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Conference At-a-Glance

All events are located in the Long Beach Convention Center (unless otherwise noted)

Monday, February 13

7:30 a.m.–6:30 p.m.	Registration Open Promenade Atrium
8:30 a.m.–4:30 p.m.	Pre-Conference Workshops (additional fee)
10:00 a.m.–3:00 p.m. <i>(Bus loads at 9:45 a.m.)</i>	T1 Technical Facility Tour (additional fee)
5:00–6:30 p.m.	Exhibit Hall Open Exhibit Hall B
5:00–6:30 p.m.	Welcome Reception Exhibit Hall B

Tuesday, February 14

7:00 a.m.–6:30 p.m.	Registration Open Promenade Atrium
8:15–10:00 a.m.	Opening General Session Grand Ballroom
10:00 a.m.–6:30 p.m.	Exhibit Hall Open Exhibit Hall B
10:00–10:30 a.m.	Refreshment Break Exhibit Hall B
10:30 a.m.–5:00 p.m.	Technical Sessions Rooms 201-203
noon–1:30 p.m.	Lunch With Exhibits Exhibit Hall B
12:45–1:15 p.m.	Experts in the Round Networking Session Exhibit Hall B
3:00–3:30 p.m.	Refreshment Break Exhibit Hall B
5:00–6:30 p.m.	Poster Sessions & Networking Reception Exhibit Hall B
6:30–8:00 p.m.	Student & YP Reception Hyatt Regency Shoreline Room

Wednesday, February 15

7:30 a.m.–6:00 p.m.	Registration Open Promenade Atrium
8:30 a.m.–5:00 p.m.	Technical Sessions Rooms 201-203
10:00 a.m.–6:00 p.m.	Exhibit Hall Open Exhibit Hall B
10:00–10:30 a.m.	Refreshment Break Exhibit Hall B
noon–1:30 p.m.	Awards Luncheon Grand Ballroom
3:00–3:30 p.m.	Refreshment Break
5:00–6:00 p.m.	Poster Session & Social Hour Exhibit Hall B
6:00–6:30 p.m.	AMTA Membership Meeting Exhibit Hall B

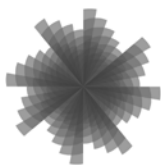
Thursday, February 16

7:30 a.m.–1:30 p.m.	Registration Open Promenade Atrium
8:00–11:00 a.m.	Exhibit Hall Open Exhibit Hall B
8:00–9:00 a.m.	Networking Breakfast in Exhibit Hall B
9:00 a.m.–3:00 p.m.	Technical Sessions Rooms 201-203
10:00–10:30 a.m.	Refreshment Break Exhibit Hall B
noon–1:30 p.m.	Luncheon Grand Ballroom
3:15–3:45 p.m.	Concluding Session & Paper/Poster Presentation Awards

Friday, February 17

8:30 a.m.–noon (<i>Bus loads at 8:15 a.m.</i>)	T2 & T3 Technical Facility Tours) (Additional Fee)
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2017 Membrane Technology Conference Planning Committee

Thank you for joining us! The 2017 Planning Committee looks forward to the week ahead as the MTC continues to be the premier event for membrane technology and its applications in North America.

Ben Movahed, Program Chair

WATEK Engineering Corporation

YuJung Chang, Program Vice Chair

AECOM

Andrea Achilli

Humboldt State University

Jorge Aguinaldo

Bios Technologies

Brent Alspach

Arcadis

Michael Bourke

Wigen Water Technologies

Lynne M. Gulizia

Toray Membrane USA, Inc.

Jill Miller

City of Bozeman Water Treatment Plant

Eric Owens

West Basin Municipal Water District

Monica A. Pazahanick

Carollo Engineers, Inc.

Tim Rynders

CDM Smith

Greg Wetterau

CDM Smith

Additional Contributors

YuJung Chang, Pre-Conference Workshops Chair

AECOM

Wayne Wright, SWMOA Representative

Tai Tseng, CA/NV AWWA Representative

Long Beach Water Department

Attendee Services

Registration

Everyone attending must register and wear a badge at all times. Please check in upon arrival.

Location: LBCC Promenade Atrium

Monday, February 13 7:30 a.m.–6:30 p.m.

Tuesday, February 14 7:00 a.m.–6:30 p.m.

Wednesday, February 15 7:30 a.m.–6:00 p.m.

Thursday, February 16 7:30 a.m.–1:30 p.m.

Continuing Education Credit Information

Continuing Education Units (CEUs)

To be awarded an AWWA CEU Certificate of Completion, please use the complimentary Attendee Time & Attendance CEU Record available at the registration counter. Please pick up a record prior to attending training, as you will need to provide it to the AWWA room monitor at the conclusion of each session. CEUs are available for technical sessions, poster sessions, workshops, facility tours, and NEW this year, Exhibit Hall Booth Visits. Please read all of the instructions on the Record.



Professional Development Hours (PDHs)

Only use the PDH recorder if your licensing agency will accept manual documentation. If you need Certificates of Completion, please follow the instructions under (CEUs). Agencies can convert CEUs into PDHs (.1 CEU = 1 PDH).



Questions on Continuing Education? Please contact Leah Bang, at Lbang@awwa.org.

Conference Proceedings

Conference Proceedings will be produced post-conference and sent to full-conference registrants via email in approximately eight weeks. In the interim, a pre-conference email was sent last week that contained a link to preview the conference papers. Look for these emails and be sure to add service@awwa.org as a safe sender.

Disclaimer

While AMTA and AWWA have taken care to ensure the qualifications of speakers, presenters and moderators at this conference, the opinions, comments and other views made by participants in his/her presentation(s) are not necessarily those of AMTA and AWWA nor their officers, directors, planning committee or staff.

Internet Access

Complimentary WiFi is available in the lobbies of the Long Beach Convention Center for casual web browsing. Additionally, two computers and a printer are available to you near the MTC registration counter. You may purchase 'Instant Internet' service inside session rooms for \$12.95 per day, or inside the exhibit hall for \$79 per day.

Exposition

Showcasing the latest in membrane technology and services! Enjoy dedicated exhibit hours, poster sessions, "Experts in the Round," Tuesday luncheon, Thursday networking breakfast, refreshment breaks and networking receptions—all taking place inside the exhibit hall! The exposition is open Monday evening through Thursday at 11:00 a.m., giving you plenty of time to meet with manufacturers' representatives, see application demonstrations, and get answers to your questions about membrane products, performance, and applications.

Presenter Ready Room

Room 204

Presenters, speakers, moderators, and room monitors are all required to check in at the Presenter Ready Room upon arrival. Staff will be available to assist with on-site technical support and all session-related activities.

Sunday, February 12	2:00–5 :00 p.m.
Monday, February 13	7:30 a.m.–5:00 p.m.
Tuesday, February 14	7:30 a.m.–5:30 p.m.
Wednesday, February 15	7:30 a.m.–5:30 p.m.
Thursday, February 16	8:00 a.m.–3:30 p.m.

Photo and Information Release

By registering for this event, you agree to allow AMTA/ AWWA to use your photo in any AMTA or AWWA-related publication or website. Registrants may receive show-related and promotional emails from exhibitors.

Recordings

The preparation of audio or video recordings is strictly prohibited at all times, for any purpose.

DAILY EVENTS

Monday, February 13

Pre-Conference Workshops—available for an additional fee at registration. See page 21 for details.

Technical Facility Tour

Tour 1—Carlsbad Desalination Project Tour

10:00 a.m.–3:00 p.m. (Boarding at 9:45 a.m.)

Ticket required to board.

Pre-registration was required for Tour 1—tickets are no longer available for purchase.

Board bus at 9:45 a.m. at the corner of Pine Street & Bay Street, directly across from the main promenade exit of the LBCC. NOTE: Drive time approximately 2 hours each way; attendees must wear long pants and closed-toed shoes with no heel and must carry photo ID for security.

Exposition Opening & Welcome Reception

Exhibit Hall B

5:00–6:30 p.m.

The receptions are a great place to network with other membrane technology professionals in a relaxed and informal atmosphere. Full-conference and one-day attendees received a beverage coupon for each reception in the badge packet. Entertainment provided by Sid Fly.

Tuesday, February 14

Opening General Session

8:15–10:00 a.m.

Grand Ballroom, Level 2

Join us for the grand conference kickoff, including local welcome and an inspiring keynote by Mina Guli, international marathoner and founder of the water organization Thirst. Entertainment will be provided by Sid Fly. See page 29 for complete OGS details.

Exposition Hours & Events

Location: Exhibit Hall B

Open: 10:00 a.m.–6:30 p.m.

Refreshment Break: 10:00–10:30 a.m.

Luncheon: noon–1:30 p.m.

Food served until 12:40 p.m.

Student & Young Professional Lunch Meet-Up

(Look for table signs): noon–1:30 p.m.

Experts in the Round Networking Session

(See page 34 for details): 12:45–1:15 p.m.

Refreshment Break: 3:00–3:30 p.m.

Networking & Poster Reception: 5:00–6:30 p.m.

Student & Young Professional Carnival-Themed

Charity Competition, Benefitting the charity: Thirst

5:00–6:30 p.m.

Technical Sessions

10:30 a.m.–5:00 p.m.

Student & Young Professional Reception

Hyatt Regency Hotel

Shoreline Room

6:30–8:00 p.m.

All students and young professionals are welcome to join us at this networking reception!

Wednesday, February 15

Exposition Hours & Events

Location: Exhibit Hall B

Open: 10:00 a.m.–6:00 p.m.

Refreshment Break: 10:00–10:30 a.m.

Refreshment Break 3:00–3:30 p.m.

Poster Session & Social Hour 5:00–6:00 p.m.

AMTA Membership Meeting 6:00–6:30 p.m.

Technical Sessions

8:30 a.m.–5:00 p.m.

Awards Luncheon

noon–1:30 p.m.

Grand Ballroom, 2nd Level

Join us for this annual celebration. Ticket required; awards ceremony begins at 12:20 at which time food service is discontinued.

AMTA Membership Meeting

6:00 p.m.

Exhibit Hall B

All AMTA Members encouraged to attend!
Beverage, snacks and prizes provided.

Thursday, February 16

Exposition Hours & Events

Location: Exhibit Hall B

Open: 8:00–11:00 a.m.

Networking Breakfast: 8:00–9:00 a.m.

Refreshment Break: 10:00–10:30 a.m.

Technical Sessions

9:00 a.m.–3:00 p.m.

Thursday Luncheon

noon–1:30 p.m.

Grand Ballroom, 2nd Level

Networking luncheon, ticket required.

Food served until 12:40 p.m.

Concluding Session & Paper/Poster Presentation Awards

3:15–3:45 p.m.

Join us for this conference finale!

Friday, February 17

Technical Facility Tours

All tours require a ticket—inquire at registration regarding availability.

Tour 2—Overview of Water Replenishment District of Southern California Reuse Program and Tour of Leo J. Vander Lans AWTF MF/RO Facility

8:30 a.m.–noon (Board bus at 8:15 a.m.).

Ticket required to board.

Tour 3—Terminal Island Water Reclamation Plant Advanced Water Purification Facility

8:30 a.m.–noon (Board bus at 8:15 a.m.)

Note: pre-registration was required for Tour 3. No onsite registration or name changes permitted; ticket required to board.

Board bus at 8:15 a.m., at the corner of Pine Street & Bay Street, directly across from the main promenade exit of the LBCC. Attendees must wear long pants and closed toed shoes with no heel and must carry photo ID for security.

MTC Awards

The Robert O. Vernon Operator of the Year Award recognizes the outstanding contribution of the year by a plant operator working at a membrane filtration, desalination, or water reuse facility that resulted in significant, long-term improvement in water production and/or water reuse.

The Membrane Facility of the Year Award recognizes an outstanding water/wastewater facility that uses any membrane technology with high efficiency in an environmentally friendly approach.

The Water Quality Person of the Year Award recognizes outstanding contribution by an individual in government, academia, research, or other to water supply improvement.

The Membrane Exhibit of the Year Award recognizes and honors the organization that highlights the importance of membrane technology with an exhibit booth at the AMTA/AWWA Membrane Technology Conference and Exposition.

The awards listed above will be presented at the Awards Luncheon.

Best Paper Presentation & Poster Presentation Awards

Two Student Best Paper Presentation Awards will be presented for the most outstanding student papers, and one Student Best Poster Presentation Award will be presented for the most outstanding Student Poster Presentation. An award will also be presented for the Best Paper Presentation by a Non-Student and Best Poster Presentation by a Non-Student.

The awards will be presented at the closing ceremony.

AMTA Awards

AMTA will be presenting the following awards during the Awards Luncheon on Wednesday:

- AMTA Hall of Fame
- AMTA/NWRI Fellowships
- AMTA/ADC Fellowships

AMTA will be presenting the following awards during the AMTA Membership Meeting on Wednesday, 6:00 p.m., in Exhibit Hall B:

- AMTA Member of the Year Award
- AMTA Distinguished Service Awards
- AMTA Presidential Awards

AWWA Awards

AWWA will be presenting the following awards during the Awards Luncheon:

- Best Advanced Treatment of Water Paper Award
- AWWA Austin F. McCormack Jr. Award, for Outstanding Membrane YP

2017 AMTA Upcoming Events

The American Membrane Technology Association (AMTA) is the nation's leading authority on membrane technology and application. With more than 2,000 membrane facilities installed throughout the United States, AMTA has led the way in providing membrane focused technical workshops, conferences, and networking opportunities to ensure manufacturers, suppliers, operators, and owners have the information they need to maximize their system productivity. Our members are a critical part of that effort and AMTA supports their commitment with unique benefits including

- Professionally authored technical Fact Sheets
- Access to AMTA's complete member list
- AMTA's quarterly newsletter—*Solutions*—which includes regulatory updates
- Access to compelling interviews with the pioneers of our industry
- Access to comprehensive Digital Library for AMTA Members
- Discounted registration fees at all AMTA events

The 2017 AMTA Technology Transfer Workshops schedule is outlined below, and we also encourage you to visit our website for more detailed information at www.amtaorg.com.

April 4–6, 2017

AMTA/SEDA Workshop, Atlanta Northeast, Ga.

“MBR and Reuse in the Southeast”

Facility Tours at Fulton County's Johns Creek Environmental Campus and Forsyth County Shakerag Water Reclamation Facility

May 10, 2017

AMTA Special Focus Workshop, Jupiter, Florida
“Concentrate Management”
Facility Tour at Town of Jupiter WTP

July 11–13, 2017

AMTA/NWMOA, Bozeman, Montana
”Fire, Ice & Difficult Water”
Facility Tour at City of Bozeman WTP

September 7, 2017

Membrane Technology “Uses and Needs in the
United States”
AMTA Workshop, Washington, D.C.

October 25–27, 2017

AMTA Workshop, Bloomington, Minnesota
“Membranes Solving Water Quality Problems”
Facility Tour at Minneapolis’s Columbia Heights
Membrane Filtration Plant

March 12–16, 2018

2018 AMTA/AWWA Membrane Technology
Conference & Exposition
West Palm Beach, Florida

February 25–March 1, 2019

2019 AMTA/AWWA Membrane Technology Conference &
Exposition
New Orleans, Louisiana

2017 AWWA Upcoming Events

Established in 1881, the American Water Works Association is the largest nonprofit, scientific and educational association dedicated to managing and treating water, the world's most important resource. With approximately 50,000 members, AWWA provides solutions to improve public health, protect the environment, strengthen the economy and enhance our quality of life.

AWWA Sustainable Water Management Conference

March 19–22, 2017

New Orleans, Louisiana

AWWA Annual Conference & Exposition (ACE17)

June 11–14, 2017

Philadelphia, Pennsylvania

AWWA Water Infrastructure Conference & Exposition

October 30–November 2, 2017

Houston, Texas

AWWA Water Quality Technology Conference & Exposition

November 12–16, 2017

Portland, Oregon

2018 AMTA/AWWA Membrane Technology Conference & Exposition

March 12–16, 2018

West Palm Beach, Florida

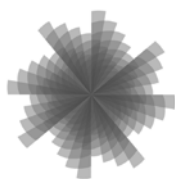
2019 AMTA/AWWA Membrane Technology Conference & Exposition

February 25–March 1, 2019

New Orleans, Louisiana

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2017 AMTA/AWWA Membrane Technology Conference

Monday, February 13, 2017

Monday's pre-conference workshops require an additional fee. Please inquire at registration.

Exposition open today 5:00–6:30 p.m.

Exhibit Hall B, Lower Level

PC1

Back to Basics

8:30 a.m.–4:30 p.m.

Room: 203 BC

Track: Workshop

Moderator: *Russ Swerdfeger*

Overview

Offering an introduction to membrane technologies and applications, this workshop introduces the basics of membranes and process design. Case studies targeting systems currently in operation will include comparison of pilot-scale and full-scale results. Workshop presenters have extensive experience in their specific fields, allowing the participants to freely engage in discussions during the individual presentations and/or during the roundtable discussion.

8:30

Introduction

Russ Swerdfeger, Evoqua Water Technologies

8:35

MF/UF Technology and Application Overview

Robert McCandless

Monday, *continued*

- 9:15** **MF/UF Design Perspective**
Ben Movahed, WATEK Engineering Corporation
- 9:45** **MF/UF Implementation: Procurement, O&M and Lessons Learned**
Robert Cormier, Pall Corporation
- 10:20** **Panel Discussion, Q&A Forum**
Robert McCandless, Ben Movahed, WATEK Engineering Corporation, Robert Cormier, Pall Corporation
- 10:35** **Break**
- 10:45** **NF/RO Technology and Application Overview**
Troy Walker, Hazen and Sawyer
- 11:15** **NF/RO Design Perspectives**
Wayne Bates, Hydranautics
- noon** **Lunch**
- 1:00** **NF/RO Implementation: Procurement, O&M and Lessons Learned**
Peter Waldron, Toray Membrane USA, Inc.
- 1:40** **Panel Discussion, Q&A Forum**
Troy Walker, Hazen and Sawyer, Wayne Bates, Hydranautics, Peter Waldron, Toray Membrane USA, Inc.
- 1:50** **Break**
- 2:00** **MBR Technology and Application Considerations**
Mike Snodgrass, Ovivo USA, LLC
- 2:40** **MBR Design Perspectives**
Zeynep Erdal, CH2M
- 3:10** **MBR Procurement, O&M, and Lessons Learned**
Andrew Gilmore, Carollo Engineers

- 3:50** **MBR vs. Tertiary UF: Considerations for Technology Selection**
Denis Guibert, H2O Innovation
- 4:15** **Panel Discussion and Q&A**
*Mike Snodgrass, Ovivo USA, LLC,
Zeynep Erdal, CH2M, Andrew Gilmore,
Carollo Engineers, Denis Guibert,
H2O Innovation*
- 4:25** **Closing Remarks**
*Russ Swerdfeger, Evoqua Water
Technologies*
-

PC3

Emerging Membrane-Based Technologies for Seawater Desalination: Present Status and Future Opportunities

8:30 a.m.–noon

Room: 202 BC

Track: Workshop

Moderator: *Chandra Mysore*

Overview

This workshop will provide the latest developments in membrane-based technologies for seawater desalination from both academic and practical perspectives. Presentations will discuss current and future development of membrane-based technologies for reduction in footprint, energy demand, and overall sustainability. The workshop will also review the potential advances in materials (e.g. ceramic, graphene) and configurations to improve performance. Specific aspects involving design and operation of these innovative technologies will inform decision makers of the important aspects they must consider in their own applications.

- 8:30** **Workshop Introduction**
Chandra Mysore, Jacobs
-

Monday, *continued*

- 8:40** **Forward Osmosis (FO): Advances in Process Engineering, Membranes, Draw Solutions, Hybrids, and Applications**
Gary Amy, Clemson University
- 9:10** **Membrane Distillation (MD): Process Development and Hybrid Systems for Different Applications**
Noreddine Ghaffour, KAUST
- 9:40** **Closed Circuit Reverse Osmosis**
Richard Stover, Desalitech
- 10:10** **Break**
- 10:30** **Procurement and Construction of an Open Platform Membrane System for the Clifton Water District**
Daniel Hugaboom, Carollo Engineers
- 11:00** **Advances in Pre-Treatment: Ceramic Membranes, Polymeric Membranes and Intelligent Controls**
Eric Hoek, Water Planet, Inc.
- 11:30** **Panel Discussion**
Chandra Mysore, Jacobs
Gary Amy, Clemson University
Noreddine Ghaffour, KAUST
Richard Stover, Desalitech
Daniel Hugaboom, Carollo Engineers
Eric Hoek, Water Planet, Inc.

PC5

Advanced Water Treatment Certification Program Development

8:30 a.m.–noon

Room: 201 B

Track: Workshop

Moderator: *Steven Garner*

Overview

As implementation of reuse grows, a key hurdle to overcome is operator training and certification. Aimed at operators and utility managers, this workshop will provide useful information regarding ongoing efforts on program development and industry guidance for advanced water treatment operator certification. This workshop does not provide operator certification but does review the efforts of CA/NV AWWA, AMTA, and other organizations to develop certification criteria and implement programs across the United States.

- 8:30** **Opening Remarks**
Steven Garner, California-Nevada
AWWA Section
- 8:35** **Overview of the Need for a New
Certification**
Toby Roy, San Diego County Water Authority
- 9:10** **WateReuse Research Foundation Efforts
(WRRF 13-13)**
Troy Walker, Hazen and Sawyer
- 9:35** **Advance Water Treatment Operator
Training ... What's Out There**
Scott McClelland, Sweetwater Authority
- 10:00** **Break**
- 10:15** **Industry Efforts by CUWA**
Wendy Broley, Brown and Caldwell
- 10:40** **Perceived Need by CA Expert Panel/
Advisory Group**
Al Lau, Padre Dam Municipal Water District

Monday, *continued*

- 11:05** **Overview of Creating a New Certification**
Steven Garner, California-Nevada AWWA Section
- 11:30** **Closing Comments and Q&A**
Steven Garner, California-Nevada AWWA Section
Toby Roy, San Diego County Water Authority
Troy Walker, Hazen and Sawyer
Scott McClelland, Sweetwater Authority
Wendy Broley, Brown and Caldwell
Al Lau, Padre Dam Municipal Water District

PC2

Membranes for Industrial Water Applications

1:00–4:30 p.m.

Room: 202 BC

Track: Workshop

Moderators: *Russ Swerdfeger,*
Jesus Garcia-Aleman

Overview

This workshop provides an overview of how membrane technologies can fit into industrial applications. Attendees will leave with a well-rounded understanding of how membrane technologies are applied in industry (e.g., CEDI, ceramic membranes) along with a summary of more broadly applied membrane systems like MF/UF and NF/RO. Presenters will discuss industrial process streams where membrane technologies are included such as boiler feed make up water in power generation.

- 1:00** **Welcome and Introduction**
Russ Swerdfeger, Evoqua Water Technologies

- 1:05** **Water for Industry: Challenges and Opportunities**
Ken Martins, CH2M
- 1:35** **Industry Applications for Membrane Technology**
Jesus Garcia-Aleman, CH2M
- 2:15** **Break**
- 2:25** **Power Applications**
Joseph Wong, Brown and Caldwell
- 2:55** **Oil and Gas**
Bruce Bishop, Veolia Water Technologies
- 3:25** **Food and Beverage**
Orest Zacerkowny, Evoqua Water Technologies
- 3:55** **Pharma and Microelectronics**
Russ Swerdfeger, Evoqua Water Technologies
- 4:25** **Wrap-up**
Russ Swerdfeger, Evoqua Water Technologies
-

PC4

Some Things Operators Oughta Know! (Presented by SWMOA)

1:00–4:30 p.m.

Room: 201 B

Track: Workshop

Moderator: *Wayne Wright*

Overview

The workshop will allow operators to learn about membrane plants from the design phase to daily operations. Topics include questions operators should be asking before a plant is built and operational, membrane procurement, replacement and disposal, and helpful strategies to tackle real-world issues. Attendees will interact with practicing treatment plant operators, support staff, and design engineers.

Monday, *continued*

- 1:00** **Welcome**
Wayne Wright
- 1:05** **10 Questions Operators Should Ask
Engineers Before Their Plant Is Built**
Kevin Alexander, Hazen and Sawyer
- 1:25** **Membrane Replacement Part 1**
*David Smith, Olivenhain Municipal
Water District*
- 2:05** **Membrane Replacement Part 2:
The Cradle to Grave Chronology**
Tom Knoell, PERC Water Corporation
- 2:35** **Break**
- 2:45** **Real-World Operations: Interactive Case
Studies of Actual Membrane Performance
Issues**
*Eric Owens, West Basin Municipal
Water District*
- 3:15** **Operator Roundtable Discussion**
*David Smith, Olivenhain Municipal Water
District, Wayne Wright*
- 4:25** **Closing**
Wayne Wright

Welcome Reception in the Exhibit Hall!

5:00–6:30 p.m.



Tuesday, February 14, 2017— Morning

Exposition open today 10:00 a.m.–6:30 p.m.
Exhibit Hall B, Lower Level

Opening General Session

8:15–10:00 a.m.

Room: Grand Ballroom

- 8:15** **Live Entertainment by Sid Fly**
- 8:35** **Welcome to MTC17**
Ben Movahed, MTC17 Program Chair
- 8:45** **OGS Sponsor Welcome**
*Thomas F. Seacord, Vice President,
Carollo Engineers, Inc.*
- 8:50** **Mayor of Long Beach**
- 8:55** **AWWA Welcome**
Steve Dennis, Vice President AWWA
- 9:00** **AMTA Welcome**
Scott Freeman, President AMTA
- 9:05** **NWRI-AMTA Fellowship Updates**
*Sarah Dischinger, University of Colorado,
Mark Summe, University of Notre Dame*
- 9:15** **Keynote Presentation and Q&A**
Mina Guli, CEO & Founder, Thirst

Since its launch in 2012, Guli's company, Thirst, has educated over 600,000 students and reached over 250 million people with its messages about water and the steps they can take to reduce their own water consumption. In recognition of her achievements, this year Fortune Magazine named Guli as one of the 50 greatest leaders in the world.

10:00–10:30 a.m.
Coffee Break in Exhibit Hall



STS01

New Trends in Membrane Technologies: Past, Present and Future

10:30 a.m.–noon

Room: 202 BC

Track: Developments and Trends in Membrane Technologies

Moderator: *Ben Movahed*

Overview

This special topic session will look into the past, present and future of membrane technologies and the market status to give an outlook of the expected major changes in the industry. This session includes presentations on the evolution of high- and low-pressure membrane markets, technologies and legacy brands; the advantages/disadvantages of Open Platform options; and the major environmental impacts of SWRO facilities, including greenhouse gas (GHG) emissions.

- 10:30** **The Evolution of the Membrane Business in Water and Wastewater Treatment**
Thomas Pankratz, Water Desalination Report
- 11:00** **The Irresistible Lure of the Open Platform Solution: Is the Membrane Filtration Market on the Brink of Fundamental Change?**
Graeme Pearce, Membrane Consultancy Association
- 11:30** **The Greening of SWRO: Innovations in Intakes and Outfalls, Chemical and Waste Minimization, and Energy and GHG Reduction**
*Gary Amy, Clemson University,
Thomas Missimer, Sabine Lattemann*

TUE01

New Approaches to Membrane Filtration

10:30 a.m.–noon

Room: 203 BC

Track: Membrane Filtration Applications

Moderator: *Mehul Patel*

Overview

This session features new information on approaches to membrane filtration, including an application with minimal to no fouling control measures (i.e., passive membrane filtration), a novel membrane for MBRs, and a comprehensive/quantitative approach to design in membrane projects.

- 10:30** **Passive Membrane Filtration for Drinking Water Treatment in Remote and Rural Communities**
*Pierre Berube, Univ. of BC Dept. of Civil Eng.,
Patricia Oka, Md Khadem, Nafis Jalil*
- 11:00** **Polycera: A Novel Ultrafiltration Membrane Providing Opex Savings for Reclaimed Wastewater Applications**
*Gil Hurwitz, Water Planet Engineering,
James Temple, Subir Bhattacharjee,
Eric Hoek, Jinwen Wang, Anna Jawor*
- 11:30** **A Quantitative Procedure to Select MF/UF Membrane Design Flux Based Upon Piloting Performance**
*Qigang Chang, Advanced Engineering and
Environmental Services Inc. (AE2S),
Brian Bergantine*

Tuesday, *continued*

TUE02

Advancements in Potable Reuse

10:30 a.m.–noon

Room: 201 B

Track: Potable Reuse Applications

Moderator: *Greg Wetterau*

Overview

This session presents recent membrane technology innovations in direct potable reuse, including an overview of a 10-MGD DPR project that will ultimately add highly purified recycled wastewater directly to the potable water distribution system, comparison of membrane performance at an IPR facility, and development of an osmotic membrane bioreactor system for potable reuse applications at military forward operating bases.

- 10:30** **RO for Direct Potable Reuse in California**
Brian Bernados, CA Dept. of Public Health
- 11:00** **Biological Nutrient Removal as Membrane Pretreatment in Direct Potable Reuse: Pilot Study Considerations and Results**
Christopher Boyd, Alan Plummer Associates, Inc., Alan Davis, Dexter May, Tymn Combest, David Gudal, Phillip Lintereur
- 11:30** **Can MBR Replace MF/UF in the Full Advanced Treatment Train for Potable Reuse**
Zakir Hirani, MWH, Joseph Jacangelo

TUE03

Tailored Solutions for Municipalities Treating Brackish Water

10:30 a.m.–noon

Room: 201 A

Track: Nanofiltration and Brackish
Water RO

Moderator: *Tim Rynders*

Overview

This session covers brackish water treatment projects, including planning and implementing RO treatment of contaminated groundwater, NF treatment to remove color and organics from groundwater, and an evaluation of directly treating high-iron and-manganese groundwater.

- 10:30** **Evaluation of an RO-Based Advanced Water Treatment Train to Augment the City of Santa Monica's Potable Water Supply**
Srinivas Veerapaneni, Black & Veatch, Jessica Arden, Myriam Cardenas, Gary Richinick, James DeCarolis, Lee Portillo, Jennifer Thompson
- 11:00** **Using Nanofiltration to Provide a New Source Water for a Small California City**
Steve Myrter, City of Signal Hill, Steven Tedesco, Tetra Tech, Inc.
- 11:30** **Direct Membrane Treatment of High Iron and Manganese Groundwaters**
Julia Nemeth-Harn, Harn R/O Systems Inc., Steven Troyer, Andrew Wood

Tuesday, February 14, 2017— Afternoon

Luncheon in the Exhibit Hall

noon–1:30 p.m. (food served until 12:40)

Exhibit Hall B

Tuesday luncheons are included in full-conference and Tuesday-Only registrations.

Student & Young Professional Lunch Meet-up

noon–1:30 p.m. (food served until 12:40)

Exhibit Hall B

A special networking seating area for all students and young professionals. Look for the specially marked tables in the exhibit hall seating area and join us!

Experts in the Round

12:45–1:15 p.m.

Exhibit Hall B

Special Feature! The MTC's "Experts in the Round" is not to be missed. Our experts will open discussions with the latest information on the top issues in the membrane industry. There will be two 15-minute rounds, with participants selecting their table and topic of choice each round. This informal event will be held in the banquet area of the exhibit hall. Topics include the following:

Microfiltration & Ultrafiltration

Jim Vickers, Separation Processes, Inc.

Jim Lozier, CH2M

Nanofiltration & Reverse Osmosis

Ben Movahed, WATEK Engineering

Corporation, *Wendy Broley*, Brown & Caldwell

Membrane Bioreactor

*Dennis Livingston, Ovivo Water,
Sue Guibert, Toray Membrane USA, Inc.*

Chemical Pre-treatment and Cleaning

*Mo Malki, American Water Chemicals, Inc.,
Ray Eaton, Avista Technologies*

Ceramic Membranes

*Brian Wise, Nanostone Water,
Holly Shorny-Darby, PWN Technologies*

Direct Potable Reuse

*Shane Trussell, Trussell Technologies,
Troy Walker, Hazen & Sawyer*

Seawater Desalination

*Jon Loveland, Black & Veatch,
Mark Donovan, GHD*

**Emerging Technologies and
Applications**

*Tom Pankratz, Water Desalination Report,
Brent Alspach, Arcadis*

TUE04

Open Platform and Universal
Rack MF/UF

1:30–3:00 p.m.

Room: 201 B

Track: Developments and Trends in
Membrane Technologies

Moderator: *Lynne Gulizia*

Overview

This session explores the experiences and drivers that are shaping the development of open platform membrane systems, including an overview of the open platform concept as well as municipal applications of open platforms in pilot and full-scale projects across the United States.

- 1:30** **A Concept for Open Platform
Membrane Systems**
Joseph Swiezbin, Pall
- 2:00** **A Supplier's Perspective on
Interchangeable Designs to Both
Pressurised and Submerged UF Formats**
*Bruce Biltoft, Memcor Products,
James McMahon, Evoqua Water
Technologies, Roger Phelps, Ying Hao Teo*
- 2:30** **West Basin PVDF Parallel Piloting
Performance Results**
*James Vickers, Separation Processes Inc.,
Don Zylstra*

TUE05

MF/UF Systems: Case Studies in Utility Improvement

1:30–3:00 p.m.

Room: 202 BC

Track: Membrane Filtration Applications

Moderator: *Jill Miller*

Overview

An in-depth look at several comprehensive utility case studies of membrane filtration at water treatment plants (WTP). The session includes presentations on membrane filtration at a new 28-mgd WTP, retrofit and expansion of a 10-mgd WTP, and the renewal of a 15-mgd WTP.

- 1:30** **IRWD and Its Partners Improve Water Supply Reliability in South Orange County (CA) by Completing Its 28-mgd Baker WTP**
*Daniel Hugaboom, Carollo Engineers,
Jim Meyerhofer, Michael Bundy, Richard Mori*
- 2:00** **Retrofit and Expansion of a 10-mgd UF System in Granbury, Texas**
*Jason Nay, WesTech Engineering, Inc.,
Libbie Linton, Alain Richard,
Joshua Berryhill*
- 2:30** **Extending the Useful Life of a 15-mgd Rio Grande Ultrafiltration Facility**
*David MacNevin, Tetra Tech, Inc.,
Jorge Barrera, Jorge Flores, Jaime Kypuros,
Jarrett Kinslow, Jennifer Roque, Erica Laberge*



3:00–3:30 p.m.
**Refreshment Break in
Exhibit Hall**

Tuesday, *continued*

TUE06

Pilot and Full-Scale
Demonstrations of Potable Reuse

1:30–3:00 p.m.

Room: 203 BC

Track: Potable Reuse Applications

Moderator: *Monica Pazahanick*

Overview

This session covers a wide range of pilot-scale projects including presentations on pasteurization as pretreatment for UF and RO, full- and pilot-scale recommendations for improvement of wastewater RO facilities, and the use of preformed chloramines to minimize NDMA formation potential during potable reuse.

- 1:30** **Evaluating the Impact of Pasteurization Pretreatment on Membrane Performance at the VenturaWaterPure DPR Pilot Facility**
Justin Sutherland, Carollo Engineers, Elisa Garvey, Andrew Salveson, Daniel Hugaboom
- 2:00** **Optimization of WWRO for Alamitos Barrier: Improving Performance Through More Aggressive Operation**
Greg Wetterau, CDM Smith, Paul Fu, R. Chalmers, Alex Wesner
- 2:30** **Use of Preformed Chloramines to Minimize NDMA Formation Potential for Potable Reuse Applications**
Sunny Wang, Brown and Caldwell, Wendy Broley, Marcus Maltby

TUE07

Tackling Salinity Issues With Brackish Water RO

1:30–3:00 p.m.

Room: 201 A

Track: Nanofiltration and Brackish Water RO

Moderator: *Tim Rynders*

Overview

The session will provide the latest information on salinity management with brackish water RO, including construction of a unique reverse osmosis facility, construction of a new indirect potable reuse facility for drinking water supplies and to maintain a saltwater intrusion barrier, and experiences in testing alternative membrane elements to calcium carbonate scaling.

- 1:30** **Treating a Variable Salinity Supply From Concept to Operation**
*James Christopher, Tetra Tech, Inc.,
Robert Robertson, Jarrett Kinslow*
- 2:00** **Pass the Salt: The Cambria Sustainable Water Facility Brine Solution**
*Gregg Cummings, CDM Smith,
Katherine Dowdell, Evelyn You,
Greg Wetterau, Robert Gresens*
- 2:30** **Qualification Membrane Demonstration Study at Concentrate Recovery System**
*Carl Spangenberg, Irvine Ranch Water Dist.,
Arseny Kalinsky*



3:00–3:30 p.m.
**Refreshment Break in
Exhibit Hall**

TUE08

RO Integrity Monitoring

3:30–5:00 p.m.

Room: 201 B

Track: Developments and Trends in
Membrane Technologies

Moderator: *Lynne Gulizia*

Overview

The session will provide the latest information on overcoming obstacles and challenges to monitoring the integrity of reverse osmosis membranes. Presentations will cover novel approaches and improvements in RO integrity monitoring regarding potable reuse applications and the use of fluorescence markers.

- 3:30** **Using Online Fluorescence Monitoring to Demonstrate Pathogen Removal Credits for NF and RO in Direct Potable Reuse Schemes**
Jim Lozier, CH2M, Michael Hwang, Seong Hoon Yoon
- 4:00** **The Importance of NF/RO in Potable Reuse and the Role of Membrane Integrity Testing**
Brent Alspach, Arcadis
- 4:30** **New Techniques for Real-Time Monitoring of Reverse Osmosis Membrane Integrity for Virus Removal**
Val Frenkel, CH2M

TUE09

Retrofitting and Integrating Membrane Filtration

3:30–5:00 p.m.

Room: 202 BC

Track: Membrane Filtration Applications

Moderator: *Jill Miller*

Overview

This session presents current and innovative approaches to retrofitting and integrating membrane filtration at existing water treatment facilities, including upgrading an MF system to balance long-term membrane selection variability with reasonable operability and system cost, accommodating various retrofit strategies, and novel current approaches to membrane retrofits.

- 3:30** **Custom Engineered Microfiltration:
West Basin's Upgrade at the Carson
Regional Water Recycling Facility**
*Troy Walker, Hazen and Sawyer,
Nathan Boyle, Don Zylstra*
- 4:00** **The Art of Retrofitting UF/MF Systems:
A Comparison of Strategies, Costs,
and Results**
*Dan Dye, WesTech Engineering, Inc.,
Jason Nay, Libbie Linton*
- 4:30** **New Concept of UF: Integrated UF**
*Marta Otegui, Fluytec S.A., Pedro Otegui,
Fernando Garcia, Beatriz Barranca,
Juan Antonio Santana*

Tuesday, *continued*

TUE10

Lessons Learned in Potable Reuse

3:30–5:00 p.m.

Room: 203 BC

Track: Potable Reuse Applications

Moderator: *Monica Pazahanick*

Overview

The session will provide even more of the latest information on potable reuse applications including presentations on DPR pilot plant operation and implications for full-scale design, the long term performance of BWRO membranes in the full-scale IPR facility, and development of a membrane bioreactor system with a submerged forward osmosis (FO) module subsystem for treatment of high-strength domestic wastewater.

- 3:30** **DPR System Operation: Translating Pilot Experience and Lessons Learned to Full-Scale Design**
Chelsea Francis, Arcadis, Gilbert Trejo
- 4:00** **City of Scottsdale Water Campus Adopted Nanocomposite RO Membranes for Indirect Potable Reuse**
Dian Tanuwidjaja, LG Nanoh2o, Hoon Hyung, Roy Daly, Arthur Nunez, Omogbemiga Talabi
- 4:30** **Submerged or Sidestream: Best Forward Osmosis Configuration for an Osmotic Membrane Bioreactor**
Christopher Morrow, University of Southern California, Amy Childress, Sage Hiibel

TUE11

Addressing Challenges in Water Treatment

3:30–5:00 p.m.

Room: 201 A

Track: Nanofiltration and Brackish Water RO

Moderator: *Saied Delagah*

Overview

An in-depth look at membrane solutions to treatment challenges, this session includes presentations on dewatering high-salinity brines using osmotically assisted reverse osmosis, an overview of the success of the Yuma Desalting Plant and its future outlook, and the indirect potable reuse project treating effluent-impacted brackish groundwater to increase drinking water supplies and maintain an existing barrier to saltwater intrusion.

- 3:30** **Dewatering of High-Salinity Brines by Osmotically Assisted Reverse Osmosis**
Jason Arena, US DOE National Energy Technology Lab, Timothy Bartholomew, Ashutosh Sharma, Meagan Mauter, Nicholas Siefert
- 4:00** **The Yuma Desalting Plant: Past, Present and Future**
Michael Hwang, CH2M, Jim Lozier, Charles McCaughey
- 4:30** **The Cambria Sustainable Water Facility: One Year of Operation**
Katherine Dowdell, CDM Smith, Evelyn You, Gregg Cummings, Greg Wetterau, Robert Gresens

Tuesday, *continued*

PST01

Tuesday Poster Session

5:00–6:30 p.m.

Exhibit Hall B

Moderators: *Stuart McClellan,*
Brent Aspach

A Detailed Modeling and Analysis of a Vacuum Membrane Distillation Process

Young-Deuk Kim, Hanyang University,
June-Seok Choi, Woo-Seung Kim

A Spoonful of Caustic Helps the Turbidity Go Down: Sodium Hydroxide as a Lime Aid for Membrane Post-Treatment

David MacNevin, Tetra Tech, Inc.,
James Christopher, Jarrett Kinslow

Application of the Solution–Diffusion Model to Optimize Water Flux in Reverse Osmosis Desalination Plants

Hisham Maddah, King Abdulaziz University,
Mohammed Almughawi

Assessment of a Full-Scale Ultrafiltration Membrane Water Treatment Fouling Control Strategies

Pierre Berube, Univ. of BC Dept. of Civil Eng., *Francois St-Pierre,* University of British Columbia, *Joerg Winter*

Brackish Groundwater RO Treatment to Supplement High-TDS Surface Water: Dealing With Escalating Construction Costs

Jonathan Bundy, Tetra Tech, Inc.

**Control of Complex Scale in Reuse
Membrane Applications: Case Studies**

David Russell, American Water Chemicals

Desalination Concentrate: Ocean Vs. Bay

Val Frenkel, CH2M

**Evaluation of Potential Particulate/Colloidal
TEP Foulants on a Pilot-Scale SWRO
Desalination Study**

Sheng Li

**Fully Carbon and Polymer-Free
Nanomembrane for Water Treatment
Applications**

*Carlo Alberto Amadei, Harvard University,
Chad Vecitis*

**Impact of Chemistry-Based Modifications
of Membrane Surfaces on Sustainable Flux
Levels in a Variety of Water Types**

*Martin Heijnen, Inge GmbH, Martin Weber,
Denis Vial, Peter Berg*

**Industrial Water Reuse Using Membrane
Systems**

*Robert Cormier, Pall Corporation,
Alan Burghart, Joseph Swiezbin, Lisa Druke*

**Lessons Learned in the Planning, Design
and Construction of the Carlsbad
Desalination Conveyance Pipeline**

Steven Tedesco, Tetra Tech, Inc., Mark Bush

**NF and Tight UF Range Membranes for
High-Quality Drinking Water Production**

Joerg Winter, Pierre Berube, Benoit Barbeau

**Numerical Analysis of Hybrid Multi-
Stage Vacuum Membrane Distillation and
Pressure-Retarded Osmosis System With
Recycling Flow**

*Jung-Gil Lee, King Abdullah University of
Science and Technology, Ahmad Al-Saadi,
Lijo Francis, Noreddine Ghaffour*

OMP Transport in FO: Influence of Draw Solute and OMP Properties

Arnout D'Haese, Ghent University—Faculty of Bioscience Engineering,
Tim Van Kerrebroeck, *Klaas Schoutteten*,
Julie Vanden Bussche, *Lynn Vanhaecke*,
Arne Verliefde

Overcoming High Hollow Fiber Membrane Fouling Rates in a Challenging Secondary Effluent Application

Katherine Ottoboni, Carollo Engineers,
Daniel Hugaboom, *Libbie Linton*

Pilot Evaluation of Ceramic Membranes for the Manitowoc Public Utilities Water Treatment Plant

Jumeng Zheng, PWN Technologies,
Rob Michaelson, *Paul Aumann*,
Gilbert Galjaard, *Holly Shorney-Darby*

Predicting the Accumulation of Organic Compounds in Direct Contact Membrane Distillation Product Water

Judith Winglee, *Nathan Bossa*, *Mark Wiesner*

The Removal Efficiency and Membrane Integrity/Challenge Tests in Damaged Membrane Module in Conjunction With Virus and the *Cryptosporidium* Removal: LT2ESWTR

David Cho, Econity USA, *Derek Kim*,
Econity USA, Inc., *Paul Jung*, *Ufuk Erdal*,
Zeynep Erdal, *John Dotinga*

The Twisted Airlift MBR

Alex Wang

**Three Modules, One Backwash Pump and
One Blower: Testing UF Module
Interchangeability**

*Nicole Mayer, Carollo Engineers
Daniel Hugaboom, Carollo Engineers,
Mike Trippett*

**Using Data Diagnostic Tools for Plant
Operation and Management**

*Jessica Boynton, King Lee Technologies,
Amy Nowlin, Miranda Federico*

**Water and Wastewater Membrane
Protection**

James Impero, Ovivo USA, LLC

**Networking Reception & Poster Session
in the Exhibit Hall!**

5:00–6:30 p.m.



**Carnival-Themed Charity Competition,
Benefiting Thirst**

5:00–6:30 p.m.

Join the AMTA YP Committee for some fun & games for a good cause—be sure to visit us in the exhibit hall tonight and take your shot at some carnival prizes.

**Tuesday Student & Young Professionals
Networking Reception**

Hyatt Regency Hotel

Shoreline Room

6:30–8:00 p.m.

All students and young professionals are encouraged to attend this very popular event!

Wednesday, February 15, 2017— Morning

Exposition open today 10:00 a.m.–6:00 p.m.

Exhibit Hall B, Lower Level

STS02

Successful Application of MBRs for Potable Water Reuse

8:30–10:00 a.m.

Room: 202 BC

Track: Potable Reuse Applications

Moderator: *Nicola Fontaine*

Overview

MBRs are commonly used for nonpotable wastewater reuse and the high-quality effluent produced in a small footprint is seemingly ideal for subsequent treatment for potable water reuse. This interactive session will dive deep into the technologies' ability to meet these goals, including pathogen removal capabilities, performance monitoring, and regulatory hurdles. A moderated townhall discussion will follow with three presentations tailored toward how we move forward with MBRs in potable water reuse processes.

- 8:30** **Pathogen Concentrations and Regulatory Targets for Potable Water Reuse**
Shane Trussell, Trussell Technologies, Inc.
- 9:00** **Pathogen Removal in MBR: Study Results and Literature Review**
Andrew Salvesson, Carollo Engineers,
Nicola Fontaine, Carollo Engineers
- 9:30** **MBR Performance Monitoring for Potable Water Applications**
Stephen Katz, GE Water & Process

WED01

Residuals Management and Zero Liquid Discharge

8:30–10:00 a.m.

Room: 201 A

Track: Developments and Trends in
Membrane Technologies

Moderator: *Brent Alspach*

Overview

Attending this session will provide you with a better understanding of both the technical and regulatory restrictions on management of high-strength waste streams, with discussion of coastal and inland approaches, including zero-liquid discharge.

- 8:30** **UF for Water Reuse Reduces Costs and Provides a Reliable Source for Industry**
*Melanie Blake, Koch Membrane Systems, Inc.,
Kevin Phillips, Benjamin Antrim*
- 9:00** **Membrane Concentrate Management Alternatives for Inland Potable Reuse**
*Corin Marron, Arcadis, Jeff Biggs,
George Maseeh, Brent Alspach,
Viking Edeback*
- 9:30** **Overview of Efforts to Reduce High Recovery and Zero-Liquid Discharge Costs**
Mike Mickley, Mickley & Associates LLC

10:00–10:30 a.m.
Coffee Break in Exhibit Hall



Wednesday, *continued*

WED02

Unique Strategies to Fight Membrane Fouling

8:30–10:00 a.m.

Room: 203 BC

Track: Fouling Scaling and Cleaning

Moderator: *YuJung Chang*

Overview

This session explores novel approaches to fighting membrane fouling including presentations on an industry-wide review of fouling, data collected from brackish and seawater applications, bench-scale fouling tests of new and existing membranes, and guidance on how cleaning study data must be interpreted carefully to maximize performance restoration from lab testing to full-scale plant operations.

- 8:30** **Maximizing Membrane Life: Lessons Learned From a Three-Year Study on Performance Recovery**
Sara Pietsch, Avista Technologies, Megan Lee, Jared Furlong
- 9:00** **Impact of Organic Matter on Fouling Propensity of a New Ultrafiltration Membrane With Low Adhesive Surface: A Study Based on 10 Different Waters**
Emmanuelle Filloux, Suez Environment, Morgane Guennec, Anne Brehant, Reynald Bonnard, Martin Heijnen, Davis Arifin
- 9:30** **Membrane Fouling Control in Municipal Water Treatment: How to Clean Them Back**
Paul Gallagher, Evoqua Water Technologies, Anh Nguyen, Evoqua Water Technologies, Steven Cao



**10:00–10:30 a.m.
Coffee Break in Exhibit Hall**

WED03

Overcoming Challenges in Seawater Desalination

8:30–10:00 a.m.

Room: 201 B

Track: Seawater Desalination

Moderator: *Srinivas Veerapaneni*

Overview

The session will provide the latest information on overcoming challenges in seawater desalination with presentations on communicating effectively when faced with common challenges to desalination projects, an analysis of current economic conditions of seawater desalination highlighting limitations and possibilities of additional improvements, and a feasibility analysis of an existing desalination plant that was placed into long-term standby mode.

- 8:30** **Increasing BWRO Plant Recovery Using Batch Operation RO and a Fluidized Bed Crystallizer**
Jacky Ben Yaish, IDE Technologies, Alex Drak, IDE Technologies, Tomer Efrat, Roi Zaken
- 9:00** **The Economics of Seawater Reverse Osmosis Desalination Projects**
Mark Wilf, Tetra Tech, Inc., Steven Tedesco, Jill Hudkins
- 9:30** **California Ocean Plan Amendments: Applicability and Requirements for New, Expanded, and Existing Facilities**
Eric Cherasia, Carollo Engineers, Thomas Seacord, Joe Monaco, Austin Melcher, Joshua Haggmark, Catherine Taylor, Kelley Dyer

WED04

Energy Reduction in
Membrane Facilities

10:30–noon

Room: 201 A

Track: Plant Design and Operation

Moderator: *Brent Alspach*

Overview

Attending this session will provide you with a better understanding of better energy management techniques in membrane facilities, with presentations on reverse electro dialysis to tap renewable energy from seawater, photodynamic inactivation of microorganisms by photosensitizers immobilized onto electro-spun nanofibers for industrial wastewater sterilization, and an evaluation of submerged anaerobic membrane bioreactor for treatment of brewery waste and energy recovery.

- 10:30** **Membrane Technology for Blue Energy Production Using Water Salinities**
Jin Gi Hong, California State University, Long Beach
- 11:00** **Energy Optimization With Energy Recovery Devices and Innovative Process Design Improvements With Applications in Membrane Systems**
Eli Oklejas, Fluid Equipment Development Company (FEDCO), *Alisha Cooley*
- 11:30** **Maximizing Energy Recovery From Brewery Waste Streams With Anaerobic Membrane Bioreactors and Biogas Conditioning**
Tim Rynders, CDM Smith

WED05

Keeping Your Membranes Clean

10:30 a.m.–noon

Room: 202 BC

Track: Fouling Scaling and Cleaning

Moderator: *Jonathan Loveland*

Overview

An in-depth look at membrane cleaning, this session includes presentations on a wide range of topics, including controlling phosphate-induced scaling during potable reuse, membrane surface modification to prevent aggregation of bacteria on the membrane surface, and discussion of an improved method for flushing CIP solutions by full displacement rather than dilution flushing.

- 10:30** **A Case Study in Controlling Phosphate-Induced Scaling in Potable Reuse**
Michael Adelman, MWH, Mia Smith, Zakir Hirani, Eileen Idica, Joseph Quicho, Seppi Henneman
- 11:00** **Membrane Surface Modification Using Quorum Sensing Inhibitors for Biofouling Prevention**
Leda Katebian, California Institute of Technology, Sunny Jiang, University of California Irvine, Michael Hoffmann
- 11:30** **Analysis of the Impact of Citric Acid CIP Carry-Over on Disinfection By-product Formation in Membrane Treatment Facilities**
Thomas Munding, Opus International Consultants Ltd., Walt Bayless

WED06

Fit for Purpose: Indirect and
Direct Potable Reuse

10:30 a.m.–noon

Room: 203 BC

Track: Potable Reuse Applications

Moderator: *Nicola Fontaine*

Overview

Attending this session will provide you with a better understanding of the nuances of indirect and direct potable reuse, including presentations on the Leo J Vander Lans Advanced Water Treatment Facility, a demonstration DPR project for addressing water quality and groundwater withdrawal issues, and selection issues for UF at DPR and IPR plants.

**10:30 Advanced Treatment of Recycled Water as
a Reliable Saltwater Barrier at the
Long Beach WRD**

*Michael Fox, Pall Process Systems,
Richard Salas, Lance Benjamin*

**11:00 Potable Reuse Demonstration Scale
Program in East Coast Florida**

*Jennifer Roque, Tetra Tech, Inc.,
Andrew Woodcock, Jarrett Kinslow,
Brian Foulkes*

**11:30 Pressurized Ultrafiltration Membrane
Performance at the Ventura, California,
Demonstration Plant**

*Sean Carter, Toray Membrane USA, Inc.,
Susan Guibert, Toray Membrane USA,
Inc., Curtis Elwell, Gina Dorrington,
John Willis, Andrew Salvesson, Elisa Garvey,
Justin Sutherland*

WED07

**Seawater Desalination:
California Case Studies**

10:30 a.m.–noon

Room: 201 B

Track: Seawater Desalination

Moderator: *Ali Sharbat*

Overview

This session covers California seawater desalination projects with presentations on the cost and schedule drivers for a design/build approach for delivery of a new seawater reverse osmosis system, a study on the benefits of collocating desalination facilities with wastewater treatment plants beyond simply diluting the brine before discharge, and the key design features of a California water reclamation plant expansion, with details on challenges during startup and acceptance testing and data from the first six months of operation.

- 10:30** **San Andres Turns to Seawater RO to Meet Critical Water Supply Shortfall**
Curtis Kiefer, CDM Smith, Pedro Rojas Pena
- 11:00** **California's Desalination Amendment: Opportunities From the Co-location of Desal Facilities With Wastewater Treatment Plants**
Andrea Achilli, Humboldt State University, Lori Jones
- 11:30** **Carlsbad Water Recycling Facility Expansion: Design, Permitting, Startup, and Operations**
Evelyn You, CDM Smith, Greg Wetterau, Lanaya Voelz, Leonel Almanzar, Terry Smith, Lindsey Stephenson, Lindsay Leahy

Awards Luncheon (Ticket Required)

noon–1:30 p.m.

Room: Grand Ballroom, 2nd Level

Please arrive promptly; awards ceremony will begin at 12:20 p.m., at which time food service will be discontinued.

Wednesday, February 15, 2017— Afternoon

WED08

Ceramic Membranes

1:30–3:00 p.m.

Room: 201 B

Track: Developments and Trends in
Membrane Technologies

Moderator: *Chandra Mysore*

Overview

An in-depth look at ceramic membrane developments, this session examines novel ceramic membrane case studies and applications for reuse and a comparison of ceramic and polymeric membranes for treatment of produced water.

- 1:30** **Ceramic Membranes for Reuse**
*Holly Shorney-Darby, PWN Technologies,
Jumeng Zheng, Gilbert Galjaard*
- 2:00** **Application of Flat-Sheet Ceramic
Membrane Technology for Water Reuse**
*James DeCarolis, Black & Veatch,
Sock-Hoon Koh, Sandeep Santhymorthy,
Gary Hunter, Bikram Sabherwal,
Scott Freeman*
- 2:30** **Comparison of Polymeric and Ceramic
MF/UF Membranes for the Treatments of
Produced Water**
*Hooman Vatankhah, Colorado School of
Mines*



**3:00–3:30 p.m.
Refreshment Break in
Exhibit Hall**

WED09

Optimization to Reduce Membrane
Scaling and Fouling

1:30–3:00 p.m.

Room: 203 BC

Track: Fouling Scaling and Cleaning

Moderator: *Michael Bourke*

Overview

This session presents current and innovative approaches to reduce membrane scaling and fouling through presentations on pilot tests to identify pretreatment requirements for reducing biofouling and organic fouling, a case study highlighting concentrate disposal and scaling-potential from combining concentrate after aeration.

- 1:30** **Optimizing Pretreatment for a High-Organic Florida Surface Water**
Mickal Witwer, CH2M, Justin Martin, Marco Island Utilities, Joseph Elarde, CH2M, Jeffrey Poteet, Nickolas Easter
- 2:00** **Combined NF and RO Concentrate Disposal Piping and Deep Injection Well Scaling: A Case Study**
Cristina Ortega-Castineiras, CH2M, Albert Jemej, Gerardus Schers, Gerrit Bulman, Mickal Witwer, Thomas Good
- 2:30** **Advancements in Scaling Calculations and an in-Depth Look at Antiscalant Dosing for Stressed Waters and High Recovery Systems**
Matt James, Avista Technologies, Inc., Mike Jefferies, Sara Pietsch

WED10

Advancements in MBR for Reuse

1:30–3:00 p.m.

Room: 202 BC

Track: MBR and Reuse Applications

Moderator: *Jorge Aguinaldo*

Overview

An in-depth look at recent advancements using MBR for reuse, this session includes presentations on reliability and validation testing of MBR components, modification of a sequencing batch reactor (SBR) into an MBR, and the expansion of a water recycling facility with a tertiary membrane bioreactor.

- 1:30** **Improving MBR Footprint: A California Case Study**
Lisa Leckie, Evoqua Water Technologies, Gerin James, Jessica Tola, Aaron Balczewski, Chan Tun, Paul Gallagher
- 2:00** **A Successful Modification of Conventional SBR to MBR at Indian Casino and Facility: Case Study of Chumash Casino and Resort Water Facility**
Derek Kim, Econity USA, Inc., David Cho, Paul Jung, Kevin McKennon, Greg Lowe, Moonseog Jang
- 2:30** **Advanced MBR Technology to Improve Water Quality and Increase Use of Recycled Water for West Basin Municipal Water District**
Bryce Danker, Hazen and Sawyer, Troy Walker, Don Zylstra



3:00–3:30 p.m.
Refreshment Break in Exhibit Hall

WED11

Innovations in Seawater
Desalination

1:30–3:00 p.m.

Room: 201 A

Track: Seawater Desalination

Moderator: *Andrea Achilli*

Overview

This session features new Innovations in seawater desalination with presentations on early warning of biofouling of membrane-based desalination systems, a 5-year analysis comparing traditional cartridge filters with self-cleaning disc filters ahead of RO membranes, and integration of a SWRO desalination plant with a seawater pump storage hydropower facility.

1:30 Development and Application of New Methods to Measure Bacterial Activity and Nutrients in Seawater Reverse Osmosis (SWRO)

Subhanjan Mondal, Promega Corporation, Almotasembellah Abushaban, Sergio Salinas-Rodriguez, Nasir Mangal, Said Goueli, Maria Kennedy

2:00 Analysis of 20-Micron Self-Cleaning Disc Filter Versus Cartridge for RO Protection After Media Filters in SWRO System

Zipora Tal, Amiad Water Systems, Peachie Maher Hytowitz, Amiad Water Systems, Adva Zach-Maor, Eatay Pomeranz, Erika Ben-Basat

2:30 Innovative Water/Energy Nexus: Optimizing Renewables by Combining Seawater Pumped Storage, Hydropower, and Desalination

Mark Allen, Oceanus Power & Water, YuJung Chang, AECOM, Sandy Walker, Neil Aronson

WED12

Pre- and Post-Treatment

3:30–5:00 p.m.

Room: 203 BC

Track: Developments and Trends in
Membrane Technologies

Moderator: *Michael Bourke*

Overview

This session summarizes several innovative approaches to pre- and post-treatment of membrane processes including fouling reduction ahead of membrane filtration and RO product water stabilization.

- 3:30** **Post-Treatment of RO Permeate With Calcite Contact to Provide Stability and Corrosion Control**
Scott Freeman, Black & Veatch, Saqib Shirazi, Jarrett Kinslow
- 4:00** **Hollow Fiber Ultrafiltration of Hydrophobic Natural Organic Matter (NOM) Waters Using Different Pretreatment Schemes**
Roberto Narbaitz, University of Ottawa Dept. of Civil Eng, Bingjie Xu
- 4:30** **ILCA®: In-Line Coagulation and Absorber for Pre-Treatment to Ceramic Microfiltration**
Roberto Floris, PWN Technologies, Jumeng Zheng, Holly Shorney-Darby, Gilbert Galjaard

WED13

New Strategies for Fouling Minimization

3:30–5:00 p.m.

Room: 201 B

Track: Fouling Scaling and Cleaning

Moderator: *YuJung Chang*

Overview

The session will provide the latest information on minimizing fouling at membrane facilities, including presentations on lessons learned from a chemical selection process and test protocol, changes in cleaning efficiency with the addition of microbubbles, and development of a scaling index to explore antiscalant performance as a function of pH.

- 3:30** **Challenges in Understanding Membrane Fouling and Cleaning**
Charles Liu, Pall Corporation
- 4:00** **Keeping the RO Membranes of the Future Continuously Clean**
Boris Liberman, IDE Technologies
- 4:30** **A Novel Calcium Carbonate Scaling Model for Calculating Maximum Recovery and Inhibitor Dosages in Industrial Applications**
Mo Malki, American Water Chemicals DBA Alkema Solutions, Inc.

WED14

Pushing at the Boundaries of
Reuse With MBR

3:30–5:00 p.m.

Room: 202 BC

Track: MBR and Reuse Applications

Moderator: *Jorge Aguinaldo*

Overview

This session provides current and innovative strategies for MBR in reuse with presentations on a study investigating the relationship among the reverse diffusion of fertilizer draw solute, bacteria community and bio-methane production rates, and pilot-testing, and commissioning of subregional MBR plants to minimize collection system upgrades and reclaimed water distribution systems within the communities served.

3:30 Bio-Methane Production Variation Under Different Draw Solute Reverse Diffusions in an Anaerobic Digester Simulated for FOANMBR

Sheng Li, Youngjin Kim, Sherub Phuntsho, Ho Kyong Shon, TorOve Leiknes, Noreddine Ghaffour

4:00 Design of High Recovery Rate 12-mgd RO Plant for Reclamation of Municipal Wastewater Effluents Utilizing Advanced Membrane Technology

Mark Wilf, Tetra Tech, Inc., Steven Tedesco, Beverly Encina, Kara Buttacavoli, Jorg Menningmann, Richard White

4:30 Landfill Leachate MBR Plant Utilizing PTFE MF Membrane

Takafumi Shinozaki, Sumitomo Electric Industries, Ltd. Millard Fore, Sumitomo Electric Industries, Ltd., Toru Morita, Kenichi Ushikoshi

WED15

Forward Osmosis and Membrane Distillation

3:30–5:00 p.m.

Room: 201 A

Track: Membrane Research

Moderator: *Andrea Achilli*

Overview

Attending this session will provide you with a better understanding of forward osmosis & membrane distillation; this session explores these topics with presentations on a detailed study of water and draw solute transport through FO membranes, a bench-scale study of polyethersulfone (PES) FO flat sheet membrane for dewatering *Chlorella vulgaris*, and a study of a method to decouple the effects of feed pressure from other differences between FO and RO to explore foulant compaction and fouling reversibility.

- 3:30** **A Refined Draw Solute Flux Model in Forward Osmosis**
Arnout D'Haese, Ghent University—Faculty of Bioscience Engineering, Motsa Machawe, Paul Van Der Meeren, Arne Verliefde
- 4:00** **Algae Dewatering With Different Draw Solutions and Cross Flow Velocities Using a Forward Osmosis (FO) Flat Sheet Membrane**
Faris Munshi, University of Central Florida, Jared Church, A. H. M. Sadmani, Woo Hyoung Lee
- 4:30** **Effect of Pressure on Alginate Fouling in Forward Osmosis**
Emily Tow, MIT, John Lienhard

Wednesday, *continued*

PST02

Wednesday Poster Session

**Social Hour & Poster Session
in the Exhibit Hall!**

5:00–6:00 p.m.



**‘Recommissioning’ of the Beverly Hills
Reverse Osmosis Treatment Facility:
Preparation, Startup and Lessons Learned**
*Nathan Boyle, Hazen and Sawyer,
Kenny Chau, Troy Walker, Vince Damasse,
John Merluzzo*

**Antifouling Properties of Ultrafiltration
Membranes Modified With
Perfluorophenylazide Molecules for Use in
Membrane Biore**
*Mackenzie Anderson, University of California,
Los Angeles, Brian McVerry, Dukwoo Jun,
William Huang, Kris Marsh, Eric Hoek,
Richard Kaner*

**Computational Fluid Dynamic CFD
Modelling of the Multiphase Influences in
Ultrafiltration Using Injected Air**
*Amira Abdelrasoul, Huu Doan, Ali Lohi,
Chil-Hung Cheng*

**Connecting Electrical and Control Systems
for MBR Processes**

Raluca Constantinescu, CH2M

**Desalination, Raw Water Supply, and
Integrated Water Resources Management**

*Robert Maliva, WSP-Parsons Brinckerhoff,
William Manahan*

**Design of Mixed Matrix Polysulfone-
Modified Phase Inversion Membranes for
Membrane Distillation**

Trent Pinion, Lucy Mar Camacho

**Electrodialysis Performance in Non-Ohmic
Region**

*Fattaneh Naderi Behdani, New Mexico State
University, Abbas Ghassemi, Paul Andersen*

**Field Study Showing How Ceramic
Membranes Can Provide Operability
Improvements and Design Flexibility
for Drinking Water and Industrial Process
Water Production Facilities**

*Aditya Kumar, Nanostone Water Inc.,
Winnie Shih, Brian Wise, Stanton Smith*

**Going Big: The Growth of MBR for Large
Populations**

*Stephen Katz, GE Water & Process,
Sven Baumgarten, Min Luo,
Carsten Owerdieck*

**Hollow Fiber Nanofiltration for Potable
Water Production From Highly Colored
Surface Water**

Frans Knops, Pentair

**Impact of Source Water Characteristics and
Process Operations on CM Performance:
Industrial and Municipal Water Segment**

*Winnie Shih, Nanostone Water, Aditya Kumar,
Mark Waer, Brian Wise, Stanton Smith*

Mobile Membrane Drinking Water Solutions

Joseph Swiezbin, Pall

Wednesday, *continued*

**Nanoparticle-Driven Forward Osmosis
Modification for Mitigating Membrane
Biofouling in Algae Separation**

Rebecca McLean, University of Central Florida

**Pretreatment for the Control of Membrane
Fouling in Direct Contact Membrane
Distillation of High-Salinity Produced Water**

Omkar Lokare, Radisav Vidic

**Scrubber Blowdown Waste, There's
Nothing Neutral About It**

James Christopher, Tetra Tech, Inc.

**Selective Nanofiltration by DNA-Templated
Ceramic Membranes**

*Jonathan Duke, Cerahelix, Tyler Kirkmann,
Cerahelix, Charles Tapley, Tracy Bantegui,
James Hutchinson, Karl Bishop*

**Taking IPR From Concept to Reality in
Florida: Clearwater Groundwater
Replenishment Approaches the
Construction Phase**

*Jarrett Kinslow, Tetra Tech, Inc., Robert Fahey,
David Porter, Lan Nguyen, Emilie Moore,
Jennifer Roque, David MacNevin*

AMTA Membership Meeting

6:00–6:30 p.m.

Exhibit Hall B

All AMTA Members encouraged to attend!

Beverage, snacks and prizes provided.

Thursday, February 16, 2017— Morning

Exposition open today

8:00–11:00 a.m.

Exhibit Hall B, Lower Level

Networking Breakfast in Exhibit Hall

8:00–9:00 a.m.

Join us in the Exhibit Hall this morning for breakfast and extra networking time with exhibitors.

THU01

Industrial Applications

9:00–10:00 a.m.

Room: 202 BC

Track: Developments and Trends in
Membrane Technologies

Moderator: *John Tracy*

Overview

Attending this session will provide you with a better understanding of membrane processes in industrial applications, including treatment of acid mine drainage and experiences from an oil refinery.

9:00 Optimization of Abandoned Mine Drainage Treatment by Commercially Available Nanofiltration Membranes

Shardul Wadekar, University of Pittsburgh
Chem & Petro. Eng., *Radisav Vidic*

9:30 Energy Recovery Devices, Membrane Flux Balancing and Net Energy Consumption for Recycled Water: A Full-Scale Evaluation

James Vickers, Separation Processes Inc.,
Mehul Patel, *William Dunivin*

Thursday, *continued*

THU02

Improving Quality of Receiving Waters Using MBR

9:00–10:00 a.m.

Room: 201 A

Track: Membrane Bioreactors

Moderator: *Scott Freeman*

Overview

This session covers projects aimed at using MBR to improve quality of receiving waters with presentations covering upgrades to a four-stage Bardenpho process along with addition of new MBR and MF to meet strict effluent nutrient limits, as well as a presentation on the potential for MBR to be used in sensitive areas to reduce pollutants that help preserve wildlife as well as protect human health.

9:00 Being Good Stewards: Improving Effluent Quality on a Barrier Island

Brett Messner, Tetra Tech, Inc., Fred Mitti, Kevin Friedman

9:30 The Role of Membrane Bio-Reactors in Addressing Chesapeake Bay Challenges

Zohreh Movahed, WATEK Engineering Corporation, Melissa Lin



**10:00–10:30 a.m.
Coffee Break in Exhibit Hall**

THU03

Optimizing Membrane Plant Performance

9:00–10:00 a.m.

Room: 203 BC

Track: Plant Design and Operation

Moderator: *Mark White*

Overview

This session explores membrane plant performance optimization through presentations on information management systems leading to better management of membrane facilities as well as on methods to examine and ultimately extend RO run times using data from bench-scale, pilot-scale, and full-scale performance.

9:00 **Fixing the “Data Rich, Knowledge Poor”:
Leveraging Information Technologies for
Enhanced RO Performance and
Maintenance**

*Nathan Boyle, Hazen and Sawyer,
Dawn Guendert, Sanjay Puranik,
Arseny Kalinski*

9:30 **Plant Optimization for an Inland Industrial
RO Reuse Facility**

*William Lovins, AECOM, Bret Nicholas,
Catherine Magliocco,
Jayapregasham Tharamapalan, C. Scott Lee,
Brit Johnston*

Thursday, *continued*

THU04

Membrane Research I

9:00–10:00 a.m.

Room: 201 B

Track: Membrane Research

Moderator: *Yuliana Porras-Mendoza*

Overview

An in-depth look at membrane research, this session presents current and innovative studies with presentations on the mainly diffusive transport of organics in the presence of various salt ions as well as an exploration into the possible benefits and application of silver nanoparticles on biofouling control.

9:00 Separation of Organics and Salts With Ion-Exchange Membranes: Effect of Matrix and Organics

Marjolein Vanoppen, University of Ghent, Griet Stoffels, Lingshan Ma, Evelyn De Meyer, Klaas Schoutteten, Lynn Vanhaecke, Arne Verliefde

9:30 The Effect of In-Situ Silver Nanoparticle Coating Onto UF and RO Membranes for Biofouling Control to Water Permeability

Shahnawaz Sinha, ASU, Meredith Morrissey, Sean Zimmerman, Francois Perreault, Paul Westerhoff



**10:00–10:30 a.m.
Coffee Break in Exhibit Hall**

THU05

Permitting Membrane Plants

10:30 a.m.–noon

Room: 202 BC

Track: Developments and Trends in
Membrane Technologies

Moderator: *Mehul Patel*

Overview

This session will provide attendees a look into permitting membrane plants.

- 10:30** **Speaker to be announced—
Please refer to the Addendum**
- 11:00** **Drinking Water Permit for the Carlsbad
Desalination Facility: Demonstrating
How to Obtain Log Removal Credits for
RO Membranes**
Jonathan Loveland, Black & Veatch
- 11:30** **Charge Mosaic Membranes From Ink-Jet
Printing for Improved Water Reuse and
Treatment**
Mark Summe, University of Notre Dame

Thursday, *continued*

THU06

Optimizing MBR Operations

10:30 a.m.–noon

Room: 201 A

Track: Membrane Bioreactors

Moderator: *Chandra Mysore*

Overview

This session features new information on optimizing MBR operations. Those attending this participate in discussions on a case study demonstrating the potential of how MBR technology in industrial applications like dairy wastewater treatment for areas with stringent nutrient limits and limited site footprint, an overview of an MBR pilot and full-scale system fouling and troubleshooting, system recovery, and lessons learned, and the results of a study using nonadsorbed particles with conventional gas-sparged anaerobic MBR as a three-phase moving-bed anaerobic MBR in attempt to enhance flux production.

10:30 **Achieving Stringent Nutrient Compliance**
Michael Mecredy, Brown and Caldwell

11:00 **Improving Organic Reduction and
Overcoming Challenges of a Membrane
Bioreactor (MBR) Treating Wastewater
From Plastic Production**
*David Holland, Aqua-Aerobic Systems,
Benjamin Antrim*

11:30 **One MBR, 15 Years of Innovation**
*Mike Snodgrass, Ovivo USA, LLC,
Dennis Livingston*

THU07

Improving Membrane Plant Operations

10:30 a.m.–noon

Room: 203 BC

Track: Plant Design and Operation

Moderator: *Steven Coker*

Overview

An in-depth look at improving membrane plant operations, this session includes presentations on RO performance optimization resulting from online THM monitoring, a review of the startup and commencement phase of a brackish groundwater desalination project, and an overview of tools and techniques to maximize the operational lifetime of membrane modules prior to replacement.

- 10:30** **Predicted Network TTHM Levels Derived From Online THM Formation Potential Monitor Helped Optimize Reverse Osmosis Treatment and THM Management**
Richard Bacon, Aqua Metrology Systems Limited, Miquel Faus, Michael West
- 11:00** **Startup and Initial Operations of the SAWS Brackish Groundwater Desalination Project**
Jarrett Kinslow, Tetra Tech, Inc., Esther Harrah, Jill Hudkins, David Timmermann
- 11:30** **Use of Membrane Performance Metrics to Characterize Membrane Replacement Requirements**
Jeffery Beaty, CH2M, Laura Meterer, Alec Cranmer, Heather Wray

Thursday, *continued*

THU08

Membrane Research II

10:30 a.m.–noon

Room: 201 B

Track: Membrane Research

Moderator: *Yuliana Porras-Mendoza*

Overview

The session will provide the latest in membrane research with presentations on a comprehensive physicochemical characterization of human adenoviruses to understand the energetics of virus-filter interactions and evaluate crossflow filtration from various water matrices, an exploration of the effects of Arabic gum addition to act as a new pore-forming and hydrophilic agent on the properties of cast PSF membranes, and a lengthy case study of one plant's ongoing experience with biofouling.

- 10:30** **Recovery of Adenovirus From Tap and Surface Water by Crossflow Ultrafiltration: Experimental Determination and XDLVO Predictions**
Hang Shi, Michigan State University, Irene Xagorarakis, Kristin Parent, Merlin Bruening, Vlad Tarabara
- 11:00** **The Effect of Arabic Gum on the Properties of Polysulfone Membranes**
Yehia Manawi, QEERI, Muataz Hussien
- 11:30** **18 Years RO-Experience at WTP Heemskerk Biofouling Aspects**
Gilbert Galjaard, PWN Technologies, Herman Smit

Thursday Luncheon (Ticket Required)

noon–1:30 p.m.

Room: Grand Ballroom, 2nd Level

Food served until 12:40 p.m.

Thursday, February 16, 2017— Afternoon

THU09

Oil and Gas Applications

1:30–3:00 p.m.

Room: 201 A

Track: Developments and Trends in
Membrane Technologies

Moderator: *John Potts*

Overview

The presentations in this session will cover a range of membrane projects for treatment of produced water from oil and gas activities. Topics include comparison studies of various approaches and results of recent pilot projects.

**1:30 Treatment of Hydraulic Fracturing Flowback
Water Using a Nanoporous Liquid Crystal
Polymer Membrane**

Sarah Dischinger, University of Colorado at
Boulder, *James Rosenblum*, *Richard Noble*,
Douglas Gin, *Karl Linden*

**2:00 Operations of Integrated Water Treatment
Platform for Treatment of Produced Water
From Bakersfield, California**

Anna Jawor, *Jason Lake*, *Subir Bhattacharjee*,
Eric Hoek, *Arian Edalat*

**2:30 Comparison of DCMD and VMD for
Treatment of Produced Water From
Unconventional Gas Extraction**

Omkar Lokare, *Shuai Liu*, *Radisav Vidic*

Thursday, *continued*

THU10

MBR Innovations

1:30–3:00 p.m.

Room: 202 BC

Track: Membrane Bioreactors

Moderator: *Greg Wetterau*

Overview

This session features new information on MBR applications and improvements, including presentations on the feasibility of direct integrity testing in MBR systems and what alternatives are needed to warrant 4-log *Crypto* and *Giardia* removal credit, a study of how chemicals of emerging concern captured through treatment by require further treatment before being released to the environment, and a summary of pilot tests of side-by-side UF membranes in the face of storm flows and changes to upstream operations.

- 1:30** **Can MBR Replace MF/UF in a Potable Reuse Train—Implementation Concerns?**
Ufuk Erdal, AECOM
- 2:00** **Evaluating Management and Disposal of CECs in Water Reuse Projects**
*Graham Juby, Carollo Engineers,
Saied Delagah, Ali Sharbat,
Mojtaba Farrokh Shad*
- 2:30** **Long-Term Pilot Testing of Membrane Filtration for Ultra-Low Tertiary Phosphorus Removal at Spokane**
Paul Mueller, CH2M, Lars Hendron

THU11

Lessons Learned in Membrane Plant Operations

1:30–3:00 p.m.

Room: 203 BC

Track: Plant Design and Operation

Moderator: *Christine Owen*

Overview

This session presents current and innovative approaches to operating membrane plants, with presentations on performance before and after the membrane modules' retrofits, a study of factors related to membrane fouling and their changes along the RO feed channel from stage to stage.

- 1:30** **Direct Module Retrofits: Operating History of Five Low-Pressure Membrane Plants**
Thomas Poschmann, Scinor Water America, LLC, Jay Garcia, Jan Cornelius, Joe Tardio
- 2:00** **RO Membrane Surface Factors Influencing Specific Flux**
Jana Safarik, Orange County Water District, Donald Phipps
- 2:30** **Performance Metrics for Ageing of Drinking Water Membranes**
Shona Robinson, Pierre Berube

THU12

Project Planning and
Implementation

1:30–3:00 p.m.

Room: 201 B

Track: Plant Design and Operation

Moderator: *Mike Snodgrass*

Overview

The session will provide the unique improvements on membrane project planning and implementation with presentations on a mass balance model used to optimize a tool for blending operations, a bench-scale investigation of alternative chemicals for an enhanced cleaning regime of aged membranes, and a review of a new element design and its potential advantages.

- 1:30** **Making Good Better: Optimizing Salinity Management Using Time-Step Water and Salt Balance**
Qun He, Carollo Engineers, Chao-An Chiu
- 2:00** **Process Optimization and Adjustments Help Save Money, Achieve Membrane Integrity, Reliability and Increase Membrane Life**
Korkud Egrican, CH2M, J.C. Lan, Alexander Echols, Jim Lozier, Srinivas Jalla
- 2:30** **Capitalizing on the Latest Advancements in Reverse Osmosis Membrane Technology**
Tom Knoell, PERC Water Corporation, Richard Franks, Derrick Mansell, Craig Bartels, Myles Davis

Closing Session and Best Papers & Best Posters Award Ceremony

3:15–3:45 p.m.

Room: Grand Ballroom

Moderator: *Ben Movahed*

Join us for this conference finale, including the announcement of Best Paper, Best Poster, Student Best Papers and Student Best Poster

Friday, February 17, 2017—Morning

Technical Facility Tours

All tours require a ticket—inquire at registration regarding availability.

Tour 2—Overview of Water Replenishment District of Southern California Reuse Program and Tour of Leo J. Vander Lans AWTF MF/RO Facility

8:30 a.m.—noon (Board bus at 8:15 a.m.)

Ticket required to board.

Tour 3—Terminal Island Water Reclamation Plant Advanced Water Purification Facility

8:30 a.m.—noon (Board bus at 8:15 a.m.)

Note: pre-registration was required for Tour 3.

No onsite registration or name changes permitted; ticket required to board.

Board bus at 8:15 a.m. at the corner of Pine Street & Bay Street, directly across from the main promenade exit of the LBCC. Attendees must wear long pants and closed toed shoes with no heel and must carry photo ID for security.

Committee Meetings

Membrane Processes Committee

Tuesday, February 14, 2017

5:30–6:30 p.m.

Room: 203BC (session room)

Membrane Systems Subcommittee

Tuesday, February 14, 2017

10:00–11:00 a.m.

Room: 203A

Membrane Technology Research Committee

Tuesday, February 14, 2017

5:00–6:00 p.m.

Room: 202 A

Water Desalting Committee

Tuesday, February 14, 2017

5:30–6:30 p.m.

Room: 203 A

Exhibitors

As of December 30, 2016

Company Booth

Aerex Industries, Inc. **537**
(An Affiliate of CWCO)

www.aerexglobal.com

Aerex Industries, Inc. is an original equipment manufacturer and service provider of a wide range of products and services applicable to municipal water treatment and industrial water and wastewater treatment.

Afton Pumps Inc. **412**

www.aftonpumps.com

For more than 45 years, Afton Pumps has had a worldwide reputation for excellence in the design and production of custom vertical pumps.

American Water Chemicals, Inc. **301**

www.membranechemicals.com

American Water Chemicals (AWC) manufactures specialty chemicals for pretreatment and cleaning of reverse osmosis (RO), nanofiltration (NF), ultrafiltration (UF), and microfiltration (MF) membrane systems.

Amiad Water Systems **514**

www.amiadusa.com

For more than 50 years, Amiad Water Systems has met the need for clean water by developing a comprehensive line of exceptionally efficient automatic self-cleaning and manual filters for industrial, municipal and domestic use.

Aqua-Aerobic Systems, Inc. **327**

www.aqua-aerobic.com

Aqua-Aerobic Systems, Inc. is a leading solution provider of advanced water/wastewater treatment technologies. Featured products include ultrafiltration and microfiltration, membrane systems, and cloth media filtration.

Avista Technologies, Inc. **109**

www.avistatech.com

A trusted expert in membrane system chemistry and global process support for RO, MF/UF and MMF. RO products include Vitec antiscalants, RoClean membrane cleaners, AvistaClean MF cleaners and RoCide biocides.

Biwater Inc. **421**

www.biwater.com

A premier membrane systems supplier for water filtration, wastewater reuse and desalination. Turnkey Ultrafiltration and Reverse Osmosis water treatment process facility design, supply and handover capability.

Blacoh Surge Control **341**

www.blacoh.com

Blacoh Surge Control provides customized system-wide engineered solutions with our system modeling, proof of design, and large pressure vessels used in surge protection, pressure regulation, storage, and pump control.

Boll Filter Corporation **523**

www.bollfilterusa.com

Boll Filter offers automatic, self-cleaning, backwashable filters/strainers. These units have a highly efficient cleaning cycle with continuous flow during bi-directional cross-flow, reverse flow backwash.

**Brackish Groundwater National Desalination
Research Facility** **441**

www.usbr.gov/research/bgndrf

The Research Facility is a federal facility available to agencies, universities, and private sector companies for developing technologies for the desalination of brackish and impaired groundwater found in the inland states.

Bray International **515**

www.bray.com

With over 30 years of success, Bray International is one of the premier butterfly valve, severe service ball valve, specialty slurry valve, knife gate valve and pneumatic and electric actuator manufacturers in the world.

Burkert Fluid Control Systems **538**

www.burkert-usa.com

Burkert Fluid Control Systems is a global solution provider of process control, automation and filtration to the water treatment industry; improving automation, accuracy, and water quality for water treatment processes.

Conwed Global Netting Solutions **525**

www.conwedplastics.com

Conwed manufactures the leading netting portfolio for filtration applications. From extruded cylinder tubes, sleeves, and feed spacers, to diamond and extruded netting, Conwed offers a wide range of customization options.

Danfoss High Pressure Pumps **427**

www.hpp.danfoss.com

Danfoss High Pressure Pumps is a Global Leading supplier of high-pressure pumps (APP) and energy recovery devices (iSave) for seawater RO applications for land based, marine, offshore and mobile/ containerized applications.

David H. Paul, Inc. **325**
www.dhptraining.com
Since 1988 DHP has been the world's leader in providing high-tech water treatment technology training. We train beginners, operators, supervisors and engineers. We save facilities costs and damage.

DelStar Technologies, Inc./SWM **523**
www.delstarinc.com
For over 30 years we've been the premier manufacturer of extruded nets, permeate tubes & machined parts for the membrane filtration industry. Naltex Feed Spacer products are the most widely used netting for RO applications.

Doosan Hydro Technology LLC **213**
www.doosanhydro.com
Backed by 30 years of experience and over 150 successful installations, Doosan Hydro Technology is an Integrated Solutions Provider for Water and Wastewater Treatment Systems.

Dow Water & Process Solutions **113**
www.dowwaterandprocess.com
Dow Water & Process Solutions is the global leader in sustainable separation & purification technology, offering ion exchange resins, reverse osmosis membranes, ultrafiltration membranes, high-solids filters products.

Econity, Inc. **413**
www.econity.com
Membrane filtration and equipment manufacturer for water and wastewater treatment system for recycling and reuse.

Energy Recovery **512**
www.energyrecovery.com
Energy Recovery Inc. is the leading producer of energy recovery devices, including the award-winning PX Pressure Exchanger. With 17,000 devices worldwide, its products save clients more than \$1.7 billion (USD) a year.

Evoqua Water Technologies **207**

www.evoqua.com

Providing leading technologies and know-how for 100 years to help engineers and municipalities clean and purify the world's water. We excel in membrane systems, membrane pretreatment, disinfection, and DBP treatment.

Federal Screen Products Inc. **509**

www.federalscreen.com

Federal Screen Products manufactures Wedge Wire screen and fabricated Wedge Wire products for straining, screening, filtering and media retention in water purification, conditioning and wastewater equipment.

Fluid Equipment Development Company (FEDCO) **400**

www.fedco-usa.com

FEDCO is a global leader in the design and manufacture of highly efficient, custom manufactured centrifugal pumps and energy recovery devices with fast delivery for seawater and brackish water RO applications.

GE Water & Process Technologies **306**

www.gewater.com

With operations in 130 countries and over 7500 employees worldwide, GE's Water & Process Technologies leverages our innovation, expertise and global capabilities to solve our customers' toughest water and process challenges.

Genesys North America **425**

www.genesysro.com

Genesys International supplies specialty RO membrane chemicals, antiscalants, cleaners, flocculants and biocides. Our dedicated laboratories in UK and Spain conduct membrane autopsies, water analyses and cleaning tests.

Global Water Intelligence **527**

www.globalwaterintel.com

GWI is the global leader for primary research information on global water markets. Our publications are the leading data source for anyone seeking data on water projects involving the private sector.

Grundfos Pumps Corporation **433**

www.grundfos.us

Grundfos Pumps Corp is a global pump & pumping systems leader serving the residential, commercial building and process industry markets, as well as being a major supplier to the water supply and water treatment industries.

H2O Engineering, Inc. **532**

www.h2oengineering.com

H2O Engineering is a full-service resource for drinking water, water reuse & soil & groundwater remediation. We pride ourselves in manufacturing systems that employ leading-edge technologies & industry-leading automation.

H2O Innovation **313**

www.h2oinnovation.com

H2O Innovation designs, manufactures and operates water & wastewater treatment systems with membrane filtration technologies.

Hach Company **110**

www.hach.com

Analytical instruments and reagents to test water quality. The best solutions for distribution system monitoring and disinfectant monitoring along with chloramination and disinfection challenges in the distribution system.

Harn R/O Systems, Inc. **438**

www.harnrosystems.com

Harn R/O Systems makes customized equipment that focuses on maximizing membrane performance for each application. Harn has earned a reputation for quality and ability over 40 years service. Client satisfaction is Job 1.

Henry Pratt Company **540**

The Henry Pratt Company designs, develops, manufactures & markets butterfly, rectangular, ball, nuclear, industrial, cone, sleeve, energy dissipating valves as well as valve actuators & control systems.

Hydranautics, Nitto Group Company **307**

www.membranes.com

Hydranautics is one of the global leaders in the field of Integrated Membrane Solutions and offers complete membrane solutions like RO, NF, UF and MF for water, wastewater and process treatment and applications.

i-2-m **432**

www.i-2-m.com

i-2-m is a spinoff of MANN+HUMMEL, a worldwide leader in filtration. i-2-m is accelerating filtration solutions to the market. We offer ion exchange filtration and Ceramic Hollow Fiber Membrane for wastewater filtration.

IDE Technologies **508**

www.ide-tech.com

A world leader in water treatment, specializing in the development, engineering, construction and operation of Desalination, Industrial Water Treatment, Brackish Water and Water Reuse plants.

inge GmbH - BASF's Ultrafiltration Membrane Business **424**

www.inge.basf.com

inge® - part of BASF - is a world's leading provider of UF technology used in treatment of drinking water, process water, sea water and wastewater. Its range of products includes membranes, modules and rack solutions.

Kinetrol USA, Inc. **526**

www.kinetrolusa.com

Kinetrol manufactures 16 vane actuator sizes from 8 in. lb. to 168,000 in. lb. output guaranteed for 4M operations & 2M cycles. Kinetrol vanes are uniquely suited for high-cycle, limited-space RO and UF skid applications.

King Lee Technologies **435**
www.kingleetech.com

King Lee Technologies has developed and refined product lines in antiscalants, membrane cleaners and specialty products. Contact us at klt@kingleetech.com.

Koch Membrane Systems, Inc. **326**
www.kochmembrane.com

KMS designs and develops standard and custom tubular, hollow fiber, and spiral membrane water filtration systems that purify municipal and industrial water and wastewater so it is safe for consumption, discharge, or reuse.

LANXESS Sybron Chemicals Inc. **319**
www.lanxess.com

LANXESS is a leading specialty chemicals company. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, specialty chemicals and plastics.

Lenzing Technik GmbH **521**
www.lenzing-filtration.com

Lenzing Technik GmbH manufactures automatic filter devices for solid-liquid separation of various water/wastewater applications. The unique regeneration principle ensures efficient filtration, even down to 1µm.

LG Chem Water Solutions **500**
www.lgwatersolutions.com

Responsive & Responsible—LG Water Solutions, part of LG Chem and the manufacturer of the full line of high-efficiency NanoH₂O™ reverse osmosis (RO) membranes, has been an innovative solution partner in the water industry.

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- Meiden America, Inc.** **335**
www.meidensha.com/products/water
Water resource management is a top priority for Meiden, so one key product is our ceramic flat sheet membranes for use in micro-filtration and MBR. Now available to the North American municipal and industrial reuse markets.
- MemBrain** **507**
www.membrain.cz/en
MemBrain s.r.o. is a research, engineering and technology company that focuses mainly on research and innovation activities in the field of membrane processes, especially EDR and EDI.
- Membrane Solutions** **530**
www.membrane-solutions.com
Membrane Solutions is a global separation and purification company serving customers in water-intensive industries. We focus on municipal & industrial, chemical & petrochemical, food & beverage, mining and water treatment.
- Meurer Research, Inc.** **318**
www.meurerresearch.com
Meurer Research engineers and manufactures water and wastewater treatment products. Founded in 1978, MRI has over 50 patents and more than 5,000 installations. Call 303-279-8373 or visit www.meurerresearch.com
- Microdyn-Nadir** **415**
www.microdyn-nadir.com/en/
Microdyn-Nadir offers a complete range of membranes to treat water and wastewater, from MBR to RO. In late 2016, we acquired TriSep Corporation to offer a complete line of process and specialty membranes.
- Myron L® Company** **407**
www.myronl.com
The Myron L® Company manufacturers precision water quality instrumentation. Our instruments measure, monitor and control Conductivity; Resistivity; TDS; pH; ORP, Dissolved Oxygen and Temperature.
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Nanostone Water Inc. **434**

www.nanostone.com

Nanostone Water Inc. is a USA company with ceramic membrane manufacturing in Germany. Nanostone is proud to introduce the CM-151 ceramic UF membrane for industrial process water and municipal water / wastewater treatment.

Ovivo USA **501**

www.ovivowater.com

Ovivo® MBR has played a pivotal role in establishing submerged MBR technology in North America. Since April of 2001, Ovivo has been responsible for the design, installation, and or commissioning of 270+ MBRs.

Pall Water **419**

www.pall.com/water

Pall Water is a global leader in filtration, separation and purification technologies. Our water systems have a flexible design, small footprint and can produce high-quality water for municipal and industrial applications.

Pentair **330**

www.xflow.pentair.com

Pentair Advanced Filtration; our high quality X-Flow membranes and Codeline Membrane Housings are the most trusted brands for critical and demanding filtration applications.

Permionics Membranes PVT LTD **535**

www.permionics.com

End-to-End customized MF UF NF and RO membranes and solutions including Custom Design Engineering & Manufacturing services at competitive costs catering to water wastewater and process markets.

Protec-Arisawa **440**
www.protec-arisawa.com
Protec-Arisawa is a leading supplier of FRP pressure vessels for NF, RO and forward osmosis membranes. We are the only US manufacturer of vessels, fully compliant with ASME Section X. We manufacture in US, Europe and Japan.

Pure Aqua Inc. **338**
www.pureaqua.com
Pure Aqua is a manufacturer of commercial and industrial brackish and seawater reverse osmosis systems, media filters, water softeners, ultrafiltration systems, wastewater treatment systems, deionizers, and UV sterilizers.

Purifics **314**
www.purifics.com
Purifics provides Complete Water Purification systems based on its proprietary ceramic membrane technology which Filters, Destroys & Recovers contaminants from water globally.

QUA Group **431**
www.quagroup.com
QUA is an innovator of advanced membrane technologies that address the most demanding water purification requirements. Our products include fractional electrodeionization, polymeric and ceramic ultrafiltration, and MBR.

RWL Water **439**
www.rwlwater.com
RWL Water is a global leader in water, wastewater and reuse, offering cost-cutting solutions for mid-sized industries and municipalities throughout the world.

Saf-T-Flo Chemical Injection **529**
www.saftflo.com
SAF-T-FLO specializes in manufacturing chemical injection quills for chemical feed systems in the municipal, industrial, and commercial water treatment industries.

- Scinor Water America, LLC** **533**
www.scinor.com
Scinor designs and manufactures high performing TIPS Ultrafiltration modules for direct retrofit applications of most MF/UF platforms and new systems, providing the best overall value to end-users.
- SUEZ** **320**
www.suez-na.com
SUEZ provides technology solutions for industrial water, municipal drinking water, municipal wastewater and biosolids management. Our treatment technologies bring today new solutions to the water specialists.
- Sulzer Pumps Solutions** **339**
www.sulzer.com
Sulzer is one of the world's leading pump manufacturers. We are well known for state-of-the-art products, performance reliability, and energy-efficient solutions.
- Sumitomo Electric Industries Ltd.** **503**
www.sumitomoelectricusa.com/poreflon/
Wastewater treatment solutions with PTFE hollowfiber MF/UF membranes. Robust, superior thermal & chemical stability, including tolerance to high content of oil in feed. Enabling treatment in hard to treat wastewaters.
- Superlok USA** **332**
www.superlokusa.com
We serve the following industries: oil & gas, geothermal, semiconductor, power generation, CNG, solar, biotechnology, analytical, aerospace, shipbuilding, chemical, environmental, nanotechnology, nuclear, pharmaceutical, R&D.
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- Tesco Controls, Inc.** **513**
www.tescocontrols.com
Full-Systems Integrator meeting YOUR specification and needs: (MCC) Motor Controls, Pump Controls, Instrumentation, Telemetry, PLCts, SCADA Systems, Engineering, Design-Build Services & Service Contracts.
-

Tetra Tech, Inc. **506**
www.tetrattech.com
In a complex world with competing demands for limited resources, Tetra Tech offers clear solutions made possible with sound science, understanding, innovation, and industry-leading approaches.

Toray Membrane USA, Inc. **203**
www.toraywater.com
Manufacturer offering a full spectrum of membrane technologies for water and wastewater treatment — reverse osmosis (RO), nanofiltration (NF), ultrafiltration (UF), microfiltration (MF) and membrane bioreactors (MBR).

UGSI Solutions **334**
www.ugsichemicalfeed.com
UGSI Chemical Feed is the leader in chemical feed & polymer activation with PolyBlend® dry & emulsion polymer feed systems, Encore® diaphragm metering pumps, dry chemical feed systems & Varea-Meter® variable area flowmeters.

Victaulic Company **112**
www.victaulic.com
Victaulic is the originator and leading producer of mechanical and grooved pipe-joining solutions. Our innovative technologies put people to work faster while increasing safety, ensuring reliability and maximizing efficiency.

Water. Desalination + Reuse **531**
www.desalination.biz
Published in association with The International Desalination Association, *Water, Desalination + Reuse* has been serving the world's growing need for water since 1991 delivering invaluable research & news on key developments.

Water Planet, Inc. **534**

www.waterplanet.com

Based in California, Water Planet develops and markets breakthrough water treatment solutions to solve the most challenging water reuse and desalination applications. Products include IntelliFlux systems and PolyCera membrane.

Watersurplus **324**

www.watersurplus.com

Watersurplus provides engineered solutions utilizing new and/or remanufactured filtration tanks, RO's and wastewater systems. Rental assets are available for emergency or long term use. We buy and recycle used 8" RO elements.

Weir Floway, Inc. **333**

www.global.weir

Weir Floway, Inc. is an industry-leading vertical turbine pump manufacturer with extensive experience in the casting and fabrication of special alloy materials and committed to superior quality and extended operational life.

WesTech Engineering, Inc. **331**

www.westech-inc.com

WesTech Engineering is a recognized leader in the manufacture of water and wastewater treatment equipment for municipal and industrial water and wastewater process systems. Employee-owned since 1973, ISO 9001:2008 certified.

Wigen Water Technologies **401**

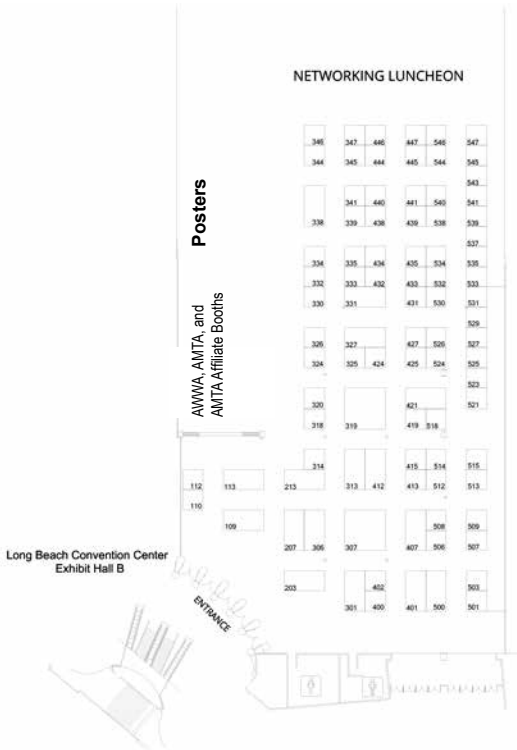
www.wigen.com

WWT manufactures the complete range of membrane systems, including MF/UF, NF & RO. Wigen is one of the first large-scale manufacturers of Open Platform UF systems for drinking water and advanced wastewater reuse applications.

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