

**AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING
ENGINEERS, INC.
1791 Tullie Circle, N.E./Atlanta, GA 30329
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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/TRG NO.: . T.C. 6.7
TC/TG/TRG TITLE: Solar Energy Utilization
DATE OF MEETING: January 24, 2012

DATE: March 25, 2012
LOCATION: Chicago, Il

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Gaylen Atkinson	09	Andrew Chiasson (Sec)	10	John Dunlap (partial)
Janice Means (Chair)	10	Christian Vachon	11	Alexander Zhivov (partial)
Marija Todorovic (NQ)	09	Charlie Cromer	09	
Mark Hertel	11	Scott Wayland	11	
Wilfred Laman	09	Costas Balaras (Handbook)	CM	
Ali Al-Alili	CM	Brian Dougherty (Std)	CM	
Tim Merrigan (VC/Research)	CM	Joshua Gillespie	CM	
Svein Morner (Webmaster)	CM	Henry Healey (ALI)	CM	
Khalid Nagidii	CM	Andy Lowenstein	CM	
Ram Narayanamurth	CM	Khalid Nagidi	CM	
Joe Brillhart	Guest	Robert Aresty	CM	
Joshua Kading (Acting Sec)	Guest	Erv Bales	CM	
Cyrus Riventna	Guest	William Bahnfleth	CM	
Etizaz Syed	Guest	John Brown	CM	
Matthew Showalter	Guest	Alan Chalifoux	CM	
Yanda Zhang	Guest	Brad Collins	CM	
Yongfang Zhong	Guest	Kevin Cross	CM	
Pangioton Karava		Robert Davis	CM	
		Peter Ellis	CM	
		Robert Foster	CM	
		David Gerlach	CM	
		John Gladstone	CM	
		D.Y. Goswami	CM	
		Cory Hasiak	CM	
		Richard Hayter	CM	
		Hugh Henderson	CM	
		Bion Howard	CM	
		Jim Huggins	CM	
		Pamela Immekus	CM	
		Sanford Klein	CM	
		Alfred Lutz	CM	
		Fariborz Mahjouri	CM	
		Jeff Mahoney	CM	
		Andrew McNamara	CM	
		Alfi Helmy Malek	CM	

		Stanley Mumma	CM	
		Joseph O’Gallagher	CM	
		Henry. Peebles	CM	
		Andrew Price	CM	
		Talal Rabiah	CM	
		Agami Reddy	CM	
		Harvey Stenger	CM	
		Menalaos Stylianou	CM	
		Ather Syed	CM	
		Gregoris Thoma	CM	
		Dean Tompkins	CM	
		Michael Wassmer	CM	
		Dean Wiersma	CM	
		Bede Wellford	CM	
		Maurice Wildin	CM	
		Byard Wood	CM	
		Paul Zeigler	CM	
		Cenk Yavuzturk	CM	
		Ken Beisser	CM	
		Kevin Brown	CM	
		Nizaj Chandra	CM	
		Reda Djebbar	CM	
		Caroline Hachem	CM	
		Jaap Hogeling	CM	
		Hakin Elmahdy	CM	
		Michael Kummert	CM	
		Lars Lisell	CM	
		Andy Lowenstein	CM	
		Michael M Collarin	CM	
		Mohammed Tabarra	CM	
		Shady Attia	CM	

DISTRIBUTION

<i>All Members of TC/TG/MTG/TRG plus the following:</i>	
TAC Section Head: John Dunlap	
TAC Chair: Charles H. Culp, III	
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters:	
Research Liaison	Stephen Hancock
Special Pubs Liaison	William Fleming
Standards Liaison	James Vallort
Manager Of Standards	Stephanie Reiniche
Manager Of Research & Technical Services	Mike Vaughn

*Starting month as a voting member is July of the year shown. CM = corresponding member.

FIMAL MEETING MINUTES
ASHRAE TC 6.7 – SOLAR ENERGY UTILIZATION
Winter Meeting – January 24, 2012
Chicago, IL USA

I. CALL TO ORDER, MEETING AGENDA, AND MEETING MINUTES

The meeting was called to order at 1:04 pm by Chair, Janice Means. Quorum was met with five voting members. Mark Hertel moved to approve the Montreal Meeting Minutes and Gaylen Atkinson seconded three votes yes, two abstained.

Five voting members were present:

Gaylen Atkinson
Mark Hertel
Wilfred Laman
Janice Means
Marija Todorvic

II. CHAIR’S REPORT (Janice Means)

Proposed Publication Endorsement: Janice advised that Publications requested that TC6.7 take a second look at endorsing the U.S. Army Corps of Engineers’ publication of the “*Central Solar Hot Water Systems Design Guide*” for publication under the ASHRAE logo. She introduced the project manager and principal investigator for the publication, Alexander Zhihov, who advised that multiple case studies have been added to the document and that changes previously **recommended by TC6.7 had been made**. Dr. Zhihov presented a workshop with **this guide at the 2012 Army Net Zero Installation Conference** which preceded the Winter Meeting. He further advised that **the design guideline can be placed on the ASHRAE website in exchange for a commitment**. The committee is requested to set a schedule for this review. Maria Todorvic suggested that this item be somehow incorporated with a web based training session. [Discussion continued under Old Business. This introduction was made at the beginning of the meeting since Alexander Zhihov could only attend the beginning of the meeting.]

Rebranding of ASHRAE: The TC6.7 website needs to be updated with the new ASHRAE logo.

Future Conference Fees: Starting with the Dallas 2013 conference, speakers and presenters will be charged \$100 dollars to attend meetings. Fees for other attendees will be reduced.

Mini Conferences: TCs can now sponsor Mini Conferences for ASHRAE Conferences. Sessions must fill two days and should be proposed to the Conferences and Expositions Committee (CEC).

CEC Changes for Papers: A change to the conference paper review process beginning for the Dallas conference will require that the initially submitted conference papers will “be considered final and all technical information and editorial corrections must be incorporated”. The CEC is also requesting TCs to maintain a list of members who are willing to perform paper reviews. TC6.7 members were requested to indicate if they wished to review papers and to indicate their area of expertise.

III. SUBCOMMITTEE REPORTS

A. Research (Tim Merrigan)

Tim indicated a need for more RTAR’s. TC 6.7 does not have any RTARs in process nor ongoing research at this time.

Janice Means, who stood in for Tim at the Research Sub-Committee meeting, reported that there was a presentation at the sub-committee meeting of how to develop RTARs by Research Liaison, Steven Hancock.

Svein Morner proposed writing an RTAR to improve the details for comparing solar hot water systems. Standard OG-300 describes a Method of Test (MOT) for solar systems in a simulation to verify performance. The concern with this is that it does not give enough detail so that accurate comparisons can be determined between collectors and is confusing. The rating conditions in OG-300 are based on conventional domestic hot water heaters. The question was raised whether this should be a standard revision and/or a research proposal? It was pointed out that ASHRAE standards are MOT based, are not rating systems and an RTAR must be careful about that aspect. Standard 93/95 test results were used to develop OG-300. Questions included: Is there is an ISO standard equivalent to OG-300? What simulation methods and software are available? Should this be a new standard or research project?

An ad hoc committee chaired by Svein was appointed to write an RTAR to review the simulation software available for solar hot water systems. **Deadline March 15, 2012**

Other potential Research Projects include:

- Method to determine what makes a good solar system.
- How to combine photovoltaic thermal hybrid (PVT) implementation in refurbishment.
- MOT for air collectors.
- PV versus Heat Pump water heaters
- Solar assisted Heat Pumps
- MOT for Concentrated Solar Collectors
- Fluids for use with PV

Champions need to be identified for potential RTARs.

B. PROGRAMS (Ram Narayanamurth)

TC 6.7 has had 11 programs in the last 8 meetings. As a TC, we are doing very well in both proposing conference programs and bringing them to fruition.

For this meeting, the TC is sponsoring three sessions:

- Seminar 01: “2011 Solar Decathlon: Lessons for Net Zero Energy Residences”, chaired by Janice Means [Co-listed with the Student Program]– estimated attendance was 120
- Conference Session 03: “How Regulations and Policies are Promoting Sustainable Energy use and High Performance Buildings Around the World”, chaired by Maria Todorovic [Co-sponsored by ASHRAE Associate Alliance Society (AAAS)] – estimated attendance was 70
- Conference Session 24: “Role of Energy Efficiency and Renewable Energy”, chaired by Maria Todorovic [Co-sponsored by AAAS)] –scheduled to run Wednesday at 8:00 am.

San Antonio Annual Meeting (June 23-28, 2012): seminar proposals are due by February 13, 2012; final conference paper abstracts and full technical papers are due March 7, 2012.

Proposed Seminars for San Antonio:

1. Light weight solar solutions for Building Integrated PV (BIPV)
2. Heat Pumps and Renewable Energy
3. Solar Pool Heating
4. Solar Combi-Systems

Al Al-Alili will put together a seminar for San Antonio by February 3, 2012.

Dallas Conference Meeting (January 26-30, 2013): conference paper abstracts/session proposals are due March 19, 2012 (full conference papers due July 9, 2012); technical papers abstracts are due April 19, 2012; and seminar, forum, technical program session (TPS) and conference program session (CPS) proposals are due August 13, 2012. (Beginning with the Dallas meeting, entire conference sessions can be proposed through the meeting program submission website).

Proposed Conference paper sessions for Dallas:

1. Commissioning of Solar Systems (Svein Morner)

2. Solar Cooling Systems (Khalid Nagidi)
Proposed Seminars for Dallas:
 1. Drake Landing district solar

C. STANDARDS (Brian Dougherty)

Brian was not in attendance, but did email in the attached report.

There was a Status update on standards 93 and 95 reports.

A SPC has been formed to revise the standard to adopt ISO 9451. A procedure is now in place. The only change will be that one of the annexes will be replaced. Standard should be out for public review. Ram Narayanamurth will contact ASHRAE headquarters to determine why this has not gone out for public review yet.

D. WEBSITE (Svein Morner)

Svein reported that the website was up to date and requested committee members to review its content and to keep him informed and copied on all RTARs and programs.

Svein will add guidelines for Programs, RTARs and Standards from ASHRAE. Chair Janice Means requested the Secretary to create and keep a motion summary from TC 6.7 full committee meetings on the website. Svein advised that he is happy to add any links that members think will be useful to users.

E. HANDBOOK (COSTAS BALARAS)

Janice reported on behalf of Costas.

Dr. Balaras became the new Handbook subcommittee chair as of July 1, 2010. The revision of the Systems & Equipment Handbook Chapter 36 has been submitted. In September or October, the chapter will be sent to Costas Balaras for final review. The Committee will not see it again until the next revision. The next two volumes (2013 Fundamentals and 2014 Refrigerants) will not need any modifications from TC 6.7.

The sub-committee is working on justification to propose a section on solar energy to the Fundamentals Handbook. It could be part of the chapter on renewables. This will require collaboration with other TCs.

Lawrence Technological University graduate students (under Janice Means) are reviewing solar energy terminology for continuity within the ASHRAE Handbooks as well as capability with international standards for use by the Handbook Sub-Committee.

New electronic features to the handbook can be submitted through Online Plus. This includes new materials, enhancements, spreadsheets and illustrations. It was shared that Technical Committees are also encouraged to come up with applications for handheld devices. Janice mentioned the possibility of current research on solar terminology being done by her graduate students as a resource for contributing to online version of handbooks.

IV. LIAISON REPORTS FROM SOCIETY & OTHER ORGANIZATIONS

TAC: Section 6 (John Dunlap). TC 6.7 will be notified of all approved conference and technical papers related to solar energy for approval of sessions. The following question was not resolved: Can a paper that is not acceptable to the TC be vetoed by the TC?

ASHRAE Learning Institute (ALI) (Henry Healey): No report

LEED Energy and Atmosphere TAG (Bion Howard): No report.

American Solar Energy Society (ASES): No report.

American Society of Mechanical Engineers (ASME): No report.

Standards Liaison: See subcommittee report below.

Solar Decathlon (Mike Wassmer): No report.

Energy Guide (Don Colliver): No report.

V. OLD BUSINESS

The review of the US Army Corp of Engineers developed “*Central Solar Hot Water Systems Design Guide*” for publication under the ASHRAE logo was discussed further by the committee. Previous reviewers of the guide included: Costas Balaras, Charlie Cromer, Mark Hertel, Lars Lisell, Janice Means, Tim Merrigan, Marija Todorovic, Henry Healey and Cy Yavuzturk.

Central Solar Water Heating Systems Design Guide Comments:

1. Needs title change, “central” to “district”.
2. Limited circulation?
3. Do we need to publish a hard copy of the design guide or can it be an online document?
4. Needs strict review.
5. Not enough methodology.
6. Is this a viable publication?
7. Too many case studies--add case studies as an electronic option.
8. Will anyone benefit commercially for this document?
9. Review the legal perspective.
10. Is the CD already in circulation through the organization’s labeling?

Review will likely take a year. A call was made to enlist others to review the document with the following persons volunteering: Khalid Nagidi, Svein Morner, Marija Todorovic, Tim Merrigan, Joshua Kading, Joe Brillhart, Yanda Zhang, Yongfang Zhong, Wilfred Laman and Ali AlAili.

Reviewers are requested to contact Janice Means (jmeans@ltu.edu) with the topics that they are interested in reviewing within a month.

VI. NEW BUSINESS

No members are scheduled to roll off of voting member status.

Brian Dougherty (Standards Chair) and Andrew Chiasson (Secretary) can no longer attend meetings. Therefore, Svein Morner is appointed as the new Standards Chair and Joshua Kading is appointed as the new Secretary.

Andrew Chiasson will be changed from voting member to corresponding member and Janice will contact those voting members who have not been attending for potential status change from voting to corresponding membership.

Sveinn Morner, Ram Narayanamurth and Joshua Kading will be appointed as voting members.

VII. ADJOURNMENT

Meeting adjourned at approximately 3:30 PM.

Respectfully Submitted by Acting Secretary, Joshua Kading with edits by Chair, Janice Means

The Standards Committee Chair’s report has been copied to pages 6 through 9 of this document and the revised TC TG Activity Form for TC6.7 is found on pages 10-11.

Standards Subcommittee Report
ASHRAE TC 6.7 Solar Energy Utilization
2012 Winter Conference – Chicago
Standards Committee Liaison to TC 6.7: James Vallort

Std 93-2010 *MOT to Determine the Thermal Performance of Solar Collectors*

The revised standard completed the ASHRAE/ANSI approval process on January 28, 2010. The standard will next be considered by TC 6.7 for revision, reaffirmation, or withdrawal in 2013.

Std 95-1987P¹ *MOT to Determine the Thermal Performance of Solar Domestic Water Heating Systems*

Co-cognizant TC: 6.6 (Service Water Heating)

SPC 95P was disbanded in June 2010 because of its inability to repopulate the committee. A TC 6.7 recommendation is needed on whether to withdraw or try again at revising Standard 95. The plan had been to recommend replacing Standard 95 with a Modified adoption of ISO Standard 9459-1: 1993, “Solar heating – Domestic water heating systems – Part 1: Performance rating procedures using indoor test methods.” Much of the work needed to forward this recommended modified adoption to the ASHRAE Standards Committee had been completed when the failure to repopulate SPC 95P caused the SPC to be disbanded.

Std 96-1980 (RA 89)P¹ *MOT to Determine the Thermal Performance of Unglazed Flat-Plate Liquid-Type Solar Collectors*

SPC Chair: James Huggins

SPC Liaison: Boggarm Setty

SPC 96P originally planned to pursue an identical or modified adoption of ISO Standard 9806-3, “Test methods for solar collectors -- Part 3: Thermal performance of unglazed liquid heating collectors (sensible heat transfer only) including pressure drop.” A single ISO Standard 9806 series is currently being revised via participation on CEN/TC 312 . SPC 96 Chair Jim Huggins plans to wait until this revision is completed before restarting work on revising ASHRAE Standard 96.

Std 125-1992 (RA2011) *MOT Thermal Energy Meters for Liquid Streams in HVAC Systems*

Cognizant (Lead) TC: 6.1, Hydronic and Steam Heating Equipment and Systems

Co-cognizant TC: 6.7

The reaffirmed standard completed the ASHRAE/ANSI approval process on February 3, 2011. The standard will next be considered by TC 6.1 for revision, reaffirmation, or withdrawal in 2014.

Canvass Ballots - None

¹ *NOTE: Standards 95 and 96 are designated as “Proposed” rather than as a “Revision” due to exceeding the maximum time frame in which a standard may retain the ANSI designation.

TC 6.7 Standards Subcommittee Report
2012 Winter Conference – Chicago

ISO Technical Committee 180 (Solar Energy)
Subcommittee 4 (Systems – Thermal Performance, Reliability, and Durability)
ISO TC 180 Secretariat: Australia
ISO TC180/SC4 Secretariat: USA (ASHRAE)

ASHRAE holds the secretariat for Subcommittee 4 within TC 180, Systems – Thermal Performance, Reliability and Durability. Jim Huggins serves as the SC 4 chair.

ISO TC 180 holds joint meetings with CEN/TC 312 and/or IEA Task Group 43, when possible. The most recent meetings took place in Kassel, Germany on September 1-3, 2011 and included meetings of ISO TC 180, Subcommittee 4 of ISO TC 180, and CEN/TC 312.. The next meeting of TC180/SC4 is tentatively scheduled for July 2012 in San Francisco.

Several ISO solar thermal standards are currently being revised or revisions are planned in the near future. Opportunities therefore exist for US experts to serve on ISO working groups and as members of the US Technical Advisory Group that ultimately formulates the US position on these ISO standards. Anyone who can serve in such a capacity is asked to contact Doug Tucker, Assistant Manager of Standards – International (dtucker@ashrae.org or 404-636-8400, ext. 504).

1. ISO Standard 9459-1: 1993, “Solar heating – Domestic water heating systems – Part 1: Performance rating procedures using indoor test methods”
Cognizant SC: 4
At its meeting in Kassel, ISO/TC 180/SC4 requested that the Secretary submit the needed paperwork confirming the 1993 version of the standard.
ISO document stage code is 90.60 – close of review.
2. ISO Standard 9459-2: 1995, “Solar heating – Domestic water heating systems – Part 2: Outdoor test methods for system performance characterization and yearly performance prediction of solar-only systems.”
Cognizant SC: 4
At its meeting in Kassel, ISO/TC 180/SC4 requested that the Secretary submit a New Work Item Proposal to SC4 to revise the 1995 version of this standard.
ISO document stage code is 90.60 – close of review.
3. ISO/DIS 9459-4, “Solar heating – Domestic water heating systems – Part 4: System performance characterization by means of component tests and computer simulation”
Cognizant SC: 4
The document passed the DIS (Draft International Standard) ballot with 100% approval. However, substantive comments from Germany and Switzerland were received. These comments were discussed at the meeting in Kassel. The document will be revised based on the accepted comments and will then be circulated for an informal review for a period of one month. Thereafter, the document will be submitted to the ISO Central Secretariat for preparation of the approval ballot.
ISO document stage code is 40.60 – Close of voting.
4. ISO Standard 9459-5: 2007, “Solar heating – Domestic water heating systems – Part 5: System performance characterization by means of whole-system tests and computer simulation”
Cognizant SC: 4
At its meeting in Kassel, ISO/TC 180/SC4 requested a ballot to revise the standard.
ISO document stage code is 90.60 – Close of review

TC 6.7 Standards Subcommittee Report
2012 Winter Conference – Chicago

5. ISO Standard 9806-1: 1994, “Test methods for solar collectors – Part 1: Thermal performance of glazed liquid heating collectors including pressure drop”
Cognizant SC: 5 (Collectors and other components)
In August 2011, ISO TC 180 unanimously approved a New Work Item Proposal to support and participate in a CEN lead project to develop an overall standard on solar thermal collectors. The project has already been developed by CEN and is ready to proceed to parallel public enquiry (DIS) stage. ISO document stage code is 10.99 – New project approved.
6. ISO Standard 9806-2: 1995, “Test methods for solar collectors – Part 2: Qualification Test Procedures”
Cognizant SC: 5 (Collectors and other components)
See comments given above with ISO Standard 9806-1.
7. ISO Standard 9806-3: 1995, “Test methods for solar collectors – Part 3: Thermal performance of unglazed liquid heating collectors (sensible heat transfer only) including pressure drop”
Cognizant SC: 5 (Collectors and other components)
See comments given above with ISO Standard 9806-1.
8. ISO New Project 16280: “Solar energy – Evacuated solar collectors – Design, classification and tests,”
Cognizant TC: 180
The new project was proposed by China and approved by TC 180. According to the New Work Item Proposal, the purpose of the proposed standard is to promote the harmonization of national specifications and requirements for evacuated solar collectors, including the vocabulary and definitions, product classifications and marks, requirements, test methods, inspection rules, labels, packing, transportation, and test reports.
ISO document stage code is 10.99 – New project approved.
9. ISO New Project 9488: “Solar energy – Vocabulary”
Cognizant TC: 180
The new project calls for revising the existing 1999 standard. The revision will be performed in collaboration with CENT/TC 312.
ISO document stage code is 10.99 – New project approved.
10. ISO/TR 12596:1995, “Solar heating – Swimming-pool heating systems – Dimensions, design and installation guidelines.”
Cognizant SC: 4
At its meeting in Kassel, ISO/TC 180/SC4 passed a resolution supporting a previous recommendation of the TC 180 Secretariat to prepare an ISO Technical Report (TR) based on the withdrawn document ISO/TR 12596: 1995. The Secretary will prepare the draft for circulation to SC4 for a decision to publish.

Report Submitted By: Brian Dougherty

TC/TG/TRG Activity Feedback Form

Please provide feedback on your TC/TG/TRG activities and return this form to your Section Head by email or drop off a printed copy in the Section Head's mailbox folder outside the ASHRAE Headquarters Room by Tuesday night 9:00 pm.

TC 6.7	Committee Name: SOLAR ENERGY UTILIZATION
	Chair: Janice K. Means, PE, LEED AP

Meeting was Held	(City) Chicago	(Day) Tuesday	(Date) 01/24/12
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Membership		
	Number Present	Total Number on Committee
Voting Members	5	8 (including NQ member)
Voting Non-quorum Members	1	1
Corresponding Members	4 → 5	58
Visitors and Guests	9	

Major Committee Accomplishments/Challenges/Issues from this Meeting (Continue on separate page if needed)

Accomplishments:

- Three Programs were presented for 2012 Chicago Winter Meeting:
 - Seminar 01 – 2011 Solar Decathlon: Lessons for Net Zero Energy Residences (about 120 attendees) All student presenters were very professional, showed good presence of mind and had well organized presentations .
 - Conference Session 03 – How Regulations and Policies are Promoting Sustainable Energy Use and High Performance Buildings Around the World (about 70 attendees)
 - Conference Session 24 – Role of Energy Efficiency and Renewable Energy (to be held Wed. morning)
- At least three programs will be submitted for each future meeting in San Antonio and Dallas meeting, to include a minimum of two conference paper sessions for Dallas.
- Handbook Chapter 37 (Systems HB) has been revised and submitted for publication.
- Potential submission of RTARS and Standard revisions were discussed and subcommittees were formed to write position statements in preparation for future submissions.
- A sub-committee of volunteers will continue in the review and editing of the proposed ASHRAE/U.S. Army publication, “Central [District] Solar Water heating Systems – Design Guide”

Challenges:

- Former Standards Chair and Committee Secretary can no longer obtain approval for travel to meetings from their employers.
- Only one liaison (TAC Section 6 liaison) visited full committee meeting, however, the Research Liaison (Steve Hancock) did visit the Handbook Sub-Committee meeting.

Current Annual Committee Objectives and Status (see section 2.2.5 TC/TG/MTG/TRG MOP):

Jan. 2012 – Complete Chapter 37 Systems HB 2012 revision for publication – COMPLETED

Ongoing – Submit a minimum of three (3) programs for every ASHRAE Winter Meeting and Annual Meeting Conferences. ON TARGET

Ongoing – Monitor Standards activities and make recommendations, as appropriate – SUB-COMMITTEE FORMED TO EVALUATE FOR POTENTIAL RTAR OR STANDARDS RECOMMENDATION

Does Committee have Website on ASHRAE Server?__YES

URL if on another Server: _____

If so, is Website up to date? YES

Do you have special requests from your group for consideration by the Technical Activities Committee?

NO

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