TC/TG/TRG MINUTES COVER SHEET

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

TC/TG/TRG NO.: TC 4.1
DATE: September 8, 2012

TC/TG/TRG TITLE: LOAD CALCULATION DATA AND PROCEDURES
DATE OF MEETING: January 23, 2012
LOCATION: Chicago, IL

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<tr>
<th>MEMBERS PRESENT</th>
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<th>EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE</th>
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DISTRIBUTION:

All Members of TC/TG/TRG

ADDITIONAL DISTRIBUTION:

TAC Chairman: Charles H. Culp, III
TAC Section Head: Michael R. Bilderbeck
Chapter Tech Transfer: Harris M. Sheinman
Research Liaison: Dr. Srinivas Garimella
ALI/PDC: John H. Nix, II
Special Publications: William S. Fleming
2013 HB Fundamentals: Peter Simmonds, PhD
Standard Liaison: James R. Tauby, P.E.
Manager of Standards: Stephanie C. Reinche
Staff Liaison: Michael R. Vaughn

These minutes have been approved by vote of Technical Committee 4.1 on June 25, 2012.
January 23, 2012
Committee Meeting Minutes (Approved)
TC4.1 Load Calculations Data and Procedures
Chicago, IL

1. Meeting called to order by Chris Wilkins at 2:25pm
2. Roll Call
   a. 10 of 10 voting members present. Quorum is present.
3. Introductions
   a. Motion to approve: Jim Pegues.
   b. Seconded: Rolando Legarreta, Suzanne LeViseur
   c. Vote: 10-0-0-0.
5. Liaison Reports
   [No liaison's attending]
6. Research Chair Report
   a. RP-1416 - Convection Coefficients
      • Project completed
      • Data produced by project is difficult to use. PMS met and identified a solution to the usability issues.
      • Results will go into HOF Chapter 15 (Fenestration) and will supply the means of adjusting U-values for windows.
      • A section will also be provided in HOF Chapter 19 (Energy Estimating) with more detailed discussion and a bibliography.
      • TC 4.7 (Energy Estimating) is expected to approve and close the project at this meeting.
      • Consider including results of this project in Load Calculation Application Manual revision (RP-1616).
   b. RP-1613 - Design Weather Data
      • Steve Bruning reports this project is well along.
      • Project includes revision of solar factors used in the clear sky solar model.
      • Data is to be submitted 4/30/2012 for inclusion in our HOF Chapter 18 (Non-Residential Loads).
   c. RP-1616 - Revise Load Calculation Application Manual
      • TC 4.1 met in executive session to consider a motion to accept the Project Evaluation Subcommittee recommendation to approve the bid submitted by Oklahoma State University (Jeff Spitler)
      • Action Item: Have a TC 4.1 representative attend the RAC meeting held 7am-10am Wednesday to support the recommendation. Jim Pegues to reach out to Research Liaison to see if this is possible. Gary Wingfield is available to attend the meeting.
d. Future Research - RTAR for Research on Plenum Design Factors
   • Will focus on ceiling plenums, attics and underfloor plenums.
   • Previous work by TC 4.7 is on hand as a starting point (RP-787). Chris Wilkins to track down this material.
   • TC 5.3 (Room Air Distribution) is currently working on underfloor plenum issues.

e. Future Research - Double-Skin Facades
   • Conference Paper session on this subject is scheduled for San Antonio
   • Use these papers as a starting point for research on the subject.

f. Future Research - Kitchen Ventilation (TC 5.10)
   • Undertaking a new project to determine heat gains and radiative/convective splits for unhooded kitchen appliances. This includes toasters, panini presses, convection ovens.
   • Results would be placed in our HOF Chapter 18 (Non-Residential Loads).
   • Steve Bruning proposes TC 4.1 express interest in co-sponsoring the research.
   • Place this on the agenda for the summer meeting in San Antonio to approve co-sponsorship and appointment of a liaison.

7. Program Chair Report (Glenn Friedman)

   Chicago Winter Meeting - January 2012
   a. Seminar 41 - Mobile Applications for Load Calculations - To be
      • To be held Tuesday, 3:15pm
      • Includes three presentations and then a roundtable discussion.

   San Antonio Summer Meeting - June 2012
   b. Conference Paper on Dual Facades
      • Status of this session is currently unclear.
      • Larry Sun noted the TC can request to sponsor a Conference Paper session as long as papers have been submitted first. Not known if these papers have been submitted.
      • Glenn Friedman will proceed with this session for San Antonio.

      • Speakers: Steve Bruning (Design Analysis), Dan Fisher (Energy Modeling), Jeff Spitler (Comparative Analysis)
      • Chip Barnaby: May be worth asking TC 4.7 if it has interest in co-sponsoring this seminar. Dan Fisher will take this to TC 4.7. also propose including eQuest in this.
      • Concept: Engineers have begun using energy modeling tools like EnergyPlus or eQuest to determine peak loads for equipment sizing. Explore the pros and cons of this approach versus using tools that apply the traditional design analysis principles for estimating peak loads.
Programs for Future Meetings

d. Review of Ideas for Future Programs
- Non-uniform surface temperatures (e.g., UFAD, radiant floor heating)
- Zoning
- Ventilation and infiltration
- How load calculations interact with other ASHRAE Handbook Chapters
- Legal and business risks of load calculations, with TC 1.7 (Business, Management and General Legal Education).
- Forum on the standard of care for load calculations
- Diversity factors for design day schedules

e. Mini-Conference (Suzanne LeViseur)
- Concept: 11 to 12 programs can be bundled as a mini-conference within an ASHRAE meeting.
- One TC manages it.
- MTG (Multidisciplinary Task Group) may be best positioned to organize because it can coordinate across TCs.
- Larry Sun: Proposed having YEA co-sponsor with this with TC 4.1. Larry will advise on how to start this process.
- Conclusion: Give thought for future programs and revisit this as a long term project as it involves a large amount of coordination. Look at a timeframe 2 years out.

f. Non-Uniform Surface Temperatures (further discussion)
- Steve Bruning: This seminar idea is larger than just UFAD. It also includes radiant floor heating systems and stratified rooms. In general includes the effect of thermal radiation on load calculations.
- This seminar could be done in conjunction with publication of the UFAD Manual. That should occur by Winter 2013 Meeting. At that point its material could be used in a seminar.
- Conclusion: Revisit as a program for the Dallas meeting in January 2013.

General

g. Motion: Approve the program initiatives and priorities discussed above
- Motion by: Doug Hittle
- Seconded by: Larry Sun
- Vote: 10-0-0-0

h. TC 4.1 is in the top 20 in ASHRAE for contributions to ASHRAE programs.
8. Standards Chair Report (Glenn Friedman)
   a. SPC 203 - MOT / Determining Heat Gain of Office Equipment Used in Buildings
      - Committee is still lacking sufficient "producer" members.
      - Cannot qualify for ANSI consensus status if producers are lacking.
      - Moving forward with plan to release a draft for advisory public review.
      - Hoping this will spark manufacturers interest in joining the committee and participating.

9. Handbook Chair Report (Steve Bruning)
   a. Have reached deadline for the 2013 Handbook of Fundamentals
   b. Will distribute final drafts prior to June meeting in San Antonio
   c. Will vote at June meeting to approve draft.
   d. Submission required by July 12 (Residential Chapter) and July 19 (Non-Residential Chapter)
   e. Review of remaining tasks for Non-Residential Chapter
      - Nomenclature - Key material - Stephen Roth
      - Equation Summary - Key material - Jim Pegues
      - References - Steve Bruning
      - UFAD - Gary Wingfield and Fred Bauman
      - Example Problem - Steve Bruning

10. Web Site (Chris Wilkins)
    a. ASHRAE has revised its logo. The new logo needs to be used on the TC website.
       Chris will forward information to Jim Pegues for implementation.

11. Old Business
    
    Committee Roster Update
       - Chris Wilkins
       - Larry Sun
       - Jim Pegues
       - Steve Bruning
    b. Voting member special case
       - Rolando Legaretta will remain a voting member. Even though his 4 years a voting member are up June 30, because he becomes TC chairman at that time he gains two more years as a voting member.
    c. Proposed voting members rolling on
       - Bob Doeffinger
       - Som Shrestha
    d. In addition Bob Doeffinger will roll on as secretary, and will roll off as research subcommittee chairman. Chris Wilkins will roll on as research chair.
13. New Business
   a. Tributes to Lynn Bellinger, ASHRAE Past President, who passed away on
      October 19, 2011. Lynn began her ASHRAE career in TC 4.1 and many TC 4.1
      members knew her from her time on the committee.

      Steve Bruning: This is a great loss and a huge tragedy. I knew Lynn for 35 years.
      Lynn started her ASHRAE career in TC 4.1. At the first meeting she attended
      the secretary had resigned and Lynn was pressed into service. "You're a
      woman," the TC chair told her, "would you like to do this?" Lynn bit her lip
      and accepted. What followed was a long association with TC 4.1 during
      which Lynn turned this committee around. This is both a personal and a
      professional loss.

      Gary Wingfield: I first met Lynn Bellenger at an APEC meeting in 1982. She
      was a wonderful person and I will miss her terribly.

      Chris Wilkins: I worked closely with her during the year she was president.

      Chip Barnaby: Lynn was tremendously supportive of SPC 205P and the IBPSA
      SimBuild conference. She attended and stayed for the entire conference.

      b. Gary Wingfield announced he is resigning but will remain as a corresponding
         member. This will be his last ASHRAE meeting.

14. Adjournment
   a. Motion to adjourn: Doug Hittle
   b. Vote: 9-0-0-0.

Attachments:

Meeting Agenda
Program Sub-Committee Report
Attendance Sign-in Sheet
TC 4.1 Roster as of 7/1/2011.
Agenda for - TC4.1 Load Calculation Data & Procedures

Chicago
January 23, 2012

TC4.1 Load Calculation Data and Procedures
Monday, 2:15 PM to 4:15 PM
Salon 12, Palmer Hilton Hotel

1. Call to Order Chris Wilkins
2. Roll Call Jim Pegues
3. Introduction of Visitors Chris Wilkins
4. Approval and/or Corrections to Montreal Meeting Minutes Chris Wilkins
5. Liaison Comments
   Section Head Michael Bilderbeck
   Chapter Technology Transfer Harris Sheinman
   Research Pradeep Kumar Bansal
   Handbook Peter Simmonds
   ALI/PDC John Nix
   Programs
   Standards Liaison James Tauby
   Staff-Research/Tech Services Michael R. Vaughn
   Staff-Standards Stephanie Reiniche
6. Research Subcommittee Report Robert Doeffinger
7. Programs Subcommittee Report Glenn Friedman
8. Standards Subcommittee Report Glenn Friedman
   Residential Chap 17 Chip Barnaby
   Non-Residential Chap 18 Steve Bruning
10. ASHRAE Website for TC 4.1 Jim Pegues
11. Old Business Chris Wilkins
12. New Business Chris Wilkins
13. Adjournment Chris Wilkins
Meetings

TC 4.1 Load Calculation Data and Procedures
Monday 2:15-4:15p (Salon 12, Palmer Hilton Hotel)
Sponsoring:
  Seminar 41: Loads on the Move: Mobile Apps
  Tuesday 3:15-4:45p (Crystal)

TC 4.1 Handbook
Sunday 3:00-4:00p (Sandburg 6)

TC 4.1 Research
Sunday 4:00-5:00p (Sandburg 6)

TC 4.1 Programs & Standards
Sunday 5:00-7:00p (Sandburg 6)

TC 4.1 TRP-1616 PES
Monday 1:30-2:00 (Salon 12)

Introduction of officers and voting members for 2012:

Chris Wilkins  Chair  Voting
Rolando Legarreta  Vice Chair  Voting
James Pegues  Secretary  Voting
Steven Bruning  Handbook Subc Chair  Voting
Robert Doeffinger, Jr  Research Subc Chair  Non-Voting
Glenn Friedman  Stds/Prog Subc Chair  Voting
Chip Barnaby  Voting
Dan Fisher  Voting
Doug Hittle  Voting
Suzanne LeViseur  Voting
Larry Sun  Voting
Glenn Friedman, Program Chair

1. Current Programs
   a. Chicago Seminar 41: Loads on the Move: Mobile App, Tuesday at 3:15 pm
      1. SEMINAR
         • Speaker #1: Chip Barnaby
         • Speaker #2: Stephen Roth
         • Speaker #3: Oliver Davis
         • Speaker #3: Larry Sun

2. Future Programs
   a. San Antonio, June 23-28
   b. Deadlines
      • Feb. 13 — Seminar, Forum, TPS and CPS Program Proposals Due
      • Feb. 13 — Technical Papers Final Reviews
      • Mar. 7 — Final Technical Papers Due/Final Conference Papers Due
      • Mar. 16 — Notifications of Seminar and Forum Accept/Reject Distributed
      • Mar. 30 — Conference Papers Accept/Reject Notifications
      • May 4 — Upload of PPTs Begin
      • June 4 — All PPTs Due Online
      • June 23, 2012 — Speaker’s Lounge Opens
   c. San Antonio
      2. Conference Paper Session Proposal
         a. Dual Façade with Branko Todorovic and international papers
         b. Larry Sun says we can sponsor a session with a chair.
         c. Discussion agreed to continue as previously directed by TC4.1.

3. Seminar Session Proposals
   a. New ideas:
      i. RECOMMENDATION: Why can’t I use the energy model peak to size my
equipment? TC4.1 and TC4.7 smack down or shoot out. Comparison. “Why
do I have to run things twice?” Could follow up with Mitchell Swam
standard of care.
         a. Cooling
         b. Heating
      2. Load Calculation, Steve Bruning
      3. eQuest and/or Energy Plus (Dan Fisher will ask his students if the model
will be ready), Dan Fisher
      4. Results/Comparison, Jeff Spitler

Co-sponsor with TC4.7. Dan Fisher and Chip Barnaby will talk to TC4.7.
Title: Why run things twice? Can’t an energy model give loads? Run things
twice? Loads and Energy Models
A good topic to ask TC4.7 to do is an Energy Plus/eQuest smack down.
Motion by Doug Hittle, with second by Larry Sun. Accept item i., above. Passed
unanimously.
ii. Non-uniform surface temperatures. The UFAD manual could co-sponsor this with their manual. Target one year away in Dallas.
   1. Radiant floors
   2. Stratified spaces
   3. UFAD

b. Old Ideas
   i. Load Calculations Process Flow from Zoning through selection
   ii. Zoning
      1. Space loads
      2. Air side
      3. Refrigeration side
      4. The Art of Zoning
         a. Zoning criteria
      5. Modeling results for poor zoning
   iii. What is the difference between energy modeling and load calculations
      1. Design day
      2. TMY file versus handbook approach
      3. Peak load (combined with TC4.7 to explore the difference, this could be a good one hard session)
   iv. Ventilation and infiltration
   v. How Load Calculations Interact with Other ASHRAE Chapters
      ▪ Weather
      ▪ Infiltration
      ▪ Building skin color
      ▪ Ventilation
      ▪ Fenestration, dynamic windows
   vi. TC1.7 Legal/Business Practices Risks of Loads Calc Codes Being so Hidden
   viii. Design day schedules, diversity factors

c. Discussed creating a mini-conference for something like interacting with different sections of the Handbook. Good for a winter meeting in Dallas. Do a design process.
   i. Weather
   ii. Loads
   iii. Fenestration
   iv. TC7.1
   v. Equipment selection
   vi. Energy model
   vii. Ducts
   viii. Etc.

   Might get YEA be the overseeing body for this. Larry Sun offered to help Glenn figure out who to talk to about this.

Tony Giometti, ASHRAE Staff Liaison (404) 636-8400, TGiometti@ashrae.org
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<th>Name</th>
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TC 4.1 Sign-In Sheet - Chicago - January 2012
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<td>Mr Christopher K Wilkins, PE</td>
<td>07/01/2009 to 06/30/2012</td>
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<td>Hallam-ICS</td>
<td>38 Eastwood Dr Ste 200</td>
<td>S Burlington, VT 05403-4403</td>
</tr>
<tr>
<td>Email: <a href="mailto:cwilkins@hallam-ics.com">cwilkins@hallam-ics.com</a></td>
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<tr>
<th>Vice Chair</th>
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<tr>
<td>Mr Rolando Legarreta, PE</td>
<td>07/01/2009 to 06/30/2012</td>
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<tr>
<td>Alegro Engineering L P</td>
<td>4150 Rio Bravo St Ste 238</td>
<td>El Paso, TX 79902-1054</td>
</tr>
<tr>
<td>Email: <a href="mailto:rlegarreta@alegro-engineering.com">rlegarreta@alegro-engineering.com</a></td>
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<th>Secretary/Webmaster</th>
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<tr>
<td>Mr James F Pegues</td>
<td>07/01/2011 to 06/30/2012</td>
<td>Voting</td>
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<tr>
<td>Carrier Corporation</td>
<td>PO Box 4808 Rm 400A Tr-4</td>
<td>Syracuse, NY 13221-4808</td>
</tr>
<tr>
<td>Email: <a href="mailto:james.f.pegues@carrier.utc.com">james.f.pegues@carrier.utc.com</a></td>
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<tr>
<th>Handbook Subcommittee Chair</th>
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<tr>
<td>Mr Steven F Bruning</td>
<td>07/01/2008 to 06/30/2012</td>
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<tr>
<td>Newcomb &amp; Boyd</td>
<td>303 Peachtree Center Ave NE Ste 525</td>
<td>Atlanta, GA 30303-1277</td>
</tr>
<tr>
<td>Email: <a href="mailto:sbruning@newcomb-boyd.com">sbruning@newcomb-boyd.com</a></td>
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<tr>
<th>Research Subcommittee Chair</th>
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<tbody>
<tr>
<td>Mr Robert Doeffinger, PE</td>
<td>07/01/2011 to</td>
<td>Non-voting</td>
</tr>
<tr>
<td>ZMM Inc</td>
<td>222 Lee St W</td>
<td>Charleston, WV 25302-2225</td>
</tr>
<tr>
<td>Email: <a href="mailto:rcd@zmm.com">rcd@zmm.com</a></td>
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<tr>
<th>Standards/Program Subc. Chair</th>
<th>Term in Position</th>
<th>Voting</th>
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<tbody>
<tr>
<td>Mr Glenn Friedman</td>
<td>07/01/2009 to 06/30/2013</td>
<td>Voting</td>
</tr>
<tr>
<td>Taylor Engineering</td>
<td>1080 Marina Village Pkwy Ste 501</td>
<td>Alameda, CA 94501-1142</td>
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<tr>
<td>Email: <a href="mailto:gfriedman@taylor-engineering.com">gfriedman@taylor-engineering.com</a></td>
<td></td>
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<tr>
<td>2045660</td>
<td>07/01/2010 to 06/30/2014</td>
<td>Voting</td>
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<tr>
<td>Mr Charles S Barnaby</td>
<td>Wrightsoft</td>
<td>131 Hartwell Ave</td>
</tr>
<tr>
<td>Email: <a href="mailto:cbarnaby@wrightsoft.com">cbarnaby@wrightsoft.com</a></td>
<td></td>
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<tr>
<td>2045832</td>
<td>07/01/2011 to 06/30/2015</td>
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<tr>
<td>Dr Daniel E Fisher, PhD</td>
<td>Oklahoma State University</td>
<td>Dept Of Mech &amp; Aero Engnr 218 Engineering N</td>
</tr>
<tr>
<td>Email: <a href="mailto:dfisher@okstate.edu">dfisher@okstate.edu</a></td>
<td></td>
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<tr>
<td>326538</td>
<td>07/01/2011 to 06/30/2015</td>
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<tr>
<td>Dr Douglas C Hittle</td>
<td>Hittle LLC</td>
<td>2640 S County Road 23</td>
</tr>
<tr>
<td>Email: <a href="mailto:hittle@colorado.edu">hittle@colorado.edu</a></td>
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<td>433789</td>
<td>07/01/2011 to 06/30/2015</td>
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<tr>
<td>Ms Suzanne LeViseur, PE</td>
<td>Haddad Engineering, Inc.</td>
<td>2955 Hartley Rd Ste 205</td>
</tr>
<tr>
<td>Email: <a href="mailto:slleviseur@haddadeng.com">slleviseur@haddadeng.com</a></td>
<td></td>
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<tr>
<td>Member</td>
<td>5013351</td>
<td>105</td>
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<tr>
<td>Mr Larry Sun</td>
<td>Tsuchiya Kaino Sun &amp; Carter</td>
<td>17911 Von Karman Ave Ste 250</td>
</tr>
<tr>
<td>Email: <a href="mailto:lsun@tkscengineering.com">lsun@tkscengineering.com</a></td>
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<tr>
<td>Corresponding Member</td>
<td>8132064</td>
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<tr>
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<tr>
<td>Mrs Lucy Amankwah, PE</td>
<td>URS</td>
<td>75 Commerce Valley Drive East</td>
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<tr>
<td>Email: <a href="mailto:lucyamankwah@gmail.com">lucyamankwah@gmail.com</a></td>
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<tr>
<td>Mr David O Ariyo</td>
<td>PO Box 6541</td>
<td>Ilorin Kwara State 011234 NIGERIA</td>
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<tr>
<td>Email: <a href="mailto:davidaoariyo@yahoo.com">davidaoariyo@yahoo.com</a></td>
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<tr>
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<td>52758</td>
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<tr>
<td>Mrs Lynn G Bellenger, PE</td>
<td>Pathfinder Engineers &amp; Architects LLP</td>
<td>134 Fitzhugh St S</td>
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<tr>
<td>Email: <a href="mailto:lbellenger@pathfinder-ea.com">lbellenger@pathfinder-ea.com</a></td>
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<tr>
<td>CORRESPONDING MEMBER</td>
<td>5082748</td>
<td>006</td>
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<tr>
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<tr>
<td>Mr Andrew S Braum</td>
<td>A.S.B Engineering PC</td>
<td>1924 Bellmore Ave</td>
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<tr>
<td>Email: <a href="mailto:asb@frigidyne.com">asb@frigidyne.com</a></td>
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<tr>
<td>CORRESPONDING MEMBER</td>
<td>8096056</td>
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<tr>
<td>Term in Position:</td>
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<tr>
<td>Mr Jui-Chen Roger Chang</td>
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<td>Email: <a href="mailto:rchang@wrldesign.com">rchang@wrldesign.com</a></td>
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<tr>
<td>Corresponding Member</td>
<td>2033343</td>
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<tr>
<td>Term in Position:</td>
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<tr>
<td>Dr D. Charlie Curcija</td>
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<td>Email: <a href="mailto:dccurcija@lbl.gov">dccurcija@lbl.gov</a></td>
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<tr>
<td>Corresponding Member</td>
<td>2051726</td>
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<tr>
<td>Mr Joseph S Ferdelman, PE</td>
<td>Heapy Engineering</td>
<td>1400 W Dorothy Ln</td>
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<tr>
<td>Email: <a href="mailto:jferdelman@heapy.com">jferdelman@heapy.com</a></td>
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<tr>
<td>Mr John M Filler, Jr, P.E.</td>
<td>Trane</td>
<td>101 William White Blvd</td>
</tr>
<tr>
<td>Email: <a href="mailto:mfiller@trane.com">mfiller@trane.com</a></td>
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<tr>
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<tr>
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<tr>
<td>Mr Nick Gmitter</td>
<td>DLB Associates</td>
<td>625 Industrial Way W</td>
</tr>
<tr>
<td>Email: <a href="mailto:ngmitter@dlbassociates.com">ngmitter@dlbassociates.com</a></td>
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<tr>
<th>Corresponding Member</th>
<th>Term in Position:</th>
<th>Phone:</th>
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<tr>
<td>Mr Martin C Gough</td>
<td>07/01/2005 to</td>
<td>1280822218</td>
<td>1415528371</td>
<td><a href="mailto:martin.gough@iesve.com">martin.gough@iesve.com</a></td>
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<tr>
<td>Dr Stephen P Kavanaugh</td>
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<td>(205)348-6419</td>
<td><a href="mailto:skavanaugh@eng.ua.edu">skavanaugh@eng.ua.edu</a></td>
</tr>
<tr>
<td>Dr Ken-Ichi Kimura</td>
<td>07/01/2005 to</td>
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<td>81429245730</td>
<td><a href="mailto:ken1kimuro@nifty.com">ken1kimuro@nifty.com</a></td>
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<tr>
<td>Mr Larry R Lisenbee</td>
<td>07/01/2006 to</td>
<td>(205)257-4320</td>
<td>(205)257-4302</td>
<td><a href="mailto:lrlistenb@southernco.com">lrlistenb@southernco.com</a></td>
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<tr>
<td>Dr Curtis O Pedersen, PhD</td>
<td>07/01/2011 to</td>
<td>(612)325-0660</td>
<td>(217)244-6534</td>
<td><a href="mailto:cpederse@uiuc.edu">cpederse@uiuc.edu</a></td>
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<tr>
<td>Ms Gabrielle Powell</td>
<td>07/01/2011 to</td>
<td>(785)864-3603</td>
<td>(785)864-5631</td>
<td><a href="mailto:hvacman@ku.edu">hvacman@ku.edu</a></td>
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<tr>
<td>Mr Brian A Rock, PhD, PE, FASHRAE</td>
<td>07/01/2003 to</td>
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<td>(817)336-1682</td>
<td><a href="mailto:thosromine@aol.com">thosromine@aol.com</a></td>
</tr>
<tr>
<td>Mr Thomas B Romine, Jr</td>
<td>07/01/2003 to</td>
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<td>(214)242-2639</td>
<td><a href="mailto:stephenroth@gmail.com">stephenroth@gmail.com</a></td>
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<tr>
<td>Mr Stephen B Roth, PE</td>
<td>07/01/2006 to</td>
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<td>(515)509-4646</td>
<td><a href="mailto:shresthass@ornl.gov">shresthass@ornl.gov</a></td>
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<tr>
<td>Dr Som S Shrestha</td>
<td>07/01/2011 to</td>
<td>8049255</td>
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745308 176  Non-voting
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159455 064  Non-voting
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5077138 032  Non-voting
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5079153 506  Non-voting
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Special Pubs
231957 035  Non-voting
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Term in Position: 07/01/2009 to 06/30/2013

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Standard Liaison
2032527 006 Non-voting
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MANAGER OF STANDARDS
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Term in Position: 07/01/2001 to

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