

Water Quality Technology Conference and Exposition 2013

**Long Beach, California, USA
3 - 7 November 2013**

Volume 1 of 4

ISBN: 978-1-62993-845-5

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



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2013

The Premier Conference for Water Quality Professionals Around the World

Making New Waves in
Water Quality

- | | |
|-------|--|
| MON01 | Source Water Protection and Climate Change Poster Session / Track: Water Resources Sustainability |
| MON02 | Inorganics Poster Session / Track: Inorganics |
| MON03 | Membrane Poster Session / Track: Treatment Process |
| MON04 | Treatment Poster Session / Track: Treatment Process |
| MON05 | UV, AOP, and Ozone Poster Session / Track: UV, AOP, and Ozone |
| MON06 | Disinfection By-products Poster Session / Track: Disinfection By-products |
| MON07 | Promoting Reuse Acceptance Track: Water Resources Sustainability Moderator: <i>Sharon Long</i> |

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|-------|--|
| MON08 | Factors in the Development of Microbial Regulations Track: Microbiology Moderator: <i>Marilyn Marshall</i> |
| MON09 | Monitoring for Waterborne Contaminants Track: Lab Methods and Monitoring Moderator: <i>David Hilmo</i> |
| MON10 | New Research on Treatment of Trace Organics (EDCs) Track: Treatment Processes Moderator: <i>Philip Brandhuber</i> |
| MON11 | Treatment Options for Taste and Odor Track: Treatment Processes Moderator: <i>Pinar Omur-Ozbek</i> |
| MON12 | Biological Treatment and Stability After Advanced Oxidation Track: Biological Processes Moderator: <i>Jason Carter</i> |
| MON13 | Analysis of Biological Stability, NOM, Organic Matter, and DBP Precursors Track: Disinfection By-products Moderator: <i>Megan Roberts</i> |

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|---------|---|
| ST01MON | LT2ESWTR–What Did We Learn From Round 1? Track: Microbiology Moderator: <i>Michael Hotaling</i> |
| MON14 | Getting the Inorganics Out: Strategies for (Cost-Effective) Removal Track: Inorganics Moderator: <i>Thomas Gillogly</i> |
| MON15 | Tools for Understanding Organic Contaminants Track: Treatment Processes Moderator: <i>Glen Boyd</i> |
| MON16 | Understanding Ozone and AOP Treatment and Its Potential Consequences Track: UV/AOP/ Ozone Moderator: <i>Richard H. Sakaji</i> |
| MON17 | Plant- and Pilot-Scale Biological Treatment Overview Track: Biological Processes Moderator: <i>Betsy Shepherd</i> |

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- MON18 Identifying DBP Precursors and Innovative Treatment for
Formation Control
Track: Disinfection By-products
Moderator: *Colleen Arnold*
- MON19 Unique Distribution Water Quality Issues
Track: Distribution
Moderator: *Jeffrey Swertfeger*
- MON20 Impacts of Distribution System Hydraulics on
Inorganics Levels
Track: Distribution
Moderator: *Jeffrey Swertfeger*

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- EBTUE Hydraulic Fracturing Studies: Understanding the Impacts on Drinking Water
Track: Water Resources Sustainability
Moderator: *Adam Carpenter*
- ST02TUE Inorganic Contaminants (IOCs) on the Regulatory Horizon
Track: Inorganics
Moderator: *Chad Seidel*
- ST03TUE California's Contributions to Safe Water
Track: Treatment Processes
- TUE01 Extreme Events, Sea-Level Rise, and Variable Water Quality
Track: Water Resources Sustainability
Moderator: *Nicole McLellan*
- TUE02 Pathogens and Indicators of Water Quality
Track: Microbiology
Moderator: *Rebecca Hoffman*

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| TUE03 | Media Filtration Is Still Relevant! Track: Treatment Processes Moderator: <i>James DeWolfe</i> |
| TUE04 | UV Validation and Performance for Medium Pressure Disinfection Systems Track: UV/AOP/Ozone Moderator: <i>Paul Swaim</i> |
| TUE05 | Existing, New, and Optimized DBP Treatment and Compliance Strategies Track: Disinfection By-products Moderator: <i>Linda Geddes</i> |
| TUE06 | Microbiology Poster Session / Track: Microbiology |
| TUE07 | Lab Methods & Monitoring Poster Session / Track: Lab Methods & Monitoring |
| TUE08 | Organic Contaminants Poster Session / Track: Treatment Processes |

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|-------|--|
| TUE09 | Taste and Odor Poster Session / Track: Treatment Processes |
| TUE10 | Biological Treatment Poster Session / Track: Biological Processes |
| TUE11 | Distribution Systems & Corrosion Poster Session / Track: Distribution |
| TUE12 | Considering Energy Efficiency Track: Water Resources Sustainability Moderator: <i>Colleen M. Arnold</i> |
| TUE13 | Managing Main Breaks to Minimize Risk and Using Chemistry to Promote In-situ Repair Track: Distribution Moderator: <i>David Hilmo</i> |
| TUE14 | Microbial Growth in Distribution Systems Track: Microbiology Moderator: <i>Charlotte Smith</i> |

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|-------|---|
| TUE15 | Occurrence and Health Effects of Lead Track: Inorganics Moderator: <i>Chris Hill</i> |
| TUE16 | Evaluation, Optimizing, and Planning of Water Quality Monitoring and Response Track: Lab Methods & Monitoring Moderator: <i>Dan Kroll</i> |
| TUE17 | Enhancing Pretreatment to Optimize Membrane Performance Track: Treatment Processes Moderator: <i>Brent Alspach</i> |
| TUE18 | UV Oxidation—Practical Issues to Consider Track: UV/AOP/Ozone Moderator: <i>Karl G. Linden</i> |
| TUE19 | Optimizing and Evaluating Performance of Non-Biological and Biological Filters and Contactors Track: Biological Processes Moderator: <i>Quirien Muylywyk</i> |

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|---------|---|
| EBWED | Committing to the Conversion: Using New Reporting Procedures and Implementing Revised Regulations Track: Distribution Moderator: <i>Alan Roberson</i> |
| ST04WED | Cyanobacteria and Cyanotoxins: A Growing Challenge for Water Utilities Track: Water Resources Sustainability Moderator: <i>Yingbo Guo</i> |
| ST05WED | RTCR: What Is the Future of “Find and Fix”? Track: Distribution Moderator: <i>Patricia Klonicki</i> |
| WED01 | Using Quantitative Microbial Risk Analyses (QMRA) Track: Microbiology Moderator: <i>Yone Akagi</i> |
| WED02 | Preventing and Detecting Bacterial Contamination in Large Building Water Systems Track: Microbiology Moderator: <i>Yone Akagi</i> |

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|-------|--|
| WED03 | Removing Inorganics With Biological Treatment Track: Biological Processes Moderator: <i>Jess Brown</i> |
| WED04 | Manganese Removal Using Physical/Chemical and Biological Processes Track: Inorganics Moderator: <i>Nicole Blute</i> |
| WED05 | Novel Membrane Applications Track: Treatment Processes Moderator: <i>Khalil Atasi</i> |
| WED06 | Advanced Techniques for Membrane Residuals Management Track: Treatment Processes Moderator: <i>Khalil Atasi</i> |
| WED07 | Fine Tuning UV Understanding: Science and Engineering of UV Performance Track: UV/AOP/Ozone Moderator: <i>Harold Wright</i> |

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- WED08 UV Disinfection in Practice: Overcoming Implementation Challenges
Track: UV/AOP/Ozone
Moderator: *Harold Wright*
- WED09 Understanding NDMA Formation and Control
Track: Disinfection By-products
Moderator: *David Wahman*
- ST06WED Impacts of Wildland Fires on Water Quality: Implications for Water Utilities
Track: Water Resources Sustainability
Moderator: *Chi Ho Sham*
- ST07WED Beyond Pathogen Monitoring: The Microbiology of Drinking Water
Track: Microbiology
Moderator: *George Di Giovanni*
- ST08WED Iodine 131—Radio Nuclide Observed in Drinking Water Sources and in Wastewater Treatment
Track: Inorganics
Moderator: *Jeffrey Rosen*

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|-------|---|
| WED10 | Analysis of UCMR3, CC Lists, and Cyanotoxins Track: Lab Methods & Monitoring Moderator: <i>Elizabeth Turner</i> |
| WED11 | Water Quality and Treatability of Challenging Source Water Situations Track: Treatment Process Moderator: <i>Jeff Swertfeger</i> |
| WED12 | Using Models to Predict Treatment Process Efficacy: DAF and Coagulation Track: Treatment Process Moderator: <i>Jeff Swertfeger</i> |
| WED13 | Understanding and Managing Membranes Fouling in Different Applications Moderator: <i>Jonathan Pressman</i> |
| WED14 | Modeling DBP Production and Disinfection Track: Disinfection By-products Moderator: <i>Richard Sakaji</i> |

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WED15

Better Understanding of Chloramine Chemistry
and Distribution System Applications
Track: Distribution
Moderator: *David Hartman*

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Opening General Session

- 1.* Local Welcome ~~AWWA~~
- 2.* Managing Water Quality in a Changing Water Quantity World ~~AWWA~~
Ed Means, President, Means Consulting, LLC
- 3.* Impacts of Federal Budget Volatility on Water Regulations ~~AWWA~~
Tom Curtis, Deputy Executive Director Government Affairs, AWWA
- 4.* WQTC Conference Chair Welcome ~~AWWA~~
David Hartman

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Monday



MON01

Source Water Protection and Climate Change ~ Posters

Track: Water Resources Sustainability

1. PPCPs and Pesticides: Determining the Significance of Unregulated Synthetic Organic Contaminants in a Utility's Source Water ~~AWW~~
Gordon Williams, Trussell Technologies, Elaine Howe, Emily Owens, R. Rhodes Trussell
2. Modeling the Impact of Climate Change on TOC Threshold Exceedances for Meeting DBP Regulations ~~AWW~~ ~~PE~~
Carleigh Samson, Balaji Rajagopalan, R. Scott Summers
3. Mitigating the Environmental Impacts of Activated Carbon ~~AWW~~ ~~PE~~
Curtis Harnanan, PE International, Inc., Eric Yeggy, Water Quality Association
4. Water and Hydraulic Fracturing AWWA White Paper ~~AWW~~ ~~PE~~
Adam Carpenter, American Water Works Association

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MON02

Inorganics ~ Posters

1. Demonstration-Scale Pilot Study for Radium Removal:
Optimizing Water Quality and Disposal Costs Using RO
and Ion Exchange
*Justin Sutherland, Carollo Engineers, Hutch Musallam,
Kevin Krueger*
3. Portable Test Rig for Assessing Lead and Copper Corrosion in
Water Systems
*Jeffrey Parks, Virginia Tech, Amrou Atassi, Sheldon Masters,
Marc Edwards*

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MON03

Membrane ~ Posters

Track: Treatment Process

1. The Rejection of Endocrine Disrupting and Pharmaceutically Active Compounds by Various Drinking Water Treatment Processes ~~AWI~~
Soon Buhm Kwon, Youngbeom Yu, Jaewon Choi, Yanghun Choi
2. Optimization of Physicochemical Cleaning Procedures for Microfiltration Membrane System With Different Water Properties ~~AWJÁ~~
Soon Buhm Kwon, Yanghun Choi, Youngbeom Yu, Dongjin Kim
- 3.* Removal of Organic Matter and Ammonia Nitrogen by Integrated PAC/UF System for Drinking Water Treatment: A Case Study ~~AWPDE~~
Jun Shi, Tongji University
4. Impact of Biofilm Formation on Salt Passage During RO Treatment in a Long Channel Membrane Test Cell (LCMTC) ~~AWPDE~~
*Nadine Siebrath, Technische Universität Dresden,
Elisabeth Pietsch, Dr. Wolfgang Uhl*

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MON04

Treatment ~ Posters

Track: Treatment Process

1. Pumping Iron as Ferrate to Sustainably Strengthen Water Treatment Systems ~~WQ~~
Brian Yates, Battelle Memorial Institute, Virender Sharma, Audrey Levine
2. Impacts of a Coagulant Change on Water Quality and Operational Costs: A Pilot-Scale Approach ~~WQ~~ ~~DE~~
Kevan Light, John Armour, Robert Andrews, Jim Wang, Nicolas Peleato, René Gagnon
3. Dayton's Lime Residuals Recycling Plant ~~WQ~~ ~~H~~
Philip Van Atta, City of Dayton Water Department
4. Dona Bay Treatability Analysis and Pilot Testing for New Drinking Water Supply ~~WQ~~ ~~DE~~
Sandeep Sethi, Carollo Engineers, Jess Brown, Jennifer Nyfennegger

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5. Using Process Modeling to Enhance Treatment Strategies at a 700 mgd Water Treatment Plant ~~AAA~~ €
Jason Curl, CH2M HILL, Ted Kilpatrick, Brian Fuerst, Matt Ridens
6. Tamper-Evident Packaging Requirements for Water Treatment Chemicals ~~AAA~~ €
David Purkiss, NSF International
8. Cr(VI) Treatment With Strong Base Anion Exchange: Advances in Brine Disposal Minimization ~~AAA~~ I
Craig Gorman, Jacobs Engineering Group, Chad Seidel, Taj Dufour, Xue Li

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MON05

UV, AOP, and Ozone ~ Posters

Track: UV, AOP, and Ozone

1. Evaluating the Toxicity of 1,2,3-Trichloropropane Post UV and Ozone-Based AOP Treatment *AAA I*
Austa Parker
2. Fine Tuning Ozone Operations for improved Disinfection Control *AAA F*
Richard Gullick, Passaic Valley Water Commission, Wendy Simone, Kerwin Rakness
4. Conducting a Tracer Study to Demonstrate Plug Flow Characteristics in an Ozone Pipeline Contactor *AAA J*
Craig Thompson, Kennedy/Jenks Consultants, Julia S. Lund
5. Use of the Solution Ozone Test to Estimate Ozone Demand and Ozone Dose for Treating Sacramento River Water *AAA DE*
Elaine Howe, Trussell Technologies, R. Rhodes Trussell, Celine Trussell

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6. Implications of Unsteady Flow Modeling for UV Reactor Bioassays ~~WFI~~
Colin Powell, University of Toronto, Yuri Lawryshyn
7. UV Treatment for GWR Compliance: Simple, Safe, and Effective
4-Log Virus Inactivation With a Footprint the Size of a
Dining Room ~~WFI DE~~
Charles Corey, Aqua Pennsylvania, Inc.
- 8.* Assessing Efficiency and By-products Formation of Several AOP
Techniques for Potable Water Reuse ~~WFI DE~~
Sylvain Merel, University of Arizona
9. Comparison of the Energy Requirements of O₃/H₂O₂ and UV/
H₂O₂ Processes for the CECs Removal ~~WFI DE~~
*Yeo-Joon Yoon, Yonsei University, Min Hwan Kwon, Seohee Kim,
Seonbaek Kim, Tae-Mun Hwang, Joon-Wun Kang*

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MON06

Disinfection By-products ~ Posters

Track: Disinfection By-products

1. A Study on the Behavior of Aldehydes in Conventional and Advanced Treatment ~~WFFI~~
Su-Won Lee, Chi-Hwa An, Water Technology Research Institute, Seoul Metro
3. A Fluorescence Based Decision Support System to Achieve DBP Compliance While Reducing Chemical Cost ~~WFG~~
Andrew Skeriotis, Christopher Miller
4. Electrolysis in Water Treatment, Design, Concepts and Treatment Costs ~~WFE~~
Lina Boulos, L. Boulos Consulting, Inc., George Zacheis, David Kimbroug
6. Removal of THMs Within Storage Tanks Using Aeration: A Holistic Approach ~~WPE~~
Randy Moore, Utility Service Co., Inc.

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7. Assessment of the Performance of the “TRS” System for the Reduction of THM Levels in Storage Tanks ~~WQDE~~
Miquel Paraira, Ramon Arino Tarrago, Meritxell Minoves Ruiz, Rosa Boleda Vall-Ilobera, Veronica Garcia Tarrino
- 8.* Formation and Toxicity of Nitrogenous Disinfection By-products in Reclaimed Wastewater Effluents ~~WQDE~~
Julien Le Roux, Kaust, Shane Snyder
9. The Application of a Spectrofluorometric Technique to Measure Bulk Tertiary Amines In Water: A Proxy for NDMA Precursors ~~WQDE~~
Gwen Woods, Sujanie Gamage, Eric Dickenson

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Monday

MON07

Promoting Reuse Acceptance

Track: Water Resources Sustainability

Moderator: *Sharon Long*

1. Improving Indirect Potable Reuse Treatment With Preozonation
Fredrick Gerringer, Trussell Technologies, Inc., R. Shane Trussell, Teresa Venezia, Rajen Budhia, Marc Serna
2. The Cost of Over-Treating Reclaimed Water: A Triple Bottom Line Evaluation of Potable and Non-Potable Reuse Treatment Schemes
Lawrence Schimmoller, CH2M HILL, Mary Jo Kealy
3. Potable Reuse Equivalency Criteria and Treatment Train Evaluation
Brian Pecson, Trussell Technologies, Fredrick Gerringer, R. Shane Trussell, R. Rhodes Trussell

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MON08

Factors in the Development of Microbial Regulations

Track: Microbiology

Moderator: *Marilyn Marshall*

1. Using *E. Coli* to *Cryptosporidium* Ratios: Are Current Binning Thresholds Safe? ^{WQ}
Cindy Lalancette, École Polytechnique of Montréal,
Isabelle Papineau, *Sarah Dorner*, *Pierre Servais*, *Benoit Barbeau*,
George Di Giovanni, *Michelle Prevost*
2. *Cryptosporidium* and *Giardia* in Water—Re-Assessment ^{WQ}
Jerry Ongerth
3. Factors That Facilitate and Constrain Microbial Risk Governance in BC and Ontario, Canada ^{WQ}
Leila Harris, University of British Columbia, *Gemma Dunn*,
Program on Water Governance, *Karen Bakker*

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Monday

MON09

Monitoring for Waterborne Contaminants

Track: Lab Methods and Monitoring

Moderator: *David Hilmo*

1. Developing an In-house Municipal Monitoring Well Water Quality Sampling Program ~~WQ I~~
Sue Kelsey
- 2.* Real-Time Data Upload of Water Samples in the Field ~~WQ DE~~
Towanda Brown, Washington Suburban Sanitary Commission
3. Phytoplankton Dynamics and Nutrient Enrichment Affecting Toxic Cyanobacterial Blooms in Lake Champlain ~~WQ I~~
Marie-Laure De Boutray, Ecole Polytechnique De Montreal,
Yves Comeau, *Sarah Dorner*

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MON10

New Research on Treatment of Trace Organics (EDCs)

Track: Treatment Processes

Moderator: *Philip Brandhuber*

1. RO/AOP to Control EDCs for IPR in California ~~WQ~~ H
Brian Bernados, California Dept. of Public Health
2. Process Monitoring Tools for Ion Exchange Treatment of Surface
Waters for NOM Removal ~~WQ~~ I
Lindsay Anderson, Margaret Walsh
3. Applicability of Bulk Organic Parameters as Surrogates to Monitor
TORC Removal by GAC ~~WQ~~ JH
Tarun Anumol, University of Arizona

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MON11

Treatment Options for Taste and Odor

Track: Treatment Processes

Moderator: *Pinar Omur-Ozbek*

1. Threshold, Recognition, Objection and Rejection Odor Concentrations to Set a Water Treatment Goal as Exemplified by ETBE ~~WQ~~
Irwin Suffett, UCLA School of Public Health, Shannon Leavey, Philippe Piriou
2. Oxidation Treatment of Water Supplies Impacted by a Bittering Agent ~~WQ~~
Kenya Crosson, University of Dayton, Lindsay Macpherson, Madeline Murdock, Mariana Aboujaoude
- 3.* Taste and Odor, DBP, and Pharmaceutical Adsorption by Biochar Generated From Surplus Materials and Low-Cost Production Methods ~~WQ~~
Kyle Shimabuku

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MON12

Biological Treatment and Stability After Advanced Oxidation

Track: Biological Processes

Moderator: *Jason Carter*

1. Insight Into Biodegradation of Organic Matter From Different Waters and the Effect of Pre-Ozonation **W.H.G**
Joerg Winter, Benoit Barbeau, Wolfgang Uhl, Pierre Berube
2. Biologically Active Filter Performance at Large Water Treatment Plants Utilizing Ozone for Primary Disinfection **W.H.I**
Sun Liang, Metro Water District of Southern California, Joyce Lehman, Susan Yuskiewicz, Bo Labisi, Mickey Chaudhuri
3. Biological Stability of the Drinking Water After Two Plants Using Ozonation or UV Disinfection Assessed With New Bioassays **W.H.I**
Wim Hijnen, KWR Watercycle Research Institute, Rinnert Schurer, Jan Bahlman, Henk Ketelaars, Paul Van Der Wielen

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MON13

Analysis of Biological Stability, NOM, Organic Matter, and DBP Precursors

Track: Disinfection By-products

Moderator: *Megan Roberts*

1. New and Improved Methods to Measure the Biological Stability of Drinking Water ~~WQI~~ €
Paul Van Der Wielen, KWR Watercycle Research Institute, Eveline Sack, Dick Van der Kooij
2. Framework for Using Fluorescence Spectroscopy to Evaluate Changes in Organic Matter ~~WQI~~ H
Julie Korak, Fernando Rosario-Ortiz, R. Scott Summers
3. Development of a Novel HPLC System for Characterization of Size Distribution and Hydrophilicity of Organic Matter and Nitrogen ~~WQI~~ U
Gwen Woods, Aleksey Pisarenko, Douglas Mawhinney, Eric Dickenson

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ST01MON

LT2ESWTR—What Did We Learn From Round 1?

Track: Microbiology

Moderator: *Michael Hotaling*

1. Occurrence Analysis and Binning Estimates ~~AAA~~ EF
*Michael Hotaling, Newport News Waterworks, Alexa Obolensky,
Steve Via*
2. Barriers to Microbial Toolbox Implementation ~~AAA~~ FI
*Richard Brown, Environmental Engineering and Technology, Inc.,
David Cornwell, Nancy McTigue*
3. *Cryptosporidium* Monitoring Under the Long Term 2 Surface
Water Treatment Rule (LT2) ~~AAA~~ HI
Jennifer Clancy, J. Clancy & Associates, LLC
4. Next Steps for Genotyping Oocysts in Round 2 ~~AAA~~ IG
George D. Di Giovanni, University of Texas School of Public Health

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5. Open Finished Water Reservoirs an Updated Risk Assessment ~~AM I~~ ^{AM I}
Steven C. Schindler, NYC Department of Environmental Protection,
David Lipsky, *Christopher Nadareski*, *Kerri A. Alderisio*,
Anne Seeley

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MON14

Getting the Inorganics Out: Strategies for (Cost-Effective) Removal

Track: Inorganics

Moderator: *Thomas Gillogly*

1. Investigating the Sources and Fate of Chromium in Drinking Water Systems
Philip Brandhuber, HDR Engineering
2. Fluidized Bed Bioreactor Treatment of Hexavalent Chromium, Nitrate, and Selenium: Results of Pilot Testing at Davis, California
Joseph Drago, Kennedy/Jenks Consultants, *Todd Webster*, *Timothy Williams*, *Sarah Laybourne*, *Jacques DeBra*, *Dianna Jensen*
3. Optimizing Biological Denitrification of Groundwater—Recovery of Waste Backwash Water & Achieving Co-Removal of Cr (VI)
Issam Najm, Water Quality & Treatment, Solutions, *Tae Joon Kim*, *Clark Ajwani*

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4. Mass Transfer Studies of Ion-Exchange Resin Bio-Regeneration Used for Treatment of Perchlorate From Drinking Water *Ali Sharbat, California State Polytechnic University Pomona, Jacimaria Batista*
5. Comparison of Capital and O/M Costs of Full-Scale Arsenic Removal Systems *Thomas Sorg, USEPA-WSWRD*
6. On-Site Regeneration of Adsorptive Media Can Reduce the Cost of Arsenic Treatment *Thomas Sorg, USEPA-WSWRD*

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MON15

Tools for Understanding Organic Contaminants

Track: Treatment Processes

Moderator: *Glen Boyd*

1. Characterizing Variability in Ohio River NOM and Validating Reconstituted Freeze-Dried NOM as a Surrogate for its Aqueous Source ~~MM~~ GF
Paul Rossman, USEPA, Jonathan Pressman
2. Treatment Mitigation Strategies for Poly- and Perfluoroalkyl Substances ~~MM~~ HF
*Eric Dickenson, Southern Nevada Water Authority;
Christopher Higgins*
3. A Novel Kinetic Dye Test for Prediction of Activated Carbon Performance ~~MM~~ I F
*Adam Redding, Siemens Industry, Inc., Michael Greenwald,
Fred Cannon, Joseph Roccaro*

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4. Understanding and Predicting the Adsorption of Trace Organic Micropollutants by GAC
R. Scott Summers
5. Bioavailability of Hydrophobic Organic Pollutants After Powdered Activated Carbon Treatment of Drinking Water
Meng-Horng Hsu, Irwin Suffet
6. Anion Exchange for NOM Removal and the Effects on Micropollutants Adsorption Competition on Activated Carbons
Jingyi Hu, Delft University of Technology

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MON16

Understanding Ozone and AOP Treatment and Its Potential Consequences

Track: UV/AOP/ Ozone

Moderator: *Richard H. Sakaji*

1. Oxidation of Estrogens and Progestogens During Ozonation of Drinking Water ~~AA~~ JJ
Hadis Yarahmad, Khadija Aboulfadl, Sebastien Sauve, Michelle Prevost
2. Pre-Ozonation of Cyanobacteria: Potential Operation to Prevent Toxic Cells' Breakthrough Into Water Treatment Plants ~~AA~~ FF
Arash Zamyadi, Lucila Adriani Coral, Ronald Hofmann, Benoit Barbeau, Michelle Prevost
3. Characterizing Algal Organic Matter and Its Transformations During Oxidation Using Fluorescence Spectroscopy ~~AA~~ GE
Julie Korak, Eric Wert, Mei Dong, Fernando Rosario-Ortiz

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4. Using Bench Scale Tests to Determine the Feasibility of AOP for Taste and Odor and Emerging Contaminants
Erik Rosenfeldt, Hazen & Sawyer, Aaron Duke, Krista Wigginton
5. Formation of Nitrosamines and Perfluorochemicals During Ozonation of Reclaimed Waters: Implications for Potable Reuse
Aleksey Pisarenko, Erica Marti, Daniel Gerrity, Julie Peller, Eric Dickenson
6. Pilot-Scale Investigation of Advanced Water Treatment Technologies in a Eutrophic River in Southern Ontario
Patrick Halevy, City of Brantford, Peter Huck, William Anderson

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MON17

Plant- and Pilot-Scale Biological Treatment Overview

Track: Biological Processes

Moderator: *Betsy Shepherd*

1. North American Biofiltration Application and Practices
Jason Carter, Malcolm Pirnie, The Water Division of Arcadis,
Jess Brown, *Chance Lauderdale*
2. Process Monitoring and Control of Biological Filters
Jennifer Smith, CDM Smith, *Patrick Evans*, *Mark LeChevallier*,
Orren Schneider, *Lauren Weinrich*, *Patrick Jjemba*
3. Demonstrations of Full-Scale Engineered Biofiltration™
Systems in Texas
Kara Scheitlin, Carollo Engineers, *Chance Lauderdale*,
Michael Buettner, *Drew Satterwhite*
4. Bringing Biological Oxidation Filtration to California: Pilot Testing for
Ammonia, Manganese, and Sulfide Removal
Amlan Ghosh, Jacobs Engineering Group, *Chad Seidel*,
Dawn White

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5. Conversion From Conventional GAC to Biofiltration  FH
Orren Schneider, American Water
6. Efficient Removal of Multiple Contaminants Using Two-Stage
Biologically Active Carbon Bioreactors  G
*Giridhar Upadhyaya, Nadine Kotlarz, Kim Hayes, Lutgarde Raskin,
Jess Brown*

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MON18

Identifying DBP Precursors and Innovative Treatment for Formation Control

Track: Disinfection By-products

Moderator: *Colleen Arnold*

1. Prechlorination to Improve Filter Productivity Without Exceeding DBP Targets: A Case Study
Philip Singer, Robert Hoffa, Mel Tesema, Lloyd Stowe, Anne Spiesman, Alex Gorzalski
2. The Formation of Disinfection By-products From the Chlor(Am)ination of Selected Amino Acids and Aminophenols
Tom Bond, Imperial College London, Nurul Hana, Mokhtar Kamal, Thomas Bonnisseau, Jin Wei, Michael Templeton
3. Source and Characteristics of Organic Matter Related to the Formation of Disinfection By-products
Suzanne Delorenzo, Clackamas River Water, Kurt Carpenter, Tamara Kraus, Jami Goldman, John Saraceno, Bryan Downing, Brian Bergamaschi

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4. Disinfection By-product Formation From the Intracellular Organic Matter of Cyanobacteria
Eric Wert, Southern Nevada Water Authority, Fernando Rosario Ortiz
5. An Electrospray Ionization-Tandem Mass Spectrometry Method for Differentiating of Chlorine Substitution and Its Applications
Shang Chii, The Hong Kong Univ. of Science & Tech., Zhuo Deng, Xiangru Zhang
6. Relationship Between Disinfection By-product Formation and Precursor Fluorescence in Australian Drinking Water Treatment Plants
Bonnie Lyon, Advanced Water Management Centre, Maria Jose Farre, Wolfgang Gernjak, Jurg Keller

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MON19

Unique Distribution Water Quality Issues

Track: Distribution

Moderator: *Jeffrey Swertfeger*

1. Approach to Predict Water Quality Changes Resulting From Sectorization **AA JI**
Vanessa Ferreira Dias, Marie-Claude Besner, Michelle Prevost, Chrystelle Doutetien
2. Leaching and Degradation of Bisphenols, BADGE and BFDGE From Epoxy Coatings **AA EJ**
Craig Adams, Utah State University, Rachael Lane, Ray Carter, Stephen Randtke, Edward Peltier, Zachary Breault, J. Alan Roberson
3. Enhanced Chlorine Dioxide Decay in the Presence of Metal Oxides in Drinking Water Distribution Systems **AA GH**
Chao Liu, King Abdullah University of Science and Technology, Urs von Gunten, Jean-Philippe Croue

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MON20

Impacts of Distribution System Hydraulics on Inorganics Levels

Track: Distribution

Moderator: *Jeffrey Swertfeger*

1. Impact of Hydraulic Events on Organic and Inorganic Material in Distribution Systems *WAF*
J.B. Boxall, University of Sheffield, *Vanessa Speight*, *Latis Associates*, *Isabel Doutelero*, *Rebecca Sharpe*, *Katherine Fish*
2. Inorganics Accumulation in Distribution Systems: Who Cares and Why? *WAF* | F
Melinda Friedman, Confluence Engineering Group, LLC, *Andrew Hill*, *Michelle De Haan*
3. Park City, Utah, Gets Serious About Avoiding Future Distribution System Inorganics *WAF* | F
Michelle De Haan, Park City Municipal Corporation, *Melinda Friedman*, *Laurie McNeill*

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EBTUE

Hydraulic Fracturing Studies: Understanding the Impacts on Drinking Water Tuesday Early Bird

Track: Water Resources Sustainability

Moderator: *Adam Carpenter*

- * Study update ~~WQDE~~
Jose Zambrana, USEPA Research and Development
- * Literature on the Impacts of Shale Gas Extraction on Water Quality ~~WQDE~~
Chi Ho Sham, Senior Vice President, The Cadmus Group, Inc.

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ST02TUE

Inorganic Contaminants (IOCs) on the Regulatory Horizon

Track: Inorganics

Moderator: *Chad Seidel*

1. National Cost Implications of a Potential Perchlorate Regulation
Caroline Russell, Malcolm Pirnie/Arcadis, Kevin Morley, Christina Lapointe, Zaid Chowdhury
- 2.* Calculating the Benefit of a Perchlorate Drinking Water Standard
Randall Lutter, American Enterprise Institute/Brookings
3. Chlorate – UCMR3 Occurrence and Formation/Control?
Andrew Eaton, Eurofins Eaton Analytical, Benjamin Stanford, Hazen & Sawyer, P.C.
4. Managing Fluoridation Within a Stringent Regulatory Framework
Susan Teefy, East Bay Municipal Utility District

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5. Building a Program to Control Release of Inorganic Contaminants in the Distribution System ~~AWFJ~~
Michelle De Haan, Park City Municipal Corporation
6. Feasibility and Cost of Hexavalent Chromium Removal from Groundwater ~~AWHI~~
*Issam Najm, Water Quality & Treatment Solutions,
Nancy Patania Brown, Nicole Blute, Ying Wu, Sami Kader*

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ST03TUE

California's Contributions to Safe Water

Track: Treatment Processes

Moderator: *Robert Cheng*

1. Overview of the California Regulatory Environment Since the Passage of SDWA
Cindy Forbes, California Dept. of Public Health
2. Chlorine to Ozone to UV: California's Stepwise Progress to Improved Disinfection
Michael McGuire, Michael J. McGuire, Inc.
3. MTBE—and the Restoration of Santa Monica's Public Water System
Gilbert Borboa, City of Santa Monica
4. Addressing Perchlorate Contamination in the Las Vegas Valley: The Rocket Science Behind Dealing With Rocket Fuel
Peggy Roefer, Southern NV Water Authority, *David Johnson*, *Ronald Zegers*

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5. Quagga Mussels in the West and the Colorado River Basin ~~WCFI~~
Ricardo DeLeon, Metro Water District of Southern California
6. Factors That Impact NDMA Formation in Consecutive Systems ~~WCFH~~
Stuart Krasner, Metro Water District of Southern California,
Eduardo Garcia, *Rich Yates*

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TUE01

Extreme Events, Sea-Level Rise, and Variable Water Quality

Track: Water Resources Sustainability

Moderator: *Nicole McLellan*

1. Adaptation Strategies and Information Needs in Response to Extreme Events ~~WQF~~
Kenan Ozekin, Water Research Fdn., Lauren Fillmore, Karen Metchis, Nancy Beller-Simms, Claudio Ternieden, Erica Brown
2. Climate Change and Water Treatment: Impacts of Changes in Natural Organic Matter On Treatability ~~WQF~~
William Becker, Hazen and Sawyer, PC, Benjamin Wright, Benjamin Stanford, Kenan Ozekin, Allison Reinert, David Reckhow
3. Impact of Sea-Level Rise On Saltwater Intrusion and Formation of Brominated Disinfection By-products ~~WQF~~
Trevor Boyer, University of Florida, Evan Ged, Louis Motz; Paul Chadik, Kathryn Frank Christopher Hill

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4. Sudden Saltwater Intrusion at a Coastal Water Utility in Florida ~~W. H. Daniella Saetta~~
Daniella Saetta, University of Florida, Department of Environmental Engineering Sciences, *Stephanie Kino Ishii, Evan Ged, Katrina Indarawis; William Pine, Treavor Boyer*
5. Dona Bay Treatability Analysis and Pilot Testing for New Drinking Water Supply ~~W. D. Sandeep Sethi~~
Sandeep Sethi
6. Predicting the Biodegradation of Multiple Cyanotoxins in Drinking Water Sources on the Missisquoi Bay, Canada ~~W. G. Ehsan Maghsoudi~~
Ehsan Maghsoudi, Luke Masson, Nathalie Fortin, Charles Greer, Sarah Dorner, Michelle Prevost

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TUE02

Pathogens and Indicators of Water Quality

Track: Microbiology

Moderator: *Rebecca Hoffman*

1. Public Health Implications Associated With Water Quality Testing Using Colitag™: Are We Missing E. Coli? ~~WFC~~ €
Norman Neumann, University of Alberta School of Public Health
2. In Vitro Culture of Human Infectious *Cryptosporidium Meleagridis* ~~WFC~~ €
Greg Sturbaum, ALS Water Resources Group, *Jonathan Schmidt*,
Rebecca Hoffman, *Ana Child*, *George Di Giovanni*
3. *Bacteroides fragilis* GB-124 Bacteriophages, Novel Indicators of Human Fecal Pollution? ~~WFC~~ €
Brian McMinn, Environmental Protection Agency, *Asja Korajkic*,
Nicholas Ashbolt
4. Viral Pathogen Indicators in Waters ~~WFC~~ €
Jeanine Plummer, Worcester Polytechnic Institute, *Sharon Long*,
Samuel Sibley

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5. Biosensor Platforms for Rapid Detection of *E. Coli* In Water ~~WFFH~~
Nikou Hesari Zonouzi, Mohamad Elzein, Absar Alum, Morteza Abbaszadegan
6. Monitoring Microbial Pathogens and Conducting Microbial Risk Assessment in Effluent and Receiving Water ~~WFG~~
Adam Olivieri, EOA, Inc., Biovir Laboratories, Inc., Edmund Seto, Anthony Pirondini

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TUE03

Media Filtration Is Still Relevant!

Track: Treatment Processes

Moderator: *James DeWolfe*

1. Use of Empirical Filter Models in Water Treatment ~~WFI G~~
Gordon Williams, Trussell Technologies
R. Rhodes Trussell, Celine Trussell, Brett Faulkner, Eileen Idica
2. Methods for Evaluating Pathogen Log Removal Performance in a Water Treatment Plant ~~WFI I~~
Ian Douglas, City of Ottawa, Andy Campbell, Joshua Elliot, Nicole McLellan, Monica Emelko
3. Investigative Strategies to Improve Reliability From Aging Infrastructure ~~WFI H~~
Jane Bonsteel, Lee Anne Jones, Quirien Muylwyk

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4. Optimizing Primary Treatment Water Quality for Biological Sand and GAC Filtration ~~WQFI~~
Ramesh Kashinkunti, Greater Cincinnati Water Works, Deborah Metz, Ying Hong, Maria Meyer, Bruce Whitteberry, Patrick Evan, Kevin Reynolds
5. Filter Media: Replacement or Supplement? ~~WQFI~~
Yong Wang, City of Houston
6. An Evaluation of Filter Underdrain Failure and Lessons Learned ~~WQFI~~
Yue Sun, CDM Smith Inc.

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TUE04

UV Validation and Performance for Medium Pressure Disinfection Systems

Track: UV/AOP/Ozone
Moderator: *Paul Swaim*

1. Facilitation of Advances in UV Validation Through Third-Party Consensus Standards **WQ11**
Clayton Bartley, NSF International
2. Validating UV Reactors for Adenovirus Credit **WQ12**
Yuri Lawryshyn, University of Toronto, *Ronald Hofman*,
Patrick Young
3. Impact of Validation Test Microbe and *Cryptosporidium* Wavelength Response on Reduction Equivalent Dose (RED) Delivered by Medium **WQ13**
Harold Wright, Carollo Engineers, *Karl Linden*, *Thomas Hardy*

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4. UV Action Spectra of Pathogens and Surrogates ~~MG F~~
Thomas Hargy, Tetra Tech Clancy Environmental Consultants, Inc., Harold Wright, Karl Linden, Sara Beck, Thomas Larason, Randi McCuin
5. Models and Experiments to Determine Polychromatic UV Correction Factors ~~MG I~~
Brian Petri, Trojan Technologies, Steve McDermid, Wenjun Sun, O. Scheible Chengyue Shen
6. After the Low-Wavelength Research: Guidance for Operating UV Facilities and UV Facilities Under Design ~~MG I~~
Christine Cotton, ARCADIS, Karl Linden, Harold Wright

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TUE05

Existing, New, and Optimized DBP Treatment and Compliance Strategies

Track: Disinfection By-products

Moderator: *Linda Geddes*

1. Evaluating Five Process Alternatives to Upgrade NOM Removal in Conventional Treatment Plants **WQ 11**
Isabelle Papineau, Ecole Polytechnique de Montreal,
Felix Plourde-Lescelleur, *Alain Gadbois*, *Annie Carriere*,
Benoit Barbeau
2. A Variable Reactivity Model for Predicting the Disinfection By-product (DBP) Formation In Drinking Water Distribution System **WQ 12**
Hua Pei, Technische Universität Dresden, *Klaus Ripl*,
Ekaterina Vasyukova, *Wolfgang Uhl*
3. The Addition of Chlorine Dioxide for DBP Control **WQ 13**
Mindi Dearing, Beaver Water District, *William HagenBurger*,
Jeff Neemann

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4. A Regional Water System's Stage 2 DBP Compliance Challenges and Strategies ~~AWQ~~
Lynn Kirby, Seattle Public Utilities; Jim Dunn
5. Surprising Stage 2 Compliance Issues: An Assessment of the ImPact and Causes of Brominated DBPs ~~AWQ~~
David Briley, Hazen and Sawyer, Erik Rosenfeldt, Cory Hopkins
6. Genotoxic and DBP Precursor Removal: Performance Optimization and Evaluation of Drinking Water Treatment Processes ~~AWQ~~
Liz Taylor-Edmonds, Drinking Water Research Group, Laura Meter, Robert Andrews, Dana Zhengs

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TUE06

Microbiology ~ Posters

Track: Microbiology

2. Fast Detection of Viable Legionella pneumophila Cells in Water Using Flow Cytometry ~~WFI~~ I
Mariano Julio Gomez Lopez, Labaqua S.A., Elena Soria, Adela Yanez Amoros, Raquel Murtula Corbi, Vincente Catalan Cuenca

6. Fecal Source, Indigenous Microbiota and Sunlight Affect Decay of Fecal Indicator Bacteria and Microbial Source Tracking Markers ~~WFI~~ €
Asja Korajkic, USEPA, Brian McMinn, Nicholas John Ashbolt

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TUE07

Lab Methods & Monitoring ~ Posters

Track: Lab Methods & Monitoring

1. A New Approach to Algal Enumeration Methods ~~WQDE~~
Elizabeth Johnson, Seattle Public Utilities
2. Accelerated Test Approval of a Coliphage Method ~~WQDE~~
Robert Salter, Charm Sciences, Inc., *Greg Durbin*
3. Effects of Hydrogen Peroxide on NDMA Recovery From Advance
Oxidation Processes ~~WQDE~~
Anny Lau, Orange County Water Dist., *Glen Arrieta*, *An Le*,
Lily Sanchez, *Lee Yoo*
- 4.* Study on the Combined of Photolysis and Biodegradation of
Diclofenac and Triclosan and Their Transformation Products in a
Water ~~WQDE~~
Xu Han, Tongji University

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- 6.* Evaluation of the Removal Efficiency and Ecotoxicological Impact of 18 Illicit Drugs in 25 WW Treatment Plants in France ~~WQ~~ ~~DE~~
Yves Levi, University Paris SUD
7. USEPA's Water Contaminant Information Tool Expands a Water Security Tool for All Hazards ~~WQ~~ ~~FI~~ ~~G~~
Gregory Beumel, Computer Sciences Corp.
8. Significance Model as an Adjunct to MPA Log Removal ~~WQ~~ ~~FI~~ ~~F~~
*Rhonda Duncan, CH Diagnostic & Consulting Service,
Rhonda Birdnow, Gregory Moore, Carrie Howe-Carlson*
10. Low-Level Occurrence of 1,2,3-Trichloropropane (TCP) in Agricultural Areas of the US ~~WQ~~ ~~FI~~ ~~E~~
*Christopher Corwin, Jacobs, Chad Seidel, Andrew D. Eaton,
J. Alan Roberson*
11. Development of a USEPA Method for the Analysis of Select Cyanotoxins in Drinking Water by Solid Phase Extraction and LC/MS/MS ~~WQ~~ ~~FI~~ ~~G~~
Dan Tettenhorst, USEPA, Jody Shoemaker

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TUE08

Organic Contaminants ~ Posters

Track: Treatment Processes

1. Effective Monitoring and Removal of Nitrosamines in an MF/RO/UV Facility ~~WFI J~~
Lee Yoo, Orange County Water District, Mike Wehner
4. Screening Env. Samples for a Diverse Range of Compound Classes With ACC Mass LC-MS & an Integrated Scientific Information System ~~WDE~~
Kenneth Rosnack, Waters Corp.

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TUE09

Taste and Odor ~ Posters

Track: Treatment Processes

1. Laboratory and Consumer Panel Studies: Methods to Develop Taste and Odor Drinking Water Levels for Odorous Chemicals ~~WQDE~~
Irwin Suffet, UCLA, School of Public Health, Shannon Leavey
2. A Laboratory Study on Taste & Odour Control Using Powdered Activated Carbon for Water Treat Plant in Calgary, Alberta, Canada ~~WQDE~~
Jian Fu Deng, The City of Calgary, Water Quality Services, Tom Elford, Victoria Cooper, Kelly Stonehocker, John Jagorinec, Kelsey Kundert
3. Release of Cyanobacterial Metabolites Due to Preoxidation Processes ~~WQDE~~
Eric Wert, Southern Nevada Water Authority, Mei Dong, Julie Korak, Rebecca Trenholm, Fernando Rosario-Ortiz
4. Taste & Odour Control Pilot Testing for Upgrades at the 205 ML/D Buffalo Pound Water Treatment Plant ~~WQDE~~
Rudi Sapach, AECOM, Simon Breese, Tim Sedgewick, Dan Conrad

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TUE10

Biological Treatment ~ Posters

Track: Biological Processes

- 1.* Removal of Trihalomethane Formation Potentials (THMFP) From Surface Water Using Prebiofilters ~~AM-DE~~
Tommy Brown, Yuzhu Fu

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TUE11

Distribution Systems & Corrosion ~ Posters

Track: Distribution

1. Deposition Corrosion of Galvanized Iron in the Presence of Copper:
Explaining Past Discrepancies ~~WPE~~
Brandi Clark, Virginia Tech, Casey Murray, Marc Edwards
2. Mild Steel Distribution Coupon Program ~~WPE~~
*Kwame Addo-Boateng, Philadelphia Water Department,
Steven Pugsley, Matthew Smith*
3. Water Quality and Disinfection Issues Associated With the Upper
Chiquita Emergency Storage Reservoir ~~WFI GE~~
*David Hokanson, Trussell Technologies, Inc., Daniel Ferons,
Steve Francis, Amber Baylor, Matt Thomas*

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4. Impact of Time-Step on Hydraulic and Water Quality Results From Distribution System Modeling ~~WFI F~~
Yeongho Lee, Greater Cincinnati Water Works, Jerry Edwards, Haishan Piao, Mark Ginty, Jerry Corbett
5. Distribution System Mineral and Biological Deposits Impact on Water Quality: How to Evaluate, Monitor and Manage ~~WFI DE~~
Randy Moore, Utility Service Co., Inc., Roger Miller
6. Modification of USEPA Method 556 to Incorporate Mass Spectrometry Analysis ~~WFI DE~~
Prem Dinesh Parmar, Orange County Water District, Anny Lau, Lily Sanchez, Lee Yoo

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TUE12

Considering Energy Efficiency

Track: Water Resources Sustainability

Moderator: *Colleen M. Arnold*

1. Low-Energy Seawater Desalination: New Emerging and Renewable Energy-Driven Technologies
Gary Amy, King Abdullah University of Science and Technology, Noredine Ghaffour, Shahnawaz Sinha, Sabine Lattemann, Susana Margarida Nunes, Thomas Missimer, Kim Choon Ng
2. Improving Power Efficiency While Meeting The Water Quality Operational Goals of a Complex Transmission and Storage System
Michael Barsotti, Champlain Water District, Bruce Bushey, Paul Tice, Scott Flax, Tony Higgins, Richard Pratt, Jim Fay
3. Ion-Exchange Regeneration Efficiency and Life-Cycle Environmental Impacts
Trevor Boyer, University of Florida, Gabriel Maul, Qiong Zhang, Youngwoon Kim

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TUE13

Managing Main Breaks to Minimize Risk and Using Chemistry to Promote In-situ Repair

Track: Distribution

Moderator: *David Hilmo*

1. Development of a Quantitative Microbial Risk Assessment Model for Main Breaks
Mark LeChevallier, American Water, Jian Yang, Dave Hughes, Orren Schneider, Gregory Kirmeyer, Tim Thomure
2. Triage of Main Breaks to Manage Risk—Water Research Foundation Project 4307
Tim Thomure, HDR Engineering, Mark LeChevallier, Jian Yang, Rezaur Rahman
3. In-Situ Remediation of Leaks in Potable Water Supply Systems
Min Tang, Virginia Tech, Marc Edwards, Simoni Triantafyllidou

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TUE14

Microbial Growth in Distribution Systems

Track: Microbiology

Moderator: *Charlotte Smith*

1. Effect of Pipe Material, Organic Carbon and GAC Filtration on Opportunistic Pathogen Regrowth in Premise Plumbing
Caitlin Proctor, Amy Pruden, Marc Edwards
2. Survival and Nutritional Requirements for Legionella in Environmental Waters
David Schwake, Absar Alum, Morteza Abbaszadegan
3. Adhesion of Legionella on Groundwater Biofilms Grown on PVC Surfaces Depends on Biofilm Structure
Yun Shen, University of Illinois at Urbana–Champaign
4. Do Drinking Water System Biofilms Act As Reservoirs for Hospital-Acquired pseudomonas aeruginosa Infections?
Cindy Lalancette, École Polytechnique of Montréal, Emilie Bedard, Celine Laferriere, Eric Déziel, Michelle Prevost, Dominique Charron

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5. Optimization of Pathogen Recoveries Using Dead-End Ultrafiltration for Generation of Reliable Data for Quantitative Microbial Risk Assessment Studies ~~AFI~~ €
Randi McCuin, Jeff Budzik, Dylan White, Thomas Hargy, Timothy Bartrand, Tetra Tech, Inc.

6. Influence of the Water Louse, *Asellus Aquaticus*, on Bacterial Survival in Drinking Water Systems ~~AFI~~ JF
Sarah Christensen, Technical University of Denmark, DTU Environment, Erling Nissen, Erik Arvin, Hans Jorgen Albrechtsen

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TUE15

Occurrence and Health Effects of Lead

Track: Inorganics

Moderator: *Chris Hill*

1. Consumption of Lead From Drinking Water in the UK
Peter Jarvis, Cranfield University
2. Surveying Lead Concentrations in Private Drinking Water Systems
*Kelsey Janette Pieper, Leigh-Anne Krometis, Marc Edwards,
Daniel Gallagher, Brian Benham*
3. Contribution of Tap Water From Large Buildings to Blood Lead Levels
*Elise Deshombres, Ecole Polytechnique of Montreal,
Robert Andrews, Graham Gagnon, Evelyne Doré,
Shokoufeh Nour, Michelle Prevost*

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4. Measuring Lead Levels at the Tap of Canadian Schools:
The Importance of Considering Particulate Lead
Evelyne Doré, Polytechnique Montreal, Pavillon Principal (B-424),
Elise Deshombres, *Shokoufeh Nour*, *Michelle Prevost*
5. A Field Comparison of Sampling Protocols for Measuring Lead in
Drinking Water
Andrea Porter, USEPA, *Miguel Del Toral*, *Michael Schock*
6. Effects of Particulate Iron, Natural Organic Matter and
Orthophosphate on Corrosion in Low Alkalinity High pH Water
Sheldon Masters, Virginia Tech, *Marc Edwards*

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TUE16

Evaluation, Optimizing, and Planning of Water Quality Monitoring and Response

Track: Lab Methods & Monitoring

Moderator: *Dan Kroll*

1. Evaluating Alternative Configurations for Water Quality Surveillance and Response Systems
Steven Allgeier, USEPA, OGWDW, Water Security Division, Shirish Agarwal, Katie Umberg, Charles Owens, Adam Pollak
2. Maximizing Operational Benefits of Online Water Quality Monitoring
Matthew Umberg, USEPA, David Hartman
3. Planning Emergency Response to Positive Samples Using Water Quality Modeling Tools and a Backtracking Algorithm
Gabrielle Ebacher, Ville De Montreal, Robert Janke, Laurent Laroche, Benoit Mercier, Yves Bernier, Marie-Josée Girard, Babak Herischi

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4. Investigation of Performance Problems With Event Detection Systems *AFI FI*
Edwin Roehl, Advanced Data Mining International, LLC, John Cook, Ruby Daamen, Uwe Mundry
5. Developing a Consumer Complaint Surveillance Program for Water Contamination Detection *AFI I H*
Sheila Garrett, SF PUC, Manouchehr Boozarpour
6. Lessons Learned From Implementing a Water Contamination Detection Program *AFI I I*
Manouchehr Boozarpour, San Francisco Public Utilities Commission, Andrew DeGraca

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TUE17

Enhancing Pretreatment to Optimize Membrane Performance

Track: Treatment Processes

Moderator: *Brent Alspach*

1. A Pilot-Scale In-Line Coagulation Study to Reduce Microfiltration Membrane Fouling and Disinfection By-products *WQI 11*
Amy McClintock, Michael Chaulk, Graham Gagnon
2. Coagulant Optimization in Membrane Filtration Applications: Optimization of Membrane Fouling and Disinfection By-product Control *WQI 11*
Paul Mueller, CH2M HILL, Inc.
3. The Effect of Coagulation Pretreatment on the Performance of Ceramic Membranes for US Surface Water Treatment *WQI 11*
Amir Alansari, James Amburgey, Dr. Tanju Karanfil, Meric Selbes

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4. Impact of Pre-Coagulation and Air Sparging on UF Membrane Fouling and Pharmaceutical Rejection ~~WFI~~ G
Heather Wray, Robert Andrews, Pierre Berube
5. Interactions of Super-Fine Powdered Activated Carbon and Graphene Adsorbents With Microfiltration and Ultrafiltration Membranes ~~WFI~~ G
David Ladner, Clemson University, Erin Partlan, Anna Crumble, Connor Bilchak, Olin Mefford, Tanju Karanfil
6. Direct Feed Reverse Osmosis Membrane Filtration Selected to Treat Challenging Groundwater Source ~~WFI~~ H
Cristina Fonseca, Urban Systems, Ltd., Danny Weinmeier, Bryan Bepalko

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TUE18

UV Oxidation—Practical Issues to Consider

Track: UV/AOP/Ozone

Moderator: *Karl G. Linden*

1. The Tail That Can Wag the Dog: How Peroxide Quenching Can Drive AOP Selection and Determine Success
James Collins, ARCADIS
2. Quenching H₂O₂ Residuals After UV/H₂O₂ Drinking Water Treatment Using Granular Activated Carbon
Arash Zamyadi, Jinghong (Elena) Li, Jane Bonsteel, Ronald Hofmann
3. Impact of UV and UV-AOP Treatment on AOC Formation
Austa Parker
4. Development and Verification of Radical Scavenging Factor Measurement Method Using the Rhodamine B in the UV/H₂O₂ Process
Min Hwan Kwon

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5. Bromate Removal by Sulfite-UV Advanced Reduction Process
Vamsi Botlaguduru, Texas A&M University, Bill Batchelor
6. UV AOP for Taste and Odor Control at Patoka Lake: From Concept to Commissioning
Stephane Jousset, Malcolm Pirnie|Arcadis

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TUE19

Optimizing and Evaluating Performance of Non-Biological and Biological Filters and Contactors

Track: Biological Processes
Moderator: *Quirien Muylwyk*

1. The Effect of Background Matrix and Competition of GAC Adsorption of Carcinogenic VOCs in Natural Waters ~~WJFI~~
R. Scott Summers
2. Removal of Taste-and-Odor-Causing Compounds by Biofiltration: Impacts of Feed Concentration and Contact Time ~~WJGE~~
Hua Jiang, Tulsa Metropolitan Utility Authority, Robert Brownwood, Yi Yu, Rachel Watts, Roy Foster
3. Phosphate Limitation in Biological Rapid Sand Filters Used to Remove Ammonium From Drinking Water ~~WJHI~~
Carson Odell Lee, Technical University of Denmark, Hans Jorgen Albrechtsen, Barth Smets, Rasmus Boe-Hansen, Soren Lind, Philip Binning

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4. Use of Alternative Chemical Oxidants to Enhanced Biological Filtration and Minimize Cost ~~WJH~~
Patrick Evans, CDM Smith, Janelle Amador, Ramesh Kashinkunti, Jeffrey Vogt, Jennifer Smith, Patrick Richards
5. Effects of Seasonal Changes and Nutrient Availability on the Performance of Full-Scale Drinking Water Biofilters ~~WJH~~
Lizanne Pharand, Michele Van Dyke, Patrick Halevy, William Anderson, Peter Huck
6. The Impact of Biofiltration on Downstream Disinfection ~~WJH~~ €
Greg Pope, Carollo Engineers, Gary Smith, Chance Lauderdale

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EBWED

Committing to the Conversion: Using New Reporting Procedures and Implementing Revised Regulations

Track: Distribution

Moderator: *Alan Roberson*

- 1.* Update on the Top Ten Regulatory Actions ~~AWWA~~
J. Alan Roberson, Director of Federal Relations,
American Water Works Association
- 2.* An Analysis of the Variability of the Fluoride Target Level ~~AWWA~~
Richard Brown, Dave Cornwell, Environmental Engineering &
Technology
- 3.* First Use of Electronic Delivery of Consumer Confidence Reports ~~AWWA~~
Katherine Nutting, Water Quality Manager, Golden State Water
Company

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ST04WED

Cyanobacteria and Cyanotoxins: A Growing Challenge for Water Utilities

Track: Water Resources Sustainability

Moderator: *Yingbo Guo*

1. Why Blooms Form: The Biology and Ecology of Toxin-Producing Cyanobacteria
Anthea Lee, Metropolitan Water District of Southern California,
Paul Rochelle
2. Detecting Cyanotoxins Using LC/MS/MS and ELISA
Yingbo Guo, Metropolitan Water District of Southern California,
Andrew Eaton
3. Developing and Implementing a Cyanotoxin Response Plan
Ricardo De Leon, MWDSC

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4. Tailored Treatment of Cyanotoxins and Cyanobacteria: Oxidation, Adsorption and Other Technologies *WQF*
Craig Adams, Utah State University
5. Ozone: Benefits and Consequences *WQF*
Arash Zamyadi, Lucila Coral, Benoit Barbeau, Michelle Prevost
6. Responding to Customer Concerns and Cyanotoxins: A Case Study *WQF*
Keith Cartnick, United Water, Fred Lubnow

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ST05WED

RTCR: What Is the Future of “Find and Fix”?

Track: Distribution

Moderator: *Patricia Klonicki*

1. What Is a Sanitary Defect, Really? ~~WQI~~ €
Julie Javier, USEPA Office of Water
2. Managing Data to Support Level 1 Assessments ~~WQI~~ €
Mark LeChevallier, American Water
3. Evaluating Water Storage Operations ~~WQI~~ €
Vanessa Speight, Latis Associates
4. Ensuring That Flushing Is a Corrective Action, Not Just a Waste of Resources ~~WQI~~ €
Melinda Friedman, Confluence Engineering Group, LLC

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5. Elevating Disinfection Residual in a Chloraminated System:
A Case Study ~~WQI~~ €
Betsy Reilley, MWRA
6. Implementing Assessments and Find and Fix ~~WQI~~ H
Cindy Forbes, California Dept. of Public Health

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WED01

Using Quantitative Microbial Risk Analyses (QMRA)

Track: Microbiology

Moderator: *Yone Akagi*

1. Source Water Microbial Pathogen Characterization by QPCR for QMRA Modeling
Ken Hampel, Tetra Tech, Randi McCuin, Timothy Bartrand, Jennifer Clancy
2. Utilizing Source Water Monitoring and QMRA to Inform Decision Making at a Water Utility
Norma Ruecker, City of Calgary Water Resources
3. Characterizing Influent Water Quality for a Water Reuse Operation
Timothy Bartrand, Jeffrey Rosen, John Mieog, Thomas Hargy

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WED02

Preventing and Detecting Bacterial Contamination in Large Building Water Systems

Track: Microbiology

Moderator: *Yone Akagi*

- 1.* Large Buildings: The New Frontiers for Biological Stability in Drinking Water Distribution Systems ~~WQDE~~
Marie-Claude Besner, Ecole Polytechnique De Montreal,
Pierre Servais, *Michelle Prevost*
2. An Innovative and Simple Approach to Identify Bacterial Amplification Risk Areas in Large-Building Water Distribution Systems ~~WQDE~~
Emilie Bedard, Ecole Polytechnique Montreal, *Dominique Charron*,
Cindy Lalancette, *Eric Déziel*, *Michelle Prevost*
3. Building Disinfection Strategies to Control Legionella in Premise Plumbing: Anticipating Concerns With the New ASHRAE Standard ~~WQDE~~
William Rhoads, Virginia Tech University, *Amy Pruden*,
Marc Edwards

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WED03

Removing Inorganics With Biological Treatment

Track: Biological Processes

Moderator: *Jess Brown*

1. Bugs in the Water...just the Way We Like It! Waterford, Michigan's Introduction to Biological Iron Removal
William Fritz, Waterford Township, Glenn Hummel
2. Taking Advantage of Biological Iron Oxidation
Andrew Reid, CDM Smith, Erik Grotton
3. Treating Three Varied Contaminants in a Single Process: Initial Operations Results for Hanford's Anoxic Biological Reactors
Ken Martins, CH2M HILL, Paul Mueller, Duane Hicks, Laird Ellis

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WED04

Manganese Removal Using Physical/Chemical and Biological Processes

Track: Inorganics

Moderator: *Nicole Blute*

1. Bench-Scale Assessment of Manganese Oxidation With Ferrate
Joseph Goodwill, University of Massachusetts, *David Reckhow*,
John Tobiason
2. Optimizing Filter Conditions for Manganese Control During
Conversion to Biofiltration
Chance Lauderdale, HDR, *Greg Pope*, *John Zwerneman*,
Mary Jo Kirisits, *Kara Scheitlin*, *Sungwoo Bae*
3. Manganese Removal From Surface Water Using Bench-Scale
Biofiltration
Heather Granger, *Graham Gagnon*

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WED05

Novel Membrane Applications

Track: Treatment Processes

Moderator: *Khalil Atasi*

1. Use of RBS for Understanding the Impact of Hypohalogenous Acids on PA Membrane **WQH**
Thomas Maugin, King Abdullah University of Science & Technology (KAUST), *Jean-Philippe Croue*, *Leonard Valentino*, *Benito Marinas*
2. Removal of Organic Micropollutants in a Hybrid Membrane Process **WQH**
Celine Stouart, Ecole Polytechnique De Montréal, *Gabriela Vazquez*, *Pierre Servais*, *Sebastien Sauve*, *Benoit Barbeau*
3. Demonstration and Commercialization of ARoNite®, a Novel Hydrogen-based Membrane Biofilm Biological Reduction Process **WQH**
David Friese, *Ryan Overstreet*, *Robert Hills*, *Bruce Rittmann*

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WED06

Advanced Techniques for Membrane Residuals Management

Track: Treatment Processes

Moderator: *Khalil Atasi*

1. Overcoming Inland Concentrate Management Challenges Using Pretreatment and Electrodialysis Reversal
Qun (Charlie) He, Carollo Engineers, Jun Wang, Brandy Kelso
2. Comparing the Costs of Zero Liquid Discharge Technologies for Drinking Water Systems—Results of Pilot Tests at La Junta, Colorado
Adriano Vieira, HDR Engineering, Philip Brandhuber, Jennifer Gelmini
3. Coagulant Recycling in Potable Treatment: Can the Successes of Ultrafiltration at Bench-Scale be Transferred to Full-Scale?
James Keeley, Cranfield Water Science Institute

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WED07

Fine Tuning UV Understanding: Science and Engineering of UV Performance

Track: UV/AOP/Ozone

Moderator: *Harold Wright*

1. Demonstrating High UV Doses Using *Bacillus pumilus*: How Recent Validation Tests Go Beyond The 2006 USEPA Groundwater Rule ~~MG FH~~
Jeff Bandy, Carollo Engineers, Ronnie Bemus, Traci Brooks
- 2.* Wavelength Specific Inactivation of Viruses: Measuring Protein Damage at UV-C Wavelengths ~~MG DE~~
Sara Beck, University of Colorado, Boulder—Civil Environmental
3. How IT Is Distributed in UV Reactors: Visualization Using 3-Dimensional Laser Induced Fluorescence ~~MG GE~~
Varun Gandhi, Carollo Engineers

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WED08

UV Disinfection in Practice: Overcoming Implementation Challenges

Track: UV/AOP/Ozone

Moderator: *Harold Wright*

1. A High-Pressure, Low- Pressure UV Application
Seth Schneider, Malcolm Pirnie, the Water Division of Arcadis, *Christine Cotton, James Collins*
2. Using Validation Data and CFD to Compare Horizontally and Vertically -Aligned UV Reactors
Traci Brooks, Carollo Engineers, *Harold Wright, Jeff Bandy, Keith Bircher*
3. The LADWP UV Challenge: Delivering The MP UV Facility on Schedule Amidst Regulatory Uncertainty
Christine Cotton, ARCADIS, *Kurt Wells, Steve Ott, James Collins, Ben Kuhnel*

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WED09

Understanding NDMA Formation and Control

Track: Disinfection By-products

Moderator: *David Wahman*

1. Development of an Easy and Selective Tool for Nitrosamine Precursor Characterization in Water ~~WQ 1 F~~
Irwin Suffet, UCLA, School of Public Health, Shannon Leavey, Stuart Krasner
2. Contribution and Physical Removal of Watershed and Cationic Polymer N-Nitrosodimethylamine Precursors ~~WQ 1 G~~
David Hanigan, Arizona State University, Stuart Krasner, Pierre Herckes, Paul Westerhoff
3. Controlling the Formation of Nitrosamines During Water Treatment ~~WQ 1 H~~
Stuart Krasner, Metro Water District of Southern California, Paul Westerhoff, William Mitch, Janice Skadsen, Urs Von Gunten

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4. Preoxidative Control of Nitrosamine Formation in Chloraminated Drinking Water ~~MG F~~
Daniel McCurry, Stuart Krasner, William Mitch
5. New *N*-Nitrosodimethylamine Precursors That React With Ozone: Evaluation of NDMA Yields and Enhanced Formation in Reclaimed Water ~~MG F~~
Erica Marti, Aleksey Pisarenko, Julie Peller, Eric Dickenson
6. Artificial Sweeteners As Emerging Indicators of Wastewater Discharges and NDMA Precursor Loading in Potable Source Waters ~~MG G~~
Matthew Prescott, Metro Water Dist. of Southern California, Stuart W. Krasner, Yingbo Guo

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ST06WED

Impacts of Wildland Fires on Water Quality: Implications for Water Utilities

Track: Water Resources Sustainability

Moderator: *Chi Ho Sham*

1. Assessing Wildfire Impacts on Water Quality and Treatability ~~WG H~~
*Uldis Silins, University of Alberta, Kevin Bladon, Uldis Silins,
Monica Emelko, Kevin Bladon, Michael Stone*
2. Water Quality Impacts From Fires in Lower Versus Upper
Watersheds of Central Arizona ~~WG I F~~
Paul Westerhoff, Arizona State University
3. Post-Fire DOC, DBPs, and Nutrients: Justifying and Achieving
Robust Treatment ~~WG I F~~
Monica Emelko, University of Waterloo

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4. Impact of the High Park Forest Fire on Water Quality and Treatment
Amanda Hohner, University of Colorado, Boulder, Jeff Writer,
Kaelin Cawley, R. Scott Summers, Fernando Rosario-Ortiz
5. Understanding Your Watershed Approaches for Assessing
Downstream Propagation of Wildfire Impacts on Water
Quality
Michael Stone, University of Waterloo, Monica Emelko,
Krish Krishnappan, Adrian Collins, Kevin Bladon, Chris Williams
6. Minimizing Wildfire Risk to Municipal Water Works by Active Source
Water Protection
Kevin Bladon, University of Alberta, Uldis Silins,
Monica Emelko, Diane Dupont

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ST07WED

Beyond Pathogen Monitoring: The Microbiology of Drinking Water

Track: Microbiology

Moderator: *George Di Giovanni*

1. The Good, The Bad, and The Ugly—There's More to Microbiology Than Just Pathogens ^{WG} i F
Paul Rochelle, Metropolitan Water District
2. Microbial Corrosion ^{WG} JH
Marc Edwards, Virginia Tech
3. Evaluating and Controlling Biofilms in Distribution Systems ^{WG} FI
Melinda Friedman, Confluence Engineering Group, LLC
4. Biological Drinking Water Treatment? ^{WG} HF
Jess Brown, Carollo Engineers

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5. Nitrification and Biostability ~~AG I I~~
Amy Pruden, Virginia Tech, Yan Zhang, Marc Edwards, Hong Wang
6. The Microbial Universe in Your Distribution System ~~AG I I~~
Wen-Tso Liu, University of Illinois at Urbana–Champaign

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ST08WED

Iodine 131–Radio Nuclide Observed in Drinking Water Sources and in Wastewater Treatment

Track: Inorganics

Moderator: *Jeffrey Rosen*

1. AWWA-Regulatory Background on I 131
J. Alan Roberson, American Water Works Association
2. Philadelphia's Investigation of Iodine-131 in its Drinking Water
*Kelly Anderson, John Consolvo, City of Philadelphia,
Kathryn Guest, Julia Rockwell*
3. Occurrence and Concentrations of Medically Derived I 131 in
Municipal Sewage and Sewage Sludge
*Paula Rose, National Research Council Postdoctoral Research
Associate*

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4. CH2M HILL, the State of the Art in I131 Removal in Drinking Water Treatment ~~WG F1~~
Kevin Dixon, CH2M HILL
5. Tetra Tech, Monitoring Considerations for I131 in Source Waters ~~WG GG~~
Jeffrey Rosen, Tetra Tech-Clancy Environmental, Timothy Bartrand
6. Experts Workshop on the Significance of Elevated 131I Activity in Drinking Source Waters ~~WG HF~~
Timothy Bartrand, Jeffrey Rosen

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WED10

Analysis of UCMR3, CC Lists, and Cyanotoxins

Track: Lab Methods & Monitoring

Moderator: *Elizabeth Turner*

1. UCMR3—What Have We Learned From Year 1?
Andrew Eaton, Eurofins Eaton Analytical
2. Challenges and Solutions in UCMR3 Analyses
Yongtao Li, UL LLC
3. Development of an On-line SPE-LC/MS/MS Method for the Analysis of Chemicals on USEPA'S Contaminant Candidate List
Jody Shoemaker, USEPA, Office of Research & Development
4. Simple Modification of Liquid Chromatographic System to Reduce Perfluorinated Alkyl Acids (PFAAs) Background for USEPA Method 537
Lily Sanchez, Orange County Water District, *Anny Lau*, *Lee Yoo*, *Linda Liang*

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5. Challenges in Quantification of Lead (Pb) in Tap Water
Simoni Triantafyllidou, USEPA
6. Effect of Alkalinity and NOM on Trace-Level Hexavalent Chromium Analysis
Jeffrey Parks, Virginia Tech, Laurie McNeill, Kathita Chittaladakorn, Marc Edwards

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WED11

Water Quality and Treatability of Challenging Source Water Situations

Track: Treatment Process
Moderator: *Jeff Swertfeger*

1. The USEPA Drinking Water Treatability Database—A Tool for All Drinking Water Professionals **WG 6F**
Thomas Speth, WA State Department of Health, *Samuel Perry*, *Jeffrey Adams*, *Michael Dodd*
2. Determining Water Quality Specifications for an Operations Service Contract of a Large Water Treatment Plant **WG FH**
Elaine Howe, Trussell Technologies, *R. Rhodes Trussell*, *Celine Trussell*, *Eileen Idica*
3. Water Treatment Optimization Strategy of Blending Multiple Water Sources and Treatment **WG G**
Ryan Rhoades, CH2M HILL, *Michael Hwang*, *Lee Odell*, *Shuang Huang*

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WED12

Using Models to Predict Treatment Process Efficacy: DAF and Coagulation

Track: Treatment Process
Moderator: *Jeff Swertfeger*

1. Opening the Door of Dissolved Air Flotation: Using CFD Modeling to Evaluate the Fundamentals of DAF ~~WG H~~
Matthew Valade, Hazen and Sawyer
2. Development of a Three-Phase Flow Model for Optimization of Particle Removal in Dissolved Air Flotation ~~WG I~~
Babak Lakghomi, University of Toronto, Ronald Hofmann, Yuri Lawryshyn
3. Application of a Semi-empirical Model to Predict DOC-Removal by Coagulation on the Basis of LC-OCD-Analytcs ~~WG I J~~
Javier Farias, Technische Universität Dresden, Irene Slavik, Wolfgang Uhl

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WED13

Understanding and Managing Membranes Fouling in Different Applications

Track: Treatment Process

Moderator: *Jonathan Pressman*

1. Understanding Ultrafiltration Fouling Caused by Manganese and Iron
Seyedeh Laleh Dashtban Kenari, Benoit Barbeau, Pierre Berube
2. Application of Tight Ceramic UV Membrane for RO Pre-treatment and Impact of Organic Fouling and Chemical Cleaning on the Surface Charge
Ran Shang, Delft University of Technology
3. Ceramic Membrane Filtration of Seawater: Fouling Management
Gary Amy, King Abdullah University of Science and Technology, Juma Hamad, Chang-Won Ha, Maria Kennedy

Continued . . .

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4. Ultrafiltration of Seawater During Algal Bloom: Membrane Fouling as a Function of the Algae Species and Cleaning Performances
Tony Merle, Laure Dramas, Veronica Garcia-Molina, Jean-Philippe Croue, King Abdullah University of Science & Technology
5. Challenges in Replicating Full-Scale Fouling of Nanofiltration Membranes Treating Groundwater in Laboratory Cross-Flow Systems
Alex Gorzalski, Orlando Coronell
6. Impact of Synergistic Interactions of DOM, Colloids, and Cations in Natural Water Matrix on Nanofiltration of Phac/Edcs
A. H. M. Anwar Sadmani, Robert Andrews, David Bagley

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WED14

Modeling DBP Production and Disinfection

Track: Disinfection By-products

Moderator: *Richard Sakaji*

1. Beyond the CT_{10} Approach: A Validation of Alternative Models to Predict Disinfection Performance ~~WJEG~~
Benoit Barbeau, Ecole Polytechnique De Montreal, Valentin Pfeiffer
2. Disinfection By-product Modeling Using Principal Components Analysis of Fluorescence Excitation-Emission Matrices ~~WJFH~~
Nicolas Peleato, Robert Andrews
3. T in CT -CFD Modeling Puts the "T" in Contact Time in the Driver's Seat to Optimize Design and Reduce Costs ~~WJFI~~
Sean Zhang, Hazen and Sawyer, P.C., Bill Becker, Matthew Valade, Julie Herzner, Rich Peters

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WED15

Better Understanding of Chloramine Chemistry and Distribution System Applications

Track: Distribution

Moderator: *David Hartman*

1. The Reaction of Monochloramine and Hydroxylamine: Implications for Ammonia–Oxidizing Bacteria in Chloraminated Drinking Water
David Wahman, USEPA/ORD, Gerald Speitel
2. Burn Baby, Burn! Modeling and Implementing a Free Chlorine Burn for Biofilm Control in Chloraminated Water Systems
Simon Horsley, Laura Meteer
3. Case Study of Mobile Booster Chloramination Unit—Another Tool for Better Water Quality
Don Pannell, Prince William County Service Authority, Sonali Ambre

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