THE 2019 CTI ANNUAL CONFERENCE PROGRAM

The Technical Sessions will run simultaneously between two separate Ballrooms.

While every effort has been made to insure the accuracy of the program, CTI is not responsible for cancellations, changes, errors or omissions after the posting of the program.

Sunday, February 10, 2019

3:00p - 5:00p - Board of Directors Meeting, ***Grand Couteau***

4:00p - 8:00p - Registration, ***Armstrong Foyer***

5:00p - Midnight - Hospitality Suite, ***Armstrong Ballroom***

6:00p - 8:00p - Speaker Ready Room, ***Grand Ballroom E***

Monday, February 11, 2019

7:00a - 10:00a - Service, ***Grand Foyer***

7:00a - 8:00a - Speakers' Breakfast, ***Grand Chenier***

7:30a - 8:30a - Presidential Address, ***Grand Ballroom C***

SITF

Eurovent

Multi Agencies Report

Certification Report

7:00a - 5:00p - Registration and Paper Sales, ***Grand Foyer***

Gramd Ballroom C (ES&M and P&T Sessions)

8:30a - 9:00a

TP19-01

Lessons Learned During a Lifetime of Cooling Tower Operation

David W. Anton, Ascend Performance Materials

Dave has supported many site engineering teams as an energy and water treatment expert. He has developed numerous tools for tracking energy and chemical per-formance. Many sites have used his leak calculator tool for steam, water, compressed gases, and insulation to determine the potential impact of system en-ergy losses. Dave has used his six-sigma black belt training for Chocolate Bayou Plant (CHB) as well as other sites. Technical Lead for numerous Root Cause Analysis Studies at the CHB site and other Ascend sites involving water chemistry issues.

A Review of learning's for cooling tower system maintenance focused on practical experience. Topics covered will include the following: Pump Perfor-mance, Pump Screens and Side Stream Filtration, CT PM Maintenance Plan Overview, Transition to FRP from wood, Fan Maintenance and Monitoring, and Counterflow Towers.

Monday, February 11 2019

7:00a - 10:00a - Service, ***Grand Foyer***

7:00a - 8:00a - Speakers' Breakfast, ***Grand Chenier***

7:30a - 8:30a - Presidential Address, ***Grand Ballroom C***

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7:00a - 5:00p - Registration and Paper Sales, ***Grand Foyer***

Grand Ballroom A&B (Water Treating Sessions)

8:30a - 9:00a

TP19-02

Reclaim Water for Cooling Tower Makeup; Not as Simple as Perceived

Brad Buecker and Ray Post, ChemTreat, Inc.

Brad Buecker is Senior Technical Publicist with ChemTreat. He has 35 years of experience in or affiliated with the power industry, much of it in steam generation chemistry, water treatment, air quality control, and results engineering positions with City Water, Light & Power (Springfield, Illinois) and Kansas City Power & Light Company's La Cygne, Kansas station. He also spent two years as acting water/wastewater supervisor at a chemical plant. Most recently he was a technical specialist with Kiewit Engineering Group Inc. He has authored many articles and three books on power plant and water/steam chemistry topics. He is a graduate of Iowa State University.

Growing emphasis, and rightly so, is being placed on water recovery and reuse to help sustain our planet's water supplies. By choice or mandate, design engineers for many new industrial plants are select-ing alternatives to fresh water for plant makeup, with an increasingly common choice being effluent from a publicly owned treatment works (POTW). These waters go by various names including reclaim water, grey water, purple-pipe water, and so forth. Regardless, virtually all reclaim waters contain elevated concentrations of ammonia, nitrate, organics, phosphate, and suspended solids, all of which, if left untreated, can lead to a nightmare scenario of microbiological fouling in cooling towers and cooling systems; a point that is sometimes not emphasized enough to those designing new facilities or switching supplies at exist-

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PROGRAM continued

The Technical Sessions will run simultaneously between two separate Ballrooms.

Grand Ballroom C (ES&M and P&T Sessions)

9:00a - 9:30a

TP19-03

Bolted Structural Connections in Fiberglass

Mark Martich, Cyrco, Inc.

Senior Design Engineer and Project Manager with extensive US and international business development experience managing cross-functional teams. Products include high-volume automotive and other consumer products, OEM electro-mechanical and solid-state electronic components, industrial controls, telecommunications network components and network management equipment. Technical expertise includes injection & transfer plastic molding, metal stamping, sheet metal fabrication, tooling, offshore sourcing/relocation, and returning production to the US through product redesign and automation. Recognized for creative contributions to the growth of small and large organizations with more than 25 US utility patents and intellectual property protection experience spanning 25 years while leading and contributing to new product development.

This paper compares several methods of connecting fiberglass pultruded plastic (FRP) structural members with bolts that are commonly used in the cooling tower industry. The study shows full-scale test results and compares the results with theoretically predicted values. The geometry of the structural members studied are representative of the diagonal bracing typically found in cooling towers, but the results should not be limited to just those members, or only structures found in cooling towers for that matter.

9:30a - 10:00a

TP19-05

A Fouling And Thermal Performance Test Rig For Cooling Tower Fill Selection

Johannes P. Kotze, TF Design and Ockert Augustyn, Eskom Soc Ltd

Bio: *Johan Kotzé obtained his PhD from Stellenbosch University in 2014. His research pioneered the use of metallic phase change materials for isothermal energy storage with eutectic molten metals as heat transfer fluids to enable the use of supercritical steam in concentrated solar power (CSP) applications. He went on into CSP research on robust, low cost, self-learning heliostat technology to reduce the cost CSP in the Helio100 project. Currently Johan is working as a project manager and senior engineer at TF Design, a company with expertise in thermo fluids, heat transfer, thermodynamics and mechanical engineering.*

ESKOM's coal fired power stations mostly have natural draft wet cooling towers, where excessive fouling results in maintenance and performance issues. ESKOM is planning to replace the asbestos fill in selected cooling towers and need to evaluate potential replacement fills. A set of four test rigs has been built that simulates conditions within a natural draft wet cooling tower. Water tapped from a cooling tower is used in the test. Both the fouling and thermal performance of the fills are measured as fouling occurs over time. This paper presents the overall design of the test rig, and initial results.

Grand Ballroom A&B (Water Treating Sessions)

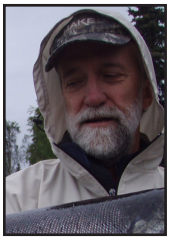
ing plants. But with proper pre-treatment and cooling water chemical treatment, these waters can successfully be utilized for cooling water makeup. Methods to prepare this water for use in cooling systems include biological treatment of the makeup, consistent and reliable biocide feed to the recir-culating water, and use of all-polymer treatment for scale/corrosion control in place of the phosphate/phosphonate programs of the past. The latter has also been gaining impetus due to concerns about the environmental impacts of phosphorus discharge to lakes and rivers.

9:00a - 9:30a

TP19-04

DiscFiltration For Cooling Water Treatment

Bill Willersdorf, Veolia Water Technologies



Bill Willersdorf has been serving the water and wastewater industry for over 40 years, primarily in the Power Generation industry. He has a BS in Environmental Engineering from Lehigh University and a MBA in Marketing. He has primarily worked for two corporations; Graver Water and one company that went through several acquisitions and name changes- Permutit/USFilter/Siemens Water Technologies and Veolia. Bill is currently Veolia Water Technologies' Global Power Director and serves on the Executive Committee for the International Water Conference, sponsored by the Engineers Society of Western Pennsylvania. He has spoken at the World Bank in Washington DC during 'Water Week' and at other prestigious conferences; including the IWC and the Electric Utility Chemistry Workshop sponsored by the University of Illinois; and now is happy to add the Cooling Technology Institute's 2019 Annual Conference

Discfiltration is not a new technology but it has only recently caught on for cooling water treatment. Most discfilter installations are at POTW's for tertiary filtration of sewage and since many industries are using reclaim water for cooling it was a natural progression and a very inexpensive way to filter large quantities of water. They have been applied for cooling water make-up, sidestream filtration and cooling tower blowdown. Major advantages: low installed cost, continuous filtration; low backwash rates and volumes- some clients reducing backwash volume by 90% over media filters.

9:30a - 10:00a

TP19-06

Impact Of Legionella Regulations On Water Treatment Programs And Control – An Observational Prospective Survey

Patrick Racine, Klenzoid Canada – Eldon Water

Patrick Racine, P.Eng., CEM is General Manager of Klenzoid Canada and Eldon Water. Patrick has been involved with Legionella risk mitigation for the last decade. He is the vice-chair of ASHRAE's Water Treatment Committee TC3.6, and a member of the ASHRAE SSPC 188. He co-authored ASHRAE's Water Treatment Handbook. Patrick is the Chair of the Canadian Boiler Society and has held board membership for SEMPPES (South East Michigan Power Plant Engineers Society) and MiSHE (Michigan Society of Healthcare Engineers). He was also an active member of SMSHE (Southeastern Michigan Society of Healthcare Engineers).

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The Technical Sessions will run simultaneously between two separate Ballrooms.

Grand Ballroom C (ES&M and P&T Sessions)

10:00a - 10:30a

TP19-07

High Efficiency Heat Exchanger For Ice Energy Storage And Beyond

Mitchell Ishmael, Levon Atoyan, and Grady Iliff, Active Energy Systems

Dr. Ishmael, the inventor of our technology and initial force behind Active Energy Systems, received his Ph.D. in Materials Science and Engineering from Cornell University in May 2017. Dr. Ishmael has experience designing, building and using experimental equipment for precision measurements of material properties. He has synthesized phase change materials for efficient and cost effective thermal energy storage.

Active Energy Systems has developed a new high-efficiency multiphase heat exchanger for ice energy storage. We achieve our high performance by constantly shedding the ice from the freezing surface. Doing so, first we achieve 5-10x larger freezing rates than currently seen. Second, an ice storage system that uses our heat exchanger takes up much less space than what is currently offered, a great benefit for high-density urban environments. Third, the heat exchanger operates at steady freezing and melting rates, a major improvement to the transient behavior seen in current systems. These factors combine to substantially lower costs and increase applicability of the ice energy system.

10:30a - 11:00a

TP19-09

Extending The Service-Life of Reinforced Concrete Structures By Means Of Cathodic-Protection

Eyad Alhariri, Structural Technologies

Eyad Alhariri is the NACE CP Specialist & Instructor Director of Corrosion Solutions. Mr. Alhariri has experience in the design, installation, testing, and commissioning of both conventional cathodic protection systems as well as cathodic protection for steel in reinforced concrete structures. He is a member of IEEE, SCS, and NACE, and has recently become a NACE instructor for Cathodic Protection Certifications.

Reinforced concrete structures are meant to function with little maintenance. As structures age, it's important to choose a repair approach focused on long-term protection to extend service-life and reduce maintenance costs. This paper discusses a cooling tower basin that required corrosion protection via an ICCP system. This system showed significant cost savings by eliminating future repairs and led to a second phase implementation on untouched areas of the basin. Data collected since the system's commissioning confirmed both repair phases are protected. A life-cycle cost analysis illustrated the value of a one-time cost system for long-term corrosion protection.

Grand Ballroom A&B (Water Treating Sessions)

He is a past committee member of AWT's Regulation & Legislation Committee. Patrick is a recognized public speaker on the national level on the subject of water treatment and Legionella prevention.

Localized Legionella regulations often get implemented following an outbreak. Many questions have been raised regarding the effectiveness of such regulations. Following the Quebec City Legionella outbreak in 2012, the province of Quebec introduced legislation requiring owners of evaporative cooling systems to register their cooling towers. Owners must now document the mechanical maintenance program as well as their water treatment program. Since July 2014, they must also sample for Legionella on a 30-day interval basis. What was the impact of the regulation on cooling water treatment programs, control schemes and the industry? Through the review of what is believed to be the world's largest dataset of over 10,000 Legionella samples and corresponding 10,000 service reports from field engineers, we will draw conclusions and try to answer some of these questions.

10:00a - 10:30a

TP19-08

Optimized Cooling Water Circuit Brings Cost Savings of More 50%

Christophe Vanschepdael, ENGIE Laborelec

Christophe Vanschepdael is a Project Engineer at ENGIE Laborelec, and an expert in water treatment, including boiler and cooling water treatment, working for power plants worldwide. With a bachelor's degree in Chemistry and the Environment obtained from La Haute Ecole Louvain en Hainaut in 2006, he has participated in seminars and workshops, and has presented a number of papers on water treatment. He received a Grand Prix at the GDF Suez Innovation Awards in 2014 for his work on the implementation of an innovative, cost effective and safer anti-scalant for cooling water circuits.

Cooling water treatment is a major element of total chemical costs in power plants. For new plants, the relevant guidelines are usually somewhat conservative, and treatments are not optimized for the specific cooling circuit. This case study discusses cooling circuit treatment optimization carried out by ENGIE Laborelec at a Belgian power plant. The annual cost of the original water treatment was estimated at about 700,000€ per year. Optimization was achieved in three steps, starting with evaluation of the make-up water, followed by technical optimization via pilot testing and finally implementation on site. In addition, the solution takes into account environmental factors, with the study leading to the annual water treatment costs falling to 325,000€ per year.

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The Technical Sessions will run simultaneously between two separate Ballrooms.

Grand Ballroom C (ES&M and P&T Sessions)

11:00a - 11:30a

TP19-11

Cold Water Data Collection Method For An Individual Cell Of A Multicell Tower

Arushi Shukla and Navneet Kishor Dubey, Brentwood Industries India Pvt Ltd

The speaker has been working for Brentwood Industries India Pvt. Ltd. for three years as an Applications Engineer and has a Bachelor's of Technology in Chemical Engineering from one of the top Engineering Institutes of India. She is a research enthusiast and has publication in prestigious research journals such as American chemical society (ACS) - Journal of chemical and engineering data, has presented various papers and has participated in significant workshops and exhibitions at her University. She is a permanent resident of Chhattisgarh, India.

There are instances when, an owner wants to assess the thermal performance of just an individual cell of a cooling tower as per ATC 105. But, the cold-water outlet being common for the entire tower, it has been very difficult to devise a method wherein a cell can be isolated from the tower and thermally tested. This paper addresses solution to this problem- encompassing initial ideas, challenges faced and troubleshooting involved in a fill demo test conducted in India as per ATC-105, utilizing a unique, modular and cost-effective test set-up to thermally assess individual cell of the tower.

11:30a - Noon

TP19-13

Numerical Analysis Of The Effects Of Water Spraying On Cooling Tower Evaporation

Song Baohong, Guizhou Colorful Sunshine Water Co., and Yan Maogang, Guizhou Panjiang Coal Co., Ltd

Author introduction: 2016.10- Guizhou Colorful Sunshine Water Co., Ltd.; 2014.12-2016.10 Water saving technology workroom (Individual); 1992.12-2014.12 Work unit: Guizhou Jianfeng Company; 1987.12-1992.12 Work unit: Mercury Deposit in Wuchuan, Guizhou Province. Work achievement: 1. Proof Leak Valve China Patent. ZL 03 2 34071.0 2. A Device for Water Saving and Water Treatment of Industrial Circulating Water China Patent. ZL 2013 2 0543786.2

Abstract: By changing the make-up water model of the cooling tower. The sprayed make-up water area was 600 m2 in the tower interior, and it accounted for 30% of the water drenching area. The best water loss reduction was 7.9 m3 h-1, and the drift recovery rate was 30¨C69.2% in the spraying area. The discussion covers fully proving the Merkel model assumption that the air in the tower was saturated air, the change rule of evaporation loss and drift recovery in the cooling tower that was observed, and the effects of the ambient air relative humidity for these change rules.

Grand Ballroom A&B (Water Treating Sessions)

10:30a - 11:00a

TP19-10

Metal And Organic Solutions For Reduced Phosphorous Applications

Paul R. Frail and Claudia P. Pierce, Suez Water & Technologies Solutions

Paul R. Frail is currently a Senior Engineer with Suez Water & Technologies Solutions with 7 years' experience in the Cooling division (2010 – Current). Prior to working with Suez he completed a post-doctorate fellowship and PhD degree at the University of Pennsylvania in the Materials Science and Electrical Engineering Departments and Chemistry departments respectively. In the Cooling division, he has focused primarily on deposit control and corrosion control. During this time, he has developed expertise understanding the relationship between surface chemistry, corrosion rate, chemical treatments, and water characteristics. Paul has authored and co-authored 20 peer reviewed publications, 4 patent applications, and currently belongs to the ACS and NACE.

Customers are facing a trending reduction in the allowable phosphorous they can expel from open recirculatory cooling systems in direct discharge applications, requiring significant modification of traditional treatment programs. Other Customers have had to circumvent fouling associated with the use of phosphorous inhibitors, seeking non-fouling options and assurances. This paper will provide a review of metal solutions, as well as, highlighting recent advances in the use of aluminum and all organic solutions. Surface analysis was used to identify passivation films and correlate their chemical composition to respective treatment and water conditions; providing the knowledge to manipulate film chemistry for performance.

11:00a - 11:30a

TP19-12

Control of Ozone Based On Water Temperature For Reduction Of Legionella In Cooling Towers

Dave Gilbert, EMO3 Inc.

The author is a mechanical engineer and owner of EMO3 Inc. Graduated from the Royal Military College of Canada, he has subsequently and successfully created technology companies representing sustainable solutions to societies needs. As such, EMO3 provides sustainable solutions for industrial water treatment needs notably for cooling towers.

Having worked and studied in water treatment for cooling towers and industrial applications, the author has pioneered a method to control ozone dosage in treating waters in cooling towers in order to control bacteria growth and Legionella development. Ozone being a very powerful biocide has proven effective in neutralizing Legionella pneumophilia in water. Several factors contribute to bacterial and Legionella growth in cooling towers, one of which is water temperature. Knowing that ozone half-life is reduced by higher water temperatures while bacterial growth increases, the paper will present a method to control ozone dosage to maximize the reduction of bacterial growth while avoiding over-dosing.

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The Technical Sessions will run simultaneously between two separate Ballrooms.

Grand Ballroom C (ES&M and P&T Sessions)

Group Luncheon - 12:15p - 1:45
Armstrong Ballroom

2:00p - 2:30p

TP19-15

Deformation Behavior of Cooling Tower Fills

Nina Woicke, Enexio Water Technologies GmbH

Dr.-Ing. Nina Woicke is the head of R&D for ENEXIO Water Technologies. She is an expert in process engineering and has a PhD in polymer analysis from the University of Stuttgart, Germany. She has nearly 20 years of experience in plastic engineering as well as 10 years of knowledge on the use of structured packings in various industrial applications like cooling towers. Her main goal is to create products with enhanced properties or performance, to include trendsetting technologies into the production processes and to improve the cost effectiveness of the whole manufacturing chain for the ENEXIO products.

Mechanical behavior of plastic cooling tower fills is not only dependent on the pure load, but also on loading time and temperature. In a previous paper of the author a simplified viscoelastic deformation model had been derived to take these factors into account, but at that time the model was calibrated only for one type and material (PP). Now this model has been extended to generalized to PVC as well as a second product type. To show the model in application, it has been used to calculate the deformation for a specific case in a cooling tower environment.

2:30p - 3:00p

TP19-17

Life-Cycle Cost Analysis For Concrete Cooling Towers

Mark Williams, Walter P. Moore And Associates, Inc.

Mark Williams, Ph.D., P.E., S.E., is a Principal and Senior Project Manager in Walter P Moore Diagnostics Group. He has 16 years experience in structural engineering analysis, design and management, as well as software engineering research and development. Dr. Williams has been involved with the restoration of several cooling towers as well as repair of several bridges and garage projects that have used state of the art carbon fiber reinforced polymers for structural enhancements

The deterioration of concrete cooling towers and the cost of repairing, rehabilitating, or replacing deteriorated tower structures is a major issue for tower owners and operators. This paper will explore the application of a Life-Cycle Cost Analysis (LCCA) as a useful tool to predict and schedule maintenance and repair tasks for concrete cooling towers. Factors that affect the durability of concrete cooling tower structures, including concrete cover to reinforcement, type of reinforcement, concrete material properties, admixtures, concrete surface treatments, cooling water chemistry, and environmental exposure, will be discussed as input parameters to concrete service life prediction models.

Grand Ballroom A&B (Water Treating Sessions)

11:30a - Noon

TP19-14

Underwater Robotic Technology For Online Tower Basin Cleaning

Grant Swonke, Steven Rydarowski, Joe Leist and Randi Morgan, Scantron Robotics USA, Inc.

Joe Leist is the CEO of Scranton Robotics USA, Inc.

On-line tank cleanings utilizing submersible robots and basins have greatly improved the landscape of industrial water tank cleaning by reducing costs and liabilities while greatly increasing site safety. This is the next step in tank cleaning, along with new, improved forms of tank inspections.

This concludes the Water Treating papers for Monday. Note: Technical Papers for ES&M and P&T Sessions will continue to 3:30p.

Group Luncheon - 12:15p - 1:45
Armstrong Ballroom

Water Treating
Panel Discussion
Monday, Feb 11, 2019
2:00p - 3:30p
Grand Ballrooms A&B

Topic to be discussed:

Best practices for water treatment program performance guidelines, a long overdue update by industry

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PROGRAM continued

Grand Ballroom C (ES&M and P&T Sessions)

3:00p – 3:30p

TP19-19

Utilizing New Technology to Provide Comprehensive Asset Management for Cooling Tower Maintenance

Glenn Schaefer, Eric Koehler, and Eyad Alhariri, Structural Technologies

Glenn Schaefer is the Director of Durability Solutions at STRUCTURAL TECHNOLOGIES and has over 25 years of experience in the industry with a focus on concrete durability. He oversees all condition assessments and investigative efforts, including the management and integration of project disciplines such as forensics, corrosion, testing, and determining service life to develop holistic repair recommendations for a wide variety of concrete structures throughout the world. Glenn has led teams of technical experts in the evaluation and analysis of concrete structures with a focus on concrete durability, concrete materials, and degradation mechanisms, and serves as technical liaison on these topics to other parts of the organization.

Because cooling towers are such massive structures, assessments can be challenging. Typically, only limited and cursory tactile field assessments and sample collection are evaluated to determine areas in need of repair. Utilizing new technology, such as drones, allows for more comprehensive inspections at a reasonable cost. Advancements are taking these technologies past standard assessment methodologies and into 3-D graphic modeling, design, and integrated quality assurance during construction to create an asset management approach for cooling tower infrastructure maintenance. This paper discusses where this new technological approach is taking us in each area of asset management from investigation and analysis, to design and quality control in a BIM-like environment.

Afternoon Schedule for Monday, February 11, 2019

12:15p - 1:45p Group Luncheon, *Armstrong Ballroom*

2:00p - 3:30p Water Treating Panel Discussion, *Grand Ballroom A&B*

3:00p - 4:00p Break

3:45p - 5:00p Technical Committee Meetings

- **Engineering Standards & Maintenance, - *Grand Ballroom D***
- **Performance & Technology, - *Grand Ballroom C***
- **Water Treating, *Grand Ballroom A&B***

6:00p - 9:00p Monday Night / Hospitality Suite *Armstrong Ballroom*

Come join us for fun, food, music and fellowship with others in the cooling tower industry. This venue will be open to everyone who has paid for a 3 day Meeting Registration.

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Tuesday, February 12, 2019

7:00a - 8:00a - New Member's Breakfast, *Grand Couteau*

7:00a - 8:00a - Speakers' Breakfast, ***Grand Chenier***

7:00a - 10:00a - Service, ***Grand Foyer***

7:00a - 5:00p - Registration and Paper Sales, ***Grand Foyer***

The Technical Sessions will run simultaneously between two separate Ballrooms.

Armstrong Ballroom (ES&M and P&T Sessions)

7:30a - 8:00a

TP19-21

Fluidized Bed Cooling Towers Come Of Age

Howard Davis, Fluid Technologies (Env) Ltd and David Missions, Osprey Corporation Ltd

Osprey Corporation Ltd & FTL (Fluid Technologies (Env) Ltd) work together in a JV headed up by David Missions (Process Mechanical Engineer & TD of Osprey) & Howard Davis (Chemical Engineer & MD of FTL). They market a unique fluid bed technology, which simultaneously absorbs toxic gases, removes very fine particulate & recovers heat to high efficiency in a single compact unit. Employed across a very wide range of industrial applications this versatile technology has recently been adapted to Cooling Tower configuration trialed successfully at Huhtamaki's Maine pulp & paper plant.

These Cooling Towers use an improved cooling variant of the technology originally developed for gas scrubbing which simultaneously absorbs toxic gases, removes sub-micron particulates and recovers heat by direct gas-liquid heat transfer. Using the vigorous fluid bed tumbling action for ultra-rapid counter-current contact of hot liquids with cooling gases achieves the following advantages: Unrivalled Heat Transfer in Highly Compact Towers, Sub 3ºF Approach & Range Temperatures Achieved, Guaranteed Non-Clogging allows Cooling of Slurries, Minimal Air to Water Ratios Minimize Fan Power, Self-Clean Mobile Packing Overcomes Biofilm Build Up.

8:00a - 8:30a

TP19-23

ATC-105 And Cold End System Performance

Upendranath Bhupal, Spectrum Consultants Pvt. Ltd

Upendranath Bhupal is a Mechanical Engineer with an overall experience of 27 years. He has spent his initial years of work in a thermal power plant and the subsequent years of his experience dedicated to cooling towers. He has worked with Balcke Durr, India for 9 years and is presently a consultant to the cooling tower industry.

A cold end system in a thermal power plant comprises of a condenser and a cooling tower. The performance of each of these equipment is inter-dependent, which means that a below par performance of one affects the other. This aspect of inter-dependence of performance of these equipment is often ignored when it comes to PG testing of cooling towers and only the condition of the cooling towers is assessed for its readiness for a PG test while that of the condenser is ignored. There are many situations where the condition and performance of the condenser directly affects the performance of the cooling tower.

Grand Ballroom D (ES&M and P&T Sessions)

2:00p - 2:30p

TP19-16

The Rest of the Story – Your Cooling System is Being Treated – What Can Go Wrong?

Adam Green, Baker Donelson and Robert J Cunningham, International Water Consultants

Adam Green is an attorney and the Chairman of Baker Donelson's Water Technology and Water Treatment Group. Over the past 17 years, has successfully defended high value, catastrophic failures of building water systems on a national scale. He has served as lead counsel in litigation arising from failures of varying degrees and from a myriad of different causes. In addition to defending multimillion dollar property damage claims, he has successfully defended and advised clients on a wide range of matters relating to water borne pathogens, water handling systems and water treatment throughout the United States and in international venues. He has published numerous technical papers on the subject and is a regular speaker with the Association of Water Technologies and the Cooling Technology Institute where he serves on various technical committees.

Open and closed cooling systems are subject to the very real constant threat of corrosion, scale, and microbiological fouling. While water treatment is the science of minimizing these conditions, water treatment alone cannot avail the system. The process by which systems are designed, installed and started-up is complex and necessarily involves various specialized trades. In order to provide for optimum conditions, these trades must closely coordinate for a system that remains uncompromised from initial conception through hydro-testing, commissioning and turnover. This publication will address the critical moments in the life of a cooling system, areas of common risk and how those risks can be minimized.

8:00a - 8:30a

TP19-18

Legionella Law: How Did We Get Here?

Adam Green, Baker Donelson and Robert J Cunningham, International Water Consultants

Adam Green is an attorney and the Chairman of Baker Donelson's Water Technology and Water Treatment Group. Over the past 17 years, has successfully defended high value, catastrophic failures of building water systems on a national scale. He has served as lead counsel in litigation arising from failures of varying degrees and from a myriad of different causes. In

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The Technical Sessions will run simultaneously between two separate Ballrooms.

Armstrong Ballroom (ES&M and P&T Sessions)

Such situations, based on experience gained during third party PG tests in India, have been explained briefly in the paper so that agencies party to PG tests can take an informed decision vis a vis the test conditions of the cold end system as a whole.

8:30a - 9:00a

TP19-25

Adiabatic Fluid Coolers and Condensers: Impact Of Pad System Design On Saturation Efficiency And Unit Operation

Jennifer Hamilton, Evapco, Inc.

Jennifer Hamilton is the Vice President of HVAC Product Development at Evapco, Inc where she manages the design, testing, and rating of factory assembled cooling towers and closed-circuit coolers. She has been a part of the cooling tower industry since 2005 with experience in both Applications Engineering and Product Development. Jennifer holds a BS in Chemical Engineering and a Minor in Environmental Engineering from the Pennsylvania State University. Prior to joining Evapco she spent several years as a consultant to the Environmental Protection Agency (EPA) where she supported the Office of Water, the Confidential Business Information group and the Office of Compliance.

Air-cooled, closed circuit coolers and condensers are growing in popularity due to increasing water costs, water scarcity, regulatory burdens, and the desire to reduce maintenance associated with water-cooled products. However, in some climates, applying air-cooled, dry heat exchangers can be cost prohibitive due to capital, available installation footprint and total system energy requirements. Incorporating an air dry-bulb pre-cooling system via adiabatic pads to an air-cooled heat exchanger can be a solution to better balance costs and resource consumption. Consumers face a major challenge when evaluating this technology: widespread commercialization and variation in claimed adiabatic saturation efficiency exists in the global marketplace. This variation results in a dramatic impact to the size of the air-cooled closed-circuit cooler or condenser. Currently, no third-party performance verification or certification program exists for adiabatic coolers, adiabatic condensers or the adiabatic pads. While adiabatic cooling is a known process, thoroughly understanding how it works is critical to ensure the air-cooled heat exchanger is properly designed to meet thermal performance and energy use expectations.

9:00a - 9:30a

TP19-27

A New Technology For Ultra-Low Noise And High Efficient Axial Fan For Industrial Application

Riccardo Provasi, Axial Fans Int Srl

Riccardo Provasi current position is Director of Global Technology and Innovation with Axial Fans International. His fields of expertise are structural analysis, thermodynamics, fluid dynamics, acoustics and signal processing. Before joining Axial Fans International, Riccardo held the position of Director of Process Engineering and R&D Department with SPIG S.p.A., where he provided technical supports in wet and dry cooling system design area and directed the development of new products. Formerly, Riccardo was the Technical Director of Cofimco S.p.A., a leader in aluminum and fiberglass axial fans manufacturing. Riccardo received the M.S. degree in aeronautical engineering from the Politecnico of Milan, Italy, in 1989.

In the industrial plants, the regulations concerning the noise emission are prescribing more and more stringent requirements. In the large cooling sys-

Grand Ballroom D (Water Treating Sessions)

addition to defending multimillion dollar property damage claims, he has successfully defended and advised clients on a wide range of matters relating to water borne pathogens, water handling systems and water treatment throughout the United States and in international venues. He has published numerous technical papers on the subject and is a regular speaker with the Association of Water Technologies and the Cooling Technology Institute where he serves on various technical committees.

Whether due to a true increase in disease frequency or improved diagnostics, reported cases of Legionnaires' disease are on the rise. The flurry of corresponding litigation has been substantial. Understanding the critical factors that influence judicial decisions in Legionella lawsuits is paramount in understanding and managing risk. This publication will review the roadmap of landmark decisions and the current state of Legionella law. The potential issue of competing standards is imminent. These standards may complicate and could delay codification of best practices.

8:30a - 9:00a

TP19-20

Tailoring Scale Prediction Models to a Specific Application: Cooling Water

Robert J. Ferguson, French Creek Software, Inc.

Rob Ferguson began modelling the minimum effective dosage for scale inhibitors in the early 1970's and has been a major contributor to the practical application of computer modelling to water treatment applications, control, and treatment. He worked in research. marketing, computer services and technical support for several major water treatment service companies prior to co-founding French Creek Software in 1989. Mr. Ferguson was honored to receive the Association of Water Technologies Ray Baum Water Technologist of the Year Award in 2017. Rob was educated at the U.S. Naval Academy and the University of Minnesota where he received a BS BioCh in 1971.

This paper discusses the practical application of advanced physical chemistry techniques commonly employed in cooling water, geothermal and oil field chemistry, to application specific modelling of mineral scale formation and control in cooling water systems. The techniques are discussed and applied to: Predicting scale formation; Identifying the upper driving force limit for inhibitors and blends; Developing inhibitor models for minimum effective dosage; and Developing models for preventing failure due to inhibitor solubility. The methods discussed have been validated in field applications.

9:00a - 9:30a

TP19-22

Using Experience And Six Sigma To Optimize Water Treatment

David W. Anton, Ascend Performance Materials and John Morstead, Suez Water Technologies

Dave has supported many site engineering teams as an energy and water treatment expert. He has developed numerous tools for tracking energy and chemical performance. Many sites have used his leak calculator tool for steam, water, compressed gases, and insulation to determine the potential impact of system energy losses. Dave has used his six sigma black belt training for Chocolate Bayou Plant (CHB) as well as other sites.

THE 2019 CTI ANNUAL CONFERENCE
PROGRAM continued

The Technical Sessions will run simultaneously between two separate Ballrooms.

Armstrong Ballroom (ES&M and P&T Sessions)

tems like cooling towers and air-cooled steam condensers, to comply with these regulations, the use of the so called ultra- low noise fans is mandatory. But these fans actually available on the market, despite their optimal acoustic properties, have some negative aspects in terms of efficiency, weight, and size, that they determine a huge impact on the cost of the whole unit. This paper describes an innovative technology solving all the negative aspects that also the last generation of the ultra-low noise fans could not solve completely.

9:30a - 10:00a

TP19-29

CTProfiler: Performance Evaluation of Cooling Towers

Jure Smrekar, JS Energy Ltd and Marko Hocevar, University of Ljubljana

Jure Smrekar is Engineering Director at company JS energy Ltd. His doctorate work was in performance evaluation of local anomalies inside natural-draft wet cooling towers. He manages projects related to continuous improvements of fossil-fired power plants. His expertise is in performance improvements of boilers, turbines and cooling systems with numerous applications in industry. Dr. Smrekar was also a project leader of the EU innovation project CTProfiler: Performance Evaluation of Cooling Towers.

In the natural-draft cooling tower (NDCT) market, there is no service that can estimate the impact of local issues inside NDCTs on power production, financial losses and emissions. Due to the slow pace of degradation of NDCTs, their big sizes and complexity of heat and mass transfer processes, NDTCs performance degradation is in most cases unnoticed and unattended. In this paper, the solution CTProfiler is presented consisting of: (1) high-resolution mobile-based measuring system for detection of component issues inside NDCT, (2) NDCT and power plant modelling and (3) cost-benefit analyses. Based on the high-resolution measurements, an impact of NDCT degradation, damages or design issues on power generation, financials and emissions is evaluated.

Grand Ballroom D (Water Treating Sessions)

Technical Lead for numerous Root Cause Analysis Studies at the CHB site and other Ascend sites involving water chemistry issues

A review of learning's for cooling tower system treatment program using both practical experience and six sigma tools. Topics covered will include the following: Passivation of equipment, Stabilization of incoming water quality, Feed locations and measurement analysis, Statistical regression of data, Time lag of processes, Corrators, Coupons, and inspections linking the processes and Drawing straight lines and challenging your sampling process.

9:30a - 10:00a

TP19-24

Clean And Green Approach To Cooling Tower Water Management

Bee Keong Ng, Innovative Polymers P/L

Chemical & Material Engineer- Graduated 1980 University Of Auckland, New Zealand Co-Inventor of a "Chemical Free Water Treatment System for Cooling Tower"

Scale deposition is a challenge commonly encountered when processing aqueous solutions containing ions of sparingly soluble salts. Scale deposits can readily form on flow surfaces when a solution is concentrated beyond the solubility limit of a dissolved sparingly soluble salt or when a solution containing an inverse solubility salt is in contact with a hot surface. Many brackish water sources contain alkaline forming ions which tend to precipitate CaCO3 and Mg(OH)2. Controlling the scaling potential of water circulating in cooling towers using precipitation by electrolytic methods has long been recognized. But now, it can be enhanced with a modern control system and chemical-free approach.

10:30a - Noon

Technical Committee Work

- **Engineering Standards & Maintenance**
  Grand Ballroom E
- **Performance & Technology - *Armstrong Ballroom***
- **Water Treating - *Grand Ballroom D***

Noon - 2:00p

Owner Operator Seminar (w/box lunch)

Grand Ballroom D

Noon - 2:00p

Lunch on your own

2:00p - 3:00p  **Services**

2:00p - 4:30p

Armstrong Ballroom

Do you have a nagging question that concerns any aspect of your cooling tower operation? Maybe you have a question concerning one of the technical papers you heard at the conference. This is the place to get those questions answered. Put your question on cards provided or on a piece of paper and place it in the receptical at the regiatration area. As with last year the questions will appear on a monitor - helping all to understand what is being asked.

4:00p - 8:30p

Exhibits and Hospitality Suite

(*Bar Closes @ 9:30p*)

Grand Ballroom A, B, & C

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Wednesday, February 13, 2019	
7:00a - 10:00a	 **Services,** ***Grand Foyer***
7:00a - 5:00p -	**Registration and Paper Sales,** ***Grand Foyer***
7:00a - 8:00a -	**Speakers' Breakfast,** ***Grand Chenier***
8:00a - 12:00p -	**Educational Seminar,** ***Grand Ballroom C*****- info on page 3**
12:00p - 1:30p -	**Lunch on your own**
1:30p - 5:00p -	**Technical Committee Meetings -**
	Engineering Standards & Maintenance - ***Grand Ballroom E***
	Performance & Technology - ***Grand Ballroom C***
	Water Treating - ***Grand Ballroom D***
2:00p - 3:00p -	 **Services,** ***Grand Foyer***
5:00p - 8:00p -	**Hospitality Suite (*Bar closes @ 8:00p*) -** ***Armstrong Ballroom***
Thursday, February 14, 2019	
7:30a - 8:15a	**Board of Directors' (includes Committee Chairs) Breakfast,** ***Grand Chenier***
8:30a - 2:00p	**Board of Directors' Meeting,** ***Grand Couteau***