

**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.: T.C. 6.7

DATE: January 26, 2005

TC/TG/TRG TITLE: Solar Energy Utilization

DATE OF MEETING: June 29, 2004

LOCATION: Nashville, Tennessee

MEMBERS PRESENT	YEAR APPTD*	MEMBERS ABSENT	YEAR APPTD*	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Svein Morner (Chair)	01	J. Huggins	00	Gary Debes (Handbook)
Tim Merrigan (VC/Research)	02	H. Stenger	02	Nance Lovvorn (RAC)
Mark Hertel (Handbook)	03	D. Menicucci	02	Birol Kilkis (TAC)
B. Dougherty (Std/Sec)	00	Maria Todorovic (Int'l)	03	Bruce Hunn (ASHRAE staff)
		A. Helmy Malek (Int'l)	00	John Brown (G)
Cenk Yavuzturk (Program)	CM	H. Healey (ALI)	CM	Jeff Christian (G)
M. Wassmer	CM	Tony Pierce (Web)	CM	Peter Ellis (G)
		R. Aresty	CM	David Gerlach (G)
		E. Bales	CM	Matt Lawrence (G)
		B. Black	CM	Andrew Lowenstein (G)
		N. Buckley	CM	Janice Means (G)
		M. Butler	CM	Ehab Mima (G)
		A. Chalifoux	CM	Ian Beausoleil-Morrison (G)
		Andrew Chiassom	CM	
		C. Cromer	CM	
		Kevin Cross	CM	
		W. Fleming	CM	
		R. Foster	CM	
		D. Goswami	CM	
		R. Hayter	CM	
		H. Henderson	CM	
		B. Howard	CM	
		S. Klein	CM	
		L. Lister	CM	
		F. Mahjouri	CM	
		S. Mumma	CM	
		R. O'Neil	CM	
		E. Olsen	CM	
		H. Peebles	CM	
		A. Price	CM	
		E. Rush	CM	
		D. Schieman	CM	
		E. Seiler	CM	
		D. Tompkins	CM	
		R. Turner	CM	
		M. Wildin	CM	
		B. Wood	CM	
		P. Zeigler	CM	

\*Starting month as a voting member is July of the year shown.

**DISTRIBUTION**

ALL MEMBERS OF TC/TG/TRG

TAC COMMITTEE CHAIRMEN: M. C. Hegberg

TAC SECTION HEAD: B. I. Kilkis

LIAISONS:

Program: \_\_\_\_\_ F. W. Betz \_\_\_\_\_ ALI: \_\_\_\_\_ S. A. Mumma

Handbook: \_\_\_\_\_ R. L. Davis \_\_\_\_\_ RAC: \_\_\_\_\_ N. C. Lovvorn

Standards: \_\_\_\_\_ D. E. Knebel \_\_\_\_\_ TEGA: \_\_\_\_\_ J. W. Gartner

Special Pubs: \_\_\_\_\_ M. A. Listvan

MANAGER OF TECHNICAL SERVICES: M. R. Vaughn

MANAGER OF RESEARCH: \_\_\_\_\_ M. R. Vaughn

MANAGER OF STANDARDS: \_\_\_\_\_ C. B. Ramspeck



# ASHRAE

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## MEETING MINUTES ASHRAE TC 6.7 – SOLAR ENERGY UTILIZATION Annual Meeting – June 29, 2004 Nashville, Tennessee

These draft minutes have not been approved and are not the official, approved record until approved by this committee.

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

Chairman Svein Morner called the meeting to order at 13:10. The attendees made self-introductions and a sign-in sheet was circulated. Four of seven voting members were present, thus constituting a quorum. Absent international members Todorovic and Malek did not count against the quorum. (See Sections 2.2.3 and 5.1 of the *ASHRAE Manual of Procedures for Technical Committees, Task Groups, and Technical Resource Groups* for quorum requirements.)

Tim Merrigan moved and Brian Dougherty seconded a motion to approve the meeting minutes from the June 2003 meeting in Kansas City. Chairman Morner moved and Mark Hertel seconded a motion to approve the meeting minutes from the January 2004 meeting in Anaheim. Both motions passed with unanimous votes (4-0-0, CV).

### II. LIAISON REPORTS FROM OTHER COMMITTEES

Gary Debes, the section 6 Handbook Liaison, reiterated the membership's complaints that much of the handbook material is too complex and difficult to use. The Handbook Committee is asking that technical committee use better language, better structure, and incorporate examples. The goal is to simplify without losing content.

Nance Lovvorn, the section 6 liaison for the Research Administration Committee (RAC), recommended that the TC contact the incoming RAC Vice Chair, Wayne Reedy, for information on efforts to develop a more definitive criteria for evaluating Research Topic Acceptance Requests (RTAR) and work statements (WS).

Birol Kilkis, the Technical Activities Committee (TAC) liaison for Section 6, reported that TAC wants to especially encourage TC's to organize symposium. In response to a question on the new ASHRAE Green Guide, Dr. Kilkis said that future special publications will be circulated to the TCs to give their membership the opportunity to review and comment, something that didn't happen prior to the publication of the Green Guide. Members wishing to comment on the few pages in the Green Guide dealing with solar energy are encouraged to do so; comments should be sent to Chairman Morner.

Bruce Hunn, ASHRAE's Director of Technology, responded to questions from the TC on if and how ASHRAE should collaborate with the American Solar Energy Society (ASES). Dr. Hunn indicated that he would like to see a permanent ASHRAE tract/program at the annual ASES conference. For several years now, ASHRAE has been one of the ASES conference sponsors. Dr. Hunn also encouraged the idea of seeking ASES members to attend and present at ASHRAE conferences, especially on topics of design and installation that may help ASHRAE members who occasionally come upon projects where a solar energy component is considered. A possible resource at ASES for promoting participation at ASHRAE meetings – more likely during the Winter meeting given the typically close scheduling of the ASES conference and the ASHRAE Annual meeting – is Becky Campbell Howe.

### III. CHAIRMAN'S REPORT

Chairman Morner reported on matters presented at the TC Chairs meeting/breakfast. In Orlando, ASHRAE will highlight the centennial anniversary of the American Society of Refrigerating Engineers, one of ASHRAE's two predecessors. Plans are also underway to have an extended set of programs on hydronic heating at either the upcoming Chicago or Quebec meetings.

*American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.*

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A N I N T E R N A T I O N A L O R G A N I Z A T I O N



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Chairman Morner reported that the technical committee structure is still under review and subject to small changes. For example, TC 6.4 (In-space Convection Heating) and TC 6.5 (Radiant Space Heating and Cooling) were recently combined (now TC 6.5 is named Radiant and Convective Space Heating & Cooling).

Future program deadlines are listed in the below table.

Program Package Deadlines		
Program	Technical Papers Due for Review	Completed Packages Due
Orlando, Florida – Winter 2005	—	August 6, 2004
Denver, Colorado – Annual 2005	September 24, 2004	February 18, 2005
Chicago, Illinois – Winter 2006	April 1, 2005	August 5, 2005
Quebec City – Annual 2006	September 23, 2005	February 10, 2006

## IV. SUBCOMMITTEE REPORTS

### A. HANDBOOK SUBCOMMITTEE – MARK HERTEL

TC 6.7 is responsible for two handbook chapters: Chapter 33 of the HVAC Systems and Equipment Handbook, “Solar Energy Equipment,” and Chapter 32 of the HVAC Applications Handbook, “Solar Energy Use.”

The Handbook Subcommittee meeting was held on Sunday, June 27. Except for Mr. Hertel, no other official members of the subcommittee attended. “Applications” chapter 32 is the next chapter due for revision. The objective now is to focus on editing sections rather than attempt a more extensive revision. The present timetable is to have most of the proposed chapter 32 revisions finalized by the Annual meeting in Denver and to approve the revised chapter at the Winter 2006 meeting in Chicago. The “Systems and Equipment” chapter 33 is due a year later.

Handbook subcommittee members (Erv Bales, Charlie Cromer, Bion Howard, and Mike Wassmer) and any other volunteers are encouraged to read the “Handbook Authors and Revisers Guide” that is available on the ASHRAE web site as a pdf file. (Access file by clicking on the “Handbook” link that is listed under the “Education and Publications” menu header.) Mike Wassmer agreed to help update the chapter 32 references.

Mr. Hertel reported that the member benefit will now be both the electronic and hard copy versions of the annual handbook. The dual benefit begins with the 2005 Fundamentals release.

### B. RESEARCH SUBCOMMITTEE – TIM MERRIGAN

The Research Subcommittee meeting was held on Monday, June 28. Going into the meeting, the TC had two RTARs that had been previously submitted to RAC on one or more occasion. In 2003, neither RTAR was accepted or prioritized by RAC. The title of these two RTARs are: (1) Solar Radiant Heating and Cooling and (2) Optimization and Testing of a Double Effect Solar Driven Absorption Chiller and Dual Fired Generator. These two RTARs will be modified and updated based on the most recent comments received from RAC and then considered for re-submission. At the June 28<sup>th</sup> meeting, progress was made on formulating a new proposal in the area of solar air heating systems. If this new RTAR is generated prior to the August 2004 submittal deadline, then Mr. Merrigan will conduct an email ballot to rank order the three RTARs with the two highest being forwarded to RAC. Otherwise, Mr Merrigan will resubmit the two existing RTARs, once revised, with the same rank ordering as decided upon in 2003.

Mr. Merrigan informed the attendees that donations for ASHRAE research can be earmarked for a particular project. This policy can thus influence the projects selected by RAC.



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The TC 6.7-sponsored research project URP-1109 – Optimization of Hybrid PV / Thermal Solar Collector has never been closed. Questions remain as to whether the project contractor, Solar Design Associates, must write an ASHRAE paper that summarizes the results of the project. Tim Merrigan was assigned the following action item.

**AI (Merrigan): In cooperation with the contractor and ASHRAE staff, complete all steps needed to close URP-1109.**

## **C. PROGRAM SUBCOMMITTEE – CENK YAVUZTURK**

At the Nashville meeting, TC 6.7 sponsored Seminar 29, “Leading Edge Solar Energy Technologies.” The four seminar speakers were Jeff Christian, Marija Todorovic, Andrew Lowenstein, and Christian Vachon. The seminar was very well attended, having approximately 100 people fill the room to the point that a few people had to be turned away.

The Program Subcommittee meeting was held on Monday, June 28. For the next meeting in Orlando, the TC will seek to organize a seminar that focuses on near zero energy homes, with a goal of emphasizing any solar component. Possible speakers include researchers from the Florida Solar Energy Center (FSEC) and Jeff Christian. Henry Healey will be asked to chair the seminar.

Potential topics for future programs include: (1) how to specify and commission a solar installation, (2) solar-assisted radiant heating and cooling, and (3) designs and results from the 2005 Solar Decathlon. With regard to the first topic, the TC seeks to make members aware that they don’t have to start from scratch; every system does not need to be a custom design. For topic #2, a possible co-sponsor is TC 6.5.

The TC discussed whether to promote a technical tour to FSEC or to one of the FSEC field study sites. Jeff Christian offered to speak with FSEC’s John Subarto to see if FSEC would be interested in hosting a tour. For the Denver meeting, the TC can consider promoting a technical tour to see the University of Colorado’s revamped Solar Decathlon house.

## **D. STANDARDS SUBCOMMITTEE – BRIAN DOUGHERTY**

The standards subcommittee report is provided below. One update to the report is that FSEC has agreed to provide a person to chair ISO TC 180/SC 4, “Systems – Thermal Performance, Reliability, and Durability.” In response to a request for members to serve on the US Technical Advisory Group (TAG) that formulates the US position on ISO TC 180 standard activities, one meeting attendee volunteered, Janice Means. Ms. Means name will be forwarded to ASHRAE’s Assistant Manager of Standards – International, Doug Tucker, for processing.

## **E. WEBMASTER – SVEIN MORNER FOR TONY PIERCE**

Chairman Morner reported that ASHRAE has still not moved the TC 6.7 web page to the ASHRAE server. The conversion is expected prior to the Orlando meeting.

## **F. ASHRAE LEARNING INSTITUTE – HENRY HEALEY**

No Report.

## **V. Membership**

The committee assignments for the 2004-2005 society year are set except for the position of secretary. Chairman Morner will seek to find a TC 6.7 member to fill that position beginning with the Orlando meeting. Janice Means asked to be added as a corresponding member.

## **VI. OLD BUSINESS - None**



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**VII. NEW BUSINESS - None**

**VIII. ADJOURNMENT**

The meeting was adjourned at 3:30 PM



# ASHRAE

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Standards Subcommittee Report  
ASHRAE TC 6.7 Solar Energy Utilization  
2004 Annual Meeting – Nashville  
Standards Committee Liaison to TC 6.7: David Knebel

**Std 93-2003** *MOT to Determine the Thermal Performance of Solar Collectors*

The current standard is a reaffirmation of the 1986 publication. The standard received ANSI approval on April 22, 2003. No action is needed at this time.

**Std 95-1987P<sup>1</sup>** *MOT to Determine the Thermal Performance of Solar Domestic Water Heating Systems*

SPC Chair: Tim Merrigan

SPC Liaison: Stephen Kennedy

Co-cognizant TC: 6.6 (Service Water Heating)

SPC 95P remains in limbo while the ASHRAE Standards Committee develops ANSI-compatible procedures that will allow ASHRAE to conduct Identical and Modified adoptions of ISO and IEC Standards. SPC 95 voted back in August 1995 to recommend (5-0-1) that ASHRAE adopt ISO Standard 9459-1: 1993, "Solar heating – Domestic water heating systems – Part 1: Performance rating procedures using indoor test methods" as the replacement for ASHRAE Standard 95. The proposed adoption would be a modified adoption because SPC 95P further recommended that the normative annexes of the ISO standard be changed to informative. (Note: ISO Standard 9459-1:1993 is based on ASHRAE Standard 95-1987.)

**Std 96-1980 (RA 89)P<sup>1</sup>** *MOT to Determine the Thermal Performance of Unglazed Flat-Plate Liquid-Type Solar Collectors*

SPC Chair: James Huggins

SPC Liaison: Stephen Kennedy

SPC 96P plans to consider an identical or modified adoption of 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" in lieu of, or in addition to, revising ASHRAE Standard 96. Like SPC 95P, work on formally establishing a standards project committee and beginning the revision process has not moved forward because of the lack of ASHRAE procedures on how to adopt ISO standards. Once these procedures are in place, a new call for members for SPC 96P will be conducted as the committee officially consists of one member, the chair, at present.

**Std 109-1986 (RA 03)** *MOT to Determine the Thermal Performance of Flat-Plate Solar Collectors Containing a Boiling Liquid*

The current standard is a reaffirmation of the 1986 publication. The standard received ANSI approval on April 22, 2003. No action is needed at this time.

**Std 125-1992 (RA 00)** *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

ANSI approval gained on November 30, 2001. TC 6.1 has been requested to recommend whether Standard 125 should be revised, reaffirmed, or withdrawn. The vote was not conducted at the Anaheim meeting and instead the committee planned to conduct a letter ballot prior to Nashville.

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<sup>1</sup> \*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. The standard will be sent to ANSI for their approval once its is revised.



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## TC 6.7 Standards Subcommittee Report 2004 Annual Meeting – Nashville

### Canvass Ballots - None

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

ASHRAE is seeking individuals to join the US Technical Advisory Group (TAG) for ISO TC 180. At this stage, any TAG duties would probably be handled via email correspondences. TAG members review, comment, and help form the US position on ISO standards for which TC 180 is cognizant. The “call for members” in the January 2004 edition of ASHRAE Insights yielded no volunteers.

ASHRAE holds the secretariat for Subcommittee 4 within TC 180, Systems – Thermal Performance, Reliability and Durability. ASHRAE is seeking a volunteer to chair SC 4.

**1. ISO/CD 9459-5, “Solar heating – Domestic water heating systems – Part 5: System performance characterization by means of whole-system tests and computer simulation”**

Cognizant SC: 4

Work on this ISO Standard ceased in the late 1990’s. A Spring 2003 proposal (N216) to restart work on this standard was approved. The restarted work is to proceed in parallel development with CEN TC 312. At the November 2003 meeting of ISO TC 180/SC 4, a decision was made to make minor edits to the current draft in an effort to get it published and then immediately start a new revision process. ISO lists this document’s stage code as 30.99 – committee draft (CD) approved for registration as a draft international standard (DIS).

**2. ISO/AWI TS 11924, “Solar heating – Domestic water heating systems – Test methods for the assessment of reliability and safety”**

Cognizant SC: 4

Work on this ISO Standard ceased in the late 1990’s. A Spring 2003 proposal (N218) to restart work on this standard was approved. The restarted work is to proceed in parallel development with CEN TC 312. At the November 2003 meeting of ISO TC 180/SC4, a decision was made to publish the current version as a Technical Specification (which has occurred) and then revise it with the goal of publishing it as an ISO Standard. Professor G. Morrison offered to prepare the revised draft. ISO lists this document’s stage code as 20.00 – new project registered in TC/SC work program.

**3. ISO Standard 9459-1: 1993, “Solar heating – Domestic water heating systems – Part 1: Performance rating procedures using indoor test methods”**

Cognizant SC: 4

At the November 2003 meeting of ISO TC 180, a resolution was passed to have the secretariat move forward with paperwork to have the standard reconfirmed. ISO lists this document’s stage code as 90.20 – international standard under periodical review.

**4. 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)

At the November 2003 meeting of ISO TC 180, a resolution was passed to request the SC 5 Secretariat to initiate the revision of ISO 9806 series of standards using the current work done by CEN in this area, including





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TC 6.7 Standards Subcommittee Report  
2004 Annual Meeting – Nashville

the current draft revision of EN 12975 Part 1 and Part 2. ISO lists this document's stage code as 90.93 – international standard confirmed.

Report Submitted By: Brian Dougherty

ASHRAE TC/TG/TRG ACTIVITIES SHEET

DATE: January 26, 2005

TC/TG/TRG NO.: 6.7 TC/TG/TRG TITLE: Solar Energy Utilization

CHAIRMAN : S. O. Morner VICE CHAIRMAN: T. J. Merrigan

SECRETARY: B. Dougherty

TC/TG/TRG MEETING SCHEDULE			
Location – Past 36 Months	Date	Location - Planned Next 18 Months	Date
Atlantic City, NJ Honolulu, HI Chicago, IL Kansas City, MO Anaheim, CA Nashville, TN	02/01 02/06 03/01 03/06 04/01 04/06	Orlando, FL Denver, CO Chicago, IL	04/06 05/02 05/06
TC/TG/TRG SUBCOMMITTEES			
Function	Chairman		
Program Handbook Standards Research	C. Yavuzturk M. A. Hertel B. P. Dougherty T. J. Merrigan		

RESEARCH PROJECTS – CURRENT			
Project Title	Contractor	Monitoring Comm. Chairperson	Report Made At Mtg.
URP-1109 – Optimization of Hybrid PV / Thermal Solar Collector	Solar Design Associates	P. Zeigler	Project complete except for ASHRAE paper

LONG RANGE RESEARCH PLAN				
Rank	/ Title	W/S Written	Approved	To RAC
1.	Solar radiant heating and cooling	RTAR submitted to RAC, 03/08	Ranked #1	Not selected by RAC, 03/10
2.	Optimization and Testing of a Double Effect Solar Driven Absorption Chiller and Dual Fired Generator	RTAR submitted to RAC, 03/08	Ranked #2	Not selected by RAC, 03/10

HANDBOOK RESPONSIBILITIES					
Year & Volume	Chapter	Title	No.	Deadline	Handbook Liaison
07 HVAC Applications	32	Solar Energy Use			
08 HVAC Systems & Equipment	33	Solar Energy Equipment		05/02	G. Debes

STANDARDS ACTIVITIES - List and Describe Subjects
<p><b>STD 93-2003</b> MOT to Determine the Thermal Performance of Solar Collectors. Reaffirmation of the 1986 standard. Approved by ANSI on 03/04/22..</p> <p><b>STD 95-1987P*</b> MOT to Determine the Thermal Performance of Solar Domestic Water Heating Systems. SPC 95P recommended adopting ISO Standard 9459-1 (with annexes marked informative rather than normative) as the next revision of Standard 95. Until October 2004, SPC 95P had been in limbo awaiting ANSI-compatible procedures for adopting ISO standards. SPC 95P can now reconvene and act on the revision/replacement of Standard 95. TC 6.6 is co-cognizant; TC 6.7 is the cognizant (lead) technical committee.</p> <p><b>STD 96-1980P*</b> MOT to Determine the Thermal Performance of Unglazed Flat-Plate Liquid-Type Solar Collectors. SPC 96P chair Jim Huggins plans to recommend that the SPC review ISO Standard 9806-3 and consider it as a replacement for Standard 96. Until October 2004, SPC 96P had been in limbo awaiting ANSI-compatible procedures for adopting ISO standards. SPC 96P can now more rigorously recruit committee members and then consider the options of an identical or modified adoption of the ISO standard.</p> <p><b>STD 109-2003</b> MOT to Determine the Thermal Performance of Flat-Plate Solar Collectors Containing a Boiling Liquid. Reaffirmation of the 1986 standard. Approved by ANSI on 03/04/22.</p> <p><b>STD 125-1992 (RA2000)</b> MOT Thermal Energy Meters for Liquid Streams in HVAC Systems. The cognizant (lead) technical committee is TC 6.1; TC 6.7 is co-cognizant. TC 6.1 voted in Nashville to recommend Standard 125 for reaffirmation (10-0-0).</p> <p>*NOTE: Standards 95, and 96 are designated as “Proposed” rather than as a “Reaffirmation” or as a “Revision” due to exceeding the maximum time frame in which a standard may retain the ANSI designation. These standards will be sent to ANSI for their approval once they are reaffirmed/revised.</p>

<p><b>TECHNICAL PAPERS from Sponsored Research – Title, when presented (past 3 yrs. present &amp; planned)</b></p> <p>None</p> <p><b>TC/TG Sponsored Symposia – Title, when presented (past 3 yrs. present &amp; planned)</b></p> <p>1. Renewable Energy Sources, Energy Efficiency and BPS for Sustainable Local and Regional Development, Jan. 2004, Anaheim</p> <p><b>TC/TG Sponsored Seminars – Title when presented (past 3 years, present, &amp; planned)</b></p> <p>1. Leading Edge Solar Energy Technologies, June 2004, Nashville  2. Solar Domestic Hot Water Applications, June 2003, Kansas City  3. RES Integrated Sustainable Buildings, June 2003, Kansas City  4. The Solar Decathlon: Results of the 2002 Competition, Jan. 2003, Chicago</p> <p><b>TC/TG SPONSORED FORUMS - Title, when presented (past 3 years, present, &amp; planned)</b></p> <p>1. What Can ASHRAE and Its Members Do to Increase the Use of Solar Energy?, Jan. 2003, Chicago</p> <p><b>JOURNAL PUBLICATIONS, when published (past 3 years, present, &amp; planned)</b></p> <p>None</p>
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Submitted By: \_\_\_\_\_  
B. Dougherty