHRAE standards in model codes.

Electrical codes, especially the National Electric Code¹⁹, are relevant to ammonia because ammonia in high concentrations can form flammable mixtures with air. Standard 15 establishes design procedures for applying ammonia, including proper ventilation levels, which are referenced in electrical codes to assure the safe application in buildings.

In some cases, very stringent local toxic gas ordinances have been applied to ammonia, even though they were intended to apply to highly toxic chemicals. These types of ordinances can be very restrictive.

7.4 Technology Transfer and Education

ASHRAE plays a very important role in providing technical information on the proper application of ammonia as a

refrigerant. In this role ASHRAE assists in transfer of technology and in education of the technical community. These important activities are carried out through a number of vehicles: ASHRAE Handbooks, ASHRAE Journal and ASHRAE Transactions; special publications; and through a number of educational forums.

The major sources of technical information on ammonia are the ASHRAE Handbooks. The [2005-2009 Fundamentals](#)²⁰ volume contains general information on Thermodynamics and Refrigeration Cycles. (Chapter [4F2](#)) and on Refrigerants (Chapter [4F29](#)), including the thermodynamic properties of ammonia. The other major resource for information on ammonia is the [2002-2010 ASHRAE Handbook, Refrigeration](#) volume²¹, covering Liquid Overfeed Systems (Chapter [1R4](#)), ~~System Practices for Ammonia Refrigerant~~ [Refrigeration Systems](#). (Chapter [3R2](#)), and Refrigeration System Chemistry (Chapter [5R6](#)). An additional resource is the ASHRAE publication [Thermodynamic Properties of Refrigerants](#) [1986].²²

ASHRAE has published a number of technical papers, articles and special reports addressing the use of ammonia. These include notices and articles regarding ammonia refrigeration in ASHRAE Journal. Technical papers presented at ASHRAE meetings are published in ASHRAE Transactions, and in various special publications. A summary of more than 30 technical articles and references can be found on ASHRAE Online.

Key parts of ASHRAE's technology exchange and education functions are fulfilled by the annual and winter meeting technical programs, including seminars, forums, symposia and technical sessions. In addition, the Society offers a self-directed learning course on the Fundamentals of Refrigeration. Local ASHRAE chapters also sponsor refrigeration-related programs and speakers, which have recently shown a strong interest in ammonia.

Technical activities focusing on ammonia are addressed within ASHRAE by the Refrigeration Committee, which is now a standing committee. In addition to the Refrigeration Committee, the Chapter Technology Transfer Committee (CTTC) encourages grass roots regional and chapter activities, which focus on refrigeration. The Refrigeration Committee maintains a speakers list of speakers/topics that includes ammonia. Various technical committees (TCs 10.1, 10.3, 10.5, 1.3, 8.5 etc.) also focus on ammonia-related issues.

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19. National Electrical Code, NFPA 70-~~2008~~ [1993](#), National Fire Protection Association, Quincy, Mass.
20. ASHRAE ~~2005-2009~~ Handbook, Fundamentals, ASHRAE, Atlanta, Ga.
21. ASHRAE ~~2002-2010~~ Handbook, Refrigeration, ASHRAE, Atlanta, Ga.
22. Thermodynamic Properties of Refrigerants. 1986, ASHRAE, Atlanta, Ga. April 2002

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. ~~Projects to be considered by the standing Refrigeration Committee are to be submitted by chapters for judging at the regional CRC. Each region may submit multiple nominations per year for final judging by the Society Refrigeration Committee.~~ Submission must be received by the Refrigeration Committee ~~Chair~~ by November 1st 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 ~~Annual 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 ~~CRC Chapter~~ nominees shall receive the following:
 - A. The designer shall receive a plaque at a Society ~~Annual 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 ~~ten-eight (108)~~ page submittal shall be as follows:
 - A. The front cover shall be ~~on the submission form. 8 1/2" x 11" sheet containing the project name, the project location, the owner's name, the designer's name, and the chapter submitting.~~
 - 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 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 Chapters may only have one submittal and may devise their own method(s) for selecting their CRC submittal.
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 Appendix A, Scoring Chart. ~~Regional judging is at the option of the Region, but it is recommended that the same scoring system be used as will be used at Society level. If any bonus points are added, the Society Refrigeration Committee would like to have the Region's insight as to the reason for the bonus.~~

SCORING CHART FOR MILTON W. GARLAND COMMEMORATIVE REFRIGERATION AWARD

Problem	Evaluation Points			
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 15 <u>10</u>			B. Concept	
				Superior	100%
	B2. Integrated Design Architectural Integration - Maximum 5			Excellent	67%
				Very Good	53%
	B3 <u>B3</u> . Sustainability - Maximum 5				
	B3 <u>B4</u> . Originality - Maximum 10			Good	47%
			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%
				Fair	33%
C4. Ease of Maintenance - Maximum 10					
Subtotal: SOLUTION - Maximum 50 Points	Sum =				
DISCRETIONARY BONUS - Maximum 10				*	
GRAND TOTAL					

Reasoning for Bonus:

MILTON GARLAND 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. Telephone: Office _____ 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

Telephone: Office _____ E-mail address: _____

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. ~~Projects to be considered by the standing Refrigeration Committee are to be submitted by chapters to their Regional Refrigeration Chairman for judging at the Regional CRC. Each region may submit two nominations per year for final judging by the Society Refrigeration Committee. 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 ~~annual 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 ~~CRC Chapter~~ nominees shall receive the following:
 - A. The designer shall receive a plaque at a Society ~~annual 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 ~~ten-eight (8+0)~~ page submittal shall be as follows:
 - A. The front cover shall be ~~the submission form, an 8-1/2" x 11" sheet containing the project name, the project location, the owner's name, the designer's name, and the chapter submitting.~~
 - 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.
6. The selection criteria shall be re-evaluated by the Society Refrigeration Committee every thirty-six (36) months beginning with the acceptance of these 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 c~~Chapters may only have one submittal and may devise their own method(s) for selecting their CRC submittal.
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". ~~Regional judging is at the option of the Region, but it is recommended that the same scoring system be used as will be used at Society level. If any Bonus points are added, the Society Refrigeration committee would like to have the Region's insight as to the reason for the bonus.~~

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
				Difficult	50%
				Not Difficult	30%

Concept	B1. Concept - Maximum 45 <u>10</u>			B. Concept	
				Superior	100%
	B2. Integrated Design Architectural Integration - Maximum 5			Excellent	67%
				Very Good	53%
	<u>B3. Sustainability – Maximum 5</u>				
	B3 <u>B4. Originality</u> - Maximum 10			Good	47%
				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:

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. Telephone: Office _____ 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

Telephone: Office _____ E-mail address: _____

REFRIGERATION COMMITTEE

(520-160)

2.420.002 MEMBERSHIP

2.420.002.1 Composition (06-01-26)

The members of this committee are as follows

- Twelve (12) voting members, including a chair and a vice chair (91-01-24-63/99-01-28-80/99-06-24-36/00-02-10-64B/06-01-25/26-29)
- Board ex-officio and coordinating officer shall be assigned
- One member of the committee shall also serve as a liaison to the Chapter Technology Transfer Committee.
- Membership should include a cross-section of the refrigeration industry
- Consultants

MOTION PASSED: 8-0-0 CNV

BACKGROUND: REF normally has a consultant, who may serve as the CTTC Liaison. Allowing additional non-voting consultants from other organizations in the field of refrigeration to serve as non-voting members of the committee would provide valuable input to REF. Those consultants should be formally recognized as members in the ROB.

FISCAL IMPACT: None. Representatives of other refrigeration organizations would not qualify for travel reimbursement.

TC No	TC Name	REF Liaison	TC Chair	TC Vice Chair	Members Voting / CM	Handbook Chapters	ASHRAE Standards	Outside Liasons	Programs		Active Research	RTAR's accepted WS req'd	WS's Released for Bid	Proposed RTAR's	Research Closed	Website	
									Orlando January 2010	Albuquerque June 2010						Webmaster	Status
REF	Refrigeration Committee		Kent Anderson	Cynthia Gage		Intro to Refrigeration			Seminar 14	CO2 systems, components, and applications, Part 3		SPC "Guide for Refrigerated Facilities and Systems"					
TC 1.3	Heat Transfer & Heat Flow		Steven Eckels			Fundamentals 2 thru 5 & 39			Forum 10 Seminar 75		1352-RP 1444-RP				1270-RP 1280-RP		
TC 3.1	Refrigerants & Secondary Coolants	Cynthia Gage	Barbara Minor	Sean Cunningham		Fundamentals 19 thru 21			Seminar 14 Forum 5 Seminar 60		1484-RP 1507-RP						
TC 3.8	Refrigerant Containment		Danny Halel			Refrigeration 8											
TC 8.1	Positive Displacement Compressors	Georgi Kazachki	Alex Lifson	Matt Irons	9 VM 31 CM	Refrigeration 45	23, 41, 179, 186 (see below for details)		Seminar 14				See below for details				
TC 8.2	Centrifugal Machines	Norbet Mueller	Ajay Iyengar						Seminar 8		1476-RP						
TC 8.3	Absorption & Heat Operated Machines		Laura Schaefer			Fundamentals 1 Refrigeration 41											
TC 8.5	Liquid to Refrigerant Heat Exchangers		James Bogart			Equipment 35 & 37			Seminar 75		1316-RP 1345-RP				1394-RP		
TC 8.9	Residential Refrigerators & Food Freezers	Cynthia Gage	Pradeep Bansal	Gregory Rosenquist		Refrigeration 48											
TC 10.1	Custom Engineered Refgn Systems	Don Siller	Doug Scott	Dan Dettmers	12 VM	Refrigeration 1, 4, 36, 37 & 43	15		Seminar 44			1513-RTAR		1514-RTAR			
TC 10.2	Ice Making/Skating Rinks	Don Siller	William Wladyka	Wayne Borrowman	7 VM 23 CM	Refrigeration & 35											
TC 10.3	Refgn Piping, Controls, Acc	John Sluga	Todd Jekel	Don Siller		Refrigeration 2, 3 & 33 (new CO2 Chapter)		B31.5 IIAR Piping			1327-RP 1356-RP w/TC 1.8	1513-RTAR w/TC 10.1		1569-RTAR			
TC 10.4	Ultra Low Temp/ Cryogenics		Pradeep Bansal			Refrigeration thru 40			Forum 10		1472-RP						
TC 10.5	Refgn Distrib/Storage Facilities	Don Siller	John Miranda	Dennis Halsey	10 VM 37 CM	Refrigeration & 14			Seminar 39 Seminar 44								
TC 10.6	Transport Refrigeration	Don Cleland	Jeff Berge			Refrigeration thru 32	29		Seminar 51								
TC 10.7	Food Display/Storage Equip	Cynthia Gage	David Hinde	Scott Mitchell	10 VN 46 CM	Refrigeration & 47			Seminar 5 Forum 3		1402-RP 1467-RP						
TC 10.8	Refgn Load Calculations	Don Siller	Don Siller		11 VM 10 CM	Refrigeration 13			Seminar 19 Seminar 39					1435-RTAR 1433-RTAR			
TC 10.9	Refgn for Food & Beverage		Brian Fricke	Ajay Chatiani	7 VM 38 CM	Refrigeration 9, 10, 12 & 15 thru 29			Seminar 19								
TC 10.10	Managemnet of Lubricant Circulation	Doug Reindl (?)	Pega Hrnjak														
USNC/IIR		Georgi Kazachki	E. Groll														
Standard 15	Safety Standard for Refrigeration Systems	Bruce Griffith															

TC 8.1 Proposed research:

- Status of RTAR – “Low and High Pressure Falex Style Testing and a Tribology Comparison to Actual Compressor Tests” – Chris Seeton
- Status of RTAR – “Measurement and Comparison Methods for Studying Oil Circulation Rates” TC 8.01 voted to co-sponsor with TC10.10.
- Status of RTAR – “Measurement of the Dielectric Properties of Oil/Refrigerant Mixtures” Alex Leyderman has drafted this RTAR.
Chris Seeton and Matt Iron recommended RTAR to be sent to Research liaison to be submitted to RAC after his review.
At Salt Lake it was suggested to approach TC 3.4 and TC 3.1 to determine if they want to co-sponsor it.
- TC 8.1 discussed at Salt Lake to list 8.1 as interested in research and then to vote as co-sponsor on “Quantification and Mechanism of Oil Hold up in Vertical and Horizontal Suction Risers with Immiscible and Miscible refrigerants” TC 10.10 is a primary sponsor who will resubmit this RTAR – need status from TC10.10.
- TC3.4 is working on RTAR on “Physical Property measurements of CO2/Lubricant Mixtures”. RTAR has been written and Chris Seeton and Liz Dixon wrote work statement.
Chris indicated that he will contact 3.4 if they want to co-sponsor it. Chris also indicated that he will send a letter ballot to TC 3.4 asking to approve our participation and send work statement to TC8.1 with a letter ballot asking them to co-sponsor it

TC 8.1 Standards

- SPC 23-2005R “Method of Testing for Rating Positive Displacement Compressors and Condensing Units”.
- SSPC-41 Project Committee – Standards 41.9 and 41.10
- SPC 179P (Bob Utter – Chair) “Method of Test for Life Testing of Positive Displacement Compressors”
- SPC 186P “Method of Test for Rating Positive Displacement Compressors and Condensing Units that Operate at Supercritical Conditions”.

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.



REFRIGERATION COMMITTEE MBO's – C. Gage, Chair 2010-2011

6/15/10

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