Greetings from the hurricane blown gulf coast. I am happy to report that the CTI office is back-up and functioning. I wish to thank all the Manufacturers and Suppliers whose people went beyond the call of duty to provide new parts and crews to the plants. Thanks to their generosity, our area returned to production in a short time period.

I am most pleased to announce that our office received no reports of any injuries from members. Many employees had damage. While the damage was much more severe, the times of tragedy illuminated their resolve and character.

People often ask, “What is value of CTI?” The value is its people. During our dark time, I observed employees from different companies working side by side in the field with one goal, get the plants back in operation. I talked to many of them over the past weeks. Most damage has to homes, no electricity, and other personnel problems. Regardless, these people responded to the needs of their customers and communities. I am proud to work in an industry that cares about what they do and how they do it. Moreover, I am proud to work with people whose character and values translate into action.

The cooling tower industry is normally a very small piece of most operating companies’ business. A piece that goes almost unnoticed until it is not there. “What is the value of CTI?” Its value lies in an organization whose sole purpose is meeting the needs of the public in a responsible and caring way.

The CTI Annual Conference in San Antonio is only a few months away. I encourage current members, past members and anyone associated with the cooling water business to attend. It will be the most informative and enlightening Technical Meeting to date.

If you need any reason to attend, I invite you to come and meet the people of CTI, a group of professionals focused about their work and serious about doing their jobs right. The winter meeting also provides plenty of opportunity to get to know a great group of people.

Denny Shea
CTI President 2008-2009
Air vs. Water: The Pros and Cons of Wet, Dry and Hybrid Cooling Systems
As the cost of water is on the rise everywhere and its availability in many parts of the world is restricted, dry and hybrid (wet & dry) cooling systems must be carefully evaluated versus wet cooling systems. This presentation describes various cooling systems available today with their respective pros and cons.

Presented by: Jean-Pierre Libert, EvapTech Inc.
In his position of Technical Director with EvapTech Inc., Jean-Pierre Libert is accountable for thermal ratings, equipment selections and acoustics. He oversees the R&D and product development activities as well as field testing of the field-erected towers.
Jean-Pierre holds a M.S. Degree in Mechanical Engineering from Faculte Polytechnique de Mons, Belgium. He has been an active member of the Cooling Technology Institute since 1985. He is a member in good standing of the American Society of Mechanical Engineers, Since 1979 in a variety of assignments in Belgium, Mexico and the U.S.A. Jean-Pierre has acquired extensive cooling technology experience. He and his wife Pilar live in Frederick, Maryland, with their dogs Mitsu (a Beagle) and Mocha (a Chihuahua).

Analyzing the Mechanical Equipment in a Cooling Tower for Improved Thermal Performance
When confronted with the need to improve cooling tower performance, many times the choice of mechanical equipment change is overlooked. This seminar will explore how to determine when mechanical equipment changes make sense in both tower performance and economics; and how to properly select and specify this mechanical equipment.

Presented by: Dennis Moran, PE with CM Towers
Graduating from Newark College of Engineering, Newark, NJ in 1974, Dennis obtained a B.S. degree in Mechanical Engineering and is a registered Professional Engineer in the state of New Jersey.
Dennis began working in the cooling tower field in 1971 while finishing his degree attending night school. In 1980 he formed CM Towers, Inc. providing services for inspection, design, construction and engineering of cooling towers.
With over thirty years of experience, which has included all types of applications and engineering assignments, covering materials of construction, mechanical issues, noise control, thermal performance and structural analysis.
Dennis formed DRM Consulting Engineers, Inc. in 1998 to specifically address engineering assignments and serves on the Board of Directors of Fresh Creek Technologies, a water pollution control company.

Water Treatment Ramifications of Cooling Tower Replacement & Additions
Repair or replacement of cooling towers on existing cooling water systems has effects that extend beyond the cooling tower basin. In addition to the obvious need to prevent debris from entering the cooling system, there are also potential chemical effects which may be caused by addition of new materials to the system. This discussion will focus on preventing damage to the cooling system from failure to employ proper startup chemistry when new materials of construction (including new portions of repaired structures) are placed in service in the wetted areas of the cooling water system.

Presented by: James Kanuth, ChemTreat, Inc.
Mr. Kanuth has been involved in Water Treatment for 32 years. He is currently a Sr. Chemical Engineer with the Technical Services Group of ChemTreat, Inc., a position he has held since December of 1995. In this capacity, he is responsible for supporting both ChemTreat Sales and Customer personnel treating Cooling Water and Boiler Water Systems.
Prior to his employment by ChemTreat, he served for six years as Gulf Coast Regional Manager for Puckorius & Associates, Inc., ten years as Sr. Utilities Engineer at a large Gulf Coast Ethylene and Co-products facility (owned successively by Monsanto, Conoco, Dupont, Cain and OxyChem), and four years as Utilities Maintenance Engineer for Jos. E. Seagram & Sons at their largest distillery.
Mr. Kanuth is a former Board Member of CTI, a member of the Water Treatment Committee and has served as a member of numerous subcommittees. He is also a member of A.I.Ch.E., NACE, AAAS, and is listed in Who’s Who in Science and Engineering.
Attend the Committee Meeting of Your Choice
February 9-11, 2009

Engineering Standards and Maintenance

Craig Burriss - Amarillo Gear Company, Vice-Chair
Chris Lazenby - Southern Company Services, Inc., Vice-Chair (not pictured)
James L. Baker - Composite Cooling Solutions, LP, Chair

I. Call to Order/Announcements
II. Introduction of Attendees
III. Approval of 2008 Summer Workshop Meeting Minutes
IV. Professional Development Hours (PDH)
V. Documents Approved in 2008
VI. Documents waiting Board Approval
VII. Standing Lead Task Group Reports
   • Wood, Metal, and Concrete Materials Task Group –
     Chair - Bill Howard, Vice Chairs – Ethan Chestnut & Terry Ogburn
   • FRP and Plastics Task Group –
     Chair - Glenn Barefoot, Vice Chairs - Jamie Bland & Jim Cuchens
   • Mechanical Equipment Task Group -Chair - Dennis Moran, Vice Chairs - Raul Castillo & Vacant

New CTI Members for 2009

Ibrahim Abdo
Affiliated Resources, Inc

Clifford Andrews
Aggreko Cooling Tower Services, UK

Annemos Hidrajulica Ltda
ATCO Power Canada Ltd

AWS Remediation Technologies, Inc.
Baker Petroleum

Balitmore Ancoil Company
Benten

Champion Components, Inc
Chepgoigt Tech Trading LLC

Commonwealth Dynamics, Inc.
Dongguan Shenting Cooling Equipment Co., Ltd

eEQ
Fiberline Composites
Gannonm Cooling Towers Limited

Glocon, Inc
IMI Sensors

Innovex Solution Co., Ltd
International Chimney Corporation

Kansas City Power & Light
Liang-Chi Industry (Thailand) Co., Ltd

Lyndel-Basell
Nalco Company

Jim Nicholls
North Street Cooling Towers (P) Ltd

OMNI Grupo Industrial Ltda

Parwate Engineering Sdn Bhd

Proco Products, Inc.

Seongdo Co., Ltd

Darin Stuhmuller

Texas Stamping Co., Inc.

Thermal-Cell Sdn Bhd

Thermal Energy Construction Ltd

Thunderbolt Wood Treating Co., Inc.

United Cooling Systems (P) Ltd

WSL - div of Walco Systems

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New products...

We are continually adding new products and product enhancements to meet the ever-increasing demands of the cooling towers of today and tomorrow. In the last 18 months alone we have introduced three new crossflow cooling tower products... Kelly Bar Splash Fill, X75 Herringbone Crossflow Film Fills, and the XF150Max Crossflow Cellular Drift Eliminator... and our new AccuShield™ anti-microbial products are coming soon!

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Brentwood Europe

In September, the Brentwood Europe engineering & sales office opened in Prague, Czech Republic, centrally-located to serve our customers across Europe and Eurasia.

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

Code of Ethics

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

- 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.
- New and Improved Help Files: guide you through the software, explain performance evaluation techniques and offer tips for use.

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Make your plans to attend Future Meetings for CTI

February 8-12, 2009
The Westin, Riverwalk
San Antonio, TX

July 12-15, 2009
Marriott Hotel
Colorado Springs, CO

February 7-11, 2010
The Westin Galleria
Houston, TX

July 10-14, 2010
Westin Albuquerque
Pyramid North
Albuquerque, NM

Earn PDH Credits while meeting and working with others in the industry. (Information when you register)
Dress code for the Annual Conference is Business Casual No Ties!

Water Treating 2009 Panel Discussion
Monday, February 9, 2009
2:00p - 3:45p

CALL FOR PAPERS
2010 Annual Conference
February 7-11, 2010
The Westin Galleria
Houston, Texas

The following schedule will begin the process for papers presented at the 2010 Annual Conference:

2009
May 8: Deadline for Abstracts
June 19: Authors Notified by Program Chair
Aug 7: Six (6) copies of draft must be sent to CTI office for review
Nov 6: 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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TP09-01 - Defining “Green” Technology in Cooling Water Systems Operation and Cooling Water Treatment
James Green | Heisler Green

James Green is currently a vice-president for Heisler Green, an 81 year old water treatment firm. He is a member of AWT and CTI. He is also studying for the LEED AP test to become a LEED certified professional. He currently offers his consulting services on evaluation and certification for GSR (Green Standard Running system), green technology and general water treatment nationwide, through Heisler Green. Many organizations use the marketing labeling of “Green” to increase profit margins and revenue. This paper researches technology to aid in defining the term “Green” as it applies to cooling water systems. This paper will examine current Green definitions from around the world, EPA standards, and materials/controls available to help operators understand the term “Green” as definable and measurable, with attainable standards. This paper will review current installations of Green chemistry and technology to provide a case study and basis for Green technology, its application, and financial/operational savings in the variations required to address small, medium and large markets.

9:00a - 9:30a
TP09-02 - Common Cooling Tower Errors
James Willa | Willa, Inc.

Mr. Willa, is graduate of Rice University, holding a B.A. and a B.S. in Chemical Engineering. He was Vice President and President of a major cooling tower manufacturing company (23 years). He has worked extensively with the Cooling Technology Institute as Field Engineer (4 years) and Manager (9 years). He performed all the testing and inspecting for 13 years with the CTI. He has been Chairman of the CTI Engineering Standards and Maintenance Committee and the Operating Seminar. He has conducted research for CTI bulletins on Wood Maintenance, Recirculation, Performance Testing, Lumber Standards, Treating Standards, Certification Program, and the Performance Curves “Blue Book”. He has twice served as President of CTI and several times as a board member. He has been a member of several technical organizations, has written and published numerous papers, has given many seminars, served on committees at CTI, ASME, AWWA, NACE (listed as Corrosion Specialist), and has over 50 years experience in the cooling tower industry. Jim has been a consultant for 20 years and is President of Willa, Inc. in St. Louis, Missouri. Willa, Inc. was engaged in cooling tower testing, inspecting, seminars, and training of on-line instrumentation for monitoring of cooling water systems and other processes.

9:30a - 10:00a
TP09-03 - Hurricane and Crawfish - A Unique Clarification Problem
Mike Doresey | DuPont

Hurricane Rita came ashore just east of Orange Texas on September 24, 2005. The event caused major damage in Orange County and subsequently the loss of consistent power persisted for weeks. This paper will discuss what the aftermath created for “Chemical Row Industries” with its raw water make-up source and how crawfish was determined to be a primary contributor.

10:00a - 10:30a
TP09-04 - Inspection of Pultruded Cooling Tower Components
Dustin Troutman | Creative Pultrusions, Inc. & Jess Seavel | Composite Cooling Solutions, LP

Dustin L. Troutman received his BS in Civil Engineering Technology from the University of Pittsburgh located in Johnstown, Pennsylvania, in 1993. He currently holds the position of Director of Marketing and Product Development for Creative Pultrusions, Inc., (CPI) located in Alum Bank, PA. He has been instrumental in the development of major pultrusion products and product lines. He holds three patents related to pultrusion systems. He has been involved in sales, marketing and engineering for fourteen years at CPI.

Pultruded profiles dominate the cooling tower market as the equipment condition continuous monitoring, specifically designed for cooling towers. This is a brief review of some of the most important of these errors and methods to correct them.

10:30a - 11:00a
TP09-05 - Chemical Free Bacteria & Legionella Control: A Case Study Using Hydrodynamic Cavitation
Phil Vella | VRTX Technologies

Dr. Phil Vella is currently the Technical Director for VRTX Technologies. He is responsible for providing technical support in the cooling water treatment area and directing research and applications using Controlled Hydrodynamic Cavitation (CHC) for wastewaters, biofuels, remediation, drinking water treatment and other environmental areas. Prior to joining VRTX, he was the Manager of Technology Support for Carus Corporation. His technical responsibilities was in oxidation chemistry and for phosphate products used for corrosion control.

This paper describes an alternative, patented, non-chemical cooling water treatment system that has proven to be effective in controlling/eradicating bacteria and Legionella. The technology works primarily on the principals of Controlled Hydrodynamic Cavitation (CHC). In this paper, field test results will be presented to demonstrate the effectiveness of the system in controlling bacteria and Legionella in cooling water systems. Data on water savings, improved heat transfer, effects on calcium removal, and cost advantages will also be presented.

11:00a - 11:30a
TP09-06 - A Continuous Monitoring System for Predictive Maintenance and Global Service on Line
Andrew Toffanin and Riccardo Provaz | SPIG International

In his current position of Director of Process Engineering and R&D Department with SPIG S.p.A., Riccardo plans and directs all the technical matters related to the development of new products. His fields of expertise are: structural analysis, thermodynamics, fluid dynamics, acoustics and signal processing.

Prior to joining SPIG, Riccardo was the Technical Director of Cofemco S.p.A., a leader in aluminium and fibreglass axial fans manufacturing. He was in charge of the R&D Division and Technical Department and he has designed a new series of axial fans. From 1989 to 2001, Riccardo has been involved in many activities for R&D programs in ENEA, the most important Electrical Company in Italy, focusing his attention mainly on the development of a rotor dynamics software and a noise balancing code and the development of new techniques for model model identification of mechanical systems. This paper describes a new patented system for process parameters and mechanical conditions continuous monitoring, specifically designed for cooling towers and air cooled heat exchangers in order to ensure the global performance of the cooling systems and support the predictive maintenance.

continued on page 11
two separate Ballrooms. Look closely to see which paper you want to attend.

**CONFERENCE PROGRAM**

**Navarro A Ballroom (Water Treating Sessions)**

10:00a - 10:30a  
**TP09-08 - Cooling Tower Basin Evaluation and Repair**  
Tom Kline  
Structural Preservation Systems

10:30a - 11:00a  
**TP09-09 - An Integrated Approach to Water Reuse**  
Petre Elliott and Gary Geiger  
GE/Water and Process Technologies

11:00a - 11:30a  
**TP09-11 - A Novel New Generation Polymer for Clarification of Water**  
Sanjay Kumar Dubey and Lim Aun Song  
Genting Sanyen Power Sdn Bhd

11:30a - 12:00p  
**TP09-12 - The Determination of the Effectiveness of the CoolPack in the Mitigation of Biofilms in HVAC/Utilities**  
Jan De Rijck and Shawn H Glieter  
Aquafinesse Industrial Water

12:00p - 12:30p  
**TP09-13 - The Determination of the Effectiveness of the CoolPack in the Mitigation of Biofilms in HVAC/Utilities**  
Jan De Rijck and Shawn H Glieter  
Aquafinesse Industrial Water

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**Navarro B Ballroom (ES&M and P&T Sessions)**

10:00a - 10:30a  
**TP09-07 - Cooling Tower Experience**  
Sanjay Kumar Dubey  
Genting Sanyen Power Sdn Bhd

10:30a - 11:00a  
**TP09-10 - A Novel Approach to Design Compact Mass Transfer Packing for Maximum Efficiency**  
Dr. Hamid Reza Goshayshi  
Azad University

11:00a - 11:30a  
**TP09-11 - An Integrated Approach to Water Reuse**  
Petre Elliott and Gary Geiger  
GE/Water and Process Technologies

11:30a - 12:00p  
**TP09-12 - The Determination of the Effectiveness of the CoolPack in the Mitigation of Biofilms in HVAC/Utilities**  
Jan De Rijck and Shawn H Glieter  
Aquafinesse Industrial Water

12:00p - 12:30p  
**TP09-13 - The Determination of the Effectiveness of the CoolPack in the Mitigation of Biofilms in HVAC/Utilities**  
Jan De Rijck and Shawn H Glieter  
Aquafinesse Industrial Water

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**Monday's Technical Sessions running simultaneously between Navarro A and Navarro B Ballrooms**

10:00a - 10:30a  
**TP09-08 - Cooling Tower Basin Evaluation and Repair**  
Tom Kline  
Structural Preservation Systems

10:30a - 11:00a  
**TP09-09 - An Integrated Approach to Water Reuse**  
Petre Elliott and Gary Geiger  
GE/Water and Process Technologies

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Dr. Hamid Reza Goshayshi has an Honors Degree in Chemical Engineering, a MSc in Mechanical Engineering (Energy Engineering) and a Ph.D in Mechanical Engineering (Energy Engineering) from South Bank University in London and did his post doctoral research on “Improvement of the Range Cycle.” He was an Industrial Training Engineer in the Black Wall Tunnel Refineries with his responsibilities being in energy management (i.e. savings, operation, policy). He also worked as a Lab Manager in the South Bank University School of Engineering. He served as Assistant Professor in Tehran & Mashad & Quohan Azad University (Iran) and presently is serving as Vice Chancellor for research in Mashad Azad University (Iran).

The optimum heat and mass transfer area at which minimum cost exists throughout the technical life of forced draft counter cooling tower is studied in the present work. Original form of the heat and mass transfer equations are developed and presented in the present. Basis equation techniques exist, both non-destructive (NDT) and semi-destructive (SDF), which can serve as tools in assessing in-site conditions, either on or offline. Additionally, the paper will highlight case histories of cooling tower basin evaluations and subsequent repair implementation.

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Dudley Benton | HC+H Associates

Dudley James Benton earned a bachelor’s and master’s degree in Ocean Engineering from Florida Atlantic University and a codraorate in Mechanical Engineering from the University of Tennessee. He worked for the Tennessee Valley Authority for 15 years at the Norris Engineering Laboratory, then for P-Squared Technologies/Dynamic Solutions for 14 years, and for the past year at McHale Performance. He has been in the heat and mass transfer, computational fluid dynamics, and power plant analysis business since 1980. His current position at McHale as Principal Engineer utilizes all these experiences. Cooling Towers have always been a key interest.

The Pilot tube has been the mainstay of flow measurement in cooling towers for decades, but this isn’t the only application for velocity probes of this type. Unlike the cooling tower flow, most other applications of these and similar probes consider the Reynolds number—typically at the head of the probe. The correction for Reynolds number in the derived correlations for each probe is sometimes iterative, but easily implemented and converges quickly. The information necessary to incorporate a correction for Reynolds number is often collected—but not used—along with the other data when the probe is being calibrated. This paper will explore the efficacy of utilizing a local Reynolds number correction with several Pilot probes and whether or not this actually reduces the overall uncertainty of the final flow measurement.

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Tom Kline is the Engineering Services Division Manager at the Structural Group Inc.’s Houston Office. He is a graduate Construction Engineer with more than 30 years experience in concrete distress and failure investigations. Kline is a member of the American Concrete Institute (ACI), American Society of Civil Engineers (ASCE), American Society for Testing and Materials (ASTM) and the International Concrete Repair Institute (ICRI) having served on its Board of Directors as well as on many of its Technical Committees. Mr. Kline has also lectured and presented numerous Technical Papers and published articles relative to Forensic Engineering and Infrastructure Restoration both in the U.S. and internationally.

Mechanical drafting apply towers critical fixed assets that need to be maintained and remain in service in order to cool various plant operations and systems. Essentially, the cooling tower basin in mechanical draft technology serves a two-fold purpose, one as containment for the cooling water and two as the foundation for supporting overlying “fill” structures. Almost all of these basin structures are constructed of conventionally reinforced concrete, either partially or totally placed below grade. Their service environment subjects them to various aggressive deterioration mechanisms including embedded metal corrosion, original construction defects, environmental degradation (i.e. freeze–thaw, algae growth, etc.) as well as the large volumes of water necessary for evaporative cooling. However, the use of wastewater as a source of cooling tower makeup water can result in significant corrosion, deposition and biological fouling issues. To address these issues at a major corn processing plant, a creative combination of mechanical and chemical approaches was employed to make a process wastewater suitable for use as cooling tower makeup water. This paper will discuss both the approach to the wastewater pretreatment and the chemical treatment used at the cooling tower.

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Sanjay Kumar Dubey, Technical Manager of Genting Sanyen Power Sdn Bhd in Malaysia is currently responsible for development and implementation of industrial water treatment projects and designing and implementation of management system. Mr Dubey has worked as a lead Chemical & Environmental Manager for about two decades having contributed in a number of power projects in the area of operation of water treatment plant, managing power station’s chemistry, environmental projects for waste minimization, water conservation, waste reclamation, statutory compliances, etc. He holds a Master’s degree in Chemical Technology from IIT Delhi, and MBA fromIGNOU, New Delhi and is a Fellow Member of the Society for Advancement of Electrochemical Science and Technology (SAEST), India.

Kuala Langat Power Plant (KLPP) draws water from Kuala Langat River. The quality of water varies significantly from season to season due to the influence of rainfall and surface water runoff. The turbidity of river water varies in the range of 70-500 NTU with lower value typically noted in the summer and higher value during rainy season. Conventional chemicals such as Alum & Lime were used for pretreatment of water. As per Malaysian Environmental laws alum sludge is categorized as scheduled waste. Hence, an alternative approach to water reuse was developed for river water at the KLPP. Polymer treatment of river water was performed using Poly DADMAC. The turbidity of treated water and treatment cost is in agreement with Alum & Lime treatment. In this, heat transfer and pressure drop results presented.

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The design of these PWT systems, its installation, and repair parts are critical fixed assets that need to be maintained and remain in service in order to cool various plant operations and systems. Essentially, the cooling tower basin in mechanical draft technology serves a two-fold purpose, one as containment for the cooling water and two as the foundation for supporting overlying “fill” structures. Almost all of these basin structures are constructed of conventionally reinforced concrete, either partially or totally placed below grade. Their service environment subjects them to various aggressive deterioration mechanisms including embedded metal corrosion, original construction defects, environmental degradation (i.e. freeze–thaw, algae growth, etc.) as well as the large volumes of water necessary for evaporative cooling. However, the use of wastewater as a source of cooling tower makeup water can result in significant corrosion, deposition and biological fouling issues. To address these issues at a major corn processing plant, a creative combination of mechanical and chemical approaches was employed to make a process wastewater suitable for use as cooling tower makeup water. This paper will discuss both the approach to the wastewater pretreatment and the chemical treatment used at the cooling tower.

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10:30a - 11:00a  
**TP09-10 - A Novel Approach to Design Compact Mass Transfer Packing for Maximum Efficiency**  
Dr. Hamid Reza Goshayshi  
Azad University

11:00a - 11:30a  
**TP09-11 - An Integrated Approach to Water Reuse**  
Petre Elliott and Gary Geiger  
GE/Water and Process Technologies

11:30a - 12:00p  
**TP09-12 - The Determination of the Effectiveness of the CoolPack in the Mitigation of Biofilms in HVAC/Utilities**  
Jan De Rijck and Shawn H Glieter  
Aquafinesse Industrial Water

12:00p - 12:30p  
**TP09-13 - The Determination of the Effectiveness of the CoolPack in the Mitigation of Biofilms in HVAC/Utilities**  
Jan De Rijck and Shawn H Glieter  
Aquafinesse Industrial Water
11:30a - 12:00p
TP09-14 - Flame Retardance of Polymer Film Fills
Dr. Nina Woicke | 2H Kunststoff GmbH
Dr Woicke was born in Kiel, Germany. She attended the University of Stuttgart, Germany earning an Engineering Diploma Degree and a Ph.D in Engineering. She has served as a Research Assistant and Head of the Polymer Engineering & Physics department at the Institute of Polymer Testing and Science, University of Stuttgart. At present she is the head of the Research and Development at GEA 2H Water Technologies GmbH.
While PVC is long known as a flame retardant polymer, other plastics have the reputation of high flammability. Whereas this is true for standard polyolefin materials, modern polypropylene products with high efficient flame retardant additives can even beat the good fire properties of normal PVC. In this study film fills for cooling towers made of PVC and of a flame retardant PP are tested by several different methods and international standards to evaluate the actual performance of these two materials.

2:30p - 3:00p
TP09-16 - Meteorological Considerations in the Design of Plume Abated Cooling Towers
Ken Hennon and David Wheeler | CleanAir Engineering
Cooling towers are often located in areas where a visible plume is objectionable. In such situations, a plume abated cooling tower is frequently specified to alleviate the perceived problem. The paper discusses the use of fogging frequency analysis to examine alternative designs of plume abatement systems and the selection of the psychrometric design point that defines the envelope of conditions in which a visible plume or fog is produced. This paper also examines the limits of plume abatement technology to reduce the frequency of visible plumes. The type of meteorological information to be used as design basis for plume abated cooling towers is specified.

3:00p - 3:30p
TP09-18 - Recent Development in Motor Technology Allow Direct Drive of Low Speed Cooling Tower Fans
Robbie McElveen and Bill Martin | Baldor Electric
Improved reliability of cooling tower systems is now possible due to a new development in motor technology. This paper will discuss the development of low speed, permanent magnet motors and how they can be used in direct-drive applications to eliminate the gearbox, NEMA motor, driveshaft, and disc couplings from cooling tower designs. A case study will be presented where an existing tower was refurbished using a direct drive motor which fit the exact footprint and height of the existing gearbox. Design considerations, performance data, maintenance history and efficiency comparisons will be presented. Fills have been developed and the performance of the best packing has been expressed in relation to the ideal packing.
By itself, the presence of legionellae in a cooling tower is insufficient to predict the potential for disease transmission because other factors are involved. This paper will describe changes for a project with water flow measurements in the main line and on individual risers plus installation of additional wet bulb sensors beyond the code required minimum. The significance of sensitivity variation among the test measurement parameters as they related to tower capability is also discussed. Safety is becoming an ever increasing factor while working around and inside of cooling towers. When a fan motor is not energized, fans free-wheel from wind and updraft in cooling towers. Entering a fan cell or removing a stack section with the fan rotating is an OSHA violation. Stopping and holding a fan to conduct maintenance operations can be dangerous to personnel. This paper presents methods for stopping and holding fans for maintenance operations and high wind conditions. It will also present various material and mounting options.

Kevin Milici and Gary Geiger | GE Water and Process Technologies

TP09-20 - Affecting Test Uncertainty

Ben graduated from Tennessee Tech in 2005 with a B.S. in Mechanical Engineering. He did co-op work at the Arnold Engineering Development Center (AEDC) - Jet Engine and Wind Tunnel testing facility where he was involved in data collection, analysis, and performing inspections on plant facilities. Ben is an Assistant Engineer II at McHale where he is responsible for testing power plants and power plant components, instrumentation, data collection, data analysis, and reporting. Ben has assisted in a test with an engine test cell cooling tower test engineer with McHale for the last three years with thermal and drift experience on 18 sites.

The CTI-ATC-105 test codes give us guidance to conduct a cooling tower thermal performance test with results having a reasonable uncertainty. A test configuration with a different number of measurements and instrumentation can lead to changes in the uncertainty and the resultant calculated tower capability. This presentation will describe these changes for a project with water flow measurements in the main line and on individual risers plus installation of additional wet bulb sensors beyond the code required minimum. The significance of sensitivity variation among the test measurement parameters as they related to tower capability is also discussed.

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increased until the established failure criteria (stress or deflection) is reached. The results of the wind load analysis can be useful to plant owners in assessing the risks associated with the existing condition of the natural-draft cooling tower structure.

TP09-24 - A Digital Method for Analyzing Droplets on Sensitive Paper
Dudley Benton | McHale & Associates

Dudley James Benton earned a bachelor’s and master’s degree in Ocean Engineering from Florida Atlantic University and a certificate in Mechanical Engineering from the University of Tennessee. He worked for the Tennessee Valley Authority for 13 years at the Norris Engineering Laboratory, then for P-Squared Technologies/Dynamic Solutions for 14 years, and for the past year at McHale Performance. He has been in the heat and mass transfer, computational fluid dynamics, and power plant analysis business since 1980. His current position at McHale as Principal Engineer utilizes all these experiences. Cooling Towers have always been a key interest.

Sensitive paper has long been used to detect droplet impingement in several processes including drift measurement. Identifying, counting, and measure the individual droplets has been a tedious, labor-intensive task involving microscopic examination and statistical extrapolation, seeing as counting all the droplets has previously been impractical. Digital techniques now in common use however, can reduce this previously labor-intensive task to a rather simple one of graphical data screening. Furthermore, all the droplets are included in the statistical sample, reducing the uncertainty of the results. The well as the effort and equipment involved.

Standards
New and Revised

New:
WTG-155 - Internal Plant Cooling Water Reuse - The purpose of this document is to provide general guidelines to plant owners and operators for water conservation through internal plant cooling water reuse. July 2008 $10.00

Revised:
STD-146 - Standard for Liquid Flow Measurement - This standard covers methods for liquid flow measurement. Its application is limited to the measurement of water, water/glycol mixtures, and other homogeneous single-phase liquids for which acceptable physical property data are available. September 2008 $16.00

WTB-148 - LEGIONELLOSIS Guidelines: Best Practices for Control of Legionella - The purpose of this guide-line is to provide information and guidance in order to minimize Legionella in evaporative cooling water systems. Specifically evaporative condensers, closed-circuit fluid coolers, and cooling towers. July 2008 N/C
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. Included in these requirements are strict guidelines regarding conflict of interest to ensure CTI Tests are conducted in a fair, unbiased manner.

Cooling tower owners and manufacturers are strongly encouraged to utilize the services of the licensed CTI Cooling Tower Performance Test Agencies. The currently licensed agencies are listed below:

**Licensed CTI Thermal Testing Agencies**

<table>
<thead>
<tr>
<th>Type</th>
<th>Agency Name</th>
<th>Contact Person</th>
<th>Telephone/Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>A,B</td>
<td>Clean Air Engineering</td>
<td>Kenneth Hennon</td>
<td>800.208.6162</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.cleanair.com">www.cleanair.com</a></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Cooling Tower Technologies Pty Ltd</td>
<td>Ronald Rayner</td>
<td>61 2 9789 7060</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="mailto:coolingtower@bigpond.com">coolingtower@bigpond.com</a></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Cooling Tower Test Associates, Inc.</td>
<td>Thomas E. Weast</td>
<td>913.681.0027</td>
</tr>
<tr>
<td></td>
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<td><a href="http://www.ctta.com">www.ctta.com</a></td>
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<td><a href="mailto:cttakc@aol.com">cttakc@aol.com</a></td>
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<td><a href="http://www.mchale.org">www.mchale.org</a></td>
<td>425.557.8377</td>
</tr>
</tbody>
</table>

* 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>
<thead>
<tr>
<th>Agency Name</th>
<th>Contact Person</th>
<th>Telephone/Fax</th>
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<td>Clean Air Engineering</td>
<td>Kenneth Hennon</td>
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<td></td>
<td><a href="http://www.cleanair.com">www.cleanair.com</a></td>
<td></td>
</tr>
<tr>
<td>McHale &amp; Associates, Inc.</td>
<td>Thomas Wheelock</td>
<td>865.588.2054</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.mchale.org">www.mchale.org</a></td>
<td>425.557.8377</td>
</tr>
</tbody>
</table>

Contact: Chairman, CTI Multi-Agency Testing Committee

Houston, Texas
3-November-2008

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 2, 2009, at the CTI address listed.

To ask the EXPERT a question go to www.cti.org

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Nigel Thomas R. Klime, Engineering Services Division Manager of Structural Group, present “Cooling Tower Basin Evaluation and Repair.”

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Table Top Exhibits & Exhibitors
Tuesday, February 10, 2009 • 4:00p - 8:30p

COMPANIES EXHIBITING ARE:

1. Erico, Inc
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4. CleanAir Engineering
5. Cooling Tower Resources
6. Dynamic Fabricators
7. Baltimore Aircoil Company
8. Amarillo Gear Company
9. Composite Cooling Solutions
10. Amarillo Gear Company
11. The Mur-Tex Company
12. SPX Cooling Technologies
13. Hudson Products Corporation
14. Colimo USA
15. Midwest Towers, Inc.
16. ProBtech, Inc.
17. Bedford Reinforced Plastics
18. LMI
19. Testex Inc
20. Sumitomo Drive Technologies
21. CTL Group
22. Brentwood Industries, Inc.
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24. ChemTreat, Inc.
25. LMI Sensors
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Don’t forget that Guest

The following is just a sample of the types of questions we get from those of every walk of life. 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 our Industry.

**Question 1:**
I’m an Engineer here at the site and I own one of the many Cooling Towers located in the area. What’s your feelings on controlling the water chemistry based on conductivity? In now try to maintain a constant blowdown flow of about 8 to 10 gpm, if I try to control by conductivity the blowdown can possible go to 0 gpm for days at a time.

**Answer 1:**
The way most people control blowdown is what I call a bypass system. You set up a manual valve in parallel with the automatic XV valve. You calculate the amount of blowdown that would result in controlling at 7 or 8 cycles of concentration. You adjust the manual valve to control at this flow. This is your base flow rate. The automatic XV valve is set up to blowdown an additional amount that would be equal to twice the amount of flow which is about 3 or 4 cycles. I use an adjustable valve just down stream of XV so I can throttle this flow manually. This set up allows you sufficient control range to keep cooling tower in the recommended 5 to 7 cycle range.

**Question 2:**
We are planning to set up two units of 350MW Coal fired. Can we go for a single natural draft cooling tower for both the units? What are the implications of going for a single CT vs unitized CT technically as well as cost wise?

**Answer 2:**
The typical setup for Power Plants is one unit one cooling tower. Most people do this because of need for yearly cleaning/repair of cooling tower. If you go with one cooling tower and multiple power units then you need to design the cooling tower in such a way that you can do maintenance on fill and most of all cleaning of the basin.

I have been in the chemical industry for most of my 40 years dealing with not being able to shut-down cooling towers that feedmultiple process units. It means using divers/robotic devices to clean sludge from basins, working on only a portion of cooling tower during unit outages and other restrictions that require you to preplan maintenance of cooling tower before you build the system. My favorite designs are sectionalizing cooling tower basin and pump basin so you can perform routine maintenance on basins without effecting other parts of cooling tower. It is more expensive than a single system cooling tower but less expensive than two completely separate cooling towers.

**Question 3:**
How do you predict whether an evaporative cooling tower will produce a visible plume?

**Answer 3:**
All evaporative cooling towers produce visible plumes unless they are equipped with plume abatement devices. Plume abatement devices are added to only a very few cooling towers in the world. You can see if a cooling tower has plume abatement equipment by looking at the top of the cooling tower just below the fan stack. If it has what appears to be removable louvers in the fan lumen area then the cooling tower has plume abatement equipment.

...Ask the Expert continued on page 22
What is a Cooling Tower?

A cooling tower is a heat rejection device, which extracts waste heat to the atmosphere though the cooling of a water stream to a lower temperature. Common applications for cooling towers are providing cooled water for air-conditioning, manufacturing and electric power generation. The generic term “cooling tower” is used to describe both direct (open circuit) and indirect (closed circuit) heat rejection equipment. A direct, or open-circuit cooling tower is an enclosed structure with internal means to distribute the warm water fed to it over a labyrinth-like packing or “fill.” The fill may consist of multiple, mainly vertical, wetted surfaces upon which a thin film of water spreads. An indirect, or closed circuit cooling tower involves no direct contact of the air and the fluid, usually water or a glycol mixture, being cooled. In a counter-flow cooling tower air travels upward through the fill or tube bundles, opposite to the downward motion of the water. In a cross-flow cooling tower air moves horizontally through the fill as the water moves downward. Cooling towers are also characterized by the means by which air is moved. Because evaporation consists of pure water, the concentration of dissolved minerals and other solids in circulating water will tend to increase unless some means of dissolved-solids control, such as blow-down, is provided. Some water is also lost by droplets being carried out with the exhaust air (drift).

For more information visit the Cooling Technology Institute at www.cti.org.

Table Top Exhibits
Tuesday, February 10, 2009
4:00p - 8:30p
Plume abatement equipment just means that as the wet air is coming up into the fan plenum area, dry warm air is mixed with it to increase/decrease the dew point of exiting air to prevent visible plume.

Question 4:
I understand the operational differences between a crossflow cooling tower and a counterflow cooling tower. What is the criteria for selecting one configuration over the other? I should also mention that I’m not referring to small rooftop systems. I am referring to large industrial (20,000-100,000 gallon) systems.

Answer 4:
There are three major criteria:
1) Pump horsepower - There is about 20 to 30 ft TDH difference between crossflow vs. counterflow. Counterflow cooling towers because of distribution header causes the tower to have lower head requirements.
2) Cost - I have found that total end cost of a counterflow is less than a crossflow. The amount of fill required is less so structure is not as big. Cooling tower basin has a smaller foot pring.
3) Water Quality - The quality of cooling tower make-up can dictate the type of cooling tower selected. A water with high TDS or on a process that has potential to cause major fouling makes a crossflow cooling tower better suited to this application than a counterflow. If you have a moderate to good quality water then counterflow would work, however the type of film fill must be chosen carefully. It is best to include a copy of typical water analysis of make-up water. Also, you should note any fouling characteristics that could be caused by process leakage into a cooling tower. I have consulted on many problems that resulted from persons buying cooling towers on price alone and ending up with maintenance headaches and major shut-downs due to cooling tower fouling.

...Ask the Expert continued from page 20

Cooling Technology Institute Annual Conference, February 8-12, 2009

HOTEL INFORMATION

THE WESTIN RIVERWALK
420 W MARKET ST, SAN ANTONIO, TEXAS 78205

A personalized website for Cooling Technology Institute Annual Conference has been created
http://www.starwoodmeeting.com/StarGroupsWeb/res?id=0810228743&key=55024
or call 210.224.6500

Hotel Cut-Off Date • January 16, 2009
• CHECK-IN TIME IS 3:00PM • CHECK-OUT TIME IS 12:00PM
STANDARD ACCOMMODATIONS: Singles and Doubles - $169
Registration Form for the
CTI 2009 Annual Conference
February 8-12, 2009

Complete and send this form to:
Cooling Technology Institute • PO Box 73383 • Houston, TX 77273
281.583.4087 • Fax: 281.537.1721 • email: vmanser@cti.org

Early Bird Registration Ends: January 23, 2009

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): __________ Billboard __________ Annual Conference News ________ Website

Last Name: ______________________________________
First Name: _________________________________________
First-time Attendee: ______
Company: ________________________________________________
Address: _____________________________________________________________
City/State/Province: ___________________________________________
Zip or Postal Code/Country: _______________________________________________
Phone (Country Code/Area/Number) ____________________________
Fax (Country Code/Area/Number) __________________________________________
Email: _______________________________________ (*E-mail addresses are used for communicating conference updates, session pre-work and to send any other pertinent information.)

Badge Information - First Name or Nickname (as you wish it to appear on your badge) __________________________________________________________
Spouse’s Name Only if they accompany you to the Conference: ___________________________________________________________

PDH CREDITS AVAILABLE - PLEASE ASK AT THE REGISTRATION TABLE!

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 31, 2007 to vmanser@cti.org. We cannot guarantee we can accommodate your request but will do our best.

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)

Check Appropriate Category: ____________________________
CTI Member (Includes technical sessions Monday, Tuesday & Wednesday) $695 $795
Non-Member (Includes technical sessions Monday, Tuesday & Wednesday) $795 $895
One day Mon Tues Wed (circle one) $500 $500
Exhibit Hall Pass Only $35 $35
Speaker (one for each paper only) N/C N/C
Press (one attendee per company only) N/C N/C
Honorary Life Member N/C N/C

Section 4a Subtotal US$ ____________________________

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

Check Appropriate Category: ____________________________
Additional luncheon ticket(s), Monday, Feb 9, 2009 (for spouse/guest) $30
Monday Night Dinner & Casino (February 9, 2009) $75
Set of Papers - Hard Copies $125
Mailing for papers sent to Mexico and/or Canada $10*
Mailing for papers sent to all other countries $15*
Set of Papers - CD (w/PDF file of each paper) Available after conference $125

*This cost is for those attendees who purchase a set of the Technical Papers presented and wish to have them mailed.
For those attendees in the US there is no additional mailing charge.

Section 4b Subtotal US$ ____________________________

Total Amount Due US$ ____________________________

4c. CONFERENCE EVENTS (Full-conference or one-day registrants)

I will attend the Water Treating Panel Discussion on Monday afternoon
I will attend the New Member Breakfast on Tuesday morning
I will attend the Owner/Operators’ Seminar on Tuesday morning
I will attend the ‘Ask the Expert’ Seminar on Tuesday afternoon
I will attend the Educational Seminar on Wednesday morning

5. PAYMENT (Please check one)

Enclosed is Check# __________ in the amount of US$_________ (Please write the registrant’s name on the check)

Credit Card: Please Charge US$ __________ to the following credit card. [ ] Visa [ ] MasterCard or [ ] AmEx
Card#: __________________________________ Exp. Date __________ CVC Code: ______________________
Cardholder’s Name: __________________________________________________________________
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There will be a 15% charge on any credit card refund made - no exceptions!
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