

ASHRAE TC ACTIVITIES SHEET

DATE: 25JUN 2001

TC NO. TC 1.5

TC TITLE: Computer Applications

CHAIR: D. Branson

VICE CHAIR/SECRETARY: D. Barrett

TC MEETING SCHEDULE

Location, past 12 mo.	Date	Location, next 12 mo.	Date
Atlanta	Feb 2001	Atlantic City	Jan 2002
Cincinnati	Jun 2001	Honolulu	Jun 2002

TC SUBCOMMITTEES

{PRIVATE }Subcommittee	Chair
Emerging Applications	Pornsak Songkakul
Handbook	Mike Pouchak
Internet	Walter Grondzik
Program	Mark Hydeman
Research	James Watts

RESEARCH PROJECTS

Project Title	Contractor	Monitoring Committee Chair	Report Made at Meeting?
TRP-1017	Texas A&M	James Watts	Yes
TRP-1049		Ron Nelson	Yes
TRP-1032		Dave Branson	No

LONG RANGE RESEARCH PLAN

Rank	Title	W/S Written	Approval	To R&T
1	Prototype demonstration of IFC/aecXML interoperability in support of HVAC&R activities.	No	No	No
2	On-line development of standards	No	No	No
3	Retooling the HVAC education process to better Use Computer-Aided Design	No	No	No
4	A Multimedia database for examining and comparing HVAC design alternatives	Yes	No	No
5	Software tool to aid the development of work statements that have software deliverables	No	No	No

HANDBOOK RESPONSIBILITIES

Year & Volume	Chapter Title	No.	Deadline	Approval	Handbook Committee Liaison
2003 Applications	Computer Applications		2003	No	Ken Cooper

STANDARDS ACTIVITIES

None

TECHNICAL PAPERS FROM SPONSORED RESEARCH (PAST 3 YRS, PRESENT, PLANNED)

{PRIVATE }Title	When Presented
From TRP - 833: Demonstration of Knowledge Based to Aid Building Operators in	

Responding to Real-Time Pricing Electricity Rates	
From TRP - 808: Demonstration Knowledge-Based Tool (KB) for Diagnosing HVAC O&M Problems in Small Office Buildings.	

TC SPONSORED SYMPOSIA (PAST 3 YRS, PRESENT, PLANNED)

Title	When Presented
Whole Building Calibration Techniques: Fact or Fantasy? - Hydeman	Minneapolis 06/00
Tools & Techniques for Calibration of Component Models - Hydeman	Atlanta 01/01
Computers and HVAC Education - Nelson	Chicago 01/99
The Great Energy Predictor Shoot-out II	San Antonio 6/96

TC SPONSORED SEMINARS (PAST 3 YRS, PRESENT, PLANNED)

Title	When Presented
The Demise of 2D CAD Design - Barrett	TBD
Where Is ASHRAE going with the Web – Dunn	Atlanta 01/01
Data Visualization for Building Operations – Kammers	Atlanta 01/01
A Virtual Office Conducting Business from Cyberspace – Barrett	Atlanta 01/01
Automated Recognition of data patterns for HVAC and Building Diagnostics – Brambley	Atlanta 01/01
A Practical Guide to the Net: Inter, Intra or What? – Pouchak	Atlanta 01/01
Applications of Internet and Electronic Media for Chapters and Regions – Hydeman	Atlanta 01/01
ASHRAE Evolves Policy & Media through Time – Schwedler	Atlanta 01/01
How Could Electronic Media Assist the Development and Implementation of ASHRAE Standards – Hydeman – 15 persons	Minneapolis 06/00
What is the Future Relationship Between DDC & The Web – Branson – 85 persons	Minneapolis 06/00
How Could Electronic Media Assist the Development and Implementation of ASHRAE Standards - Hydeman	Dallas 02/00
What is the Future Relationship Between DDC & the Web - Branson	Dallas 02/00
Where is ASHRAE Going With the Web - Dunn	Dallas 02/00
Data Visualization for Building Operations - Kammers	Dallas 02/00
Business in the Year 2000? or 1900? - Schwedler	Chicago 01/99
Does Your TC or Chapter Need Members? Retention? Communication? Action? Try Computer and the Web?	Toronto 06/98
Use of Internet for Collaborative Efforts in HVAC - Branson	Toronto 06/98
Emerging Applications: From PID to Fuzzy Logic & Beyond - Sun	San Francisco 01/98
Demonstration of Inter-Operable Computer Applications for the HVAC Industry - Forester	San Francisco 01/98
Use of the Internet by Technical Committees - Schwedler	San Francisco 01/98

TC SPONSORED FORUMS (PAST 3 YRS, PRESENT, PLANNED)

Title	When Presented
What Type of Software do ASHRAE Members Want from ASHRAE? - Kammers	TBD
ASHRAE An Electronic Society - What Pieces of the Connectivity Puzzle Are Still Missing? - Branson	TBD
Should ASHRAE Establish Guidelines for Electronic Media that contains Manufacturers Product Information – Sun	Atlanta 01/01
What will you want from your Web Handbook? – Schwedler	Atlanta 01/01
Should ASHRAE provide Open Source Software a la LINUX? – Kammers	Atlanta 01/01
How Should ASHRAE's Commercialization Policy be Applied in the Age of Electronic Media and Networks - Webster	Minneapolis 06/00
Great Research!!! Can We Do It Without Software? - Branson	Atlanta 01/01
What is the Members View of Electronic Media Support for Standards – Hydeman –18 persons	Minneapolis 06/00
Sensors for HVAC: Problems, Needs & Technology – Brambley – 80 persons	Minneapolis 06/00
Now that You Know ASHRAE's Web Plans - Pouchak	Minneapolis 06/00

Sensors for HVAC: Problems, Needs & Technology - Brambley	Dallas 02/00
What is the Members' View of Electronic Media Support for Standards? - Hydeman	Dallas 02/00
What is the Members' Response to ASHRAE's Web Plan? - Sun	Seattle 06/99
What Support Is Needed For ASHRAE Software? - Kammers/Webster	Chicago 01/99
Computer-Based Training - What Subjects Should ASHRAE Put on the Web or CDs? - Culp	Toronto 06/98
Should ASHRAE Sponsor a Cyberspace Virtual Chapter? - Hallstrom	Toronto 06/98
Who Should Champion the Transfer of Technology on the Internet? - Branson	Toronto 06/98
What Would You Do If You Had Internet Access for Your Building Control System - Songkakul	San Francisco, 01/98
What Do ASHRAE Members Want Form The ASHRAE Homepage - Linton	San Francisco 01/98
What ASHRAE members want/ need from Manufacturer's World Wide Web Site	Boston 06/97
What to ASHRAE Members want from the ASHRAE Web page	Boston 06/97
How Can User Interfaces for HVAC Software be Improved	Philadelphia 01/97
What Should ASHRAE's Role Be In The Industry Alliance for Interoperability?	San Antonio 06/96
What Do ASHRAE Members Want/Need from the World Wide Web?	San Antonio 06/96
HVAC, Virtual Reality, and You	San Antonio 06/96
What are the CAD/Simulation Tool Needs of ASHRAE Members?	San Antonio 06/96

JOURNAL PUBLICATIONS (PAST 3 YRS, PRESENT, PLANNED)

Title	When published
What HVAC Applications Would Benefit from Computer-Aided Instruction - Culp	TBD
Diagnostics for Outdoor Air Ventilation and Economizers - Brambley, Pratt, Chassin, Katipamula and Hatley	10/98

SUBMITTED BY: Duane Barrett -- TC 1.5 Secretary

TC 1.5 (Computer Applications) Minutes

Cincinnati 06/2001

Monday – June 25th, 2001 6:30 p.m. -- 9:00 p.m.

General

- **Call to order** at 6:35 p.m.
- **Introductions/Sign up sheet** – TC info passed out by Chair
- **Agenda Review** – no additions made
- **Roll Call** (Branson, Barrett, Grondzik, Nelson, Watts, Hydeman, Pouchak, Briggs, Dwyer, Songkakul) Quorum established
- **Atlanta Minutes Approval** –
Motion by Barrett/second by Hydeman; Motion passed by unanimous voice vote with Chair not voting 9-0-0

Chair's Report – Dave Branson

Announcements –

- Head count of voting members going to Honolulu. 10 planning to attend.
- Due to circumstances beyond control, Kammers and Barrett will both be unable to fulfill Chair/Vice Chair positions. Therefore, Grondzik will become chair and Hydeman Vice Chair at the next meeting.
- Krisanan Gowri will become the new Program Chair beginning 7/01.

Action Item Review -

- Deactivate PASQ – done.
- Posting 2nd draft of 2003 Handbook by end of July on the website.

Section Liaisons:

- Mark Modera Section Head Section 1 – Presented Dave with an ASHRAE appreciation award.

Subcommittee Reports

Program - Mark Hydeman (Attachment A)

Motion by Hydeman/Second by Grondzik to accept program. Motion passed by vote of hands (9-0-0) with Chair not voting

- **Program packages to Mark Hydeman by Aug. 3rd.**
- Reviewed current Cincinnati programs.

Research – Jim Watts (Attachment B)

1049 report is making good progress

1032 report contract is far along project could be completed within 2 months.

1228 report awarded as contract early this year. Charlie Culp has agreed to chair PMS

Kammers retired from the PMS and Ron Nelson will be replacing him.

Motion to accept XML work statement by Watts second by Grondzik (9-0-0) with Chair not voting

Document the TC1.5 membership with other TCs.

Motion to accept RTAR priorities by Watts, second by Pornsak. Motion passed by vote of hands (9-0-0) with Chair not voting

Motion to endorse by Grondzik, second by Branson for the Development of Internet 101 training course.

Motion passed by vote of hands (9-0-0) with Chair not voting

Emerging Applications – Pornsak Songkakul (Attachment C)

Internet – Walter Grondzik (Attachment D)

*Motion to endorse the Development of Internet 101 training course by Grondzik, second by Branson.
Motion passed by vote of hands (9-0-0) with Chair not voting*

Also Walter would like to edit time for the Internet meeting to 1 hour.

Handbook – Mike Pouchak (Attachment E)

Motion to join first rounds of Electronic Handbook development by Hydeman, second by Dwyer. Motion passed by vote of hands (9-0-0) with Chair not voting

Standards

Did not meet

Webmaster report (Ron Nelson)

Send Ron any updates.

Liaisons

SPC – 134P - Duane Barrett, Received comments from 2nd review and completed formal responses to suggestions.

Duane Barrett - XML Definitions for HVAC&R GPC liaison

Rob Hitchcock - IAI report, 16 software packages that have officially been certified by the IAI.

See: <http://eetd.lbl.gov/btp/iai/bs8/index.html>

Old Business

New Business

- Meeting times for Atlantic City.
- Pepper’s asks TC1.5 to review cyclonic data software for software quality. Mick, Tim, Charlie, will assist.
- **Sub-committee chairs need to provide Chair with strategic planning outline.
- **TC1.5 needs an org chart created that outlines our ASHRAE liaison's etc.**

Committee	Day	Time	Chair
Internet	Sunday	2:00 – 3:00	Rob Hitchcock
Emerging Applications	Sunday	3:00 – 4:00	Pornsak Songkakul
1032 PMS	Sunday	4:00 – 5:00	Dave Branson
1228 PMS	Sunday	5:00 – 6:00	Charlie Culp
IFC/XML RTAR	Sunday	6:00-6:30	Rob Hitchcock
Research & Program	Sunday	6:30 – 8:30	Jim Watts & Krishnan Gowri
Handbook	Monday	4:30 – 6:30	Mike Pouchak
Main TC	Monday	6:30 - 9:00	Walter Grondzik

Other Business

Adjournment

Motion by Hydeman/Second by Barrett; Motion passed unanimously by voice vote with Chair not voting; adjourned at 8:05 P.M.

Attachment A

TC 1.5 Program Subcommittee Meeting
Sunday June 24th Meeting 6:30pm-7:30pm
Hyatt Regency E (Floor 3)

- 1) Review rules of operation for the TC 1.5 Program Subcommittee
 - A) We will submit one symposium per meeting or no-one leaves the room
 - B) Those that try to leave are automatically volunteering to chair the symposium
 - C) Don't even think about encroaching on Research
 - D) Each person (including corresponding members and visitor) got one vote towards program prioritization. We will have two votes each in Cincinnati.
 - E) In the event of a tie, symposium will be selected over seminars, and seminars will be selected over forums. Programs previously prioritized but not selected will have a 1/2 point bonus.
 - F) The rules may spontaneously change at the whim of the subcommittee chair
- 2) Review of programs at Atlanta/Cincinnati
 - Atlanta Seminar 27 Interoperable Computer Applications for the HVAC Industry
Hydeman/Hanninen/Livchak/Hitchcock/Haves Tuesday 8am-10am RM360W
 - Atlanta Forum 28 What Does the ASHRAE Membership Need From the Computer Applications Handbook Chapter? Mike Pouchak Tuesday 11:15am-12:05am RM368W
 - Cincinnati Seminar 18 Internet for Global Working, Tim Dwyer, Chair. Room 262, Monday 8am.
 - Cincinnati Seminar 34 Testing the Interoperability of BACnet® Systems. Mike Newman, Chair. Rooms 260/261, Tuesday 10:15am.
 - Cincinnati Seminar 35 Future NET gains for the AE office. Mick Schwedler, Chair. Room 242, Tuesday 10:15am.
 - Cincinnati Seminar 46 Pattern Recognition Based Fault Detection and Diagnosis for Building Operation. Mike Brambly, Chair. Rooms 235/236, Wednesday 10:15am.
- 3) Feedback on attendance estimates.
- 4) Subcommittee Program Reports
 - Internet - Walter Grondzik
 - Emerging Aps - Pornsak Songkakul
- 5) Vote on Programs for Atlantic City (see next sheet).
- 6) Submitting program packages on-line.

Hydeman to check with Program Committee on the rumor that symposia cannot have all authors from one group. Program chair should followup with Mary McGee to find why programs don't get selected. Also it is a good idea to followup with Mary during the program process on the status of TC programs.
Krishnan Gowri will take over the Program Chair in Atlantic City.

Proposed programs for Atlantic City January 2002
Sunday June 24th Meeting 6:30pm-7:30pm

Priority	Votes	Subcommittee	Votes	Type	Title	Chair
1			Atlantic City	Sym	Tools and Techniques for Calibration of Component Models	Reddy (w/4.7)
2	9		Atlantic City	Sem	Uses and Benefits of Electronic Collaboration, Newsrooms & Groupware	Pouchak
3	8		Atlantic City	Sem	Computer Applications - Buzzword Bingo	Schwedler
4	8		Atlantic City	For	Great Research: Can we do it Without Software?	Branson
5	3		Atlantic City	For	What do you want from ASHRAE's Website?	Haberl
6	1	Internet	Atlantic City	Sem	Where is ASHRAE going with the web	Dunn
7	1	Internet	Atlantic City	For	Is there a need for an ASHRAE Standard on Graphics Compatibility	Chuck Coward
Programs for the Future						
Priority	Votes	Subcommittee	Venue	Type	Title	Chair
			Hawaii	Sym	1017 RP (Akleman and Haberl)	Watts
		EAPs	Hawaii or ??	Sym	Interoperable Computer Applications	Branson
			Hawaii	Sym	Computers in HVAC Education	Nelson/ONiel
		Internet	Hono	Sem	Emerging Internet Technologies Bring New Business Opportunities	Barrett
		Internet	Hono	Sem	Experiences with Electronic Collaboration on the Teamwork 2001 Project	Dwyer/Branson
			Future	Sem	Seminar.com: Potential & Pitfalls of Moving Business to the Internet	Grondzik
			Future	Sem	Cool Stuff that ASHRAE Could be Doing Using the Internet	Grondzik
		EAPs	Future	Sem	We are not alone in the universe emerging applications around the world	Forrester
		EAPs	Hawaii	Sem	Next generation of AEC application development	Pornsak
		Internet	Future	Sem	Internet technology for HVAC/R business Use IT or lose it	Dwyer
			Future	Sem	Internet based training	Grondzik
			Future	Sem	A Day in the life of ASHRAE members in the YEAR 2010	Culp
			Future	Sem	Network Applications of Internet, Intranet and Building Automation	Pouchak
			Future	For	Collaborative Web Based Benchmarking	Norford
			Future	For	Should ASHRAE Establish Guidelines for Electronic Media that Contains Manufacturer's Product Information?	Sun/Grondzik
			Future	For	How Should ASHRAE Handle the Age of Electronic Media and Networks	Webster
				For	Opportunities and issues with the future NET	Culp
			4	Sem	eASHRAE: A Virtual Look at Virtual Products	Schwedler
				Sem	ASHRAE Evolves Policy & Media Through Time	Schwedler
				For	What will you want from your Web Handbook?	Schwedler

Attachment B

Attachment C

TC 1.5 Emerging Applications Subcommittee: Meeting Minutes

3:00-4:00 PM, Sunday, June 24, 2001

ASHRAE 2000 Annual Meeting, Cincinnati, OH

Hyatt Regency E (Floor 3)

Agenda

1. Call to Order

The meeting was called to order at 4:00 p.m. instead of 3:00 p.m. due to the error printed on the ASHRAE program.

2. Welcome/Introductions/Additions to Agenda

3. Review of Past/Current Program Activities and their status

Seminar: *Computer Buzzword Bingo* is planned for Atlantic City. Mick Schwedler will chair the seminar.

Seminar: *We are not alone in the universe – emerging apps around the world* is planned for Hawaii. Jim Forester will try to find 5 speakers.

5. Discussion of Future/New Program Topics

Seminar: *Next generation AEC application development and deployment* will be proposed for Hawaii. Pornsak will find 4 to 5 speakers for the seminar. We will need to ask for volunteer to chair the seminar if Pornsak will be one of the speaker. Possible speakers are:

- Bruce: Real world example of on-line collaboration on AEC projects
- Duane: Future AEC on-line applications
- Guest Speaker: Market place and customer portal
- Rob: Develop AEC applications that take advantages of common data model
- Pornsak: Develop AEC applications as web services

6. Review/Status report of Proposed Research Activities

6. Discussion of New Research Topics

A new research topic was identified. The topic was *Benefits of on-line collaboration: How can we prove the return on investment for AEC and HVAC industry?* Similar situation happened in the automotive industry of which the industry conducted research to quantify the benefits and return on investment achieved from implementing on-line collaboration. The study led to big several on-line collaboration implementations in the automotive industry. Similar study should be conducted for the AEC and HVAC industry.

7. Liaison Reports

None

9. Old Business

None

10. New Business

11. Adjourn

The meeting was adjourned at 5:00 p.m.

Attachment D

Minutes

Meeting of the Internet Subcommittee of ASHRAE TC 1.5 (Computer Applications) Annual Meeting, Cincinnati, Sunday 24 June 2001

1. The subcommittee chair, Walter Grondzik, called the meeting to order at 1:30 pm.
2. Attendees introduced themselves (see TC 1.5 master roster for list of attendees).
3. Potential program ideas related to the Internet and HVAC&R interests were discussed, beginning with a review of Internet-related programs on the TC 1.5 Program subcommittee's planning list. The following new programs were suggested:
 - Emerging Internet technologies bring new business opportunities. (Seminar, Honolulu, Barrett)
 - Is there a need for an ASHRAE standard on graphics compatibility? (Forum, Atlantic City, Coward)
 - Experiences with electronic collaboration – Teamwork 2001. (Seminar, no particular city, Dwyer/Branson)These program ideas were discussed and passed on to the TC 1.5 Program Subcommittee for consideration and prioritization. Several previously recommended programs were also advanced for further consideration.
4. Dave Branson asked if there were experiences with practical use of the Internet within firms. This question generated some discussion, but no conclusions.
5. The idea of ASHRAE continuing education for engineers in the basics (and beyond) of Internet technologies and capabilities was discussed as a follow-up from previous meetings. Tim Dwyer was encouraged to pursue this idea with ASHRAE.
6. Chuck Coward asked attendees if they had experienced file compatibility problems when transferring graphics electronically and between software packages. This question generated the idea for the forum noted above.
7. Pornsak Songkakul introduced a research project concept: The Impact of Web Services on AE Firms in the Future. He was encouraged to further develop this idea for consideration by the TC 1.5 Research subcommittee.
8. The meeting of GPC 20 -- XML Definitions for HVAC&R -- was announced.
9. The meeting was adjourned at 2:25 pm.

Attachment E

Handbook Subcommittee

June 25 Convention Center 230 4:30 – 6:30 P.M. Cincinnati, OH

General

- **Call to order** at 4:30 p.m.
- **Introductions/Sign up Sheet**- TC info passed out by Chair
- **Attendance list** was distributed: Mike Pouchak, Bob Old, Mark Hydeman, Mike Galler, Dave Branson
- **Agenda Review**- no revisions made
- **Minutes** – no changes made
-

Schedule of Milestones-

Upcoming Meetings January 12-16,2002;Honolulu June 22-26, 2002

Updated schedule

Date	Milestone
March 8, 2003	Complete chapter submitted to ASHRAE
January 2003- Chicago	Winter Mtg
June 2002 – Honolulu	Final TC 1.5 vote to approve chapter (must be complete by July 1, 2002) & sent to HB committee liaison (Jarnigan).
January 2002 –Atlantic City	TC 1.5 final review- Public Comments incorporated-
June 2001 –Cincinnati	Second Draft Available for TC 1.5 review
January 2001-Atlanta	First Draft Available for TC 1.5 review

Chapter Drafts and previous Chapter products were reviewed and discussed. Items that need action:

1. Post draft copy of hdbk chapter to committee website - Hydeman
2. Review draft for content – Hydeman
3. Distribute Branson's 1999 draft - Pouchak
4. Audio/Video formats – Galler
5. On-line help documentation - Pouchak
6. Javascripting topics– Kammers
7. Remote Monitoring and Control - Kammers
8. Bacnet Models – Old
9. Security models – Old
10. Newsgroups - Old
11. Open Source discussion – Old
12.
13.

Input email in Word 6.0 format to mike.pouchak@honeywell.com –

TC 1.5 web handbook site: http://www.ashraex.org/tc1_5/handbook.htm

Adjournment at 6 p.m.

Mike Pouchak, Chair

Honeywell Home and Building Control

mike.pouchak@honeywell.com

(763) 954-6423 (w)

(763) 954-4447 (fax)

TC 1.5 Subcommittee Attendance - Cincinnati , June

Name/Affiliation	Address	Phone/Fax/Email	TC	Res	Pro	Emg	Hbk	Net
Duane Barrett	Meadow Green Center	256-774-0218						
Bentley Systems, Incorporated	9238 Highway 20 West, Suite Madison, AL 35758	256-774-0199 duane.barrett@bentley.com	X	X	X	X		x
Chris Becker	39115 Warren Rd.	734-729-3344						
Nederman, Inc.	Westland, MI 48185	866-571-2884 chris_becker@nedermanusa.com	X	X	X			X
David Bornside	1000 Deerfield Parkway	847-941-5422						
Siemens Building	Buffalo Grove, IL 60089	847-215-9519 david.bornside@stb.siemens.com	X	X	X	X		
Mike Brambley	KS-16	509-375-6875						
PNNL	PO Box 999		X	X	X			
David Branson	Richland, WA 99352	michael.brambley@pnl.gov						
Compliance Services Group,	7619 University Lubbock, TX 79423-2126	806-748-0030 djbranson@csg.net	X	X	X	X	X	X
Rob Briggs	Box 999, K5-16	509-375-3854						
Pacific Northwest Lab	Richland, WA 99352	509-375-3614 RS_Briggs@pnl.gov	X	X	X	X		
J. Patrick Carpenter	2301 Chestnut St.	215-569-5956						
Kling Lindquist	Philadelphia, PA 19103-3035	215-569-6116 pcarpenter@tklp.com	X					
Charles W. Coward	26 D Deacons Alley/East Main	856-461-7500						
Waddell Engineering Company	Moorestown, NJ 08057	856-866-0406 cwcoward@waddellengineering.net						X
Charlie Culp	Energy Systems Lab	979-458-2654						
Texas A&M	Rm 214		X	X	X			
W. Stuart Dols	College Station TX 77843-3581	cculp@tamu.edu						
NIST	Bldg. 226 Rm. A313	301-975-5860						
Piotr Domanski	STOP 8631	wsdols@nist.gov						
NIST	Gaithersburg, MD 20899	301-975-5877						
Wayne Dunn	3730 Harbor Acres Lane	piotr.domanski@nist.gov						
Tim Dwyer	South Bank University	904-635-5108						
CIBSE/ASHRAE Group	Borough Rd	904-636-9023 waynedunn@aol.com						
Jim Forester	London, UK SEIOAA	44(0) 20 7815 7638	X	X	X	X		X
Marinsoft	51 Mt. Tallac Ct.	415-492-1960 timdwyer@sbu.ac.uk						
Mike Galler	San Rafael, CA 94903	415-492-9499	X	X	X	X		
NIST	100 Bureau Drive	jim@marinsoft.com						
Krishnan Gowri	Stop 8632	301-975-6521						
PNNL	Gaithersburg, MD 20899	301-975-8973	X	X	X	X		X
Walter Grondzik	PO Box 999	mikeg@nist.gov						
Florida A&M University	Richland, WA 99352	509-375-4476	X	X	X			
David Hansen	School of Architecture	509-375-3614 k_gowri@pnl.gov						
DOE	Tallahassee, FL 32307-4200	850-599-8782	X	X	X	X		X
Kristin Heinemeier	1000 Independence Av.	850-599-8466 GZIK@POLARIS.NET						
Texas A&M	EE-41	202-586-9192						
	Washington DC	david.hansen@ee.doe.gov	X					
	PO Box 35399	210-534-7227						
	San Antonio TX, 78238	210-534-7238	X	X	X			
		kristin-h@tamu.edu						

TC 1.5 Subcommittee Attendance - Cincinnati , June

Name/Affiliation	Address	Phone/Fax/Email	TC	Res	Pro	Emg	Hbk	Net
Rob Hitchcock	901 D St. SW Suite 950	202-646-7959						
Lawrence Berkeley National	Washington DC 20024	202-646-7800 RJHitchcock@lbl.gov	X	X	X	X		X
Mark Hydeman	1305 Marina Village Parkway	510-749-9135						
Taylor Engineering	Alameda, CA 94501-1028	510-749-9136 mhydeman@taylor-engineering.com	X	X	X		X	
Ron Nelson	Dept. Of Mechanical Engr	515-294-6886						
Iowa State University	Black Engineering Building Ames, IA 50011	515-294-3261 ronn@iastate.edu	X	X	X			
Bob Old	1000 Deerfield Parkway	847-941-5623						
Siemens Building	Buffalo Grove, IL 60089		X	X	X		X	X
Vernon Peppers	3819 Beya Way	bob.old@sbt.siemens.com 770-493-9042						
Peppers Engineering	Atlanta, GA 30340	770-493-9042 vpeppers@procompcomputer.com	X					
Mary Ann Piette	Building 90-3111	510-486-6286						
LBNL	Berkley, CA 94720	510-486-4089 mapiette@lbl.gov	X	X	X			
Michael Pouchak	MS-MN10-2471	763-954-6423						
Honeywell, Inc.	1985 Douglas Drive, N Golden Valley, MN 55422-3935	763-954-4447 mike.pouchak@honeywell.com	X				X	
Pornsak Songkakul	1000 Deerfield Parkway	847-215-1000						
Siemens Building	Buffalo Grove, IL 60089	847-215-4691 pornsak.songkakul@sbt.siemens.com	X	X	X	X		X
Priya Sreedharan	1 Cyclotron Rd.	510-486-4209						
LBNL	MS 90-3111 Berkeley, CA 94720	psreedharan@lbl.gov 603-512-1724					X	
James Watts	32 Exeter St.							
Ingersoll-Rand Energy	Portsmouth, NH 03801	603-334-3310 jim_watts@irco.com	X	X	X			
Peng Xu	1 Cyclotron Rd.	510-486-4549						
LBNL	MS 90-3111 Berkeley, CA 94720	510-486-4089 pxu@lbl.gov	X				X	
Hanzhong Zhang	Dept of Biosystems and	606-257-3000x104						
University of Kentucky	University of Kentucky Lexington, KY 40546-0276	606-257-5671 hanzhang@bae.uky.edu	X	X	X			