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28 - 31 March 2011**

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2011 MEMBRANE TECHNOLOGY

Conference & Exposition

11th biennial conference dedicated to membrane processes for drinking water treatment.

March 28-31, 2011 | Long Beach, California

Tuesday, March 29, 2011

Wednesday, March 30

Thursday, March 31



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OGS	Opening General Session Moderator: <i>Brent Alspach</i>
TUE01	Electrodialysis: New Directions Moderator: <i>Jonathan Pressman</i>
TUE02	Design Membrane Systems for Indirect Potable Reuse Moderator: <i>Mary Portillo</i>
TUE03	Sustainability by Design Moderator: <i>Scott Freeman</i>
TUE04	Challenges in Brackish RO Operations Moderator: <i>Roger Noack</i>
TUE05	Desalination Posters
TUE06	Fouling Posters
TUE07	Pretreatment Posters
TUE08	Membrane Materials Research to Improve Performance Moderator: <i>Desmond Lawler</i>



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| ST01 | Permitting Challenges for Emerging Water Supplies
Moderator: <i>Greg Wetterau</i> |
| TUE09 | Concentrate and Residuals Management
Moderator: <i>Anthony Tarquin</i> |
| TUE10 | Surface Water RO/NF
Moderator: <i>Brent Alspach</i> |
| WEDEB01 | Recent Research Advances by the UCLA Water Center in
RO Desalination I
Moderator: <i>Yorum Choen</i> |
| WED01 | Seawater I: Cost, Energy Recovery, and Operations
Moderator: <i>Heidi Luckenbach</i> |
| WED02 | Pretreatment I: Coagulant Applications
Moderator: <i>Graham Best</i> |
| WED03 | Removing Constituents of Emerging Concern
Moderator: <i>Khalil Atasi</i> |



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- WED04 Fouling I: RO/NF
Moderator: *James Vickers*
- WED05 Design, Construction, and Operation Posters
- WED06 Membrane Research Posters
- WED07 Membrane Reuse and Reclamation Posters
- WED08 Seawater II: Pretreatment, Posttreatment, and
Facility Profiles
Moderator: *Karla Kinser*
- WED09 Pretreatment II: Alternative Methods
Moderator: *Kerry Howe*
- WED10 Case Studies: Challenges and Innovations
Moderator: *Mehul Patel*
- WED11 Fouling II: MF/UF
Moderator: *Peter Huck*



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- THUEB02 Recent Research Advances by the UCLA Water Center in RO Desalination II
Moderator: *Yoram Cohen*
- ST02 Planning for California's Future Water Supplies
Moderator: *Robert Cheng*
- THU01 Regulatory Challenges for Pathogen Removal
Moderator: *Brian Bernados*
- THU02 Testing Membranes for Specific Water Quality Problems
Moderator: *Robert Bergman*
- THU03 Plant Design and Project Delivery
Moderator: *Ian Wright*
- THU04 Moving Forward With Forward Osmosis
Moderator: *Ian Watson*



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- | | |
|-------|--|
| THU05 | Ceramic Membranes: Coming or Going?
Moderator: <i>Jesus Garcia-Aleman</i> |
| THU06 | Advanced Oxidation for Membrane Pretreatment
Moderator: <i>Lance Schideman</i> |
| THU07 | Membrane Life: Factory Testing to
Membrane Replacement
Moderator: <i>Todd Reynolds</i> |



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OGS **Opening General Session**

Moderator: *Brent Alspach*

1. Planning Committee Welcome ~~W. DE~~
Brent Alspach, Malcolm Pirnie, PC Chair
2. Local Welcome ~~W. DE~~
Kevin Wattier, LBWD General Manager
3. Keynote Address ~~W. DE~~
Advancing The Use of Membranes to Meet
Water Supply Challenges
Jeffrey Mosher, Executive Director, National
Water Research Institute



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TUE01 Electrodialysis: New Directions

Moderator: *Jonathan Pressman*

1. Feasibility of Electrodialysis for Inland BWRO Concentrate Treatment
W. Shane Walker, The University of Texas at El Paso, Younggy Kim, Desmond Lawler
2. Zero Liquid Discharge Desalination
Rick Bond, Black & Veatch, Srinivas Veerapaneni
3. Evaluation of the Statistical Properties of the Boundary Layer Near Ion-exchange Membranes in Electrodialysis
Younggy Kim, Penn State University, W. Shane Walker, Desmond Lawler



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TUE02 Design Membrane Systems for Indirect Potable Reuse

Moderator: *Mary Portillo*

1. Optimizing RO Design Criteria for Indirect Potable Reuse ~~AWW~~
Greg Wetterau, CDM, Eric Smith, Gary Stolarik
2. Comparison of Nanofiltration and Reverse Osmosis Membranes to Produce High- Quality Water for Indirect Potable Reuse ~~AWW~~
Bruce Mansell, LA County Sanitation Districts
3. Investigating the Limits of Technologies for MBR, RO and AOP Processes to Achieve Ultra-low Levels of Nutrients and Micropollutants ~~AWW~~
Zakir Hirani, MWH Americas Inc., Yurfa Glenny, James Ferguson, Luis Casado, Hal Schmidt, Karla Kinser, Lynette Cardoch



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TUE03 Sustainability by Design

Moderator: *Scott Freeman*

1. Indirect Potable Reuse: Examine the Sustainability of Three Different Advanced Water Treatment Schemes
Jim Lozier, CH2M HILL, Inc., Lawrence Schimmoller, Robert Bergman, Jason Curl
2. Sustainability in the Design and Construction of a New 18-MGD Submerged Membrane Filtration Plant
Jack Bryck, Malcolm Pirnie, Laurie Sullivan, Chris Jones, Rodney Rice, John Moore
3. Utilisation of Embodied Energy Down Under by “Sucking It”: Siphon Operation at a 100-MLD Membrane WTP
Matthew James Bloomfield, Hunter Water Australia, Stephen Blanshard, Ian Minney, Gabriel Kicsi, David Oxenham, Paul Thompson



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TUE04 Challenges in Brackish RO Operations

Moderator: *Roger Noack*

1. Treating High-TDS Brackish Water in Sandoval County, New Mexico ~~AWA~~
Robert Fowlie, CDM, Greg Wetterau, Jeremy Anderson
2. Operation of a Groundwater Desalination Pilot Plant in South Texas: Challenges and Lessons Learned ~~AWA~~
Roberto Macias, San Antonio Water System
3. Perris I and Menifee Desalination Facilities Operations Optimization Project ~~AWA~~
Imad Feghali, CH2M HILL Inc., Jim Lozier, Ufuk Erdal



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TUE05 Desalination Posters

1. Renewable Energy Technologies and Energy Efficient Strategies for Reverse Osmosis Facilities ~~AWFJ~~
Mohammad Badruzzaman, MWH Americas, Arun Subramani, Joan Oppenheimer, Joseph Jacangelo
4. Optimization in Electrodialysis Reversal: Influence of Operating Parameters on Separation Percentage, Current Efficiency ~~AWFI~~
Lakshmi Pradeepa Vennam, WERC, New Mexico State University, Abbas Ghassemi
6. Utilizing NF/RO to Treat Multiple Fresh and Brackish Groundwater Supplies for Potable Water Use: Upgrading Lee County Utilities ~~AWPDE~~
Mickal Witwer, CH2M HILL Inc., Douglas Meurer, Kim Hoskins, Henry Barroso, Jim Lozier, Joseph Elarde
8. An Update of Significant Coastal Desalination Projects in California ~~AWFI~~ €
Joseph Wong, Brown and Caldwell



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TUE06 Fouling—Posters

1. Application of a Peracetic Acid-Based Cleaner as a Novel Barite Scale Remover ~~WFI~~ J
Magdalena Jaklewicz, General Electric Power and Water, Michael Theodoulou, Philip Lander, Abdul Guuled, Mike Harvey
3. Use of Constant Flow Filterability and UV Absorbance Spectrum to Characterize Organic Membrane Foulants ~~WFI~~ I
Wendy Broley, Separation Processes, Inc., James Vickers, Wyatt Won, Christiana Daisey
4. CMI In Membrane Technology—A New Green Antiscalent ~~WFI~~ I
Koos Baas, AQUACARE EUROPE BV, Ron Jong, Janneke Duiven
5. Comparison of Flux Step Methods for the Determination of Critical Flux of Membranes in Drinking Water Treatment ~~WFI~~ E
Nigel Paul De Souza, Department of Civil and Environmental Engineering, Carleton University, Onita Basu



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7. The Use of Nanoalumina Filtration Media for the Prevention of RO/NF Biofouling in Integrated Membrane Systems ~~WFI I~~
Michael Jaubert, Ahlstrom Filtration, Heather Mowers
8. Fouling Resistant Polyamide RO Membrane and Its Use for Wastewater Treatment ~~WFI I~~
Ja-Young Koo, Woongjin Chemical Co., Jong Hwa Lee, Yong Doo Jung, Sung Pyo Hong



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TUE07 Pretreatment Posters

1. Combined Ion Exchange (CIX) as a Pretreatment for High-Pressure Membrane Systems ~~WFI~~
Jennifer Apell, CDM, Treavor Boyer, Katsuki Kimura
2. Full-Scale Dissolved Air Flotation as a Pretreatment Strategy for an Ultrafiltration Membrane Installation ~~WJF~~
Brian McGovern, Degremont Technologies–Infilco, Matthew Boettcher
3. Control of Membrane Biofouling in Seawater RO Desalination Systems ~~WCE~~
Mark Wilf, Tetra Tech
5. Pretreatment of Ultrafiltration Permeate for Reverse Osmosis Filtration Using Controlled Hydrodynamic Cavitation ~~WGH~~
Philip Vella, VRTX Technologies



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TUE08 Membrane Materials Research to Improve Performance

Moderator: *Desmond Lawler*

1. Determining Membrane Pore Structure by Atomic Force Microscopy Using a Novel Data Analysis Technique
Ahmed Mohamed El-Hadidy, University of Waterloo, Sigrid Peldszus, Michele Van Dyke
2. Enhancement of State-of-the-Art Polyamide RO/NF Membrane Performance With Dendritic Aramide Macromolecules
Ana Saenz De Jubera, University of Illinois at Urbana-Champaign, Yuan Gao, Jeffrey Moore, Tamlin Matthews, Benito Marinas, David Cahill
3. Polyelectrolyte Multilayer Films as Backflushable Nanofiltration Membranes With Tunable Hydrophilicity and Surface Charge
Vlad Tarabara, Michigan State University, Wenqian Shan, Merlin Bruening, Pierre Aimar, Patrice Bacchin



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4. Linking Polyamide Active Layer Structure and Chemistry to Reverse Osmosis Membrane Performance
Tamlin Matthews, University of Illinois at Urbana–Champaign, Orlando Coronell, Benito Marinas, Huan Yan, David Cahill
5. Investigating the Effect of NF and RO Membrane Surface Chemistry on Organic Fouling and Chemical Cleaning Using QCM-D
Alison Contreras, Rice University, Jinjian Wu, Qilin Li, Roni Kasher, Zvi Steiner
6. Preparation and Characterization of Ag Nanoparticle-Composite Ultrafiltration Membranes and Impacts
Pseudomonas Aeruginosa
Appala Badireddy, Duke University, Elif Soyer, Mark Wiesner



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ST01 **Permitting Challenges for Emerging Water Supplies**

Moderator: *Greg Wetterau*

1. Future Regulations and Constituents of Emerging Concern ~~Wp DE~~
Bruce Macler, USEPA Region 9
2. Developing Potable Reuse Regulations in California ~~Wp DE~~
Heather Collins, California Department of Public Health
3. An Environmental Perspective on Reuse and Desalination ~~Wp DE~~
Heather Cooley, Pacific Institute
4. Environmental Permitting for Seawater Desalination ~~Wp DE~~
Kevin Thomas, RBF Consulting
5. Integrity Testing for Reverse Osmosis Systems ~~Wp DE~~
Douglas Brown, CDM, Inc.
6. Roundtable Discussion—Permitting Challenges for Emerging Water Supplies ~~Wp DE~~
Bruce Macler, USEPA Region 9, *Heather Collins*, CA Dept. of Public Health, *Heather Cooley*, Pacific Institute, *Kevin Thomas*, RBF Consulting, *Douglas Brown*, Camp Dresser & McKee, Inc.



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TUE09 Concentrate and Residuals Management

Moderator: *Anthony Tarquin*

1. Selective Recovery of Desalination Concentrate Salts Using Interstage Ion Exchange ~~WCI~~
Kerry Howe, University of New Mexico, Joshua Goldman, Bruce Thomson
2. Utilization of High-Pressure Membranes to Allow Recovery of Waste Brine From Ion Exchange Treatment of Drinking Water Sources ~~WCI~~
Miguel Arias, Orica Watercare Inc., Kelly McCurry, Kevin Felblinger, Michael Bourke
3. A State of Approach for the Selection of Best Concentrate Management Technology ~~WCI~~
Ufuk Erdal, CH2M HILL, Jim Lozier, Anne Lynch
4. Zero Discharge Desalination: Maximum Recovery of Brackish Groundwater Utilizing Ion Substitution Electrodialysis ~~WCI~~ €
Brad Biagini, N.A. Water Systems, Bernie Mack, Thomas Davis, Malynda Cappelle



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5. Innovative Membrane Technology for Reuse at a Zero Discharge Power Plant ^{WGH}
Nathan Kutil, HDR Engineering, Inc., Craig Habben, Jacob Ostrander
6. Minimizing Sewer Discharge Through Ultrafiltration Reject Recovery: A Case Study ^{WGF}
Karla Kinser, MWH Americas, Geno Lehman, Greg Kowalski, Jeff Allred, Stephanie Sansom, James Borchardt



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TUE10 Surface Water RO/NF

Moderator: *Brent Alspach*

1. Surface Water Dual-Membrane Treatment Plant-Design Innovations and 7 Years of Operation **AGJ**
Robert Bergman, CH2M HILL, Kenny Hutchins, Brian Fuerst, Juan Gomez
2. Nanofiltration in Méry-sur-Oise Drinking Water Treatment Plant: Lessons Learned After 10 Years of Operation **MFH**
Cyril Marconnet, Veolia Water, Malik Djafer, Veronique Heim, Gerard Chagneau, Laurence Fournier, Xavier Metteil
3. Comparison of Surface Water Pretreatment Technologies for Membrane-Based Drinking Water Production Processes **MHG**
Nathalie Vigneron-Larosa, Veolia Environnement, Centre De Recherche Sur L'Eau, Maxime Magnier, Sophie Rapenne, Carine Breda
4. Optimizing NF/RO Pretreatment for an Integrated Membrane Facility Treating a Challenging Florida Surface Water **MIF**
Joseph Elarde, CH2M HILL, Douglas Meurer, Howard Wegis, Thomas Hill, Jim Lozier, Rajah Augustinraj



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5. RO Piloting for Biofouling Control at the Brazos River Authority (BRA) Surface Water and Treatment System (SWATS) ~~AMT~~ ^{AMT}
William Marriott, CDM Inc., Curtis Kiefer, David Briggs, Allen Woelke
6. Membrane Pilot Testing of the Hudson River for Potable Water Production ~~AMT~~ ^{AMT}
Curtis Kiefer, CDM, Inc., Ken Klinko, Sameet Master, Mark White



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WEDEB01

Recent Research Advances by the UCLA Water Center in RO Desalination I

Moderator: *Yoram Cohen*

1. Evaluation of the Surface Properties of High-Performance Nano-Structured NF/RO Membranes ~~W. DE~~
Kari Varin, UCLA, Nancy Lin, Yoram Cohen
2. Mineral Scaling of RO Membranes in the Presence of a Biofilm ~~W. DE~~
John Thompson, UCLA Campus
3. Real-Time Monitoring of Mineral Scaling for Reverse Osmosis Desalination ~~W. DE~~
Alex Bartman, UCLA - Chemical Engineering Office, Panagiotis Christofides, Yoram Cohen, Robert Rallo



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WED01 Seawater I: Cost, Energy Recovery, and Operations

Moderator: *Heidi Luckenbach*

1. Energy Recovery in RO Applications: Case Studies of Energy Recovery in High- & Low-Pressure Desalination Applications
Srinivas Veerapaneni, Black & Veatch, Mehul Patel, William Dunivin, Sunny Wang, Dave Argo
2. Energy Minimization in Seawater Desalination
Robert Huehmer, CH2M HILL, Inc.
3. Seawater Desalination With Large-Diameter RO Elements in Chile
Henia Yacubowicz, Koch Membrane Systems, Antonia von Gottberg, Sergio Rodrigues Ribeiro
4. Fate of Reverse Osmosis (RO) Membranes During Desalination of Chloraminated Seawater
Jean-Philippe Croue, King Abdullah University of Science & Technology (KAUST), Thomas Maugin, Benito Marinas, Sophie Rapenne, Ana Saenz De Jubera, Tennie Renkens



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5. Take It With a Grain of Salt: What You Need to Know About SWRO Costs ~~€~~ €
Brent Alspach, Malcolm Pirnie, Inc., Ian Watson
6. Cost of Desalinating Seawater Based on LBWD's Prototype Facility Testing ~~€~~ €
Tai Tseng, Long Beach Water Department, Robert Cheng



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WED02 Pretreatment I: Coagulant Applications

Moderator: *Graham Best*

1. Development of the Best Pretreatment for Low-Pressure Membranes on High-Organic Surface Water
Gerardus Schers, MWH, Kristin Hink, David Wilkes, Geno Lehman, Eduardo Balbis
2. To Settle or Not to Settle: Evaluating Direct Coagulation and Membrane Treatment on a Very Challenging Raw Water Source
Adam Evans, HDR Engineering, Adriano Vieira, Mark Graves
3. Pacific Northwest Water Challenge for Ultrafiltration Membranes
Ian Wright, Associated Engineering, William Sims, Geno Lehman
4. High-Rate Clarification With Plates for Membrane Pretreatment
Yue Sun, CDM, Inc., Jessie Li, Sunil Kommineni, SuEllen Staggs



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5. Effects of Secondary Wastewater Treatment Process Design on Tertiary Membrane Filtration Performance 
Paul Gallagher, Siemens Water Technology, Phil Sorrentino
6. Pretreatments for Selective Removal of NOM and Their Effects on Membrane Filtration 
Haiou Huang, Johns Hopkins Bloomberg School of Public Health, Kellogg Schwab, Joseph Jacangelo



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WED03 Removing Constituents of Emerging Concern

Moderator: *Khalil Atasi*

1. Hybrid Models for Predicting Rejection of Micropollutants by NF and RO Membranes *W. H. J.*
Gary Amy, King Abdullah University of Science and Technology, Victor Yangali-Quintanilla, Maria Kennedy, Takahiro Fujioka
2. Microconstituent Removal by High-Pressure Membranes in Water Reuse Systems *W. I. G.*
Eva Steinle-Darling, Erlen & Kalinowski, Inc.
3. Effect of Fulvic Acid on the Sustained Removal of Organic Microconstituents by Carbon Nanotubes Modified MF Membrane *W. I. I.*
Haiou Huang, Hyun-Hee Cho, Johns Hopkins Bloomberg School of Public Health, Joseph Jacangelo, Kellogg Schwab
4. Models to Predict Organic Contaminant Removal by RO and NF Membranes *W. I. I.*
Christopher Bellona, Clarkson University, Jorg Drewes, Karen Budgell, David Ball, Kathryn Spangler



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5. Micropollutants Removal Prediction for High-Recovery Low-Pressure Reverse Osmosis ~~AM~~ F
Céline Bullet, Veolia Environnement Recherche & Innovation,
Carine Breda, *Nicolas Dautier*, *Maxime Magnier*
6. Microconstituents Removal Via Reverse Osmosis, Ion Exchange and Ultra Violet Advanced Oxidation Processes ~~AM~~ F
Edwin Castilla, Hazen and Sawyer, *Jayson Page*, *R. Chalmers*,
Layla Llewelyn, *John Semper*



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WED04 Fouling I: RO/NF

Moderator: *James Vickers*

1. Investigation of Nanofiltration Fouling and Cleaning 
Jill Chlebeck, Separation Processes, Inc.
2. Description of an On-line Fouling Characterization Tool for the Méry-sur-Oise Nanofiltration Plant 
Kecili Karima, Veolia Eau - Compagnie, Generale des Eaux,
Malik Djafer, *Christian Democrate*, *Veronique Heim*
3. Use of Ex Situ Detectors to Simulate NF/RO Membrane Performance in a Full-Scale System 
Dian Tanuwidjaja, Long Beach Water Department, *Eric Hoek*,
Robert Cheng, *Tai Tseng*, *Kevin Wattier*
4. Fouling of RO Membrane: Chemical and Ultrastructural Characterization 
Muhammad Tariq Khan, *Jean-Philippe Croue*, *Ali Behzad*,
Bobby Hooghan, *Dalaver Anjum*



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5. Mechanisms of Combined Fouling of Reverse Osmosis Membranes by Gypsum Scale and Colloids ~~AM~~ | I
Vlad Tarabara, Michigan State University,
Fulin Wang
6. The Challenges of Identifying, Evaluating and Implementing Antiscalants in RO Reuse Applications: So Many Choices—So Few Winners ~~AM~~ | I
Tom Knoell, Orange County Water District, *Mehul Patel*,
William Dunivin, *Tyson Neely*, *Eric Owens*



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WED05 Design, Construction, and Operation Posters

1. Process Optimization and Concentrate Volume Minimization at the 6 MGD Arlington Desalter
Robert Ning, King Lee Technologies, Tom Troyer, Roger Tominello, Ray Marshall
3. Is It All in the Lime? Posttreatment Optimization for the Groundwater Replenishment System
Sunny Wang, Black & Veatch, Mehul Patel, William Dunivin, Jim Clark, Tim Phelan, Catherine Spencer
4. GWUDI Microfiltration in Rural Northern Idaho: The Enaville WTP Story
Robert Boysen, Separation Processes, Inc., Kevin Alexander, R. Michael Conn
5. From Conception to Operation: The Story of Florida's First Inland Low-Pressure Reverse Osmosis Regional Water Treatment Facility
David John Prah, CDM, Inc., Donald Thompson, Colin Hobbs, Brian Shields, Stephen McGrew



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7. First Year of Operation on a Flashy Source Water: Optimizing a 2-Stage Immersed UF Plant  JÍ
Samantha Kendrick, GE Power & Water, Paul Delphos, John Holden
11. Startup and Operation of the Wochholz Regional Water Reclamation Facility  F€
James Vickers, Separation Processes, Inc. Kevin King
12. Sustainable Low-Pressure Reverse Osmosis Concentrate Management—Three Years of Successful Operation  G
Colin Hobbs, CDM, Jorge Arevalo, John Noble
13. Enhanced Anti-scalant Monitoring and Control With Fluorescent-Dye-Laced Products  H
William Lovins, AECOM, Stephen McGrew



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WED06 Membrane Research Posters

1. Application of Membrane Distillation for Draw Solution Recovery in Forward Osmosis System
Sangho Lee, Korea Institute of Construction Technology, Hwan Kim, Yong-Jun Choi, June-Seok Choi
2. Algal Species Compatibility In EDR Concentrate
Venkat Ravi Kiran Paruchuri, Abbas Ghassemi
3. Separation of Three Divalent Cations (Cu, Ni and Co) by Two NF Membranes From pH 3-5
Shiao-Shing Chen, National Taipei University of Technology, Hong-Te Hsu
4. Modeling Scale Formation and Optimizing Scale Inhibitor Dosages in Membrane Systems
Robert Ferguson, French Creek Software, Inc., Baron Ferguson, Robert Stancavage
5. Effects of Thermodynamic Factors on Competitive Partitioning with Cation-exchange Membranes
Younggy Kim, Penn State University, Desmond Lawler



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WED07 Membrane Reuse and Reclamation Posters

1. Contribution of Physical and Biological Properties of MBR Sludge to Membrane Fouling 
Wontae Lee, KICT
4. Is Wastewater Reuse Coming to the Northeast? The University of Connecticut Selects MF to Solve Its Water Supply Problems 
Kristen Barrett, Hazen & Sawyer PC, Richard Cisterna, Alex Wesner, Joyeeta Banerjee
5. MBR Role in Reuse and Water Reclamation 
Val Frenkel, Kennedy/Jenks Consultants
6. Advanced Recycled Water Treatment Case Studies 
Sunny Wang, Black & Veatch, Sanjay Reddy, Jim Clark, Scott Freeman
7. Using Advanced Treatment and MBR Technology to Achieve Ultra-Low Treatment Targets for Wetlands Rehydration 
Stephanie Sansom, MWH Americas, Inc., James Ferguson, Karla Kinser, Lynette Cardoch



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WED08 Seawater II: Pretreatment, Post-Treatment, and Facility Profiles

Moderator: *Karla Kinser*

1. Pretreatment for SWRO – Current Practices From Water Research Foundation Survey
Srinivas Veerapaneni, Black & Veatch, Benjamin Klayman, Sunny Wang, David Carlson, Kenan Ozekin
2. Evaluating Membrane Fouling Conditions From Demonstration-Scale Under-Ocean Floor Seawater Intake System
Jason Allen, Long Beach Water Department, Robert Cheng, Tai Tseng, Kevin Wattier
3. Applying LBWD's Pipe Loop Test Results for the Integration of Desalinated Water
Yan Zhang, DXV Water Technologies LLC, Tai Tseng, Cynthia Andrews-Tate, Robert Cheng, Kevin Wattier
4. The Pareto Principle or "80-20 Rule" as Applied to Remote Community Seawater Desalination on Islands in the Torres Strait
Matthew Bloomfield, Hunter Water Australia, Daniel Fedorov, Patrick McGuire



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5. Update on Large-Scale Ocean Desal Plants
Paul Choules, Veolia Water Solutions & Technologies, Bernie Mack
6. Victorian Desalination Plant: Securing Future Water Supply in Melbourne, Australia
Ronald Cass, MWH, Dale Rohe, Steven Mendoza, Jeff Robinson



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WED09 Pretreatment II: Alternative Methods

Moderator: *Kerry Howe*

1. Impact of Polymer Flocculants on Microfiltration of Surface Water
Sen Wang, Rice University, *Charles Liu*, *Qilin Li*
2. Using Polymers During Clarification of Membrane Feedwaters—
It's Not As Scary As They Say
Lawrence Schimmoller, CH2M HILL Inc., *Jim Lozier*
3. Effect of Magnetic Ion Exchange Pretreatment on the Removal
of Organic Microconstituents by Low Pressure Reverse Osmosis
Joseph Jacangelo, MWH/Johns Hopkins University, *Haiou Huang*,
Kellogg Schwab
4. Performance of a Hybrid Membrane Process Using Biological PAC
Benoit Barbeau, Ecole Polytechnique De Montreal, *Annie Carriere*,
Sebastien Charest, *Simon Leveille*, *Alain Gadbois*



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5. Effect of Biological Activated Carbon Filters on the Removal of Biodegradable NOM, Molecular Weight & Membrane Fouling **AWI G**
Kerry Black, University of British Columbia, Pierre Berube
6. Achieving Manganese Removal at an MF/UF Plant Requires Proper Pretreatment and Raw Water Quality Monitoring **AWI G**
Benjamin Klayman, Black & Veatch, Michelle Cheek, Wayne Gresh, Srinivas Veerapaneni, Raymond Pardee



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WED10 Case Studies: Challenges and Innovations

Moderator: *Mehul Patel*

1. Operation Optimization and Membrane Performance of a Hybrid NF Plant
Craig Bartels, Hydranautics, Wayne Bates, Kirk Lai, Curtis Kiefer, Donald Bayler
2. City of Santa Monica's Charnock Well Field Restoration Program
Sunny Wang, Black & Veatch, Tony Antich, Gilbert Borboa, Dave Argo, Hala Titus, Holly Shorney-Darby, Srinivas Veerapaneni
3. Ultrafiltration Lowers DBPs for Palatka, Florida
David Edson, Hoyle Tanner & Associates, Inc.
4. A Practical Application of Converting Existing Conventional Surface Water Treatment Plants to Integrated Membrane Systems
Ken Anderson, Genivar



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5. Comparison of Ultrafiltration Systems for Small Potable Water System Improvements ~~WFC~~
Wontae Lee, KICT
6. Making Siphon SiFun: The Mid-Dakota Rural Water Expansion ~~WFC~~
Chris Lipski, GE Water and Process Technologies, *Joseph Honner*,
Bill Sarringar



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WED11 Fouling II: MF/UF

Moderator: *Peter Huck*

1. Behaviour of Foulants Under Different Hydrodynamic Conditions at the Surface of Submerged Membranes ~~WFE J~~
Sepideh Jankhah, University of British Columbia, *Pierre Berube*
2. Use of F-EEM and SEC to Characterize Variable Secondary Effluent Water Quality Prior to Microfiltration ~~WFE I~~
James Vickers, Separation Processes, Inc. *Wyatt Won*, *Christiana Daisey*, *R. Shane Trussell*
3. New Technique to Assess the Effects of Chemical Cleaning on Membrane Characteristics ~~WFE I~~
Syed Zaki Abdullah, University of British Columbia, Vancouver, *Pierre Berube*
4. Assessment of Causes of Irreversible Fouling in PAC/UF Systems for Water Treatment ~~WFE J~~
Isabel Londono-Montoya, University of British Columbia, *Pierre Berube*



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5. Comparison of Permeability and Fouling Trends for Two Different Generations of Norit Membranes at the Columbia Heights UF Plant
Graeme Pearce, Membrane Consultancy Association, Annika Bankston, Wendy Broley, Gerry Filteau
6. Reversible/Irreversible Fouling of Low-Pressure Membranes in Drinking Water Treatment
John Tobiason, University of Massachusetts, Amherst, Anh Hai Nguyen

Wednesday Additional Papers

Evaluation of the Surface Properties of High Performance Nano-Structured NF/RO Membranes
Kari Varin, Nancy H. Lin, Yoram Cohen

Mineral Scaling of RO Membranes in the Presence of a Biofilm
John Thompson, Nancy Lin, Eric Lyster, Ronit Arbel, Jack Gilron, Yoram Cohen

Real-Time Monitoring of Mineral Scaling for Reverse Osmosis Desalination
Alex Bartman, Robert Rallo, Panagiotis Christofides, Yoram Cohen



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THUEB02

Recent Research Advances by the UCLA Water Center in RO Desalination II

Moderator: *Yoram Cohen*

1. A Direct Method for Evaluating the Effectiveness of Antiscalant Retardation of Crystal Nucleation and Growth on RO Membranes
Alex Bartman, UCLA—Chemical Engineering Office
2. Fully Automated Feed Flow-Reversal Operation of RO Desalination: An Effective Approach for Suppressing Membrane Mineral Scaling
Han Gu, University of California, Los Angeles, Alex Bartman, Panagiotis Christofides, Yoram Cohen
3. Strategies for Reducing the Cost of RO Water Desalination
Aihua (Richard) Zhu, UCLA, Alex Bartman, Anditya Rahardianto, Panagiotis Christofides, Yoram Cohen



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ST02 Planning for California's Future Water Supplies

Moderator: *Robert Cheng*

1. IRP Update and Long-Range Supplies for MWD ~~WPE~~
Brandon Goshi, Metropolitan Water District of Southern California
2. Bay Area Regional Desalination Project ~~WPE~~
Manish Kothari, San Francisco Public Utility Commission,
Emily Corwin, Contra Costa Water District
3. SDCWA Seawater Program ~~WPE~~
Cesar Lopez, San Diego County Water Authority
4. Water for Monterey County ~~WPE~~
Steve Kasover, SEA Company
5. Developing a Model Solution for Sustainability
Through Water Reuse ~~WPE~~
Anthony Van, San Diego Public Utilities
6. Solving Orange County's Water Challenges Through
Membrane Technologies ~~WPE~~
Steven Malloy, Irvine Ranch Water District



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THU01 Regulatory Challenges for Pathogen Removal

Moderator: *Brian Bernados*

1. Pathogen Validation Testing of a Full-Scale Reverse Osmosis System at Gippsland Water Factory ~~AWFF€~~
Jim Lozier, CH2M HILL, Greta Zornes, Emily Jansen
2. Permitting of a Large California Membrane Filtration Installation ~~AWFF€~~
Jesus Garcia-Aleman, CH2M HILL Canada
3. Providing Safer, Softer Water While Enhancing Historic Big Spring Park: Case Study of Series Ultrafiltration With RO Softening ~~AWFFHJ~~
Christopher Milligan, Garver Engineers, David Thornton, Jeff McDonald, Jack Malone, Steven Jones
4. Spreadsheet Calculation and Comparison of Pressure-Based Direct Integrity Test Parameters ~~AWFFI F~~
Angela Cross, New Mexico Environment Department




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5. Is the LRV Calculation Applicable in Water Reclamation? ~~WFFI~~
Mary Portillo, MWH Global, Inc., Karla Kinser, Stephanie Sansom
6. Improvement to PDT Enabling a Quantification of the Remaining LRV for Viruses ~~WFFI~~
Martin Heijnen, Inge GmbH, Patrick Buchta, Roland Winkler, Peter Berg



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THU02 Testing Membranes for Specific Water Quality Problems

Moderator: *Robert Bergman*

1. Evaluations of MF/UF Membranes for High Turbidity Applications
Susan Crawford, CDM
2. Pilot Run of the Yuma Desalting Plant
*Michael D. Norris, Charles D. Moody, Bureau of Reclamation,
Yuma, Arizona*
3. Pilot Testing of Ceramic and Polymeric Membranes for a 30-MGD
Water Treatment Plant
Todd Reynolds, Kennedy/Jenks Consultants
4. Optimization of Reverse Osmosis Process Recovery for Treatment
of Mining- Contaminated Groundwater
*Arun Subramani, MWH Americas, Li Liu, Edwin Cryer,
Geno Lehman, Joseph Jacangelo*



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5. Application of Submerged Membranes and Media Filtration for a Low-Turbidity and Low-Alkalinity Surface Water ~~AMG I~~
Geno Lehman, MWH Americas, Inc., Charles Bromley, Ian Wright, William Sims
6. Selecting Organic Removal Pretreatment Processes for Membrane Filtration Facilities ~~AMG H~~
Supramaniam Suthaker, Associated Engineering, Garry Drachenberg



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THU03 Plant Design and Project Delivery

Moderator: *Ian Wright*

1. Seven Simple Suggestions for MF/UF Design ~~AWGJG~~
Scott Freeman, Black & Veatch, Srinivas Veerapaneni, Jeff Neemann
2. Optimal Location for an Ultrafiltration Membrane in a Drinking Water Plant Treating Lake Water Without Final Chlorination ~~AWHEF~~
Jakob Helbing, Zurich Water Supply, Harald Tarnowski, Oliver Koster, Heinz Bischofberger, Alexander Betschart, Hans-Peter Kaiser
3. Designing a Sustainable Surface Water Treatment Plant in an Urban Environment: The Baker Water Treatment Plant ~~AWHEJ~~
Joshi Raghavender, Irvine Ranch Water District, Richard Mori, Daniel Hugaboom, Vincent Roquebert, Corey Hess
4. How Do We Start It Up? Lessons Learned From Commissioning a Microfiltration System ~~AWHGF~~
Tricia Quigley, HDR, Jennifer Stillman



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5. Microfiltration System Upgrade at the AWT ~~AWFH~~
*Robert Boysen, Separation Processes, Inc., Kevin Alexander,
Benjamin Lee, John Matta, Arthur Nunez*
6. The “Business End” Impact of a Detailed Design and Construct
Only Procurement for a 100 MLD Submerged Membrane WTP ~~AWFH~~
*Stephen Blanshard, Hunter Water Australia Pty Ltd.,
Matthew Bloomfield, Paul Thompson, David Oxenham*



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THU04 Moving Forward With Forward Osmosis

Moderator: *Ian Watson*

1. A Comprehensive Study of Micropollutants Rejection by Forward Osmosis and Hybrid FO-RO
Tzahi Cath, Colorado School of Mines
2. Novel Dual-Barrier Hybrid Osmotic Dilution-RO System: Pilot-Scale Demonstration of Technical and Ecological Merit
Nathan Hancock, Colorado School of Mines, Tzahi Cath, Pei Xu, Dean Heil, Nathan Black
3. Effects of Membrane Surface Reconditioning by Organic Macromolecules on Gypsum Scaling of Forward Osmosis Membranes
Yaolin Liu, The George Washington University, Baoxia Mi



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THU05 Ceramic Membranes: Coming or Going?

Moderator: *Jesus Garcia-Aleman*

1. Knowing the Application: Ceramic or Polymeric Membranes? ~~WFI~~ | *Frank Rombardo, Jacobs*
2. Fouling Characterization of Ultrafiltration Ceramic Membranes With Model Solutions: Surface Characterization and Solute Rejection ~~WFI~~ | *Leila Munla, University of Waterloo, Sigrid Peldszus, Peter Huck*
3. Ceramic Membranes: Putting a Price Tag On Broken Fibers ~~WFI~~ | *Scott Freeman, Black & Veatch, Ronald Henderson, Paul Delphos, Sunny Wang*



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THU06 Advanced Oxidation for Membrane Pretreatment

Moderator: *Lance Schideman*

1. Ozone Pretreatment of a Non-Nitrified Secondary Effluent Before Microfiltration ~~WFI F~~
Fredrick Gerringe, Trussell Technologies, Inc., *Rajen Budhia*, West Basin Municipal Water District, *R. Shane Trussell*, *Marc Serna*
2. Comparison of UV, UV/Peroxide, Ozone, and Ozone/Peroxide for Organic Fouling Control in RO Membrane Applications ~~WFI GJ~~
Aleks Pisarenko, Southern Nevada Water Authority, *Shane Snyder*, *Benjamin Stanford*, *Dongxu Yan*
3. Oxidation of Model NOM and Natural Source NOM and Its Effect on Membrane Filtration Performance ~~WFI H~~
Joerg Winter, University of British Columbia, *Pierre Berube*



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THU07 Membrane Life: Factory Testing to Membrane Replacement

Moderator: *Todd Reynolds*

1. Demonstrating Improved RO Membrane Performance When Reclaiming Secondary Municipal Wastewater
Richard Franks, Hydranautics, Mehul Patel, Craig Bartels
2. Membrane Fiber Breakage: Case Histories, Probable Causes, and Possible Solutions
Richard Stratton, HDR Engineering, YuJung Chang
3. Fibre Replacement: Planning for the Future
Jeff Hennings, Region of Peel, Andrew Farr

Additional Papers Thursday

A Direct Method for Evaluating the Effectiveness of Antiscalant Retardation of Crystal Nucleation and Growth on RO Membranes
Eric Lyster, Alex Bartman, Brian McCool, Yoram Cohen

Fully Automated Feed Flow-Reversal Operation of RO Desalination: An Effective Approach for Suppressing Membrane Mineral Scaling
Han Gu, Alex Bartman, Panagiotis Christofides, Yoram Cohen

Strategies for Reducing the Cost of RO Water Desalination
Aihua Zhu, Alex Bartman, Anditya Rahardianto, Panagiotis Christofides, Yoram Cohen



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