

# **Cooling Technology Institute Annual Conference 2012**

**Houston, Texas, USA  
5-9 February 2012**

**ISBN: 978-1-62276-348-1**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2012) by the Cooling Technology Institute  
All rights reserved.

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact the Cooling Technology Institute  
at the address below.

Cooling Technology Institute  
PO Box 73383  
Houston, TX 77273-3383

Phone: (281) 583-4087  
Fax: (281) 537-1721

[vmanser@cti.org](mailto:vmanser@cti.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>Natural Draft Cooling Tower Ring Replacement: Unique Construction Challenges &amp; Solutions .....</b>	<b>1</b>
<i>Gregory S. Mailen, Darin Baugher, Rory C. McCormick</i>	
<b>A Synergistic Combination of Advanced Separation and Chemical Scale Inhibitor Technologies for Efficient Use of Impaired Water in Cooling Towers.....</b>	<b>17</b>
<i>Jasbir S. Gill, Yupo J. Lin</i>	
<b>Replacement of the Concrete Cooling Tower by Steel Structure Cooling Tower During the Operation.....</b>	<b>31</b>
<i>Martin Kubicek, Mohan Krishna Myneni</i>	
<b>Novel Ultrasonic Microbiological Control System From Ashland Improves Cooling Water Treatment Performance.....</b>	<b>41</b>
<i>John Chapman, Frank Florio, Edward Beardwood, Charles Edward</i>	
<b>Cooling Tower Modelling Approach.....</b>	<b>72</b>
<i>Magose Abraham</i>	
<b>Forward Osmosis Applied to Evaporative Cooling Make-Up Water.....</b>	<b>127</b>
<i>Peter Nicoll, Neil Thompson, Victoria Gray</i>	
<b>Fill Testing in Cooling Tower in Case of Fouling Issues.....</b>	<b>146</b>
<i>Helene Troncín</i>	
<b>An Update on Ashrae Standard 188P: Prevention of Legionellosis Associated with Building Systems .....</b>	<b>157</b>
<i>William F. McCoy, Paul Lindahl Jr.</i>	
<b>Alternate Chemical Analysis for Drift Loss Measurements.....</b>	<b>172</b>
<i>Michel Monjoie</i>	
<b>Field Evaluation and Verification of Biological Control in Operating Cooling Tower Water Systems Utilizing Non-chemical Pulse Electric Field Devices.....</b>	<b>188</b>
<i>Paul Puckorius</i>	
<b>Structural Integrity of Hyperbolic Cooling Towers with Imperfections in Geometry and Verticality .....</b>	<b>198</b>
<i>Narendra Gosain, Prasad Samarajiva, Farouk Mahama</i>	
<b>Drift Measurement Using Conductivity Methodology: Description, Advantages and Limitations .....</b>	<b>212</b>
<i>Vincent Ganzitti</i>	
<b>Biocide Treatments for Controlling Amoeba Amplified Legionella in Cooling Towers.....</b>	<b>231</b>
<i>Paul Schook, Jana Rajan</i>	
<b>Safe Cooling Tower Winter Operation .....</b>	<b>238</b>
<i>Michel Monjoie</i>	
<b>Green Technologies: Electronic Water Treatment System Successfully Evaluated for Water Conservation .....</b>	<b>261</b>
<i>Rodrigo F. V. Romo, Solomon Williams</i>	
<b>Permanent Magnet Direct Drive Motors: Lessons Learned .....</b>	<b>287</b>
<i>Robbie McElveen, Bill Martin, Mark Gmitro</i>	
<b>Polymer Detection in High Halogen Power Plant Cooling System Application .....</b>	<b>293</b>
<i>John P. Pilsits, Barbara E. Moriarty, Daniel M. Cicero</i>	
<b>Going it Alone: Lessons Learned from Managing our own Water Treatment Program .....</b>	<b>311</b>
<i>John Young</i>	
<b>Best Practices for Minimizing Drift Loss in a Cooling Tower .....</b>	<b>325</b>
<i>William C. Miller</i>	
<b>A State-of-the-Art Chemistry and Thermal Based Toolset for Developing and Optimizing Power Plant Water Balance Models .....</b>	<b>345</b>
<i>Daniel J. Robinette</i>	
<b>Film Fill Fouling: Updated Methods, Results and Predictions .....</b>	<b>371</b>
<i>Kenneth Mortensen, Frank Michell</i>	
<b>Novel, Mild Oxidant Improves Cooling Water Treatment Performance Relative to Traditional Oxidizers.....</b>	<b>394</b>
<i>Chris Baron</i>	
<b>Wind Effects on the Structural Integrity of Large Diameter Axial Fans in Air Cooled Condensers .....</b>	<b>408</b>
<i>Paul J. M. Nelissen</i>	
<b>How "Green" Is the Cooling System.....</b>	<b>418</b>
<i>Roy Holliday, Gary E. Geiger, Peter Geuns</i>	
<b>Understanding Mast Climber Systems .....</b>	<b>447</b>
<i>Kevin O'Shea</i>	
<b>Author Index</b>	