TC 9.9 Meeting Minutes
Monday January 23, 2012
Chicago, Illinois

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

TC/TG/TRG NO: **TC 9.9** Date: **January 23, 2012** Location: **Chicago, Illinois**

TC/TG/TRG TITLE: **Mission Critical Facilities, Technology Spaces and Electronic Equipment**

General Meeting on January 23th - Call to order

Chairman, Jack Glass called the meeting to order at 2:15 p.m.

Voting MEMBERS	YEAR APPTD	PRESENT ABSENT	Voting MEMBERS	YEAR APPTD	PRESENT ABSENT
Robin Steinbrecher	10	P	Ecton English	10	P
Terry Rodgers	09	P	Don Beaty	10	P
Richard Pavlak	08	P	Jack Glass	09	P
Roger Schmidt	09	P	John Bean	10	P
Mukesh Khattar	09	P	Joseph Gangemi	10	P
David Quirk	09	P	Rhonda Johnson	10	P
Chris Kurkjian	11	P	Herb Villa	10	P
David Moss	11	P	Francis Mills	09	Int'l
Corresponding Members		See Below			

TAC Section Head: Dr. Tom Lawrence	
TAC Chair: Charles Culp	
Manager Of Standards Manager Of Research & Technical Services	Stephanie C Reiniche Mike Vaughn

Attendees

Name

Jack Glass
David Moss
Greg Jeffers
Nick Gangemi
Geoff Lawler
David Quirk
Chris Kurchian
Vali Sorell
Mike Patterson
Craig Crader
Ecton English
Chris Muller
Sang Lee
David Copeland
Saurabh Shrivaskava
Rhonda Johnson
Chris O'Reilley
Rajendera Kapoor
Mark Seymour
Mukesh Khattar
John Lanni
Michael Frank
Dave Hoyt
Matt Koukl
John Peterson
Tom Squillo
Andrew Wengerd
Ron Spangler
Dave Ruede
Robert Mayfield
Rick Pavlak
Don Beaty
Tom Davidson
Ian Seaton
RobinSteinbrecher
Terry Rogers
Roger Schmidt
Andrew Baxter
Art Giesler
John Bean
Ted Jagusztyn
Vello Ehvert
Jeff Rutt
Tim Lehotsky
Bob McFarlane
Mike Ohadi
Schlomo Novotny
Stuart Lawrence
Ecton English
Terry Rogers
Elizabeth Slyziuk
Tim McCann
Rich Velten
Jeff Stein
Ken Gill
Mike Scofield
Nemat Lotfi
Dave Meadows
Patrick Castelvecchi

Part time:
(8) ASHRAE leadership noted in minutes

Opening Remarks

Jack Glass began the meeting with introductions and acknowledged the new Provisional Corresponding Members present.

Jack announced that TC 9.9 member, Don Beaty received the Hightower Award from ASHRAE. This was in recognition of his outstanding level of contributions to the Society including extensive international training based on the publications of TC 9.9.

Jack also acknowledged those presenting at the four Programs sponsored by TC 9.9.

Finally, it was reported that three new publications have been approved by the voting members since the Montreal meeting: an update to the Power Trends book; a White Paper on liquid cooling; and a revision to the White Paper on Contamination. The White Papers are on the TC 9.9 website www.tc99.ashraetcs.org.

90. 1 Update

Rick Pavlak gave an update on SSPC90.1. There has been a lot of interaction with SSPC 90.1, in particular their Mechanical Subcommittee (MSC), the last 6 months. The Continuous Maintenance Proposal (CMP) submitted by Don Beaty in January of 2011, and supported by TC9.9, was modified by the MSC in the intervening year (different in format but similar in spirit). The proposal was approved by the main 90.1 committee on January 23, 2012, and will be sent out for public review as Addendum ap after a final letter ballot within 90.1. Rick will send out a notice when the public review period starts.

A list of issues that still require resolution between TC 9.9 and SSPC 90.1 was discussed. The list, which contains 23 issues, had been circulated to the voting members. Time did not permit a thorough review of each item

Address by TAC, Standards, Tech Council and Board

The meeting broke from the regular agenda for a special address by representatives from ASHRAE. The group consisted of:

Charlie Culp, Head of TAC

Bill McQuade, incoming Head of TAC

Carol Marriott, Head of Standards

Ken Cooper, incoming Head of Standards

Tom Lawrence, Section 9 Head

Stephanie Reiniche, ASHRAE Staff

Ross Montgomery, Tech Council Chair

Eckhard Groll, Board of Directors, director at large

Charlie Culp began by acknowledging that the inclusion of data centers into SSPC-90.1 had not gone very smoothly. He noted that there had been a lot of discussions at various levels of ASHRAE regarding the right way to handle data centers.

Options were presented for the TC to consider which included:

- Keep data centers in 90.1 as they are now and work with the system to affect any changes to improve the issues of concern to the industry.
- Create a new standard with a new Title, Purpose and Scope that would cover only data centers. It was noted that the new standard could possibly reference sections of 90.1 to limit the scope of the new standard.
- Create a new Chapter for data centers within SSPC 90.1.

The group offered to assist TC 9.9 with making the decision on which course to take.

The group wanted to hear from the members of TC 9.9 about their views with regard to the inclusion of data centers in the energy code.

TC member comments covered a wide array of issues:

Members noted that the data center industry had already made great strides in improving energy efficiency. This effort has been going on for many years, well before the inclusion into 90.1.

Members pointed out that data centers are unique with the power densities many times higher than commercial office space. It was considered detrimental to apply the concepts used for office buildings to data centers. It was also noted that ASHRAE appears not to acknowledge PUE as a valuable efficiency metric for data centers even though it is universally embraced by the industry. It was noted that an early comment to use PUE was rejected.

Some members questioned the rational for the inclusion of data centers into 90.1. Some suggested expanding exemptions to include most data centers with a large process load. It was noted that the industry has made changes faster than ASHRAE could respond. The ASHRAE group responded that ASHRAE has pushed other industries in the past. They also suggested that other organizations could propose standards for data centers.

Many comments addressed the process taken up to this point. Some were critical of the way comments from TC 9.9 members were handled during the early process. It was noted that the process actually started several years ago. The main issues of concern to the data center industry center on the prescription of economizers. It was explained that 90.1 attempts to give incentive to building owners who only do the minimum. It focuses on landlords who do not have responsibility for the utility bills.

Many members countered that the data center industry is the opposite of the landlord example and has been focused on energy efficiency. They pointed out that the cost of energy is significant to data center owners.

It was noted that many in the industry are still unaware of the change that has taken place to include data centers in the energy code.

The session concluded with the group promising to help TC 9.9. Carol and Charlie will consider candidates with standards experience to advise TC 9.9. It was pointed out that managing a standard requires more time and manpower than required to manage a technical committee. TC 9.9 was encouraged to decide quickly which path to pursue.

IT Subcommittee

Roger Schmidt and Robin Steinbrecher reported that work is underway on the 3rd edition of the Thermal Guidelines book. It should be available for publication later in 2012. The new book will incorporate the information included in the latest white papers on liquid cooling and expanded equipment classes.

It was reported that 17 companies are working on the revisions to the Power Trends book. The new book will include projections out to 2020. There will be two new chapters, Component Power Trends and Practical Applications of the Power Trends. In addition, there are further breakdowns of hardware categories in the new edition.

Review of PUE Categories

Mike Patterson gave a presentation to the TC to update the members about developments in PUE measurements. Mike explained the four categories of PUE measurement, PUE 0 through 3, and the differences in measurement location and frequency. He noted several special examples of data centers with extremely low PUE values. He also pointed out that PUE is a data center infrastructure metric only. It does not measure IT equipment efficiency.

Mike covered other related metrics including WUE for site water usage and CUE for carbon accounting.

Data Center Trends

John Bean led a discussion on recent trends in data centers. Some of the key points covered were:

Containment – as referenced in an earlier presentation, there is little difference in performance between containing the hot aisle versus the cold aisle. Other considerations will drive that decision.

Energy Reuse – Several applications of reusing data center energy were discussed. Data centers near district heating or campus sites offered potential. Using waste heat as a source for generator block heating was suggested.

Liquid Cooling and Increasing Rack Temperatures were also discussed.

European Code of Conduct

Rhonda Johnson gave a presentation about the structure and organization of the European Code of Conduct. The member categories are Participant and Endorser. An overview of the Best Practices document was given. The CoC coordinates closely with TC 9.9 with regard to air cooled and liquid cooled temperature ranges and also equipment classes.

Programs

Nick Gangemi reviewed the different types of ASHRAE programs: Technical Sessions, Conference Papers, Seminars and Forums. The purpose of the programs is to educate.

A list of potential future topics was developed from member suggestions:

Fire Suppression in data centers

IT developments affecting data center cooling

Controls

Co-location data center issues

PUE, LEED, DOE

Equipment Classes

Code compliance issues for data centers, including comparisons to the EU

Power Trends book update and applying the information

Hydrothermal net-zero applications

Nick offered to collect additional topic ideas. The membership will be polled by email. It was suggested that the TC 9.9 website could be used to display program topics for development.

Summer 2012 – San Antonio – the date has passed for new Transaction Papers. There may be more competition for programs since the number of program tracks was reduced to 7.

Winter -2013 – Dallas – all program options are still available.

Note: All key dates for future conferences are on the TC 9.9 website.

Research

Mike Patterson gave a report of the Research Subcommittee.

Announcements
There are several opportunities for research at the Greater Philadelphia Innovation Cluster (GPIC) US Navy Shipyard, with Smartgrid/ Microgrid $100 - $250K grants to use as testbeds. There will be two calls: Spring and Summer 2012.

Grants in Aid: ASHRAE program for Grad Student Support

The research pipeline is running low; only 6 RTARs and 2 Work Statements are currently being evaluated.

Why do RTARs get returned?

- Idea not appropriate for ASHRAE funding
- Not adequate references to past work of existing literature
- Not clear how project will 'advance' the state-of-the-art
- Budget does not seem to be in line with work to be completed

ASHRAE is no longer funding literature searches.

TRP 1499: Humidity and ESD: there was a 6 month delay on Terms and Conditions, but issues were resolved and it is moving forward again.

PR-1487: Simplified Rack Level Modeling
Tom Davidson gave a presentation summarizing the research, which is now complete. The committee needs to accept the research to close out the project. A vote was taken:

Vote to accept PR-1487
Yes: 15; No: 0; Abstain: 0 **Motion passes**

The full research report should be available to ASHRAE members within the next month (need to be logged in). A summary technical paper has been reviewed and should be presented at the next ASHRAE meeting.

Jim VanGilder of TC4.10 (Indoor Environmental Modeling) is working on another RTAR for which he would be looking for TC9.9 co-sponsorship. The general topic would be CFD modeling validation at the DC level. He will submit this to Mike once it is further developed.

Contamination/ Corrosion study continues as an outside-ASHRAE project. Roger Schmidt will update the full committee in June.

Research Prioritization Survey

- Survey Completed
- ~39 responses
- Process: keep the top ranked ideas, archive the old, add new for next meetings TC survey
- Also considered ASHRAE Research Priorities that we had no topics mapped to..
- Top ranked items still need a team to develop the project scope and move it through the TRP process

- ASHRAE research priorities include: http://www.ashrae.org/technology/page/39

Based on the survey, the leading research priorities are:

1. Maximize the actual operational energy performance of buildings and facilities
1.7 (1) a) Expansion of the thermal guidelines - energy consumption impact
2.19 (6) b) Cooling proof of concepts: Optimal integration of data center cooling with ITE cooling
2.21 (7) i) Reliability of liquid cooling

2. Progress toward Advanced Energy Design Guide (AEDG) and cost-effective net-zero-energy (NZE) buildings
2.05 (2) a) Removing barriers to liquid cooling

5. Support the development of ASHRAE energy standards and reduce effort required to demonstrate compliance
2.11 (4) a) Develop Rating Methods; free cooling techniques - metrics for comparison
2.25 (8) b) Develop simulation tools to accurately model technologies like rear door coils. most cutting edge designs cannot be simulated in DOE-2, Trace, etc.

7. Support development of tools, procedures and methods suitable for designing low energy buildings
2.17 (5) b) Standardized protocols for data reporting and sharing, across IT and the Facility

9. Support the development of improved HVAC&R components ranging from residential through commercial to provide improved system efficiency, affordability, reliability and safety
2.06 (3) a) Reliability impact of expanding the Humidity and room temperature

New research topic suggestions include:

- Locating Data Centers Near Natural Deep Cold Water for Cooling and Warm Surface Water for Off-Grid Power generation
- Sharing data and controls signals between IT equipment and building controls systems; efficient part-load operation of cooling systems
- Data center energy reuse - air- and liquid-cooled alternatives, capabilities and ROI
- Airside Economizers

- Development of low carbon data centre solutions, Opportunities for using data centre waste heat in useful heating systems, Can phase change materials (thermal storage) be used to even out loads, reduce peaks and provide a degree of resilience
- Baseline data center energy models for ASHRAE 90.1 & LEED for Data Centers

Members wishing to work on the RTAR's for the above projects should let Mike or the TC Chair know.

SPC-127

Tom Davidson reported that SSPC-127 has already been approved by the voting members of TC9.9 and submitted to ASHRAE, and the Standard 127-2012 should be out shortly. There are several changes to the Standard; especially as they relate to the four classes of cooling equipment with higher return temperatures and larger delta t's. It was noted that the air conditioning equipment delta T is not consistent with all IT equipment delta T. Therefore data center designers and operators must be conscious of providing adequate air flow to the IT equipment.

Publications

Don Beaty reported on books in progress: Thermal Guidelines and Power Trends for revisions.

SPC-189

Jeff Rutt reported on the status of SPC-189. He noted that it provides minimum requirements for ALL high-performance, green buildings. It could therefore, apply to data centers. He described applications and exceptions for solar installations. He also noted that the Air Force and Army Corp of Engineers already use this standard. It was noted that there is also an International Green Code: IECC International Energy Conservation Code.

Meeting Adjourned

The Meeting was adjourned at approximately 9:00 p.m.

Jack Glass – TC 9.9 Chair