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

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

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**

**Grand Ballroom A&B (Water Treating Sessions)**

8:30a - 9:00a

**TP19-01 Lessons Learned During a Lifetime of Cooling Tower Operations**
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 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. 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 Performance, Pump Screens and Side Stream Filtration, CT PM Maintenance Plan Overview, Transition to FRP from wood, Fan Maintenance and Monitoring, and Counterflow Towers._

**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 selecting 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-
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 for that matter. 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.
for long-term corrosion protection. A life-cycle cost analysis illustrated the value of a one-time cost system. The system’s commissioning confirmed both repair phases are protected. This showed significant cost savings by eliminating future repairs and led to a second phase of corrosion protection via an ICCP system. This system showed significant maintenance costs. This paper discusses a cooling tower basin that required focused on long-term protection to extend service-life and reduce maintenance. As structures age, it’s important to choose a repair approach that takes into account environmental factors, with the study leading to the following questions.

700,000€ per year. Optimization was achieved in three steps, starting with 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.

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.

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
Use of Carbon Dioxide As Antiscalant For Cooling Water Circuits
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.
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.

Numerical Analysis Of The Effects Of Water Spraying On Cooling Tower Evaporation
Song Baohong, Guizhou Colorful Sunshine Water Co., and Yan Mogan, Guizhou Panjiang Coal Co., Ltd


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.

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 pneumophila 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.
**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 trending 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.

**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.

This concludes the Water Treating papers for Monday. Note: Technical Papers for ES&M and P&T Sessions will continue to 3:30p.
THE 2019 CTI ANNUAL CONFERENCE
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.

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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.
The Technical Sessions will run simultaneously between two separate Ballrooms.

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

**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 Bhopal, Spectrum Consultants Pvt. Ltd

Upendranath Bhopal 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.

**7:30a - 8:00a**

**TP19-16**
**The Rest of the Story – You Have Treated Your Cooling Tower – 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 uncom

**2:00p - 2:30p**

**TP19-18**
**Cybersecurity & Cooling Technology: What You Need To Know**
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
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)**

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.

**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. Customers 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.

**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. Cybersecurity risks and data protection vulnerabilities are significant legal, operational and business threats to the cooling technology industry. The relevance of these challenges was highlighted in 2013, when national retailer, Target was subject to a $202 million data breach through its HVAC contractor who had access to the client’s server infrastructure. Because of the evolving nature of the threats, cybersecurity remains a high priority issue in cooling technology across all industries including hospitality, healthcare, education and others. Accordingly, in 2018, the American Water Works Association identified cybersecurity as a critically important issue facing the water industry. The failure to adapt to this ongoing threat places the vendor at a competitive disadvantage and their client at risk. Cooling technology providers are challenged to develop sound cybersecurity plans to ensure that both their own internal systems and their clients’ systems are protected.

**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.
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
Profiling, Diagnostics And 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.

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

4:00p - 8:30p
Exhibits and Hospitality Suite
Grand Ballroom A, B, & C
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