

DRAFT MINUTES

MTG.LowGWP COMMITTEE January 21 & 24, 2018 Meeting (Part A & Part B)

SUNDAY, January 21, 2018
5:00 PM - 6:00 PM CST
Palmer House Hotel
Salon 7/8 Room – 3rd floor

MEMBER ATTENDEES, STAFF & GUESTS: Total Attendance - 40

Voting Members			Staff		Guests							
Chair	Jim Wolf	x	Mike Vaughn	x	Tom Watson	x	Neal Lawrence	x	Jun Yang	x	Yunho Hwang	x
Vice Chair	Chuck Gulledge	x			Mary Koban	x	Oswaldo Bueno	x	John Withouse	x	Gene Havard	x
Res. Co-Chair	Brian Fricke	#			Larry Burns	x	Heather Platt	x	Chao Ding	x	Dominic Kolandayan	
Res. Co-Chair	Ken Schultz	#			Stefan Elbel	x	KW lee	x	Yi Qu	x	Guolian Wu	x
Codes & Stds Chair	Phil Johnson	#	See attached list for additional guests									
Program Chair	Steve Eckels	#	Alternate 1		Alternate 2		Alternate 3		Alternate 4		Alternate 5	
REF	Jason Robbins		Charles Hon	x								
SSPC 34	Debra Kennoy		Sam Yana-Motta		Chris Seeton		Sean Cunningham					
SSPC 15	Dennis Dorman		Greg Scrivener									
TC 1.1	Ray Rite	x	Sankar Padhmanabhan		Samuel Sami							
TC 1.3	Omar Abdelaziz	x	Satheesh Kulankara	x	Evraam Gorgy							
TC 2.5	Larry Burns	x	John Karakash									
TC 3.1	Barbara Minor	x	Steve Kujak		Bob Richard		Greg Linteris		Kenji Takizawa	x	Bob Low	
TC 3.2	Thomas Leck		Sonny Sundaresan		Alan Cohen							
TC 3.3	Marc Scancarello		Joe Nigro									
TC 3.4	Joe Karnaz	x	Chris Seeton		Danny Halel	x						
TC 3.8	Danny Halel		Mark Adams									
TC 6.3	Siva Gopalnarayanan	x	Kevin Mercer									
TC 8.2	Phil Johnson	x	Laurent Abbas		Ray Good							
TC 8.4	Vikrant Aute	x	Yirong Jiang		Patrick Geoghegan		Chad Bowers					
TC 8.5	Steve Eckels	x	Satheesh Kulankara		Kashif Nawaz							
TC 8.7	Dermot McMorro		Doug Tucker	P								
TC 8.11	Dutch Uselton	x	Ankit Sethi									
TC 10.1	Doug Scott		Dan Dettmers		Wayne Borrowman							
TC 10.7	Brian Fricke	x	Tim Anderson		Charles Hon							
AHAM	Masud Chowdhury		Randy Cooper									
AHRI	Xudong Wang	x	TBD									
U.L.	Brian Rodgers		Mark Skierkiewicz									
UNEP	Shamila Nair-Bedouelle		Ayman Eltalouny	P								

x – Denotes Member, Alternate, Guest, or Staff noted was in attendance for this meeting.
P – Denotes Member, Alternate, Guest, or Staff noted was in attendance for part of this meeting.
- Denotes Non-Voting MTG leadership position
Bold – Denotes committee or person was represented in MTG votes at this meeting
a - Denotes voting member that arrived after votes cast

25 Voting Members Currently – 13 needed for Quorum – Quorum? – YES, 14 present at start of meeting and 2 more joined later

[illegible]

MTG.LowGWP COMMITTEE
January 21 2018 Meeting (Part A)MAIN MTG MEETING - PART A:

- A. CALL TO ORDER, Welcome comments and round of introduction
- B. REVIEW ROSTER & DETERMINE QUORUM
Quorum Reached: YES – 14 voting members or Alternates present at start of meeting. Two more joined later.
- C. ASHRAE Code of Ethics Commitment – Chair
In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests. (See full Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>)
- D. ADDITIONS AND/OR CHANGES TO THE AGENDA – **Review of Action items moved to Wednesday meeting. Initial Program Subcommittee report and discussion of possible program ideas will be moved up to today's Part A meeting so that MTG members have time to coordinate with TCs in Chicago on possible joint program sessions.**
- E. APPROVAL OF LONG BEACH MEETING DRAFT MINUTES
Motion #1 – That the Long Beach meeting minutes be approved as drafted
MTG Vote: 13-0-1-11 (25) CNV
- F. CODES & STANDARDS Working Group Interim Meeting Activity Reports just before or after the Long Beach meeting – Reports from interim meetings just before or after the Long Beach, if any, are appended to the MTG draft minutes for this meeting as **Attachment 1**.
a) **May 15, 2017 meeting**
b) **June 27, 2017 meeting**
c) **January 23, 2018 meeting – Still Pending**
- G. CHAIR'S REPORT - WOLF
a) Status on Joint AHRTI / ASHRAE / DOE-ORNL effort on A2L Refrigerants
AHRTI – All A2L projects completed and final reports available. Follow-on A3 project with CARB underway with U.L. as contractor. PTAC, Mini-split, and single & 3-door reach-in coolers being evaluated for A3 releases. Expect to complete testing this summer.

ASHRAE – All three ASHRAE projects 1806, 1807, and 1808 still underway. RP-1806 Task 1(Model Improvement, Calibration, and Validation) completed and being reviewed now by PMS for approval before proceeding to Task 2 (Simulation Study) and Task 3 (Risk Assessment Updates). RP-1807 draft final report completed and submitted to PMS for approval. RP-1808 continues testing on fittings. Draft final report expected by Houston meeting.

DOE-ORNL – Survey of A2L research needs completed. A closer look at all survey responses will occur next week in the AHRTI FRS (Flammable Refrigerants Subcommittee) meeting
b) **New & On-going Action Items – See Page 10 – Delayed until the Wednesday meeting**
c) **New Information Items:**
1. **AHRTI 9007 project final report is now available through AHRTI website.**
2. **White paper study on sensor technology is expected to be available in two weeks.**
3. **AHRTI Hot Surface Ignition Testing project is near completion.**
4. **AHRTI working with California Air Resource Board (CARB) on A3 leak & ignition study. Estimate late summer start on 24 month project.**
5. **DOE-ORNL working on following two projects:**
i. **NIST modeling tools for burn velocity**
ii. **Evaluate charge limit – Comprehensive Lit. review complete – Summarized output from workshop**

**MTG.LowGWP
WINTER MEETING 2018
CHICAGO, IL
PART A (CONTINUED)**

H. RESEARCH SUBC. REPORT – FRICKE & SCHULTZ

- a) **RP-1806**, *Flammable Refrigerants Post-Ignition Simulation and Risk Assessment Update*
Contractor: Gexcon US - P.I.: Scott Davis – Cost: \$843.5k – 12 month duration – Project start: Jan. 2017
Schultz Lead:
Update: Estimate project is approximately 6-8 months behind schedule due to complexities created by AHRTI 9007 refrigerant release configuration. In order to try and recover schedule, propose now to split Task 1 (Model Improvement, Calibration, and Verification) into the following two stages: Stage 1 – Vapor Release, Stage 2 – Flashing Liquid Release (FLR). Also plan to get Task 2 (Simulation Study) underway to help accelerate project. Come back later with FLR results when available.
- b) **RP-1807**, *Guidelines for Flammable Refrigerant Handling, Transporting, Storing and Equipment Servicing, Installation and Dismantling*
Contractor: Navigant Consulting - P.I.: William Goetzler – Cost: \$80k - 6 month duration – Project start: Mar. 2017
Fricke Lead:
Update: Project consists of the following four tasks:
Task 1. Review Requirements/Best Practices for A2L/A3 Refrigerants from Countries outside US
Task 2. Review Relevant US Requirements/Standards
Task 3. Develop Requirements/Guidelines for A2L/A3 Refrigerants
Task 4. Identify Testing to Confirm Proposed Requirements
Contractor is currently on track to have draft final report ready for review by project monitoring subcommittee (PMS) in late July or early August 2017.
- c) **RP-1808**, *Servicing and Installing Equipment using Flammable Refrigerants: Assessment of Field-made Mechanical Joints*
Contractor: Creative Thermal Solutions - P.I.: Stefan Elbel – Cost: \$115k – 6 month duration – Project start: May 2017
Fricke Lead:
Update: Project's P.I. gave a presentation outlining the fitting types, tests, and project results to date that are part of the project. P.I. estimated that they are 85% complete with testing and expect to have a draft final report available before the Houston meeting

Subcommittee Meeting Attendance – 54 members and guests

AI #1 (Vaughn) Request larger meeting room for Sunday Research Subc. Meeting in Houston for research update.

I. ADDITIONAL DISCUSSION OF HOUSTON & ATLANTA PROGRAM IDEAS

Houston Program Research Summit – Eckels Lead

Omar Abdelaziz stated that Pega Hrniak has possible session “How can we design for LowGWPs?” TCs 8.1, 8.11, and 10.7 sponsoring – Lead Steve Kujak

AI #2 (Kujak) Send Steve Eckels paragraph on proposed program titled “How can we design for LowGWPs?”

Danny Halel volunteered to help develop a workshop for 2019 winter meeting in Atlanta which is targeted to contractors. Expo session would cover how 1806, 1807, and 1808 results affect HVAC contractors. Section 3 already working on such a session and Chris Seeton is coordinating this session.

AI #3 (Halel) Continue to develop Expo session idea into program proposal in coordination with section 3 and others for MTG consideration in Houston.

MEETING RECESSED AT 6 PM CST, SUNDAY, 1/21/18

DRAFT MINUTES PART B**MTG.LowGWP COMMITTEE
January, 24, 2018 Meeting****Wednesday, January 24, 2018****10:00 AM - 12:00 PM CST****Palmer House Hotel****Clark 5 Room – 7th floor****MEMBER ATTENDEES, STAFF & GUESTS:** Total Attendance - 52

Voting Members			Staff		Guests							
Chair	Jim Wolf	x	Mike Vaughn	x	Skip Ernst	x	Andy Granzow	x	Erica Galasso	x	Bill McQuade	x
Vice Chair	Chuck Gullede				Mary Koban	x	Chao Ding	x	Sanghun Lee	x	Erin Szelagowski	x
Res. Co-Chair	Brian Fricke	x			Rusty Tharp	x	Jun Pyo Lee	x	Brian Bogdan	x	Dominic Kolandayan	x
Res. Co-Chair	Ken Schultz				James Stogdill	x	Dominique Taudin	x	John Whithouse	x	Minao Mehdizadeh	x
Codes & Stds Chair	Phil Johnson	x	See attached list at end of minutes for additional guests									
Program Chair	Steve Eckels	x	Alternate 1		Alternate 2		Alternate 3		Alternate 4		Alternate 5	
REF	Jason Robbins		Charles Hon	x								
SSPC 34	Debra Kennoy	x	Sam Yana-Motta		Chris Seeton		Sean Cunningham					
SSPC 15	Dennis Dorman		Greg Scrivener									
TC 1.1	Ray Rite	x	Sankar Padhmanabhan		Samuel Sami							
TC 1.3	Omar Abdelaziz	x	Satheesh Kulankara		Evraam Gorgy							
TC 2.5	Larry Burns	x	John Karakash									
TC 3.1	Barbara Minor		Steve Kujak	x	Bob Richard		Greg Linteris		Kenji Takizawa	x	Bob Low	x
TC 3.2	Thomas Leck	x	Sonny Sundaresan		Alan Cohen							
TC 3.3	Marc Scancarello		Joe Nigro	x								
TC 3.4	Joe Karnaz	x	Chris Seeton		Danny Halel	x						
TC 3.8	Danny Halel	x	Mark Adams	x								
TC 6.3	Siva Gopalnarayanan	x	Kevin Mercer									
TC 8.2	Phil Johnson	x	Konstantinos Kontomaris									
TC 8.4	Vikrant Aute	x	Yirong Jiang		Patrick Geoghegan		Chad Bowers					
TC 8.5	Steve Eckels	x	Satheesh Kulankara		Kashif Nawaz	x						
TC 8.7	Dermot McMorro		Doug Tucker	x								
TC 8.11	Dutch Useton	x	Ankit Sethi	x								
TC 10.1	Doug Scott		Dan Dettmers	x	Wayne Borrowman							
TC 10.7	Brian Fricke	x	Charles Hon	x	Tim Anderson							
AHAM	Masud Chowdhury		Randy Cooper									
AHRI	Xudong Wang	x	TBD									
U.L.	Brian Rodgers	x	Mark Skierkiewicz									
UNEP	Shamila Nair-Bedouelle		Ayman Eltalouny	x								

x – Denotes Member, Alternate, Guest, or Staff noted was in attendance for this meeting.

P – Denotes Member, Alternate, Guest, or Staff noted was in attendance for part of this meeting.

- Denotes Non-Voting MTG leadership position

Bold – Denotes committee or person was represented in MTG votes at this meeting

a - Denotes voting member that arrived after votes cast

25 Voting Members Currently – 13 needed for Quorum – Quorum? – YES, 20 present for votes

[illegible]

DRAFT MINUTES PART B
MTG.LowGWP COMMITTEE
January, 24, 2018 Meeting

MAIN MTG MEETING - PART B:

RECONVENE

J. PROGRAM SUBC. REPORT - Part B - ECKELS

a) Chicago 2018 Meeting

1. **Refrigerant Mini Track @ Expo – Monday 1/22 - MTG Voted to co-sponsor in Long Beach**
 - **Session #2** – 11am to 12 pm – *Lubricant Changes for LowGWP Next Generation Equipment* – Room S101B – Convention Center
 - **Session #4** – 1 pm to 2 pm – *Some LowGWP Next Generation Refrigerants will be Flammable - What Does it Mean to be Flammable?* – Room S101B – Convention Center
 - **Session #8** – Contaminant Control: *What is the same and what is new when using Low GWP refrigerants?* – Room S101B – Convention Center
2. **Seminar 35 – Tuesday 1/23 – 8 am to 9:30 am - MTG Voted to co-sponsor**
Low GWP Refrigerants in Heat Exchanger Equipment: Part 1 Introduction and Case Studies – Monroe Room – Palmer House Hotel
3. **Debate 2 – Tuesday 1/23 – 8 am to 9:30 am - MTG Voted to co-sponsor**
Low GWP Refrigerants in Heat Exchanger Equipment – Adams Room – Palmer House Hotel
4. **Seminar 45 – Tuesday 1/23 – 11 am to 12:30 pm - MTG Voted to co-sponsor**
What in the World?, Global Refrigerant Regulations Explained by Experts from Around the Globe – Red Lacquer Room – Palmer House Hotel

b) Houston 2018 Meeting Tracks

1. Program Website – www.ashrae.org/houston - Opened 5/22/17
2. Houston Conference Tracks:
 - i. Track 1 Systems and Equipment
 - ii. Track 2 HVAC&R Fundamentals and Applications
 - iii. Track 3 District Energy and Cogeneration Plants **NEW**
 - iv. Track 4 Safeguarding our HVAC&R System **NEW**
 - v. Track 5 Residential: Modern Buildings in Hot & Humid Climates
 - vi. Track 6 Professional Skills
 - vii. Track 7 Controls: Troubleshooting Building Management Systems **NEW**
 - viii. Track 8 Research Summit
 - ix. Track 9 Mini-Track: HVAC&R Analytics **NEW**

c) Houston 2018 Meeting – Research Summit

1. Submit Deadline for complete Tech Paper & Conf. Paper abstracts - 8/28/17 – **Passed**
2. Conf. Paper abstract Accept/Reject notifications sent by CEC – 9/8/17 – **Passed**
3. Submit deadline for final Conf. Papers – 12/8/17 – **Passed**
4. Website opens for Houston seminar, forum, workshop proposals – 1/2/18
5. Conf. Paper & Tech Paper Accept/Revise/Reject notifications sent by CEC – 1/15/18
6. **Submit Deadline for seminar & forum proposals – 2/9/18**
7. Conf. Paper & Tech Paper Final Accept/Reject notifications sent by CEC – 2/19/18
8. Seminar, Forum, Workshop, Accept/Reject Notifications sent by CEC – 3/19/18
9. All PPTs due On-line – June 1, 2018
10. Conference begins (June 23-27, 2018)

Motion #2 – MTG.LowGWP co-sponsors the TC 8.11 seminar proposal titled *A/C Sizing & Performance in Hot & Humid Climates including Low GWP Designs* for possible presentation in Houston.
MTG Vote: 17-0-1-7 (25) CNV

Note: This Seminar does not appear to have made it into the Houston program.

AI #4 (All members & guests) – If you have any other program ideas for Houston meeting or future meetings, please send to Steve Eckels. Letter ballot co-sponsors too if possible.

K. CODES & STANDARDS SUBC. REPORT – JOHNSON: – Total Attendance - TBD

Membership

Currently 28 members of the subcommittee, plus an additional 22 people on the distribution list for subcommittee correspondence (past guests and interested parties).

Meetings

Codes & Standards Subcommittee held meetings as follows:

- Tue, 27-Jun-2017, Long Beach, CA
- Tue, 23-Jan-2018, Chicago, IL

Despite intentions expressed in Long Beach, there were no interim meetings in the fall of 2017, and almost no activity via Basecamp either.

AI #5 (MORTS): That the following Codes & Standards Subcommittee Activity Reports and Agenda be appended to the end of the MTG draft minutes for this meeting in Chicago as **Attachment 1**.

- Activity Report from 15-May-2017 web conference meeting
- Activity Report from 27-Jun-2017 Long Beach & web conference meeting
- Agenda from 23-Jan-2018 Chicago meeting

Future monthly web conference meetings planned for February, March, April, and May of 2018.

Basecamp <https://3.basecamp.com/3106353/projects/2779045>

Per the MTG action item AI#4 in Long Beach, all primary and alternate MTG members were added to the project collaboration tool (can login via e-mail). As of today, 79 people have access to the Basecamp web site. AI#4 completed as of 16-Aug-2017.

Stakeholder List

No updates made during fall of 2017. During Chicago identified the need to refresh the status of various codes, standards, and activities. Will work on this during spring of 2018.

Advocacy Plan

No updates to the plan made during fall of 2017, however several elements of the plan were completed. During Chicago identified the need to refresh the planned activities for 2018. Will work on this during spring of 2018.

Presentation Slide Deck for Advocacy & Communication Efforts

No updates to the slide deck itself during fall 2017. However some additional materials were received that will be incorporated into the slide deck. Several of the seminar sessions in Chicago contained relevant content and the subcommittee will contact the authors/presenters to request materials.

Standards Updates (quick highlights only)

ASHRAE 15-2016. Good progress made in Chicago with revisions to Addendum D (direct systems for human comfort) and Addendum H (in machinery rooms). Expecting letter ballots for both within 2 weeks: PPR3-ISC for D and PPR2 for H. SSPC15 submitted two code change proposals to ICC IMC & IFC related to these addenda, as placeholders to be revised should the PPR(s) be successful. Also other smaller scope addenda related to 2L expecting letter ballots for PPR this spring. Addendum A (remove R 717) approved for PPR by letter ballot prior to Chicago meeting, forecast start of review period is 26-Jan-2018. Proposed 15.2 expected to be going out for Advisory Public Review (APR) this spring.

IIAR Standard 2-2014. Published.

ASHRAE 34-2016. Addendum G (make 2L a class, not sub-class of 2) had PPR1 but will go to PPR2-ISC to address some missing text from PPR1. This addendum is a prerequisite for any Standard 15 addenda that use 2L (and vice versa, to avoid conflict between 15 and 34). SSPC34 submitted a code change proposals to ICC IMC to update refrigerant table.

UL 60335-2-40 edition 2. Published 15-Sep-2017. Adds requirements for class 2 and class 3 flammable refrigerants. (Edition 1 prohibited use of flammable refrigerants) Adds requirements transcritical R-744. Expands scope from 600V to 15,000V.

UL 60335-2-40 edition 3. Preliminary comment draft out for public review 1-Dec-2017 thru 30-Jan-2018. Adds requirements for class 2L. Includes national deviations from the content of IEC 2-40 edition 6.

IEC 60335-2-40 edition 6. FDIS vote passed. Forecast publication date 16-Feb-2018. Will replace edition 5.1 published 28-Apr-2016.

UL 60335-2-89 edition 1. Published 29-Sep-2017.

IEC 60335-2-89 edition 2.2. Published 12-May-2015.

IEC 60335-2-89 edition 3. CDV approved Dec-2017. Translation of CDV forecast available Mar 2018. Forecast publication date 29-Mar-2019.

ISO 817:2014 edition 3. Published 1-Jun-2014. Amendment 1 published Nov-2017.

ISO 5149-1:2014 edition 1. Published Apr-2014 (replaced 1993 edition). Amendment 1 published Oct-2015.

ISO 5149-2:2014 edition 1. Published Apr-2014 (replaced 1993 edition).

ISO 5149-3:2014 edition 1. Published Apr-2014 (replaced 1993 edition).

ISO 5149-4:2014 edition 1. Published Apr-2014 (replaced 1993 edition).

Codes Updates:

ICC IMC 2018.	Published. Includes 2L for machinery rooms, but does not include reference to UL 60335-2-40.
ICC IFC 2018.	
ICC IRC 2018.	Published. No provisions for 2L, but does include reference to UL 60335-2-40 edition 1 (no flammable refrigerants).

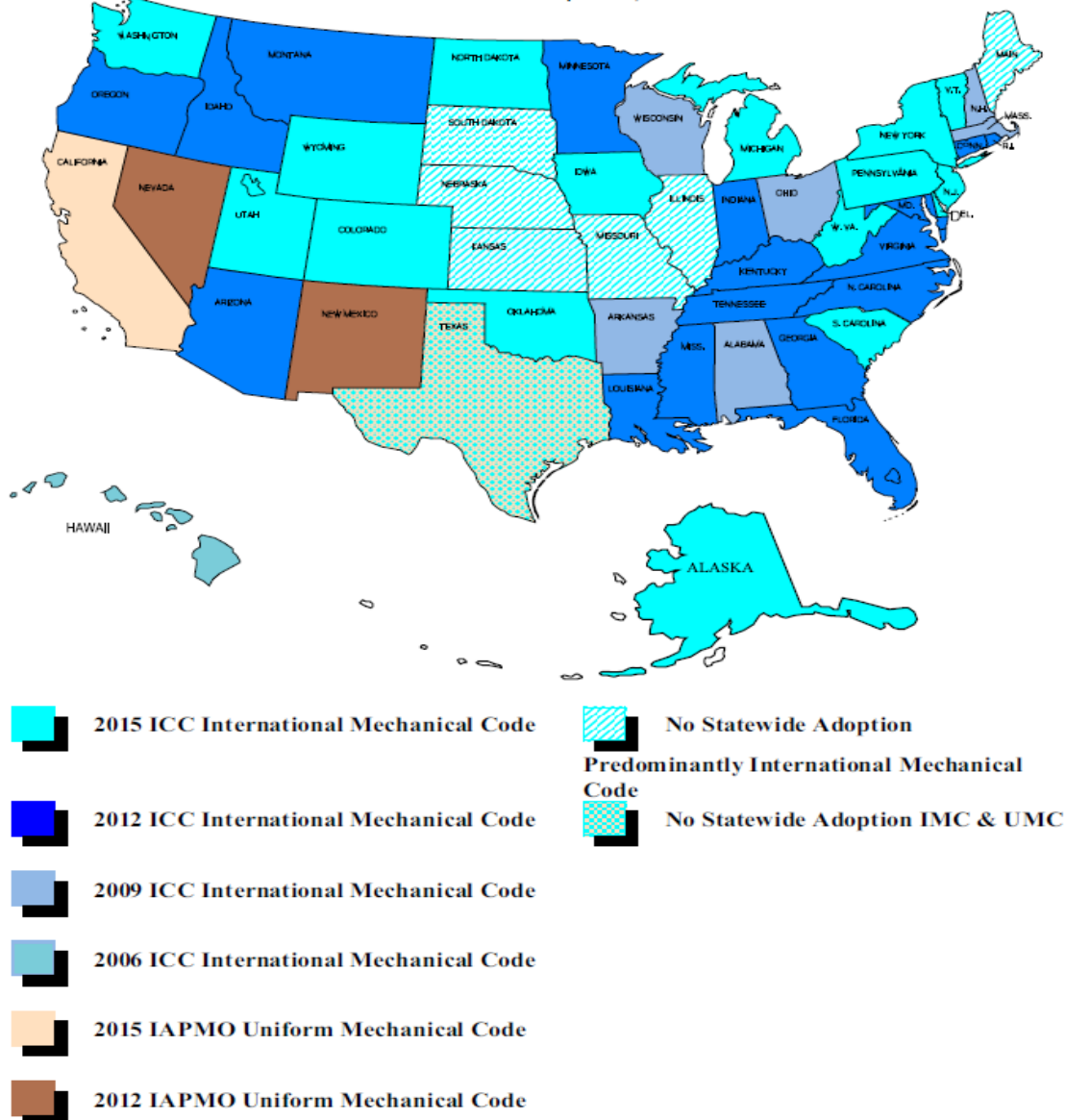
ICC IMC 2021.	Code change cycle started. 11-Jan-2018: deadline for Group A code change proposal submittals 28-Feb-2018: proposals published 15/25-Apr-2018: Committee Action Hearing (CAH) 30-May-2018: CAH Report published 16-Jul-2018: public comment deadline 24/31-Oct-2018: Public Comment Hearing Dec-2018: Final Action after voting period & certification 2019: Group B codes go through same cycle (IECC, IRC-E, IgCC, etc.) 2020: code correlation activities Fall 2020: forecast Publication.
ICC IFC 2021.	
ICC IRC 2021.	

IAPMO UMC 2018. Not yet published; forecast early-2018. Some 2L related proposals from task force public comments were accepted, but some rejected, creating inconsistencies. Petition in process attempting to resolve.

IAPMO UMC 2021.	Code change cycle starts soon. 16-Mar-2018: deadline for code change proposal submittals 13-Apr-2018: proposals published 15/18-May-2018: Technical Committee Meetings 20-Aug-2018: Report on Proposals published 3-Jan-2019: public comment deadline 22-Mar-2019: public comment monograph published 29-Apr/2-May-2019: Technical Committee Meetings 21-Aug-2019: report on comments published 2/16-Oct-2019: balloting 13/15-Nov-2019: Standards Council Meeting early 2021: forecast dublication
----------------------------	--

2017 State Mechanical Code Adoptions

Effective Date: April 19, 2017



L. AHRI AREP-II UPDATES – WANG

M. OLD BUSINESS - Slide donations needed in order to develop Chapter & GGAC slide deck for Code Officials and others.

Every ASHRAE Chapter will soon have a Grassroots Government Activities Committee (GGAC) chair. This new Chapter position will be tied to the PAOE Point system now. Plan is to then have GGAC Chair speak to chapter members about timely issues that impact codes, such flammable refrigerants, and then have GGAC Chair and possibly some Chapter members speak to local Code Officials about this issue using the slide deck.

AI #5 Long Beach (All) – Request for Low GWP Refrigerant slide donations in order to develop Chapter & GGAC slide deck for Code Officials and others. Send slides to Julius Ballanco on C&S Subc.

AI #6 Long Beach (Johnson) – Investigate further and propose a plan for the slide deck that will define the following:

1. How we want to roll it out.
2. Copyright?
3. Can end users customize?
4. What is our process for adding, modifying, or deleting slides to deck?
5. Should we consider using Distinguished Lecturers (DLs) on this topic (Follow Legionella example)?
6. Add Disclaimer to slide deck when distributed

N. NEW BUSINESS – None

ADJOURN

MEETING ADJOURNED – 12:00 PM CST, WEDNESDAY, 1/24/18

**New Action Items from Chicago Meeting
MTG.LowGWP**

NEW ACTION ITEMS FROM CHICAGO MEETING

Action Item	Action	Responsible Party	Page
1	Request larger meeting room for Sunday Research Subc. Meeting in Houston for research update.	Vaughn	4
2	Send Steve Eckels paragraph on proposed program titled "How can we design for LowGWPs?"	Kujak	4
3	Continue to develop Expo session idea into program proposal in coordination with section 3 and others for MTG consideration in Houston.	Halel	4
4	Please send Steve Eckels any program ideas on LowGWP that come up in TC meetings in Chicago.	All MTG Members & Guests	8
5	<p>That the following Codes & Standards Subcommittee Activity Reports and Agenda be appended to the end of the MTG draft minutes for this meeting in Chicago as <u>Attachment 1</u>:</p> <ul style="list-style-type: none"> • Activity Report from 15-May-2017 web conference meeting • Activity Report from 27-Jun-2017 Long Beach & web conference meeting • Agenda from 23-Jan-2018 Chicago meeting 	Vaughn	8

**Status of Long Beach Meeting Action Items
MTG.LowGWP**

ACTION ITEMS FROM LONG BEACH MEETING

Action Item	Action	Responsible Party	Status reported in Chicago
1	Develop answers to the nine questions proposed by David Underwood in order to support <i>ASHRAE Ottawa Day on the Hill</i> . See <u>Attachment 1 – Long Beach Minutes</u>	Fricke / Schultz/ Johnson/ Eckels	On-going
2	Discuss with P.I.s to see if there is value to expanding scope of work for 1806, 1807, and 1808 using remaining Research Reserve funds allocated to this effort. For example, having products of combustion after ignition in 1806 project would be beneficial to include in severity study.	Fricke / Schultz	Complete
3	If you have any other program ideas for Houston meeting or future meetings, please send to Steve Eckels. Letter ballot co-sponsors too if possible.	All MTG Members	Complete
4	Johnson to add all MTG Voting & Alternates & C&S Subc. Members to C&S Basecamp including new members (Gulledge & Robbins) and remove members who have left MTG (Keen).	Johnson	Completed on 15-Aug-2017
5	Request for LowGWP Refrigerant slide donations in order to develop Chapter & GGAC slide deck for Code Officials and others. Send slides to Julius Ballanco on C&S Subc.	All MTG.LowGWP Members	On-going
6	Investigate further and propose a plan for the slide deck that will define the following: <ol style="list-style-type: none"> 1. How do we want to roll it out? 2. Copyright? 3. Can end users customize? 4. What is our process for adding, modifying, or deleting slides to deck? 5. Should we consider using Distinguished Lecturers (DLs) on this topic? 6. Add Disclaimer to deck when distributed 	Johnson	On-going as of 2-Jan-2018
7	Add Jason Robbins to MTG roster as the Refrigeration Committee Voting member on MTG.LowGWP. Robbins to provide name of at least one Alternate from Refrigeration Committee roster to also serve on MTG.LowGWP.	MORTS / Robbins	Completed

**Open Action Items
MTG.LowGWP**

OPEN ACTION ITEMS FROM PREVIOUS MEETINGS

Action Item	Action	Responsible Party	Status reported in Las Vegas
2	Codes & Standards Subc. to work with ASHRAE Standards staff this spring to determine best way to introduce proposed A2L / A3 changes into code development update process with ICC & IAPMO	Phil Johnson	<u>On-going</u>

ADJOURN

MEETING ADJOURNED – 12:00 PM CDT, WEDNESDAY, 1/24/18

ATTACHMENT 1

MTG.LowGWP Codes & Standards Activity Reports

May 15, 2017 meeting

June 27, 2017 meeting

January 23, 2018 meeting – **Still Pending**



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

FINAL

TC/TG/MTG/TRG MINUTES COVER SHEET

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

TC/TG/MTG/TRG No. MTG.LowGWP DATE 27-June-2017

TC/TG/MTG/TRG TITLE Codes & Standards Subcommittee

DATE OF MEETING 15-May-2017 LOCATION Webconference

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Julius Ballanco	2016	David Calabrese	2016	Matt Clark
Danny Halel	2016	Dennis Dorman	2016	Charles Hon
Bill Hansen	2016	Ayman Eltalouny	2016	Dominic Kolandayan
Phillip Johnson	2016	Mike Fischer	2017	Ken Schultz
Mary Koban	2017	Debra Kennoy	2016	Dennis Stanke
Jay Kohler	2017	Dick Lord	2017	Mike Vaughn
Nanette Lockwood	2016	Mark Menzer	2016	John Withouse
Bill McQuade	2017	Shamila Nair-Bedouelle	2016	
Wayne Morris	2016	Sankar Padhmanabhan	2016	
Jay Peters	2016	Ray Rite	2017	
Mark Skierkiewicz	2017	Brian Rodgers	2016	
Rusty Tharp	2017	S.M. Sami	2016	
Doug Tucker	2016	Jeffrey Shapiro	2016	
		Jim Tidwell	2017	
		Xudong Wang	2016	

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

TAC Section Head: Tom Justice

SHMTG@ashrae.net

All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	TACchair@ashrae.net MTGLowGWP@ashrae.net MTGLowGWP.VCH@ashrae.net [CIS@ashrae.net]
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net
Steve Ferguson, Manager of Codes	SFerguson@ashrae.org

Activity Report (FINAL)
MTG.LowGWP
Codes & Standards Subcommittee
Monday, May 15, 2017 1:00pm-3:00pm EDT
Webconference

1. Call to Order

The meeting was called to order at 1:00pm EDT.

A. Determine Attendance and Introduction of New Guests

The Chair displayed the webinar attendance list.

B. [ASHRAE Code of Ethics](#)

The Chair reminded the committee of the ASHRAE Code of Ethics website.

2. Agenda Review

The draft agenda was reviewed and accepted as distributed prior to the meeting (Attachment A).

3. Announcements

A. [repeat reminder: subcommittee membership and straw polls]

As previously reported, this subcommittee will operate informally as a working group. There will be no formal voting and straw polls will be used to determine consensus. The full MTG will approve by vote any subcommittee output, deliverables, recommendations, and activity reports.

B. [repeat reminder: Basecamp project collaboration site]

The “ASHRAE MTG - LowGWP C&S” project site on [Basecamp](#) is the document repository for the subcommittee.

C. CANENA WG10 meets May 23-25 to review comments received from Content Development Document

The meeting will be held in Arlington, VA at LMO Advertising. The goal of WG10 is tri-national adoption (US, Canada, Mexico) of IEC 60335-2-40 to include A2L refrigerants.

D. ASHRAE Conference Workshop 7 “Status of Standards and Codes in the USA, In View of the Application of Low GWP Refrigerants” (sponsored by the Refrigeration Committee). Sun Jun 25, 8:00-9:00am, Long Beach Convention & Entertainment Center, Room 201B, Long Beach, CA.

Phil Johnson will present a status update on committee activities to update ASHRAE Standard 15. The relationships, interactions and relative timing between ASHRAE 15, building codes and US EPA SNAP will be reviewed. Bill Hansen will provide a status update on committee, working group and technical panel activities to update various UL standards. Interconnection and process between UL, CSA, ANCE, CANENA, and IEC will be discussed.

The proposed parallel workshop on international standards and codes was not accepted by the ASHRAE conference committee

4. Review Activity Report from Last Meeting

A. Notes from Mon Apr 17 meeting, forward with any corrections/additions to full MTG for approval and inclusion with MTG minutes

The Chair displayed the activity report; no changes or corrections were requested. The report will be sent to the MTG for approval and will be included in future MTG minutes.

5. Review Progress on Open Action Items

A. Stakeholder list (identify purpose & priority for each) [Lead: Menzer]

The Chair explained that the stakeholder list is tied together with the advocacy plan and that the subcommittee is prioritizing the stakeholders according to importance and time of contact, leading up to creation of a slide deck to be used with all stakeholders. Related to this is tracking of research activities, with the intent to communicate with stakeholders and solicit feedback.

B. Codes & Standards presentation slide deck [Lead: Ballanco]

Julius presented the Codes & Standards Presentation Slide Deck and reviewed the assignment of responsible persons by section/slide. The slides on ASHRAE Standards 15 and 34 have been completed. He will contact Jim Tidwell to check on the status of NFPA 1.

Nanette displayed and discussed the document titled “application code and standard status.xlsx”, which outlines the current status of model mechanical codes and safety standards by equipment type (indirect, direct, refrigeration, etc.). Mary volunteered to assist Nanette with updating this spreadsheet.

Julius has updated the Low GWP Code and Standards Gantt Spreadsheet with information on the ICC Code Correlation Committee inclusion of A2L refrigerants for machinery rooms (IFC and IMC correlation). The IAPMO technical committee reviewed all comments, including 3 public comments on A2L refrigerants for human comfort. IAPMO could not accept these comments because neither ASHRAE Standard 15 addendum d nor UL 60335-2-40 (A2L, 3rd edition) have been published. This will be reviewed again in September at the IAPMO Annual Conference hearing.

C. Advocacy & outreach plan [Lead: Lockwood]

Nanette reported that the advocacy plan tab of the stakeholder spreadsheet has been updated.

Rusty Tharp and Bill Walter will provide an update on ASHRAE Standards 15 and 34 on June 4 at the NFPA Conference & Expo Boston. Julius reported that the title of the presentation is “Fire Challenges of New HVAC Refrigerants”, and that two NFPA sectors endorsed the program.

The Chair may be able to present to the ASHRAE Grassroots Government Advocacy Committee (GGAC) during the ASHRAE Annual Conference in June in Long Beach, CA. Jim Wolf, MTG LowGWP chair, along with Bill McQuade, may be able to assist.

At the upcoming UNEP workshop on safety standards relevant to the safe use of low GWP alternatives in Bangkok (July 10, 2017), Nanette has a presentation slot to discuss the experience of industry in the USA with the standardization process and standards related to flammable low GWP refrigerants. Jay Kohler is also speaking, and will present on developments within ASHRAE 15 and ISO 5149.

Jim Tidwell plans to present information on refrigerants to the International Association of Fire Chiefs on July 26 in Charlotte, NC.

D. Research results [Lead: Ballanco]

The Chair reported that the AHRTI 9007 project report should be completed by UL soon. Julius reported that the UL Fire Council, which advises UL on safety requirements for equipment, building designs, and materials/products related to fire safety, received a presentation on the results of AHRTI 9007.

E. All other items [Lead: Chair]

No discussion.

6. New Business

No new business was presented.

7. Next meetings

A. Long Beach, CA; Tue Jun 27, 1:00-3:30pm Pacific Time (LBCC Room 202C)

B. Webinars for July, August, September (dates TBD)

8. Adjourn

The meeting was adjourned at 2:45 pm EDT.

ACTION ITEMS:

Who	What	When Assigned	When Due	Update 15-May-2017
Menzer	coordinate efforts of working group for stakeholder list	15-May-2017	report back updates at June meeting	spreadsheet revised & updated
Ballanco	coordinate efforts of working group for matrix of code & standard interactions and relationships	15-Mar-2017	report back updates at June meeting	spreadsheet revised & updated
Lockwood	coordinate efforts of working group for advocacy & outreach plan	15-Mar-2017	report back updates at June meeting	spreadsheet revised & updated
Ballanco	coordinate efforts of working group for research results	15-Mar-2017	report back updates at June meeting	monitoring projects

ATTACHMENTS:

Attachment	Contents
A	Agenda
B	
C	
D	
E	

Attachment A

AGENDA
MTG.LowGWP
Codes & Standards Subcommittee
Mon May 15, 17:00-19:00 UTC (1:00-3:00pm EDT)
Webinar Meeting

1. CALL TO ORDER

- A. Determine Attendance and Introduction of New Guests
- B. [ASHRAE Code of Ethics](#)

2. AGENDA REVIEW

3. ANNOUNCEMENTS

- A. [repeat reminder: subcommittee membership and straw polls]
- B. [repeat reminder: [Basecamp](#) project collaboration site]
- C. CANENA WG10 meets May 23-25 to review comments received from Content Development Document
- D. ASHRAE Conference Workshop 7 “Status of Standards and Codes in the USA, In View of the Application of Low GWP Refrigerants” (sponsored by the Refrigeration Committee). Sun Jun 25, 8:00-9:00am, Room 201B, Long Beach, CA.

4. REVIEW ACTIVITY REPORT FROM LAST MEETING

- A. Notes from Mon Apr 17 meeting, forward with any corrections/additions to full MTG for approval and inclusion with MTG minutes

5. REVIEW PROGRESS ON OPEN ACTION ITEMS

- | | |
|--|----------------|
| A. Stakeholder list (identify purpose & priority for each) | Lead: Menzer |
| B. Codes & Standards presentation slide deck | Lead: Ballanco |
| C. Advocacy & outreach plan | Lead: Lockwood |
| D. Research results | Lead: Ballanco |
| E. All other items | Lead: Chair |

6. NEW BUSINESS

- A. Open

7. NEXT MEETINGS

- A. Long Beach, CA: Tue Jun 27, 1:00-3:30pm Pacific Time (LBCC Room 202C)
- B. Webinars for July, August, September (dates TBD)

8. Adjourn



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

FINAL

TC/TG/MTG/TRG MINUTES COVER SHEET

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

TC/TG/MTG/TRG No. MTG.LowGWP DATE 31-August-2017

TC/TG/MTG/TRG TITLE Codes & Standards Subcommittee

DATE OF MEETING 27-June-2017 LOCATION Long Beach, CA

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE	
Julius Ballanco	2016	David Calabrese	2016	Omar Abdelaziz	Tom Leck
Dennis Dorman	2016	Ayman Eltalouny	2016	Mark Adams	KW Lee
Bill Hansen	2016	Mike Fischer	2017	Karim Amrane	Jordan Morrow
Phillip Johnson	2016	Danny Halel	2016	Antonio Bouza	Rick Pavlak
Debra Kennoy	2016	Jay Kohler	2017	Walid Chakroun	Chun-cheng Piao
Mary Koban	2017	Dick Lord	2017	Masud Chowdhury	Robert Richard
Nanette Lockwood	2016	Bill McQuade	2017	Matt Clark	Ken Schultz
Mark Menzer	2016	Wayne Morris	2016	Patrick Coughlan	Stephen Spletzer
Jay Peters	2016	Shamila Nair-Bedouelle	2016	Scott Creamer	Erin Szelagowski
Brian Rodgers	2016	Sankar Padhmanabhan	2016	Chihiro Furuta	Dutch Uselton
Rusty Tharp	2017	Ray Rite	2017	Brian Fricke	Mike Vaughn
Jim Tidwell	2017	S.M. Sami	2016	Siva Gopalnarayanan	Tom Watson
Doug Tucker	2016	Jeffrey Shapiro	2016	Derek Hamilton	John Withouse
		Mark Skierkiewicz	2017	Charlie Hon	Jim Wolf
		Xudong Wang	2016	Kunal Kapoor	Michael Woodford
				Dominic Kolandayan	Kouichi Yanase
				Osami Kataoka	

DISTRIBUTION: <i>All Members of TC/TG/MTG/TRG plus the following:</i>	
TAC Section Head: Tom Justice	SHMTG@ashrae.net
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	TACchair@ashrae.net MTGLowGWP@ashrae.net MTGLowGWP.VCH@ashrae.net [CIS@ashrae.net]
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net
Steve Ferguson, Manager of Codes	SFerguson@ashrae.org

Activity Report (FINAL)
MTG.LowGWP
Codes & Standards Subcommittee

Tuesday, June 27, 1:00pm-3:30pm PDT
Long Beach, CA (LBCC Room 202C)
and Webconference

1. Call to Order

The meeting was called to order at 1:00pm PDT.

A. Determine Attendance and Introduction of New Guests

All attendees introduced themselves.

B. [ASHRAE Code of Ethics](#)

The Chair reminded the committee of the ASHRAE Code of Ethics website.

2. Agenda Review

The draft agenda was reviewed and accepted as distributed prior to the meeting (Attachment A).

3. Announcements

A. [repeat reminder: subcommittee membership and straw polls]

This subcommittee will operate informally as a working group. There will be no formal voting and straw polls will be used to determine consensus. The full MTG will approve by vote any subcommittee output, deliverables, recommendations, and activity reports.

B. [repeat reminder: Basecamp project collaboration site]

The “ASHRAE MTG - LowGWP C&S” project site on [Basecamp](#) is the document repository for the subcommittee.

C. CANENA WG10 will meet monthly during July thru October to review comments received from Content Development Document (revisions for UL 60335-2-40 edition 3)

The goal of WG10 is tri-national adoption (US, Canada, Mexico) of IEC 60335-2-40 to include A2L refrigerants. Bill Hansen, chair, is leading WG10 revision of the draft in response to comments received from the limited public review.

D. ASHRAE Conference Workshop 7 “Status of Standards and Codes in the USA, In View of the Application of Low GWP Refrigerants” (sponsored by the Refrigeration Committee). Sun Jun 25, 8:00-9:00am.

Phil Johnson presented a status update on committee activities to update ASHRAE Standard 15 to include 2L refrigerants. Brian Rodgers provided a status update on committee, working group and technical panel activities to update various UL standards. For those who registered for the Annual Conference, this workshop can be viewed on the Virtual Conference platform through December 2018.

4. Review Activity Report from Last Meeting

A. Notes from Mon May 15 meeting, forward with any corrections/additions to full MTG for approval and inclusion with MTG minutes

The Chair posted the activity report on Basecamp and displayed it for the subcommittee; no changes or corrections were requested. The report was accepted by consensus and will be sent to the MTG for approval and inclusion in future MTG minutes.

5. Review Progress on Open Action Items

A. Stakeholder list (identify purpose & priority for each) [Lead: Menzer]

Mark reported that the list is currently up to about 90 organizations which may have some bearing on development of codes and standards related to Low GWP refrigerants. There are many organizations which either have an influence on or are affected by codes and standards but may not know much about this issue yet. The stakeholder list is our guidebook on the groups we need to educate in the months/years ahead. There are tabs on the spreadsheet for advocacy and outreach (see discussion under item C, below).

B. Codes & Standards presentation slide deck [Lead: Ballanco]

Julius reported that the presentation slide deck outline is nearing completion. We need to add certain presentation slides, including Rusty's NFPA presentation and a slide on ammonia. The master slide deck can be used to pick and choose slides appropriate for your audience.

Phil showed the latest version of slide deck and discussed subcommittee assignments. For each particular issue, one summary slide may be enough but more slides may be added for clarification.

The subcommittee reviewed the codes/standards status spreadsheet and the slide titled "Standard Updates and Model Code Deadlines to Enable A2L Refrigerants in HVAC&R". The Gantt chart titled "Low GWP Refrigerant Codes and Standards" was reviewed; we need to add specific new code language as proposed/approved. For example, the original Standard 15 addenda for A2L language (from APR) which is now in addendum h.

C. Advocacy & outreach plan [Lead: Lockwood]

Nanette reported that the advocacy and outreach stakeholder list has been prioritized by opportunities for outreach. During the conference in Long Beach, Nanette visited GGAC (Grassroots Government Advocacy Committee), SSPC 15, SSPC 34, and the Code Interaction Subcommittee. Nanette showed the slide on standard updates and model code deadlines which she presented to these committees.

Talking points need to be developed to include key items: Standard 15 addenda, proposed Standard 15.2, UL 60335-2-40 3rd edition, model code activity including the 2L machinery room proposal for the 2018 IFC and IMC.

For NFPA, Rusty Tharp and Bill Walters presented a slide deck on topics including the need for lower GWP refrigerants, likely alternate refrigerants, the ASHRAE 34 2L

safety sub-class, and an overview of codes and standards. This one hour presentation was provided to over 100 attendees.

Nanette reported that she and several members of the subcommittee will be attending the “Workshop on safety standards relevant to the safe use of low global-warming-potential (GWP) alternatives” being held in conjunction with the Montreal Protocol meetings in Bangkok this coming July.

There are three important dates to keep in mind for the ICC code process:

- December 1, 2017: ASHRAE 15 Addendum h must be final by this date for inclusion in the 2018 IMC (by reference only).
- January 8, 2018: ASHRAE 15 Addendum d (and Addendum h if not in the 2018 IMC) must be available as a consensus draft by this date for inclusion in the 2021 IMC & IFC. ASHRAE 15.2 must be available as consensus draft by this date for reference in the 2021 IMC.
- January 7, 2019: UL 60335-2-40 Ed 3 must be available as a consensus draft by this date for reference in the 2021 IMC.

D. Research results [Lead: Ballanco]

AHRTI 9007-01, “Benchmarking Risk by Whole Room Scale Leaks and Ignitions Testing of A2L Refrigerants,” has been published and is available online: http://www.ahrinet.org/App_Content/ahri/files/RESEARCH/Technical%20Results/AHRI_9007-01_Final_Report.pdf

Phil presented the SSPC 15 slide deck and the AHRTI summary of the research project. The last slide of deck, showing AHRTI-ASHRAE-CARB-DOE collaborative ongoing research, was discussed.

The AHRI Flammable Refrigerants Subcommittee (FRS) has set up a PMS for AHRTI Project 9007-02. This project is sponsored by CARB as follow-on to 9007-01 and will test A3 refrigerants. Similar release mechanisms and rates will be used and testing will be conducted at the UL facility in Northbrook, IL.

E. All other items [Lead: Chair]

Mark Menzer talked to the National Association of Mutual Insurance Companies regarding flammable refrigerants. In addition, both Siva and Nanette have contacts and are willing to engage with the insurance industry now that there are code proposals in process.

6. New Business

No new business was presented.

7. Next meetings

- A.** Webinars for July, August, September, October, December and early January (dates TBD)
- B.** Chicago, ASHRAE Winter Conference, January 23, 2018

8. Adjourn

The meeting was adjourned at 3:25 pm PDT.

ACTION ITEMS:

Who	What	When Assigned	When Due	Update 27-Jun-2017
Menzer	coordinate efforts of working group for stakeholder list	15-May-2017	report back updates at June meeting	spreadsheet revised & updated
Ballanco	coordinate efforts of working group for matrix of code & standard interactions and relationships	15-Mar-2017	report back updates at June meeting	spreadsheet revised & updated
Lockwood	coordinate efforts of working group for advocacy & outreach plan	15-Mar-2017	report back updates at June meeting	spreadsheet revised & updated
Ballanco	coordinate efforts of working group for research results	15-Mar-2017	report back updates at June meeting	monitoring projects
Johnson	Schedule meetings, reserve room for Chicago meeting	27-Jun-2017	mid-Aug-2017	

ATTACHMENTS:

Attachment	Contents
A	Agenda
B	
C	
D	
E	

AGENDA
MTG.LowGWP
Codes & Standards Subcommittee
Tue Jun 27, 1:00-3:30pm PDT, 2017
Meeting at Long Beach, California

1. CALL TO ORDER

- A. Determine Attendance and Introduction of New Guests
- B. [ASHRAE Code of Ethics](#)

2. AGENDA REVIEW

3. ANNOUNCEMENTS

- A. [repeat reminder: subcommittee membership and straw polls]
- B. [repeat reminder: [Basecamp](#) project collaboration site]
- C. CANENA WG10 will meet monthly during July thru October to review comments received from Content Development Document (revisions for UL 60335-2-40 edition 3)
- D. ASHRAE Conference Workshop 7 “Status of Standards and Codes in the USA, In View of the Application of Low GWP Refrigerants” (sponsored by the Refrigeration Committee). Sun Jun 25, 8:00-9:00am. Virtual conference if you missed it.

4. REVIEW ACTIVITY REPORT FROM LAST MEETING

- A. Notes from Mon May 15 meeting, forward with any corrections/additions to full MTG for approval and inclusion with MTG minutes

5. REVIEW PROGRESS ON OPEN ACTION ITEMS

- | | |
|--|----------------|
| A. Stakeholder list (identify purpose & priority for each) | Lead: Menzer |
| B. Codes & Standards presentation slide deck | Lead: Ballanco |
| C. Advocacy & outreach plan | Lead: Lockwood |
| D. Research results | Lead: Ballanco |
| E. All other items | Lead: Chair |

6. NEW BUSINESS

- A. Open

7. NEXT MEETINGS

- A. Webinars for July, August, September, October, November?, December?, and early January (dates TBD)
- B. Chicago, January 23, 2018

8. Adjourn