The program committee would like to invite you and your company to the 2012 Annual Conference and Meeting, this year held at the home of the CTI office and its wonderful staff, Houston, Texas. Houston is a wonderful city rich with culture and heritage and many interesting things to see and do. Along with a great location, we have an amazing program lined up for you. CTI has put together a full offering of education, including an opportunity to participate in some of the ongoing work on standards and codes. We believe it is our responsibility to make sure that we have a program line up that can be shared with others at your company. Our mission as a nonprofit technical organization charges us to bring you the most timely and latest industry information.

We have 25 papers being presented in a concurrent format on Monday and part of Tuesday.

Water Treatment will have one session and Performance & Technology (P&T) and Engineering Standards & Maintenance (ES&M) will have the other. This format will allow a better opportunity to take full advantage of the papers being offered. We hope you will find its benefit, as we try to add more to our programming to make the most of your experience. You will find a list of the papers, the times they are presented, their authors with company, a brief bio of the author and a brief description of the paper starting on page 10 of this newsletter.

Committee Work Shop Time - This year we have made room in our scheduling for further extended committee work time. In the past the Annual Conference only had a very short amount of time set aside for committed work. This year, more than ever, we have allowed much more time to do the work that is so important to the CTI. We encourage our members to get involved with a committee and really become part of the organization. Please refer to the CTI news for times committee work will be done.

Water Treating Panel - Monday, 2:00p - 3:30p - Discussion will center on three stand-out topics for the day. First will be Ken Henson on EPV’s health-based national air quality standard PM-10. Next will be Dr. Janet Stout on the ASHRAE Standard 188P and what it means to the operation of commercial cooling systems and last will be Frank Morrison on the Energy Efficiency Standard - Title 24 as it relates to operation of cooling systems.

Owner/Operator Session – Tuesday, 12:00p - 2:00 p - Come and meet with other Owner and Operators of Cooling Towers. Jon Bickford from Alliant Energy is the Chairperson of the Owner/ Operator Council, and has put together a terrific program for the Owner and Operators on Tuesday from 12:00p - 2:00p. Be sure to check on the registration form that you will be attending so we will have enough seating and enough handouts for everyone. As always there will be time to discuss concerns and issues that the Owner and Operators have about their Cooling Towers. If you have any issue you would like addressed at this meeting please email Jon Bickford at Jon.Bickford@alliantenergy.com

Ask The Expert - Tuesday, 2:00p - 4:30p - Last year’s Ask The Expert was a great session, and is back again by popular demand! Come prepared with your questions for the panel of experts. We will have folks from all that standing committees ready to support your questions with great qualified answers.

Education Program Session - Wednesday, 10:00a - 12:00a - The topic for this year’s Education Seminar is Cooling Towers from Concept to Completion. The main discussions will be on tower selection, tower installation and tower maintenance. If you only attend one cooling tower related meeting or conference this year, this is the one to be at! CTI has put together a program that will offer the best opportunity to inform, educate, and expand your knowledge about this industry. Please come prepared to take full advantage of everything that CTI has to offer you and your company. Along with a great location, outstanding food, entertainment, our conference gives back to the membership what they want - Information.

Please make sure you take the time to evaluate the Speakers, Education Program, and your overall experience during the conference. We constantly strive to provide you with the best program possible, and we want to hear from you!

Also, don’t forget about the Table Top Exhibition. There are 34 (as of this writing) manufacturers, suppliers, and support companies with products and information. It’s the time to set aside to have a cold beverage, a bite to eat, and learn what’s new in the industry. The Table Top Exhibition is a great place to run into an old friend or make a new one!

I, Brandon Rees, along with Paul Nelissen, Gary Geiger, Phil Kisner, and David Suptic, your program committee, invite and welcome you to the 2012 Annual Conference and Meeting. See you in Houston, Texas.

Brandon Rees, 2012 CTI Program Chairman

Message From The President

Inside

Even though the economy continues to remain static and unemployment remains at a high level, your CTI Board of Directors and Executive Committees have been active in expanding the organization to offer added membership benefits and elevating CTI to a higher level of recognition in the Cooling Technologies Industry. The Business Plan developed over the past year by the Thermal Certification Continuation Committee, under the direction of Tim Faccus, for both Thermal and Component Certification was approved by the Board of Directors at the Summer Workshop meeting in July. This plan included the addition of a new CTI technical employee that would be responsible for eventually managing both the thermal and component certification programs that CTI will assume responsibility in the very near future. This technical employee will also assist the three technical standing committees in their development and maintenance of the CTI codes and standards by monitoring the approval, ad hoc review process and submittal to the board for final approval. To accelerate this Business Plan, a new committee has been formed, “The Certification Implementation Committee”. This committee, chaired by Trevor Hegg and consists of a good cross section of CTI membership, is charged with the responsibility of executing the new CTI business endeavor under the final direction of the CTI Board of Directors. The committee has met and developed a project schedule with milestone targets due to be achieved. The future employment of this business is to begin the search, evaluation and recruitment of the new technical employee to add to the CTI staff in Houston. The employment process has begun and anyone interested in this position should contact Trevor Hegg or the CTI office for more details.

In February of 2012 my term as President will end and in late October of this year the CTI Board of Directors will elect a new CTI President. The CTI Board of Directors is to begin the search for a new President in late October of this year. I, Brandon Rees, along with Paul Nelissen, Gary Geiger, Phil Kisner, and David Suptic, your program committee, invite and welcome you to the 2012 Annual Conference and Meeting. See you in Houston, Texas.

Brandon Rees, 2012 CTI Program Chairman

Message From The President continued on page 3

CTI
PO Box 73383
Houston, TX 77273

President

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CTI is financially stable and will meet their budget targets for 2011. Even though the Certification Business Plan will generate addition revenues and forecasts a positive cash flow for CTI, a large number of CTI member companies have agreed to donate $1500 per year for two years to insure that CTI is successful in this endeavor and will not be undercapitalized in the early stages of implementation. I commend and thank each these companies for their willingness to generously donate cash to CTI to insure success of the certification program.

In keeping with the complexity of managing a nonprofit technical organization and CTI’s excellent opportunity for planned growth, the Past Presidents Council, chaired by Denny Shea, was requested to develop and submit a plan for changes to the CTI committee management organization to improve reporting and execution efficiency and to instill continuity from year to year to the technical and business programs that are initiated by various committees, the CTI Executive and Administration staff and the Board of Directors. The PPC Reorganization Task Group has met and developed a reorganization recommendation that will first be submitted to the Past Presidents Council for vote and then a final recommendation will be submitted to the CTI Board for further action and final implementation of the organization changes.

The next CTI Board of Directors meeting will be held on October 21, 2011 in Houston at the Hilton North. On October 20, before the Board meeting, the Strategic Issues Task Force Workshop, chaired by Paul Lindahl, will be held to discuss and identify key issues that are significant to our industry and develop appropriate responses to those issues. This workshop was initiated approximately eighteen years ago and meets approximately every 4 to 5 years for a full day’s session and will be facilitated again by Jim Baker. Through CTI’s Strategic Issues Committee and in consultation with the Long Range Planning Committee, these committees have identified 33 strategic issues and 9 areas of strategic focus with a rating of importance to our industry and CTI. The output and results of this meeting will be reported to the CTI Board and will be available for membership review at a later date. I certainly encourage any member to activity attend the strategic issues committee meetings that are held each year and become active in helping identify key issues and recommended responses.

Another change that has been instigated on an informal basis at the winter and summer committee meetings, for the past one and one half years, is the opening of all meetings to attendance by interested parties. In the past, certain committee meetings were limited to only directly involved member companies or individuals. The meetings have been opened to others as long as the attendees are respectful and participate in a professional manner. Also, in some few cases, where confidential information must be held at the committee level or a discussion and vote on a committee issue is to be held in private, the chairman of that committee will request that non participating members depart and that the meeting will continue with voting members only. This procedure has worked well and I plan to ask the Board to approve this change as official policy. Again I wish to thank all of the excellent volunteer members and CTI Administrative Staff that we have that work so diligently to keep the CTI organization operating on a very high professional level that is recognized worldwide. A special thanks is given to the many CTI company members that support the CTI organization with their dues and are willing share their key employees time and efforts with the organization. Their dedication to CTI is greatly appreciated.

Respectfully submitted,
Jess Seawell PE, CTI President - 2010/2011

Message From the President continued from page 1

If you are new to our conference and seem to be a little overwhelmed look for the CTI Ambassadors (the members with ‘Yellow’ name badges). These members will be able to help you and answer any questions you may have.

Water Treating Panel Discussion
Monday, February 6, 2012 from 2:00p - 3:30p

For this Panel, we plan to have experts discuss the following topics:

EPA’s health-based national air quality standard PM-10 presented by Kenneth Hennon, P.E.

Ken Hennon is the Business Leader at Clean Air Engineering, Inc. and an active member of the CTI and ASME. He has authored several CTI, EPRI, and AWMA papers addressing cooling tower related issues with an emphasis on cooling tower emissions. Ken currently serves as the committee chairman for the CTI Drift Emissions test code (ATC-140) and is the chairman of the CTI Performance and Technology Committee. Ken holds a BS in Petroleum Engineering from the University of Missouri-Rolla and a MS in Environmental Engineering from the University of Tennessee. Ken is licensed engineer in the State of Tennessee.

the ASHRAE Standard 188P and what it means to the operation of commercial cooling systems by Dr. Janet Stout

Dr. Stout received her BS in Biology from Clarion State College, Clarion, Pennsylvania; and her Masters and PhD degrees in Microbiology from the University of Pittsburgh. She is currently the Director of the Special Pathogens Laboratory in Pittsburgh, PA and an Associate Professor in the Department of Civil and Environmental Engineering University of Pittsburgh. Dr. Stout elucidated the link between the presence of Legionella bacteria in hospital water systems and hospital-acquired Legionnaires’ disease. Dr. Stout has authored more than 80 peer review papers and book chapters on the environmental microbiology and epidemiology of Legionnaires’ disease. She has been instrumental in the development of methods and strategies for the prevention of infections due to Legionella and other waterborne pathogens. Dr. Stout is a member of the American Society for Microbiology, the Association for Professionals in Infection Control, and the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE).

...and the Energy Efficiency Standard - Title 24 as it relates to operation of cooling systems by Frank Morrison

Frank Morrison is Manager of Global Product Marketing and Business Development for Baltimore Aircoil Company. With over 30 years of experience in the evaporative cooling industry, Frank has held positions in engineering, research & development, and marketing. He has authored several CTI technical papers and an ASHRAE Journal article. Frank currently serves as a voting member on ASHRAE SPPC 90.1, Vice-Chair of ASHRAE TC03.06 (Water Treatment), a corresponding member of ASHRAE TC08.06 (Cooling Towers and Evaporative Condensers), and Chair of the CTI Marketing Committee. Frank holds a BSME from Drexel University and an MBA from Loyola University Maryland.
Come and join Jon Bickford, Chairperson for the Owner/Operator group with Cooling Technology Institute (CTI) at the CTI Annual Conference in Houston, Texas. This group is made up of people that are responsible for cooling towers at their facilities. It is a chance to talk to others about issues they have with their cooling towers and gain important information on cooling towers. You will also have the opportunity to meet suppliers and manufacturers of cooling towers, which will come in handy when you have problems with your cooling towers.

There are a couple of days of presentations given by experts on tower operation, environmental policies, water treatment and structural information. There are break out sessions where you can join in on group conversations for re-writing CTI standards and procedures. As a member of CTI you can also become a committee member on these groups and help in re-writing of the new procedures and standards.

This year at the Owner/Operator (O/O) session we are going to discuss issues that people are seeing with their towers. Last year we went to a question and answer session instead of having experts give us presentations. Everyone seemed to like this because it gave them more time to talk about issues people were having. It is amazing what you can learn from others mistakes and problems. We will be using the list below to start with since these seem to be the major hitters for concerns. If anyone has a question that doesn't fit one of these topics please send me an e-mail (jonbickford@alliantenergy.com) so that I can have time to research and have answers for you when we get together. We expect this list to grow as more O/O sign up for the conference. Some of the topics that we will be talking about are as follows:

- Safe access to cooling tower gearboxes.
- Switching from one speed fans to VFD driven fans.
- Options of doing away with gearboxes and shafts by going to direct drive fans.
- Rebuilding cooling towers and switching from a wood to a fiberglass tower.
- Do's and don'ts on cooling tower rebuilds and the building of new towers.
- Lessons learned from tower project.
- Different types of cooling tower products for fill, eliminators, and nozzles.
- Fire headers and lightning protection.
- Water treatment and sludge issues.

The best thing about this group is that after the conference is over you will have people that you can call at any time for help and advice as tower problems occur. I hope to see a large turnout this year. With the change in the power industry for running plants as efficient as possible the cooling towers are becoming a very important part in plant efficiency.

New CTI Members for 2012

Arizona Public Service
Axima (Jiangsu) Refrigeration Equipment Co., Ltd
Peter Bosman
Canadian Fertilizers Ltd
ChemTreat, Inc. (Affiliate)
DuPont
Magoze Abraham Eju
F.E. Moran, Inc
Fibretex Cooling Towers
Formulas Quimicas S.A.
Glacier Ingenieria, S.A.S.
Hansen Industrial Gearboxes
HPT – Torres de Resfriamento Ltda
IMI Sensors
INMAR Brazil
Robert Jewell
Jiangsu Fengtai Cooling Tower Co., Ltd
JiangSu Haishui Cooling Tower Co., Ltd
Natasha Jones
Nanjing Dayang Cooling Tower Co., Ltd
Rossi S.p.a.
Shanghai Baofeng Machinery Manufacturing Co., Ltd
Shanghai Aosua Refrigeration Industry Co., Ltd
Shell Project & Technology
Lillian Stan
Janet E. Stout, Ph.D.
Target Equipments
Towers, Inc.
Carl Warrick
Wu Xi Yubing Cooling Equipment
Wuxi Teno Cooling Equipment Co., Ltd

Owner Operator Session
Tuesday, February 7, 2012
12:00p - 2:00p - (lunch included)
Phase 1 - Tower Selection

Purpose: Provide a brief overview of the best practices for selecting a cooling tower.

Topics of interest:
- What type of cooling tower do you need and want?
- Factory assembled or field erected?
- What types of materials are to be used: HDG, stainless steel, or FRP?
- Is the life cycle and energy consumption costs more important than the initial installation cost?
- How important is maintenance and insurance features?

Creating a specification that describes what you want and need to select.

Presented by: John Stacks, Composite Cooling Solutions, LLP.

John Stacks is Vice President of Sales and Marketing in the building trades and light industrial markets for Composite Cooling Solutions (CCS) in Fort Worth, Texas. He has worked in the HVAC arena for almost two decades. Mr. Stacks joined CCS in the spring of 2011 after seven successful years in the HVAC building automation industry, serving as regional sales manager for Honeywell. Prior to Honeywell, his tenure with Ceramic Cooling Tower Company included experience in both the operations and sales aspects of field-erected cooling towers. John Stacks graduated from Texas A&M University and is married to his lovely bride, Julie. They have two children: Lauren and John.

Phase 2 - Tower Installation

Purpose: I will be looking at some of the major items that need to be addressed from an owner/operator perspective to facilitate the installation of a field erected cooling tower. Items to be addressed will include:

- Design, Submittals and Approvals
- Scheduling
- Mobilization
- Site Access and Considerations
- Safety: Site Specific and OSHA
- Milestones and Billing
- Substantial Completion, Inspection and Punch List
- Start Up
- Demobilization
- Testing
- Lien Releases, Retention and Performance Bonds

Presented by: Tom Toth, P.E., Midwest Towers, Inc. - Tom is Senior Structural Engineer at Midwest Towers, Inc., Chickasha OK. He is a licensed Professional Engineer in the states of Virginia, New Jersey, Colorado, Oklahoma and Nebraska. His background includes 4 years in the Engineering office of a major Steel Fabricator and 18 years in Consulting Engineering Offices where he first became associated with the Cooling Tower Industry. All told he has 20 years of Cooling Tower Design experience including the last 12 years working for Cooling Tower Manufacturers. He graduated in 1977 from the New York Institute of Technology with a B.S. Degree in Architectural Technology and received his Masters of Administration Degree in Industrial Management in 1984 from Lynchburg College. He is active on the ASCE Fiber Composites and Standards Committee, the ASME RTP Committee and the ASME BPTCS Project Team on FRP Piping.

Phase 3 - Tower Maintenance

Purpose: A brief overview of the best practices for maintaining water cooling towers to prevent premature deterioration and failure in the field.

Topics of Interest:
- Inspection and maintenance of mechanical air moving equipment.
- Inspection and maintenance of water distribution system and components.
- Inspection and maintenance procedures for fill and drift eliminators. How to prevent fill from clogging.
- Structural inspection of wood cooling towers.
- Protection of cooling towers operating in very cold environments.
- Corrosion protection of cooling tower components.

Presented by: David M. Suptic, EvapTech, Inc. - David Suptic is a project manager currently employed with EvapTech, Inc. of Lenexa, KS. Mr. Suptic has been involved for over 30 years in the cooling tower industry and has served as Co-Chair of the Engineering Standards and Maintenance Committee and as a Vice-Chair of the CTI Program Committee. Mr. Suptic received a B.S. degree in Mechanical Engineering and an MBA degree both from the University of Kansas. He is also a registered professional engineer in the State of Kansas and a Certified Project Management Professional.
We the members of the Cooling Technology Institute (CTI), when acting on behalf of CTI, its members and the industry, will always abide by:

• Behaving with honesty, trustworthiness, and in good faith in representing and performing duties for the betterment of the CTI.
• Always striving to provide the best and most up to date technological information so CTI remains current with industry standards, specifications, guidelines and recommended practices for the benefit of both our members and our industry.
• Insuring that all official works, statements and/or actions on behalf of CTI are so noted as official property of the CTI. All non-official works, statements and/or actions will be clearly recognized as not of CTI and are of personal opinion.
• Avoiding damaging or critical actions with other CTI members that might be personally hurtful or degrading to their employer.
• Exposing existing or past conflicts and rectifying these conflicts in an expedient manner to the best possible solution for all parties involved.
• Holding fellow CTI members in the highest regard of respect and admiration.

August 29, 2006

Key Features of CTI ToolKit Version 3.1

• Air Properties Calculator. Fully ASHRAE compliant, psychrometrics. Interactive.
• Thermal Design Worksheet, in the “Demand Curve” Tab which can be saved to file and retrieved for later review. Now with printable and exportable graphs.
• Performance Evaluator, in the “Performance Curve” Tab to evaluate induced draft or forced draft, crossflow or counterflow cooling tower performance. Now calculates percent performance or leaving water temperature deviation. Data can be entered manually or with an input file. Automatic Cross-Plotting. Now with printable and exportable graphs.
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15. GEA Power Cooling, Inc.
16. Howden
17. Kyung In Machinery Co., Ltd (KIMCO)
18. MasterTech Services, Inc.
19. Midwest Cooling Tower Services, Inc.
20. Midwest Towers, Inc.
21. Precision Cooling Towers
22. C.E. Shepherd Co., LP
23. SPX Cooling Technologies, Inc.

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**CALL FOR PAPERS**

**2013 Annual Conference**
February 3-7, 2013
Omni Bayfront Hotel
Corpus Christi, Texas

The following schedule will begin the process for papers presented at the 2013 Annual Conference:

**2012**
May 4: Deadline for Abstracts
June 15: Authors Notified by Program Chair
Aug 3: Copy of the first draft must be sent to CTI office for review
Nov 2: Final draft, based on review comments and slides due in the CTI office

Abstract Forms can be obtained by contacting the CTI office at 281.583.4087 or email: vmanser@cti.org

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Press Release

Contact: Chairman, CTI Multi-Agency Testing Committee

Houston, Texas 2-November-2011

Cooling Technology Institute, PO Box 73383, Houston, Texas 77273 - The Cooling Technology Institute announces its annual invitation for interested thermal testing agencies to apply for potential licensing as CTI Thermal Testing Agencies. CTI provides an independent third party thermal testing program to service the industry. Interested agencies are required to declare their interest by March 1, 2012, at the CTI address listed.

Jack Bland, Corporate Sales Director, ChemTreat, is looking forward to serving as CTI President for the 2012-2013 Term as he considers CTI to be one of the premiere Global industry associations. Jack has over 35 years experience in industrial cooling water treatment, 31 years of which he has been with ChemTreat with their corporate headquarters in Glen Allen, Va. He is a member of a variety of industry associations and has proudly served on the CTI Board of Directors on two previous occasions. Jack and his wife Dinah just celebrated their 35 wedding anniversary last month. “I am honored to have been chosen to serve as CTI President over the next two years and to be able to work with my friends and colleagues to continue to enhance the standards of excellence that our association brings to each of our member companies and global customers through the Cooling Technology Institute.”

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While every effort has been made to ensure the accuracy of the program, CTI is not responsible for any changes, errors or omissions that occur after the printing of this publication.

Sunday, February 5, 2012

1:00 - 2:30p • New Board of Directors’ and Committee Chairs Meeting 101 (2011 & 2012 Board Members invited), Salon 1
3:00p - 5:00p • Board of Directors’ Meeting with Committee Chairs • Salon 1
4:00p - 8:00p • Registration, Raphael Fayer
5:00p - 12:00a • Hospitality Suite Open (Bar Closes @ 9:00) Raphael Ballroom
6:00p - 8:00p • Speaker Ready Room, Salon 3

Monday’s Technical Sessions running simultaneously between Raphael A and Raphael B Ballrooms

TP12-01
Natural Draft Cooling Tower Ring Replacement: Unique Construction Challenges and the Operation

This paper presents the technical, logistical and scheduling challenges encountered to complete the project during a 49 day outage, which included preassembly of sixty-four (64), 15-ton praltruded structural fiberglass modules. More than 150 workers logged 94,000 man hours with zero safety incidents, 3 days ahead of schedule, allowing early plant restart and commissioning. The completed tower provides PPL additional generation capacity while distributing 261,000 gpm, is 45 feet high and 400 feet in diameter.

TP12-03
Replacement of the Concrete Cooling Tower by Steel Structure Cooling Tower Dur- ing the Outage
Martin Kubicek, FANS, A.S. and Mohan Krishna Myneni, FANS Asia Pvt Ltd

Sales and Technical Manager – Africa & Asia Commercial Depart- ment, Six month trainee course in the FANS Company, Regarding long term business interests, commercial dealing with clients and suppliers in the Czech Republic and abroad, Commercial experi- ences with Indian mega tenders, Site experience during LOTOS refinery project execution in Poland, Business trip experience – Slovakia, Poland, Germany, Egypt, Iran, Iraq, Malaysia, Jordan, India, United States of America.

The paper deals with cooling tower replacement, where concrete structure cooling tower has been replaced by steel structure cool- ing tower type CTF during the operation. The problem has been solved with two cells concrete cooling tower in the Czech Republic where only simple maintenance was planned. During the first days of work it was recognized that any type of refurbishment was not possible. Existing concrete cooling tower has been replaced by new steel structure cooling tower. Min advantage of CTF steel structure cooling tower is construction/erection speed, flexibility and finally price.

TP12-04
Cooling Tower Modeling Approach
Magose Abraham Eju, Nigeria LNG Ltd

Magose Abraham Eju holds a Ph.D in Mechanical Engineering from the University of Strathclyde, Glasgow, UK and an MBA in Project Management from the University of Technology Owerrri, Nigeria. He has over seventeen years of working experience in the oil and gas industry. Between 1991 and 1994, he worked with a multi-national marine company – Holt Leasing Marine - as a 3rd class marine engineer, having passed the required profes- sional examination and certification. Between September 1997 and June 1998 he worked as a freelance inspection engineer with a multi-national inspection company - SGS Inspection Company Limited. By July 1998, he joined a multi-national liquefied natu- ral gas company – Nigeria LNG Limited where he still works today as a process engineer. During this period, he has worked in the UK – on secondment to Shell Exploration and Production Company for nine months – and in Malaysia – on secondment to Malaysia LNG Company for three months.

TP12-05
Novel Ultrasonic Microbiological Control System From Ashland Improves Cooling Water Treatment Performance

John S. Chapman earned a Ph.D. in Microbial Physiology from the University of California at Davis. He has been involved in the research, discovery and development of Microbial Control Tech- nology for 25 years as Hoffman-LaRoche, Rhône & Has, Procter & Gamble, and DuPont Central Research. He is currently the Technical Team Leader for Microbiological R&D at Ashland Water Technologies.

Ultrasonic technology Is a non-chemical treatment approach that has been proven successful in meeting these objectives. This paper will review this novel technology and provide an in-depth case study of a plant that implemented the ultrasonic technology. Program benefits include the elimination of traditional chemical biocide feed, storage and handling, improved cooling tower cleanliness, reduced corrosion, and water saving of more than 2.7 million gallons of water per year.

TP12-06
Forward Osmosis Applied to Evaporative Cooling Make-Up Water
Peter Nicoll and Neil Thompson, Modern Water Plc

Peter Nicoll leads the multi-disciplined technical team at Modern Water where he has been instrumental in the planning, develop- ment, deployment and implementation of the Company’s patented forward osmosis process. He has extensive experience in the design and operation of large desalination plants, business de- velopment, sales of capital equipment and professional services throughout the world. Peter is a Chartered Engineer and a Fel- low of the Institution of Mechanical Engineers. His previous ex- perience includes Director of Business Development for Fichtner Consulting Engineers and he has held a number of senior roles both technically and commercially at Weir Westgarth.

Modern Water is in the process of a number of manipulated / forward os- mosis based technologies, ranging from desalination to power generation. This paper outlines the progress made to date on the development and commercial deployment of a forward osmosis process applied to evaporative cooling tower make-up water. This new technology shows significant promise in allowing various raw water sources, such
Confidential and Proprietary Information

Various approaches to cooling tower modeling have been used by different authors. Some of these modeling approaches include the work of Lebrun and Aparecida (2002) titled “Cooling Towers – Method and Experimental Validation” which presented a simplified method for analyzing the countercurrent and crosscurrent heat and mass transfer processes in cooling towers using Merkel’s theory as the theoretical basis for the model. Braun et al (1989) used the Effectiveness approach in their work titled, “Effectiveness Models for Cooling Tower and Cooling Coils”. Lastly, in the “Toolkit for Primary HVAC, System Energy Calculation”, prepared for ASHRAE by Lebrun et al (1999), the model of the counterflow cooling tower was based on the Merkel’s theory with the Lewis number assumed to equal unity. This paper describes the approach that was used by the author in modeling cooling tower as part of the scope of research that was undertaken to improve the thermal performance of cooling towers. Two simulation software tools have been used in the modeling of cooling tower. The challenges encountered are also discussed.

10:00a - 10:30a

TP12-08
An Update on ASHRAE Standard 188P: Prevention of Legionellosis Associated with Building Systems
William F McCoy, Phigenics and Paul Lindahl, Jr, SPX Cooling Technologies
For the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE), he serves as Chair of Standard Project Committee 188 writing Standard 188P: Prevention of Legionellosis Associated with Building Water Systems. Previously, he was elected to the Environmental Health Committee and then served as Chair. Most recently, Bill has been elected to serve a 4-year term on the ASHRAE Research Administration Committee (RAC) which manages an annual $3 million budget.

10:30a - 11:00a

TP12-10
Field Evaluation and Verification of Biological Control in Operating Cooling Tower Water Systems Utilizing a Non-Chemical Pulse Electric Field Device (PEFD)
Paul Puckorius, Puckorius & Associates, Inc.
Paul R. Puckorius is president and CEO of Puckorius & Associates, Inc. with corporate offices in Denver, Colorado and a regional office in Selving, Florida. His corporation only provides consulting services and does not sell chemicals or equipment nor is associated with any water treatment service company. Started in 1975 projects have been done through 4 continents, Europe, South America, Mexico, Canada, and middle and far east countries. Paul has over 50 years of experience and knowledge of water treatment chemicals for use in cooling tower water systems. He provides practical solutions in problem solving and independent evaluation of water treatment programs. He has evaluated numerous cooling tower systems that use non-chemical devices for scale, corrosion and microbiological control. He is aways interested in evaluating new technologies. He has provided training workshops on cooling water, boiler water, and waste water. He has authored over 150 technical papers covering all phases of water problems and practical water treatment. Pulse Electric Field Devices (PEFD’s) have been used as the sole source of water treatment in evaporative cooling water systems for over 10 years often with good results. Several field evaluations will be presented that provide detailed data on microbiological control entirely by the PEFD’s. This paper will present both field and laboratory test data independently obtained from operating cooling tower water systems which rely solely on PEFDs for microbiological control. This data shows that adequate and acceptable control of both planktonic (bulk water) and sessile (biofilm) microbial populations in numerous full sized cooling tower systems in being obtained. A comparison of field versus lab microbiological testing methods and results will be presented that indicate if proper Guidelines will be provided for field microbiological monitoring.

11:00a - 11:30a

TP12-11
Structural Integrity of Hyperbolic Cooling Tower with Imperfections in Geometry and Verticity
Narendra Gosain, Prasad Samarajiva and Farouk Mahama, Walter P Moore
Narendra Gosain, Ph.D., P.E. is Senior Principal in the Structural Diagnostics Services Group of Walter P Moore. In his 39-year career with Walter P Moore, Dr. Gosain has designed and evaluated several significant structures throughout the United States, including commercial, industrial, and medical structures. As an adjunct professor for 16 years in the College of Civil Engineering at Rice University in Houston, he shared his expertise with later generations of structural engineers. In 1999, Dr. Gosain started a new service line in Walter P Moore called the Structural Diagnostics Services Group that is dedicated to structural restoration, rehabilitation, forensic, and problem solving support. He served as the Executive Director of the group until February 2009. Dr. Gosain’s focus is now on serving as technical consultant for complex structural rehabilitation challenges and forensics related work. Due to the large sizes of the concrete hyperbolic cooling towers and the difficulties encountered during construction, it is not always possible to maintain the dimensional accuracy as seawater, to be used directly in the manipulated osmosis step, thus releasing the use of scarce and valuable higher grade water for other more important uses. The paper presents theoretical and operational results for the process, where it is shown that the process can produce make-up seawater at a fraction of the operating and conventional processes. In particular, power consumption which in some cases may be as low as 15%, compared to competing processes. Chemical additives to the cooling water (osmotic agent) are retained within the process, thus reducing their overall consumption. Furthermore the chemistry of the cooling water does not support the growth of Legionella pneumophila.

11:00a - 11:30a

TP12-14
Biocide Treatments for Controlling Amoeba Amplified Legionella in Cooling Towers
Paul Schook, and Jana Rajan, Dow Microbial Control
Paul Schook is Senior Microbiologist for Dow Microbial Control (DMC). He is a key member of the Water Treatment team, where he focuses on creating offerings for Legionella control, as well as developing molecular biology tools and methods. At Dow Microbial Control, Paul is currently researching the efficacy of oxidizing and non-oxidizing biocides on the pathogenic bacteria Legionella pneumophila during various stages of its replication processes as they occur under real-world conditions. For this purpose, he has developed various model systems, including growing Legionella in multi-species biofilms and...
of the towers. Imperfections in the intended geometry and verticality do occur which can have an impact on the stresses in the thin concrete shell structure. Using an existing hyperbolic cooling tower as an example and some possible imperfection scenarios of the structure, the paper will provide a parametric study on when certain imperfections become critical for the safety of the cooling tower when subjected to wind.

11:30a - 12:00p

TP12-13
Drift Measurement Using Conductivity Methodology: Advantage and Limitation

Vincent Ganzitti, Hamon

Vincent Ganzitti is an electro-mechanical engineer. He graduated in 2001 in Belgium. Since then, he worked at several technical positions within Hamon Thermal Europe including thermal software development, technical design and on field testing. He is now responsible of the Hamon R&D center located near Brussels.

This paper intends to present the drift measurement using the conductivity methodology. It will show its advantages and its limitations.

2:00p - 2:30p

TP12-15
Safe Cooling Tower Winter Operation

Michel Monjoie, Monjoie Cooling

Michel Monjoie graduated as an electromechanical engineer in 1960 from Lige University in Belgium. He has worked for Hamon Thermal Europe since 1970 and was R&D manager for more than twenty years. He is active in CTI, ASME, and EUROVENT and has helped to write standards for each organisation. He has since retired and founded a company named Monjoie Cooling Sprl as a consultant in cooling tower business.

Cooling tower freezing may damage the internal or even the structure of the cooling tower with the consequences in repair cost and degrade thermal performance. The paper describes the existing winter protection devices and procedure to avoid freezing damages in cooling tower: natural draft, fan assisted natural draft, mechanical draft, in relation with the air temperature and heat load. It covers the maintenance rules and check list to avoid uncontrolled freezing. It gives procedure for safe cold start up during winter.

2:30p - 3:00p

TP12-17
Permanent Magnet Direct Drive Motors: Lessons Learned

Robbie McElveen and Bill Martin, Baldor Electric Company

Robbie McElveen earned a Bachelor of Science degree in Electrical Engineering in 1993 and a Master of Science degree in Electrical Engineering in 1995 from Clemson University in Clemson, SC. He is currently a Senior Development Engineer for Variable Speed and Specialty motors, with a focus on salient pole permanent magnet motor development and application. Mr. McElveen is a member of IEEE and has authored several technical papers on both induction and permanent magnet motors and their use in industry.

In recent years, the authors have presented several papers concerning the use of permanent magnet motors for the direct drive of cooling tower fans. The goal of this paper is to detail how the technology has evolved, communicate lessons learned from field installations and give the reader a practical guide to the installation and use of this type of motor. An in depth case study is presented detailing installation challenges and solutions for a large permanent magnet direct drive motor.

---papers continued in next column---
Bill Miller is a Sales Engineer with Brentwood Industries, Inc., based in Reading, PA, and has been in the cooling tower industry since 1998. In 1993 he graduated with a Bachelor of Science in Aerospace Engineering from the Pennsylvania State University. His duties at Brentwood involve application engineering of Brentwood’s vast array of cooling tower products to his customers’ requirements, involvement in new product development, and acting as a technical advisor to the sales team. He is a member of Tau Beta Pi, the National Engineering Honor Society, and has earned EIT certification in the Commonwealth of Pennsylvania. Bill has published and presented technical papers previously at Cooling Technology Institute (CTI) and Electric Power Research Institute (EPRI) conferences.

There are many factors associated with the drift loss potential of a cooling tower. With the greater restrictions on drift emissions that are now required in many locales, it is important to know all of these factors to make sure that the drift loss of a tower is minimized. This paper will explore the various factors involved for both counterflow and crossflow cooling towers.

Bill Miller
Brentwood Industries, Inc.

Ken Mortensen, SPX Cooling Technologies

Ken is presently the manager of research and development for SPX Cooling Technologies. He has managed several engineering and operations departments responsible for water quality, material selection, and physical application criteria for cooling towers and components, as well as design, manufacture, and servicing of water treatment equipment and installations. Ken graduated in 1977 with a Bachelor of Science in Chemical Engineering from the Pennsylvania State University. He also holds a Master of Science in Metallurgical Engineering and completed an MBA at Rockhurst University in Kansas City, Missouri in 2000.

Film fill fouling is an important problem in modern power plant and industrial process cooling. This paper will present current laboratory and field fouling evaluation methods. Also reviewed are the history of application of various film fill geometries, in-situ water conditions, and the resulting condition of those films.

Ken Mortensen
SPX Cooling Technologies

Troy Broussard, Cascade MVS

Troy A. Broussard has been a chief consultant for all rotating and reciprocating machinery reliability based maintenance initiatives at Cascade Analytic since 2003. A graduate of Lamar University, he has extensive experience in the field of reliability and condition assessment monitoring since 1983. Mr. Broussard spent 9 years with 2 of the largest reliability monitoring equipment manufacturers in the U.S., and has 4 years of in-plant experience where he was an integral part of the reliability monitoring team for the largest refinery in the United States. The core of Cascade’s business is sales, consulting, and analysis of rotating equipment reliability using the latest tools and techniques to analyze and diagnose machinery problems. The tools include vibration and oil analysis, infrared, sonic & ultrasonic detection along with analysis software. Cascade’s goal is to work with customers to improve reliability of equipment and minimize downtime and maintenance costs while helping them develop better maintenance techniques. Cascade also assists customers with balancing and aligning rotating equipment when needed.

Precision shaft alignment in cooling towers requires a different set of skills than for other rotating equipment. This presentation will discuss soft foot issues, base and foundation considerations, spacer shaft and special procedures required for cooling tower alignment. The presentation will also include the benefits of dual laser solutions in cooling tower applications and laser centering.

Troy Broussard
Cascade MVS

Rodrigo Roma grew up in Guadalajara, Mexico and earned his undergraduate degree in Chemical Engineering from ITESO University in Guadalajara in 1992. He began his career as a candidate and crew-member for the second mission enclosed inside Biosphere 2 near Tucson, Arizona, one of the world’s most sophisticated facilities dedicated to the research and understanding of global scientific issues. Locked inside for a period of six months, he was in charge of the instrumentation and air monitoring systems; including maintenance, troubleshooting, calibration, data acquisition and interpretation. After the mission, he became an air quality research specialist for the Biosphere 2 complex, and then served as Assistant Plant Manager for their 6 MW co-generating plant. Interested in environmentally sound advances over chemical treatment, Biosphere 2 had installed several Zeta Rod systems with highly successful results. Rodrigo joined Zeta in 1997, bringing his talents and discipline as a scientific researcher to the company. Mr. Roma has authored numerous peer-reviewed papers for publication, overseen independent research, and developed new applications for the technology. His research has been focused on fouling prevention in RO membranes, heat exchangers, and metal working fluids. As Vice President of Zeta Corporation, he is primarily in charge of international sales and travels extensively in that role. Rodrigo earned an MBA in 2002 from the University of Arizona, Eller School and has become a United States citizen. He became LEED AP accredited in 2009.

The U.S. Army Corps of Engineers Construction Engineering Research Laboratory and the Air Force Civil Engineer Agency evaluated a high voltage capacitance-based water treatment technology in evaporative cooling systems at four military installations in an extended study. The non-chemical technology we evaluated for control and prevention of corrosion, scaling and biological fouling in a side-by-side comparison to standard chemical treatment. Results confirmed that the technology delivered an average 20% reduction in make-up water and 48% reduction in blow-down wastewater, contributing to water conservation goals for agencies established under Executive Order 13423. This paper presents the findings from the study.

Rodrigo Romo
Zeta Corporation and Soloman Williams, Air Force Civil Engineer Agency (Retired)

John Pilotsits has over 32-years of Industrial Cooling and Boiler Water experience. He spent eight (8) years in the Power Industry responsible for Boiler Water Chemistry, Demineralizer Performance, and Cooling Water Chemistry. Mr. Pilotsits has been with Nalco for the past twenty-four (24) years in Sales, Water Lab Management, Cooling Water Research, and for the last five (5) years as a member of the Technical Expertise Center supporting 3D TRASAR and Cooling Water applications, and as a Technical Trainer for Sales and Customers in these key areas. He has several Publications, a Patent, and has presented at Industrial Water Conferences.

High cycle operation, highly variable make-up water chemistry, and intermittent halogenations: all these factors make power plant cooling systems some of the most challenging to manage. Proper polymer monitoring allows one to understand true demand factors versus other artifacts that might negatively impact control. This paper discusses how high level halogen applications should be managed to provide optimal polymer control. Lab data will be presented, along with actual application data collected in a highly stressed power plant cooling system.

John Pilotsits
Nalco Company
Facilities Operations Manager for LED lighting manufacturer Cree, Inc. since 2000. Responsible for maintenance and operations of facilities, including 6 chilled water plants, 4 boiler plants and high voltage distribution. Prior to Cree, worked at North Carolina State University as an AD for Building Maintenance and Operations, which included improving operations of their aging steam plants and steam distribution system. John is a Professional Engineer in North Carolina and holds a BS in Mechanical Engineering from NCSU. In 2006 Mr. Young founded FieldData Pro, Inc. to help companies better manage plant operating data and operator inspection data. He continues to work with FieldData Pro as VP of Engineering, helping develop new applications for mobile data collection technologies.

LED lighting manufacturer Cree took the management of water treatment for its numerous HVAC and process cooling systems in house after 12 years of full service water treatment from a national water treatment company. Cree now buys chemicals and treats its systems on their own. The road to independence was at times bumpy, but in the end it proved to be an extremely rewarding journey.

Daniel J Robinette, Rocky Mountain Water Engineering, LLC

Most of the industrial era, water has essentially been viewed as a free or very low-cost commodity but this perception of a plentiful resource is changing rapidly as communities across the country begin to face limitations in fresh water supply. This scarcity of water, portrayed. Non-Chemical Devices (NCDs) have great appeal when talking of the impact of "traditional" chemicals or treatments may be "greener" than conventionally imagined or portrayed. Some aspects of "environmental impact" of various approaches to the design, operations and Food and Beverage Industry Companies. Written, presented and had published several papers on various organisations or conferences. Design, operation and treatment of cooling systems can encompass many techniques to fulfill both the desires of Industry and Management to improve its environmental image. Environmental impact reaches much further than the "greener" of a given cooling water treatment chemical in the discharge from a cooling system. When assessed in depth, "traditional" chemicals or treatments may be "greener" than conventionally imagined or portrayed. Non-Chemical Devices (NCDs) have great appeal when talking of the impact of treatment chemicals. Marketing of some treatment chemicals emphasizes their "biodegradability": Some aspects of "environmental impact" of various approaches to the design,
For nearly thirty years, the Cooling Technology Institute has provided a truly independent, third party, thermal performance testing service to the cooling tower industry. In 1995, the CTI also began providing an independent, third party, drift performance testing service as well. Both these services are administered through the CTI Multi-Agency Tower Performance Test Program and provide comparisons of the actual operating performance of a specific tower installation to the design performance. By providing such information on a specific tower installation, the CTI Multi-Agency Testing Program stands in contrast to the CTI Cooling Tower Certification Program which certifies all models of a specific manufacturer’s line of cooling towers perform in accordance with their published thermal ratings.

To be licensed as a CTI Cooling Tower Performance Test Agency, the agency must pass a rigorous screening process and demonstrate a high level of technical expertise. Additionally, it must have a sufficient number of test instruments, all meeting rigid requirements for accuracy and calibration.

Once licensed, the Test Agencies for both thermal and drift testing must operate in full compliance with the provisions of the CTI License Agreements and Testing Manuals which were developed by a panel of testing experts specifically for this program.

Licensed CTI Thermal Testing Agencies

<table>
<thead>
<tr>
<th>License Type*</th>
<th>Agency Name</th>
<th>Contact Person</th>
<th>Telephone/ Fax</th>
</tr>
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<tbody>
<tr>
<td>A,B</td>
<td>Clean Air Engineering</td>
<td>Kenneth Hennon</td>
<td>806.208.6162</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>865.938.7569</td>
</tr>
<tr>
<td>A</td>
<td>Cooling Tower Technologies Pty Ltd</td>
<td>Ronald Ryon</td>
<td>61 2 9789 5900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>61 2 9789 5822</td>
</tr>
<tr>
<td>A,B</td>
<td>Cooling Tower Test Associates, Inc.</td>
<td>Thomas E. Waert</td>
<td>913.661.8627</td>
</tr>
<tr>
<td></td>
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<td>913.661.8639</td>
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<tr>
<td>A</td>
<td>McClure &amp; Associates, Inc</td>
<td>Thomas Wheelock</td>
<td>865.588.2654</td>
</tr>
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<td>425.557.8377</td>
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*Type A license is for the use of mercury in glass thermometers typically used for smaller towers.
Type B license is for the use of remote data acquisition devices which can accommodate multiple measurement locations required by larger towers.

Licensed CTI Drift Testing Agencies

<table>
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<tr>
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*Type A license is for the use of mercury in glass thermometers typically used for smaller towers.
Type B license is for the use of remote data acquisition devices which can accommodate multiple measurement locations required by larger towers.
It is with great sadness that we tell you that George R. (Bob) Shriver passed away on September 6, 2011. Bob had courageously fought cancer for more than six years. He continued to work at Evapco for most of that time, retiring a couple of years ago, but continuing to consult until just recently. He worked as an engineer in the cooling and refrigeration industry for his entire career. He was passionate about his work and rose to the level of Vice President at Evapco. He was a long time active CTI member, participating on many P&T committees and also serving a term as CTI Vice President. He was awarded Honorary Lifetime Member at the Winter Meeting this year. He had many friends in the CTI and he will be missed.

**Dress Code**
for the Annual Conference is Business Casual
No Ties!

In Remembrance of a good friend to CTI...

What is the DEAL for Monday Night Dinner?
Come join us at one of the Best Pasta Bars in the Houston area.

Fix your pasta dish the way you want it with a choice of fixings and sauces. Along with a salad, bread and dessert you will be filled to the max. After eating a wonderful dinner you will be able to try your hand at poker (Texas Hold ‘em, etc), Black Jack, Roulette or Craps! Prizes will be given (sorry no money)!

Cost is $70/per person which covers drinks [wine and beer] and poker chips!
Seminar
Tuesday, February 7
from 2:00p - 4:30p
in the Donatello room

Come prepared with your questions for the panel of experts. We will have folks from all the standing committees ready to support your questions with good qualified answers. Also in attendance will be the authors of the technical papers that were presented on Monday and Tuesday morning to answer questions you might have related to the paper they presented.

The following is just a sample of the types of questions we get from those from every walk of life at the CTI office via our Website. Thanks to the Ask the Expert Committee the CTI is able to reach out in another way to help those in the industry and those who have interest in the industry.

**Question 1**

My question is dealing with a (open circuit) cooling tower/heat rejection equipment on a 17 story high rise. I'm trying to determine what the term of/or definition is for type of piping that would be for the recirculation water supplying and returning from and to the heat rejection equipment feeding through out the building. After much research there seems to be no technical term other than process water piping. Could you confirm that in the industry that this is what this piping would be defined as?

The most common term for cooling tower water is CTW supply and CTW return. In the industrial world process water has very different meaning. In the HVAC world process water would be applied to the chilled water coming from chiller machines to air handlers. The truth is I have seen designations used interchangeably.

**Question 2**

We have two identical installation of cooling tower for 2 different 100TR plant. We are having two different readings on 100% load. Specially the approach condition is different with the same WBT. One is performing to its designed condition the other is not in line with the designed condition of the cooling tower parameters. We have checked all the parameters of the cooling towers for the both cooling towers and found them to be the same. My question is, is there any possibility, due to some problem within the chiller, that the cooling tower is not able to perform to its designed condition. What are the possibilities that have to be checked?

Comparing the operation of two “identical” cooling towers on two different installations always has some differences. The only difference that the chiller can cause is a difference in the delta T across the chillers. If two 100TR chillers get the same delta T at the same load then something is different within the cooling towers themselves. I suggest you contact the manufacturer or a thermal testing company to run a CTI ATC-105 thermal performance test to check performance of each tower.

**Question 3**

For calculating enthalpy difference in the cooling tower we have the following calculation:

\[ H = H_a + H_w \]

\[ H_a = \text{Enthalpy of air per Kg of dry air} \]

\[ H_w = \text{Enthalpy of water vapour per Kg of dry air} \]

\[ H_w = v * (h_g + C_{pw} (T_{db} - T_{dp})) \]

How do we calculate \( H_g \) at inlet and outlet condition of cooling tower? Which parameters do we need to refer to calculate \( H_g \)?

...Ask the Experts questions continued on page 20
The following companies have reserved their tables for exhibiting:

1. French Creek Software
2. Special Pathogen Lab
3. Design Controls
4. Composite Cooling Solutions, LLP
5. Amarillo Gear Company
6. C.E. Shepherd Co., LP
7. Baltimore Aircoil Company
8. Midwest Towers, Inc.
9. West Texas Cooling Tower Fabricators
10. Glocon Inc.
11. Resolite
12. Aggreko, LLC
13. Rain for Rent
14. Hudson Products Corporation
15. Cofimco
16. IMI Sensors
17. CoolWater Tech
18. Brentwood Industries
19. Clean Air Engineering
20. Airtech Products
21. Modern Water PLC
22. Ashland Water Technology
23. Grupo Omni
24. Field Data Pro
25. Tower Tech, Inc.
26. Yerushalmi Water Cooling Towers (YWCT)
27. McHale & Associates
28. Crane Composites
29. Cooling Tower Resources, Inc
30. EvapTech, Inc
31. GEA 2H Water Technologies
32. Rexnord, LLC
33. SPX Cooling Technologies
34. Bedford Reinforced Plastics
35. Landstar Transportation

There are plenty of spaces still left for your company to exhibit. Spaces already reserved are indicated by the red boxes. Don’t forget to reserve your space at $1200/space.

For information on reserving your table contact Virginia Manser at 281.583.4087 or vmanser@cti.org
Attend the Committee Meeting of Your Choice
February 6-9, 2012

Engineering Standards and Maintenance

James Blake - American Lightning Protection
Bill Howard - Cooling Tower Depot, Inc.
James L. Baker - Composite Cooling Solutions, LLP, Chair

I. Call to Order/Announcements
II. Introduction of Attendees
III. Approval of 2011 Summer Workshop Meeting Minutes
IV. Professional Development Hours (PDH)
V. Documents Awaiting Ad-Hoc Approval
VI. Documents Awaiting Board Approval
VII. Documents Approved in 2011
VIII. Standing Lead Task Group Reports
• Wood, Metal, and Concrete Materials Task Group – Chair: Bill Howard, Vice Chairs - Terry Ogbur and Ethan Chesnut
Guidelines and Standards: Fasteners, R Seismic Factor, Concrete Restoration, Cleaning Cooling Towers and International Woods
• FRP and Plastics Task Group – Chair - Glenn Barefoot, Vice Chairs - Jamie Bland & Jim Cuchens
Guidelines and Standards: FRP Structural Products, Structural Design of FRP, FRP Fan Stack Material, FRP Fan Stack Design Guideline, Wood to FRP Connection
• Mechanical Equipment Task Group – Chair - Craig Burriss, Vice Chairs – Denny Moran & Dave Sayker;
Guidelines and Standards: Variable Frequency Drives, Mechanical Components, Electrical Components and Vibration Standard
• Tower Operations Task Group - Chair - Jess Seawell & Jon Bickford
• Hazard Protection and Environmental - Task Group – Chair - James Blake, Vice Chairs Denny Shea & Mike Bickerstaff

IX. Standing Assignments
• Technical Review Committee (5 year reviews) - Bill Howard
• The ‘Ask The Expert’ designee - Denny Shea
• Task Group Meeting Schedule - Bill Howard
• Attendance Recording - James Blake
• Ad-Hoc Reviews - Jon Bickford

X. New Business
XI. Adjourn

Performance & Technology

Jean-Pierre Libert - EvapTech, Inc., Vice Chair
Kenneth (Ken) Hennon - Clean Air Engineering, Chair
Rich Aull - Brentwood Industries, Inc., Vice Chair

I. Call to Order
II. Acknowledgement of Attendees
III. Old Business - Active Task Groups:
• ATC-105 Thermal Test - Rich Harrison, Chair
• STD-146 Flow Measurement, David Wheeler, Chair
• STD-201 Certification - Frank Michell, Chair and Trevor Hegg, Co-Chair
• Technical Review - Trevor Hegg, Chair
• ATC-128 Sound - Jean-Pierre Libert, Chair

IV. New Business

Water Treating Committee

Jim Kanuth - ChemTreat, Inc. - Vice Chair
Matt Wangerin - Ashland Water Technologies, Chair
Jon Cohen - H-O-H Water Technology - Coordinator
Pete Elliott - GE Water & Process Technologies - Secretary (not pictured)

I. Call to Order/Announcements
II. Introduction of Attendees
III. Approval of Committee Workshop Minutes
IV. Task Group Reports
A. Environmental Issues – Don Erickson
B. Water Re-Use Document – Phil Kiser
C. Cooling Water Performance: Microbiological Monitoring - Jean Gucciardi
D. Filtration of Cooling Water Systems – Tom Cabezut
E. Cooling Water Performance: Deposit Control Monitoring - Jean Gucciardi
F. Ozone Reading Lists, WTP-139 & 139.1 – Ken Mortensen
G. CTI Document Review - Paul Puckorius
H. Instrumentation & Control Task Group

V. Liaison Reports
• ASHRAE
• ASM
• AWT
• EPRI
• NACE
• IWC
• WATERTECH

VI. New Business

Need for new Task Groups?
Technical Paper Subjects for "targeted" symposium topics
I presume your ultimate goal is to calculate that capability of an existing cooling tower or are trying to calculate the thermal demand (KaV/L) of a new cooling tower.

Let me first give the list of variables and the standard nomenclature the CTI uses:

- **T1** - hot water temperature, in degrees Fahrenheit, entering the cooling tower. Typical example is 110°F.
- **T2** - cold water temperature, in degrees Fahrenheit, exiting the cooling tower. Typical example is 84°F.
- **H1** - the inlet air enthalpy at the wet bulb temperature.
- **H2** - the enthalpy of the air at the exit of the cooling tower.
- **WBT** - wet bulb temperature, in degrees Fahrenheit, of the air.
- **L/G** - liquid to air ratio for the cooling tower. A typical example of an L/B ratio is 1.3.

Calculating the exit air temperature and resulting exit air enthalpy is a complex iteration which is beyond the scope of the communication. As a first approximate we can calculate as follows:

The inlet enthalpy read from charts or tables. For example, the inlet enthalpy of the air at wet bulb temperature of 69°F $H_1 = 33.25$ BTU/lb of dry air.

The exit enthalpy is calculated as $H_2 = H_1 + \frac{L}{G} (T_1 - T_2)$ or $33.25 + 1.3 \times (110 - 84) = 67.05$ BTU/lb of dry air.

I hope this is the information you are looking for. I strongly suggest that you purchase from the CTI a computer program called the CTI ToolKit which has all of the pertinent information and does the calculations for you. You should visit www.cti.org where you will find a demonstration program. If this fits your needs, the full version can be purchased for a nominal cost.
Cooling Technology Institute
Annual Conference, February 5-9, 2012

HOTEL INFORMATION
HILTON HOTEL (GREENSPONT)
HOUSTON, TEXAS
281.875.2222 or CTI WEBSITE

Hotel Cut-Off Date - January 13, 2012

- CHECK-IN TIME IS 3:00PM
- CHECK-OUT TIME IS 12:00PM


Earn PDH Credits while meeting and working with others in the industry.
(Information when you register)

Make your plans to attend Future Meetings for CTI

February 5-9, 2012
Hilton Hotel
Houston, TX

July 8-11, 2012
El Conquistador
Tucson, AZ

February 4-7, 2013
Omni Bayfront
Corpus Christi, TX

July 7-10, 2013
Hilton Del Mar
San Diego, CA

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CTI's committees are working on a 5-year revision program for each of our Standards and Chapters by looking at each every 5-years and revising and reprinting those that need to be updated with new and better information and reprinting those that are correct as stand. As you may realize with the number of Standards and Chapters that CTI has, this will take some time to have each completed and viewed on a 5-year rotation but our standing committees are well underway. Soon you will be seeing information printed in each Standard and Chapter located on the second page left hand corner that shows when it was revised and the year it will be reviewed again.

Our latest reviewed and revised Standards are:

- ATC-105S reviewed 7/2011: Acceptance Test Code for Closed Circuit Cooling Towers - This code is similar to the open circuit tower in both form and function except for the fluid circuits. ................................................................. $25.00
- ATC-106 reviewed 7/2011: Acceptance Test Code for Mechanical Draft Evaporative Vapor Condensers - This code specifies the procedures, apparatus, and instrumentation to be used for testing and evaluating the performance of evaporatively cooled, mechanical draft, vapor condensers. ...........................$25.00
- ATC-140 revised 7/2011: Isokinetic Drift Measurement Test Code for Water Cooling Towers - The purpose of this code is to describe instrumentation and procedures for the testing and evaluation of drift from water-cooling towers. ............................ $60.00
- BUL-145 reviewed 7/2011: International System of Units (SI) - A practical medium of exchange for all basic data of interest to manufacturers, suppliers, and users of cooling towers.......................... .......................................................... $10.00
- ATC-150 revised 7/2011: Acceptance Test Procedure for Wet-Dry Plume Abatement - This code covers the determination of the effluent air or plume characteristics of wet-dry cooling towers, designed for plume abatement. ........................................ $25.00
- STD-202 revised 7/2011: Standard for Publication of Custom Cooling Tower Thermal Performance Test Results - This standard sets forth a program whereby manufacturers of custom cooling towers voluntarily allow the results of their CLTTA tests to be published under the requirements of this program. ........................ $15.00

Our newest Standard is:

- ATC-107 as of 07/2011: Test Code for Aircooled Condensers - This document details the measured test parameters, instrumentation, test measurements and data reduction procedure required for determination of the thermal capability of a dry, air-cooled steam condenser (ACC). .......................... $25.00

Each standard and chapter is available through the CTI office. You can order them via the telephone or the internet and they are available to you electronically.

**CALL FOR PAPERS**

**2013 Annual Conference**

February 3-7, 2013

Omni Bayfront Hotel

Corpus Christi, Texas

The following schedule will begin the process for papers presented at the 2013 Annual Conference:

- **2012**
  - May 4: Deadline for Abstracts
  - June 15: Authors Notified by Program Chair
  - Aug 3: Copy of the first draft must be sent to CTI office for review
  - Nov 2: Final draft, based on review comments and slides due in the CTI office

Abstract Forms can be obtained by contacting the CTI office at 281.583.4087 or email: vmanser@cti.org
### Registration Form for the CTI 2012 Annual Conference
February 5-9, 2012

#### Early Bird Registration Ends: January 27, 2012

Please type or print clearly all information. A separate form must be completed for each registrant. Photocopies of this form may be used.

1. **REGISTRATION INFORMATION:**
   - I was invited to the conference by: (If applicable give name of the person and their company responsible for your attendance)
   - Aware of the conference after seeing (please check one):
   - First Name:
   - Last Name:
   - Company:
   - City/State/Province:
   - Country:
   - Phone:
   - Email:

2. **SPECIAL NEEDS:**
   - Dietary: __________ Vegetarian
   - Physical: __________ Please check here if you require special accommodations to participate and email a description of your needs by January 27, 2012

3. **IN CASE OF AN EMERGENCY DURING CONFERENCE, PLEASE CONTACT:**
   - Name (Please print clearly):
   - Daytime Phone:
   - Evening Phone:

4a. **REGISTRATION FEES:** (Full-conference or one-day registrants)

<table>
<thead>
<tr>
<th>Category</th>
<th>Early Bird Rate by: January 27, 2012</th>
<th>Conference Rate after: January 27, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTI Member (includes technical sessions Monday, Tuesday &amp; Wednesday)</td>
<td>$695</td>
<td>$795</td>
</tr>
<tr>
<td>Non-Member (includes technical sessions Monday, Tuesday &amp; Wednesday)</td>
<td>$795</td>
<td>$895</td>
</tr>
<tr>
<td>One day Mon Tues Wed (circle one)</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>Exhibit Hall Pass Only</td>
<td>$35</td>
<td>$35</td>
</tr>
<tr>
<td>Speaker (one for each paper only)</td>
<td>N/C</td>
<td>N/C</td>
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<tr>
<td>Press (one attendee per company only)</td>
<td>N/C</td>
<td>N/C</td>
</tr>
<tr>
<td>Honorary Life Member</td>
<td>N/C</td>
<td>N/C</td>
</tr>
</tbody>
</table>

**Section 4a Subtotal US$**

4b. **CONFERENCE EVENTS / OTHER FEES:** (Full-conference or one-day registrants)

4c. **CONFERENCE EVENTS**

5. **PAYMENT**

| Credit Card: Please Charge US$ __________ to the following credit card. |
|----------------------|----------------------|----------------------|
| Card# | Exp. Date | CVC Code |
| Cardholder’s Name: |
| Cardholder’s Signature: |

*There will be a 15% charge on any credit card refund made - no exceptions!*

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