



# International Water Conference<sup>®</sup>

*-The 73<sup>rd</sup> Annual-*

November 4-8, 2012 ♦ San Antonio, TX USA

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than 20  
PDH's!

## PRELIMINARY TECHNICAL PROGRAM

[www.eswp.com/water](http://www.eswp.com/water)



## Welcome to the 73rd Annual IWC

To help you enjoy your stay in San Antonio, Texas during the 2012 IWC, we have many special events and activities planned for you. Join your fellow conference attendees at the annual Get Acquainted Reception, held on Sunday in the Exhibit Hall to welcome you to the Conference. If your spouse is accompanying you to the IWC please refer to the IWC home page for information on optional spouse programs to enjoy San Antonio.

## About the International Water Conference® (IWC)

The IWC is the world's premier conference for understanding and dealing with the technical and business challenges of industrial water treatment. IWC presents the latest in scientific advances and practical applications in this field, cutting across a wide range of industries and functional areas.

As the preeminent international technical forum in the field, the IWC will bring together more than 750 end users, researchers, practicing engineers, managers, educators, suppliers and contractors. It is dedicated to advancing new developments in the treatment, use and reuse of water for industrial and engineering purposes.

The IWC has always been a strong educational conference. Attendees come to learn about the latest applications available in the industrial water treatment industry, educate themselves in current technology and applications through attendance in IWC workshops, and network heavily with their peers active in water treatment.

## What Makes the IWC Different?

All papers presented at the IWC are carefully peer reviewed for quality and to ensure no commercial aspect is evident. In addition to the broad educational and networking opportunities being offered, the IWC invites you to participate through our unique Prepared Discussion program. Each Paper presentation at the Conference is followed by a Prepared Discussion—a thoroughly considered, different perspective on the topic. This is followed by an open floor discussion when all audience members and presenters can fully interact—ask questions, seek clarification, and raise alternative viewpoints.

If you are interested in becoming more involved with the International Water Conference®, simply contact the IWC office for more information on the many ways you can participate.

## Who Should Attend?

Because our Technical Sessions are organized around functional areas, they apply to a broad range of industries including (but not limited to): Automotive, Chemical, Microelectronics, Paper production, Primary Metals, Semi-Conductor production, and Utilities. Typical attendee's job titles often include:

- Utility Supervisors
- Engineers
- Power Plant Operators
- R&D Personnel
- Water Chemists
- and...Spouses & Families!
- Facility Supervisors
- Academic Research / Professors
- Business Development Managers
- Operations and Plant Managers
- Graduate Students

## The Host City: San Antonio, Texas (USA)

San Antonio's River Walk, Spanish colonial architecture, and fountain-laden parks and plazas

make it one of America's most picturesque cities. Today, this seventeenth century metropolis is the seventh largest city in the nation with contemporary venues and lavish accommodations, all while maintaining an old world heritage exuded through diverse artistry, ethnic cuisine and an intimate and exquisite culture. From the stones of the Alamo to the meandering paths of the River Walk, San Antonio takes you on a journey through a land as grand as its reputation. Walk the lines drawn for independence when you visit the Alamo—one of five Spanish colonial missions. Stroll the cobblestone sidewalks of the River Walk to uncover an outdoor theatre with flamenco dancers and mariachis, nationally acclaimed museums, luxury riverside hotels and sidewalk cafes that offer everything from authentic Tex-Mex to worldly cuisines.

Just down the road you'll find SeaWorld San Antonio, the world's largest marine life adventure park and family entertainment showplace; and Six Flags Fiesta Texas with thrilling rides and shows fun for every age.

Here, diversity is a way of life; from the colors of the culture to a broad range of attractions. So come, find for yourself that San Antonio is more than a convention destination.

More visitor information is available through the San Antonio Convention & Visitors Bureaus web site at [www.visitsanantonio.com](http://www.visitsanantonio.com).

## The Host Hotel: Crowne Plaza Riverwalk

Enjoy all the excitement, charm and culture of San Antonio while staying at this beautiful AAA 4-diamond hotel. Experience the warmth of the grand hotel combined with the comfort and amenities of today's business hotels.

Located near AT&T, Frost Bank, Toyota, Boeing, General Electric and USAA, the hotel is within walking distance of the Alamo, Hemisfair Park and Tower, El Mercado Marketplace, the San Antonio Convention Center and the RiverCenter Mall. The Crowne Plaza is only a short drive to Fiesta Texas—Six Flags Amusement Park, Sea World, Schlitterbahn Water Park, the San Antonio Missions and the San Marcos Outlet Center.

This 410-room hotel features 37,000 sq. ft. of meeting space, with a grand ballroom and exhibit hall. All rooms are wired with high-speed Internet access with WiFi (wireless) access in the public areas. The Hotel features valet and self parking for all guests and meeting attendees. The hotel features a roof top pool, sauna, whirlpool and a complimentary full fitness center. All official IWC events will be held in the hotel.

To learn more about this hotel, visit [crownplaza.com/sariverwalk](http://crownplaza.com/sariverwalk)

A special block of rooms has been reserved for attendees of the IWC, with a conference room rate of \$149.00 per night, plus applicable taxes. On-line reservations can be made at <https://resweb.passkey.com/go/eswp>. Telephone reservations can be made by contacting the Crowne Plaza Riverwalk at 210-354-2800. (Hotel address: 111 East Pecan Street, San Antonio, TX 78205)

## Questions?

Visit [www.eswp.com/water](http://www.eswp.com/water) for all things related to the IWC. Need more info? Contact us at 412-261-0710, ext. 13.

The IWC Exhibit Hall features over 70 different opportunities to learn about practical and innovative solutions for the industrial water treatment industry from industry leaders. The IWC Exhibit Hall is the place to be for attendees (and exhibitors) to continue their educational experience! The following is our listing of Exhibitors as of July 1, 2012:

Aggreko, LLC  
Aquatech International Corp.  
Ashland Water Technologies  
AVANTech Inc.  
Avista Technologies, Inc.  
Baker Hughes Process and Pipeline  
Bowen Engineering Corporation  
BWA Water Additives  
CEDA International Corporation  
Champion Technologies  
CHEMetrics, Inc.  
Chemical Publishing Company  
Chemtrac Systems, Inc.  
ChemTreat, Inc.  
Cortec Corporation  
Degremont North America  
Diamond V  
DOW Water & Process Solutions

Duraflow LLC  
Eco-Tec Inc.  
Environmental Operating Solutions, Inc.  
Fluidra USA  
French Creek Software, Inc.  
GE Power & Water  
GEA Process Engineering  
Genesys International  
Global Chem-feed Solutions  
Golder Associates, Inc.  
Graver Water Systems/ Ecodyne Water  
Hach  
Honeywell  
Illinois Water Technologies  
Industrial Analytics Corp.  
Johnson March Systems, Inc.  
Justeq LLC  
Kemira Water Solutions Inc.

LANXESS Sybron Chemicals Inc.  
Liquid Membranes  
LMI/ Milton Roy  
MAR Systems Inc.  
Mettler Toledo Thornton and Ingold  
Mitsubishi Electric Automation, Inc.  
MPW Industrial Services  
Nalco Company  
Neptune Chemical Pump Co.  
OrangeBoat  
Ovivo USA, LLC  
Pall Corporation  
Parkson Corporation  
Process Solutions Inc. / MicrOclor  
Professional Water Technologies  
Purilite Company  
QUA Group LLC  
ResinTech, Inc.

SAMCO Technologies, Inc  
Schreiber, LLC  
Sentry Equipment Corp.  
Sewern Trent Water Purification, Inc.  
SolarBee, Inc.  
Southern Research Institute  
SWAN Analytical USA  
Thermax Inc.  
Turner Designs Hydrocarbon Instruments  
U S Peroxide  
U.S. Water Services  
Veolia Water Solutions & Technologies  
Waters Equipment Co.  
WaterTectonics  
WesTech Engineering Inc.  
WorleyParsons  
Zequanox by MBI

The following technical sessions were organized by the IWC Executive Committee for the 2012 International Water Conference®. Refer to the IWC home page for a full abstract of each paper and the latest developments and more information! \*Subject to change.

## Monday, November 5

### Cooling Water - New Developments in Microbiological Treatment

**IWC Rep:** Paul Puckorius, Puckorius & Associates, Inc., Arvada, CO

**Session Chair:** Ken Dunn, Ashland Water Technologies, Shrewsbury, MA

**Discussion Leader:** Don Holt, Ashland Water Technologies, Ajax, ON, Canada

- IWC-12-01 An Integrated Approach to Bio-control in Cooling Systems; Charles Ascolese, GE Water & Process Technologies, Trevose, PA
- IWC-12-02 Optimization of Cooling Tower Treatment Programs Using a Novel, Mild Oxidant for Microbiological Control; Christopher Baron, Ashland Water Technologies, Newark, DE
- IWC-12-03 New Legionella Standards: No Good Deed Goes Unpunished; Janet Stout, Special Pathogens Laboratory, Pittsburgh, PA

### Innovative Solutions & Technologies for Mine Water

**IWC Rep:** George Abraham, Veolia Water, Pittsburgh, PA

**Session Chair:** Paul Pigeon, Golder Associates, Inc., Lakewood, CO

**Discussion Leader:** Jim Woods, WesTech Inc., Salt Lake City, UT

- IWC-12-04 Integration of Bench and Pilot High Density Sludge (HDS) Treatment of Acid Rock Drainage (ARD) into Full-Scale Treatment Facility Design at the Central City/Clear Creek Superfund Site near Blackhawk, Colorado; Neal Gallagher, Golder Associates Inc., Lakewood, CO
- IWC-12-05 Mining Black Gold in South America's Water Management Challenges; Dhananjay Mishra, WorleyParsons, Houston, TX
- IWC-12-06 Fluidized Bed Bioreactor Technology: New Options for Selenium-Containing Mining Waters; David Enegess, Envirogen Technologies, Inc., Kingwood, TX

### Improved Water Monitoring and Modeling For Greater Plant Efficiency

**IWC Rep:** Wayne Bernahl, W. Bernahl Enterprises Ltd., Elmhurst, IL

**Session Chair:** David Gray, Mettler & Toledo, Bedford, MA

**Discussion Leader:** Jim Cairns, Thermo Fisher, Beverly, MA

- IWC-12-07 Silica and Sodium Measurements to Meet Today's Water Quality Specifications in the Power Generation and Semiconductor Industry; Randy Turner, Swan Analytical USA, Wheeling, IL
- IWC-12-08 Plant Optimization and Reliability with Water Treatment System Modeling; Kenneth Chen, Fluor, Irvine, CA
- IWC-12-09 An Integrated approach to Membrane Performance Management Using a New Automation and Monitoring Technology; Dejan Blagojevich, Nalco Company, Naperville, IL

### Trace Contaminants

**IWC Rep:** Dan Rice, DBR Consulting, Sault Ste. Marie, MI

**Session Chair:** Peter Meyers, Resin Tech, West Berlin, NJ

**Discussion Leader:** Charles Guzelli, Severn Trent Services, Pittsburgh, PA

- IWC-12-10 Modifying an Existing Arsenic and Mercury Pretreatment Process to Remove Selenium; Ivan Cooper, Golder Associates, Charlotte, NC
- IWC-12-11 Revolutionary Silica-Based Granular Catalytic Media For The Removal Of Iron, Manganese And Arsenic From Water; Richard Johnson, ITOCHU Chemicals America Inc., Houston, TX
- IWC-12-12 Enhanced Iron Corrosion: A New Way to Remove Dissolved Silica From Water; Yongheng Huang, Texas A&M University, College Station, TX

### 21st Century Water Challenges: Designing and Operating ZLD Plants

**IWC Rep:** Kumar Sinha, Bechtel Power, Fredrick, MD

**Session Chair:** Venus Kaur, Southern Edison Company, Westminster, CA

**Discussion Leader:** Rafique Janjua, Fluor Enterprises, Inc., Sugar Land, TX

- IWC-12-13 No Easy Answers: ZLD Improvement Options for a 720-MW Power Generation Facility; Daniel Sampson, WorleyParsons, Vallejo, CA
- IWC-12-14 A Unique All Membrane Integrated Makeup and Zero Liquid Discharge System; Gerald Alexander, Siemens Industries, Inc., La Canada, CA
- IWC-12-15 Treatment of Cooling Tower Blowdown Water with Membranes in a Zero Liquid Discharge Power Plant; Marvin Drake, Indiantown Cogeneration LP, Indiantown, FL
- IWC-12-16 Zero-Liquid Discharge System at Progress Energy Mayo Generation Station; Matthias Loewenberg, GEA Process Engineering Inc., Columbia, MD

### Boilers – Preserving One of Your Greatest Investments

**IWC Rep:** Debbie Bloom, Nalco, an Ecolab Company, Naperville, IL

**Session Chair:** Mike Preston, Black & Veitch, Overland Park, KS

**Discussion Leader:** Irvin Cotton, Arthur Freedman Associates, Newport, RI

- IWC-12-17 Proper Sampling Makes a Difference; David Daniels, M&M Engineering, Austin, TX

- IWC-12-18 Controlling Condensate & Feedwater Dissolved Oxygen & Air Inleakage (DO); Robert Bartholomew, Sheppard T. Powell Associates, LLC, Baltimore, MD
- IWC-12-19 The Continuing Crusade Against Oxygen Scavenger Use in All-Ferrous Steam Generators; Brad Buecker, Kiewit Power Engineers, Lenexa, KS
- IWC-12-20 Modern Film-Forming Based Amines – An Innovative European Technology for Boiler Water Treatment; Wolfgang Hater, BK Giulini GmbH, Duesseldorf, Germany

### Novel Processes for Produced Water Treatment

**IWC Rep:** Debbie Bloom, Nalco, an Ecolab Company, Naperville, IL

**Session Chair:** Mike Preston, Black & Veitch, Overland Park, KS

**Discussion Leader:** Irvin Cotton, Arthur Freedman Associates, Newport, RI

- IWC-12-21; Overview of Produced Water and Eor Water Treatment; Avijit Dey, Bechtel Corporation, Houston, TX
- IWC-12-22 Polymer Flood Water Specification Determination for Canadian Natural Resources Limited Sites; Melonie Myszczyzyn, Canadian Natural Resources Limited, Calgary, AB, Canada
- IWC-12-23 SAGD: Produced Water Softening Challenges for Ion Exchange Resin (IER) Technology; Claude Gauthier, The Puralite Company, Burlington, ON, Canada
- IWC-12-24 Recovery of BTEX and Light Hydrocarbons from Produced Water; H. Robert Goltz, Dow, Midland, MI

### Challenges in FGD Waste Water Treatment

**IWC Rep:** Brad Wolf, Berkeley Research Group, LLC, Pittsburgh, PA

**Session Chair:** Pat Randall, Aquatech International Corp., Tampa, FL

**Discussion Leader:** Michael Pudvay, Degremont, Richmond, VA

- IWC-12-25 FGD Evaporation Plant Operations; J. Michael Marlett, Aquatech International Corp., Hartland, WI
- IWC-12-26 Selenite and Selenate Removal by Functionalized Alumina Adsorption Technology; Gina Sacco, MAR Systems Inc., Solon, OH
- IWC-12-27 Ash Pond Replacement Therapy; Thomas Higgins, CH2M HILL, Chantilly, VA
- IWC-12-28 Removal of Selenium from Aqueous Waste Streams; Anna Casasus, Kemira, Atlanta, GA

## Tuesday, November 6

### Water Conservation, Recycle and Reuse

**IWC Rep:** Steven Gagnon, AVANTech, Inc., Columbia, SC

**Session Chair:** Jonathan Shimko, GAI Consultants, Homestead, PA

**Discussion Leader:** Chip Westaby, Turner Designs Hydrocarbon Instruments, Fresno, CA

- IWC-12-29 Producing Demineralised Water for Power Generation from Desalination of Concentrated Cooling Water and Mine Drainage; Dheneshree Lalla, Eskom Holdings SOC Ltd., Johannesburg, Gueteng, South Africa
- IWC-12-30 A Water Conservation Tool for Power Generators; Gianna Cooley, CDM Smith, Houston, TX
- IWC-12-31 Pretreatment and Reuse of Wastewater at an Industrial Laundry; Yakup Nurdogan, Bechtel National, Inc., Pueblo, CO
- IWC-12-32 Detection of Organic Contamination in Sugar Process Condensate Streams by Fluorescence; Ling Liang, Nalco (China) Environmental Solution Co Ltd, Shanghai, China

### Treatment and Analysis Technologies for the Nuclear Renaissance

**IWC Rep:** Andrew Calderwood, Consultant, Pittsburgh, PA

**Session Chair:** Michele Funk, Bechtel Power Corporation, Fredrick, MD

**Discussion Leader:** John M. Jevic, The Babcock & Wilcox Company, Barberton, OH

- IWC-12-33 Emergency Response Wastewater Processing at Fukushima Nuclear Plant; James Braun, Avantech Incorporated, Columbia, SC
- IWC-12-34 Effects of Zinc Addition on Steam Generator Tube Surface Chemistry and Structure; Rachel DeVito, Westinghouse Electric Company, Cranberry Township, PA
- IWC-12-35 Nanodex(TM) Filter Papers; Peter A. Yarnell, Graver Technologies, LLC, Glasgow, DE
- IWC-12-36 Intelligent Sensor Technology For Power Plant Liquid Analytics; David Gray, Mettler-Toledo Thornton, Inc., Bedford, MA

### ASME Water Subcommittee: Unlocking Corrosion and Scale Deposition Mechanisms By Determination of Key Produced Water Elemental Ions: Oxygen, Organic Matter, and Silica:

**IWC Rep:** Debbie Bloom, Nalco, an Ecolab Company, Naperville, IL

**Session Chair:** Melonie Myszczyzyn, Canadian Natural Resources Limited, Calgary, AB Canada

**Discussion Leader:** Rudy Tamayo, Husky Energy, Calgary, AB Canada

- IWC-12-37 Monitoring PPB Levels of Dissolved Oxygen in SAGD Pilot Facilities; Glenn Weagle, Champion Technologies, Sherwood Park, AB, Canada

(Continued on next page)

- IWC-12-38 Advances in the Characterization of Dissolved Organic Matter in SAGD Produced Water; David Pernitsky, Suncor, Calgary, AB, Canada
- IWC-12-39 Silicate Scale Inhibitor Use in Once-Through Steam Generators in the SAGD Industry; Edward Van Doorn, Baker Hughes Inc., Calgary, AB, Canada
- IWC-12-40 Silicate Deposit Control in Steam-Assisted Gravity Drainage (SAGD) and Produced Water Applications; Corbin Ralph, Nalco, an Ecolab Company, Calgary, AB, Canada

### **Pilot and Full Scale Operating Experiences for FGD Wastewater Treatment**

**IWC Rep:** Colleen Layman, HDR Inc., Harpers Ferry, WV

**Session Chair:** Patricia Scroggin, Burns & McDonnell, Kansas City, MO

**Discussion Leader:** Ashwin Thakkar, Aquatech International Corp., Canonsburg, PA

- IWC-12-41 Design and Start-up of a Full-scale Biological Selenium Removal System for Flue Gas Desulfurization (FGD) Wastewater from a Power Generating Station; Antonio Lau, Inflico Degremont, Inc., Richmond, VA
- IWC-12-42 Start-up and Operation of a Full Scale, No Liquid Discharge Boron Removal Process for FGD Waste Water; H Robert Goltz, The Dow Chemical Company, Midland, MI
- IWC-12-43 A Pilot Demonstration of Spray Dryer Evaporation as a Method to Treat Power Plant FGD Wastewater; Jason (Xinjun) Teng, Southern Company, Birmingham, AL
- IWC-12-44 Constructed Wetland Treatment System for FGD Wastewater Treatment - Pilot Project Final Results; Christopher Snider, Burns & McDonnell Engineering Company, Kansas City, MO

### **Reverse Osmosis Membrane Issues: New Directions in Pretreatment**

**IWC Rep:** Dennis McBride, Fluor Associates, Greenville, SC

**Session Chair:** Jane Kucera, Nalco, an Ecolab Company, Naperville, IL

**Discussion Leader:** Jeff Tate, Agape Water, Harleysville, PA

- IWC-12-45 Development of a Phosphorous-free RO Antiscalant for Waste Water Recycling Applications; Deepak Musale, Nalco, an Ecolab Company, Naperville, IL
- IWC-12-46 A Novel Approach to Control Microbial Fouling of Reverse Osmosis Membranes; William Colletta, Consultant, Plymouth, MA
- IWC-12-47 Control of Biofouling of Reverse Osmosis Membrane Systems with a Biocide; Fred Singleton, The Dow Chemical Company, Buffalo Grove, IL
- IWC-12-48 Increasing Water System Efficiency with Ultrafiltration Pre-treatment in Industrial Applications; Katarina Majamaa, Dow Chemical Iberica, S.L., Tarragona, Catalonia, Spain

### **Refinery Wastewater**

**IWC Rep:** Jim Dromgoole, Fort Bend Services, Stafford, TX

**Session Chair:** Ramesh Kalluri, Kalluri Group, Inc., Houston, TX

**Discussion Leader:** Arun Mittal, Aquatech International Corp., Canonsburg, PA

- IWC-12-49 Selenium Removal from Refinery Wastewater Using A New Polymer Treatment Program; Daniel Schwarz, Nalco, an Ecolab Company, Naperville, IL
- IWC-12-50 Characterization of Two Gulf-Area Refinery Secondary Wastewater Treatment Plants to Resolve Hindered Settling Issues; David Pecina, General Electric, The Woodlands, TX
- IWC-12-51 Wet Air Oxidation Treatment of Spent Caustic in Petroleum Refineries; Bryan Kumfer, Siemens Industry, Inc, Rothschild, WI
- IWC-12-52 Zero Harmful Discharge of Refinery Waste Water by Removing Toxic Dispersed and Dissolved Hydrocarbons with the Macro Porous Polymer Extraction Technology; Dick Meijer, Veolia MPP Systems/ Veolia Water, Ede, Gelderland, The Netherlands

### **Treatment of Water from Unconventional Oil and Gas Development**

**IWC Rep:** John Lucey, Heckmann Corp., Pittsburgh, PA

**Session Chair:** John Schubert, HDR, Inc., Sarasota, FL

**Discussion Leader:** Jerry Penland, Chester Engineers, Moon Township, PA

- IWC-12-53 VSEP Solution for Frac Flowback Water Recycling; Mark Galimberti, New Logic Research - VSEP, State College, PA
- IWC-12-54 Field Operation Results for Treatment of Frac Water with Aquatech's MoVap, Mobile Industrial Distillation; Charles Kozora, Aquatech International Corp., Canonsburg, PA
- IWC-12-55 ClO2 for Treatment of Frac Water: A Guide to Its Safe Use; Greg Simpson, NRCCA, Grapevine, TX
- IWC-12-56 Shale Gas Produced Water Pretreatment for Barium and Radium Removal; James Silva, GE Global Research, Niskayuna, NY

### **FGD Wastewater Chemistry and Treatment**

**IWC Rep:** Manoj Sharma, Aquatech International Corp., Canonsburg, PA

**Session Chair:** Thomas Lawry, HDR, Inc., Pittsburgh, PA

**Discussion Leader:** Joe Janeczko, Ashland Water Technologies, Shrewbury, MA

- IWC-12-57 Chemistry of FGD Blowdown; Thomas Higgins, CH2MHILL, Chantilly, VA

- IWC-12-58 Extending the Linear Dynamic Range for Measurements of Selenium in Complex Flue Gas Desulfurization Water Systems by Inductively Coupled Plasma Mass Spectrometry; Frank Kero, Kemira, Atlanta, GA
- IWC-12-59 Pilot-Scale Demonstration of the hZVI Process for Treating FGD Wastewater; Yongheng Huang, Texas A&M University, College Station, TX
- IWC-12-60 Sulfate Discharge Considerations for FGD System Design; Diane Martini, Sargent & Lundy, LLC, Chicago, IL

**Wednesday, November 7**

### **Ion Exchange – More than Just Demineralizing**

**IWC Rep:** Jim Sabzali, Aldex Chemical Company Ltd., Granby, QC, Canada

**Session Chair:** Don Downey, Purolite Company, Paris, ON, Canada

**Discussion Leader:** William Tuck, Anderson Water Systems, Inc., Dundas, ON, Canada

- IWC-12-61 Perchlorate Specific Resin Regeneration: An Alternative Approach to Single Use Resin Disposal; Charles Drewry, Calgon Carbon Corporation, Fischer, TX
- IWC-12-62 Sulfate Removal to Increase Cooling Water Re-use; David Kratochvil, BioteQ Environmental Technologies, Vancouver, BC, Canada
- IWC-12-63 Arsenic Removal by Nano Particles of Iron Prepared on Polymer Substrate by Novel Technique; Atul Bhagwat, Ion Exchange Global, India
- IWC-12-64 Removal of Trace Contaminants by Ion Exchange; Peter Meyers, ResinTech Inc, West Berlin, NJ

### **DBOM Services, UF Membrane Failure, High Rate Clarification Nutrient Removal and Boiler Cleaning**

**IWC Rep:** Mike Gottlieb, Resin Tech, West Berlin, NJ

**Session Chair:** Larry Gottlieb, ResinTech, West Berlin, NJ

**Discussion Leader:** Andrew Bishop, ResinTech, West Berlin, NJ

- IWC-12-65 Design, Build, Operate & Maintain (DBOM) – Water/Wastewater Treatment Equipment & Services; Steven Gagnon, Avantech Inc, Columbia, SC
- IWC-12-66 Comparative MS2 Bacteriophage Challenge Testing Of Intact and Compromised Ultrafiltration Modules; Daryl Gisch, The Dow Chemical Company, Midland, MI
- IWC-12-67 Chemical Cleaning of Boilers; Kenneth Hansen, The Babcock and Wilcox Company, Barberton, OH
- IWC-12-68 2 for 1: Dry Weather Nutrient Removal With A High Rate Wet Weather Treatment Technology; Daniel Austria, Kruger Inc., Cary, NC

### **Frac Water Analysis, Treatment and Reuse**

**IWC Rep:** Manoj Sharma, Aquatech International Corp., Canonsburg, PA

**Session Chair:** Scott Quinlan, GAI Consultants, Homestead, PA

**Discussion Leader:** Brent Means, Office of Surface Mining, Harrisburg, PA

- IWC-12-69 Opportunities for On-site Treatment, Monitoring and Reuse of Acid Mine and Produced Water in Oil and Gas Shale; Timothy Keizer, Nalco, Naperville, IL
- IWC-12-70 Water Treatment and Reuse in Unconventional Oil and Gas Production: Case Study from Eagle Ford Shale Play; Dhananjay Mishra, WorleyParsons, Houston, TX
- IWC-12-71 On-site Field Analysis of Hydraulic Fracturing Flowback and Produced Waters; Scott Tucker, Hach Company, Loveland, CO
- IWC-12-72 Sequential Precipitation - Fractional Crystallization Treatment of Marcellus Shale Flowback and Production Wastewaters; Timothy Keister, ProChemTech International, Inc., Brockway, PA

### **Addressing Water Treatment Challenges at Power Plants**

**IWC Rep:** John Lucey, Heckmann Corp., Pittsburgh, PA

**Session Chair:** Gregg Poppe, DOW, Edina, MN

**Discussion Leader:** Greg Osen, AVANTech, Columbia, SC

- IWC-12-73 Deciphering the Choices in Treatment Required to Meet EPA Effluent Limitation Guidelines at Coal-Fired Generating Stations; James Harwood, GE Power & Water, Oakville, ON, Canada
- IWC-12-74 Using Reclaimed Municipal Wastewater for Power Plant Cooling and Process Water Systems; Michael Wilson, CH2M Hill, Boston, MA
- IWC-12-75 Conserving Gallons and Kilowatts: Challenges of Today's Solar Power Plants- EPC Perspective; Christopher Huth, Bechtel Power Corp., Frederick, MD
- IWC-12-76 Biofouling of Water Systems; Sarahann Rackl (Dow), Marrone Bio Innovations, Davis, CA

**Wednesday, November 7, 1:00-5:00PM**

### **W1: Treatment of Water for Steam Generation in SAGD Enhanced Oil Recovery Plants**

**Presenter: Robert Holloway, Holloway Associates, Etobicoke, ON, Canada**

"Once you know the fundamentals, acquiring experience is just a matter of time." This course explores the theories and fundamental practices for treating de-oiled produced and brackish waters to generate high pressure steam for use in SAGD enhanced oil recovery operations. We will explore hot and warm lime softening, filtration and ion exchange options such as strong acid versus weak acid cation softening including in-situ versus external regeneration. We will look at the different requirements imposed on system choices for wet steam generation in once-through generators as opposed to "dry" steam generation in water tube power boilers.

### **W2: Water Treatment 101**

**Presenter: Dennis McBride, Fluor Enterprises, Greenville, SC**

This workshop is a great introductory course covering the basic concepts of water treatment for industry. It will address unit operations (clarification, filtration, lime/soda ash softening, iron and manganese removal, membrane filters, and roughing demineralizers) used in water preparation for industry with emphasis on power, chemical industry, and refineries. It was include treatment of makeup water for cooling water systems as well as boiler water makeup. Wastewater generated by these unit operations and their treatment and disposal will be discussed. Basic water chemistry requirements for low, medium, and high pressure boilers will be considered with chemical conditioning as required.

### **W3: Electrodeionization (EDI)**

**Presenter: Steve Gagnon, AVANTech, Columbia, SC**

Electro-deionization (EDI) is a time proven process which combines semi-impermeable membrane technology with ion-exchange media to provide high efficiency self-regenerated demineralized water without chemicals. This workshop will explore the design and operation of EDI modules from different manufacturers of EDI membranes. A 100 gpm feed water source shall be provided, EDI projections from different EDI membranes manufacturer will be presented their design and effluent water quality will be evaluated complete with discussions on the advantages of system will be presented. The program shall also provide a simplified EDI P&ID print of the system designed and presented complete with recommended membrane data collection parameters, cleaning protocol, review of a typical autopsy report and the system operating cost. This workshop provides one stop shopping for all your EDI needs. **W4:**

### **Water and Wastewater Treatment for Natural Gas Development**

**Presenter: John Schubert, HDR Engineering, Sarasota, FL**

This course reviews the geologic conditions associated with shale gas plays, describes the hydrofracturing process, including chemical and mechanical aspects of hydrofracturing. The workshop identifies wastewater characteristics for flowback and produced water, and provides insight into water quality requirements for hydrofracturing. Significant time is spent on wastewater treatment options for flowback and produced water, with areas of emphasis including treatment for recycle and evaporation/crystallization options. The economics of water supply and wastewater treatment are identified.

### **W5: HRSG and High Pressure (Above 900 psig/60 bar) Boiler Water Treatment and Operation**

**Presenter: David Daniels, Mechanical and Materials Engineering, Austin, TX**

This workshop will cover the water quality required for high pressure (>900 psig/60 bar) steam boilers including the various treatments being used and new developments relative to protection from scale and corrosion. The course will also cover treatment issues related to pre-boiler systems and the condensate systems and a discussion of controls and troubleshooting techniques. Operators, utility plant supervisors, managers, and engineers can all benefit greatly from the practical information provided in this course.

**Thursday, November 8, 8:00AM-12 Noon**

### **W6: Reverse Osmosis – Back to Basics**

**Presenter: Jane Kucera, Nalco Company, Naperville, IL**

The application of reverse osmosis (RO) has grown rapidly over the last 15 year. However, some of the basics have been lost in shuffle. Furthermore, many times professionals and operators familiar with ion exchange are now faced with operating RO systems with little or no training. This Workshop covers the basics of RO, from sound design to proper operating techniques. Fouling and concentration polarization, data collection and normalization, cleaning and storage are just some of the topics included in this Workshop. This Workshop is intended for all who need to understand the basics of RO.

### **W7: Thermal Zero Liquid Discharge Processes**

**Presenter: Michael Marlett, Aqua-Chem ICD, Hartland, WI**

This course is designed to give a basic understanding of the information required for the selection and design of an evaporation system in a wastewater application. It will include the impacts of chemistry, equipment selection and energy source selection as well as provide case studies based on real world applications in a variety of industries.

### **W8: Industrial Boiler Water Treatment (Up to 1800 psig/120 bar)**

**Presenter: James Robinson, GE Betz, Trevose, PA**

The course is intended for those interested in industrial steam systems operating at pressures up to 1800 psig. While some basic theory is covered, the main focus of the course is to provide practical information that can be used to avoid common system problems. The course covers deaerators, boilers, steam turbines and condensate systems from both mechanical operation and chemical treatment aspects. The causes of deposition and corrosion as well as water quality and monitoring guidelines and chemical treatment options are discussed in an informal atmosphere.

### **W9: Introduction to Cooling Tower Water Systems and How to Develop a Cooling Tower Water Treatment Program**

**Presenter: Paul Puckorius, Puckorius & Associates, Inc., Arvada, CO**

This work shop discusses the problems commonly found in Cooling Tower Water systems and the various water treatments that can be used to control or prevent those problems. Specific water treatment chemicals are discussed and their advantages and disadvantages are presented. These specific chemicals are for corrosion, scale, fouling, and microbiological control. They are identified generically and include the most recent developments. The preparation of the complete water treatment program is provided in easy to apply steps. This workshop is excellent for operators, utility managers, and water treatment suppliers both new on the job and great as a refresher for others.

**Thursday, November 8, 1:00-5:00PM**

### **W10: Ion Exchange Technology and Practical Operating Practices**

**Presenter: Wayne Bernahl, W. Bernahl Enterprises, Ltd., Elmhurst, IL**

This workshop provides a detailed review of the various ion exchange processes for softening and demineralizing water as well as preparation for boilers, cooling, and process applications. A section on how to evaluate systems, their resin, operation, and water quality of ion exchange units is an excellent troubleshooting and informative portion of this workshop. A review of the different ion exchange resins available along with the newest developments and how those can be applied to provide specific water quality is a must for water treatment system operations. This is a great opportunity to ask questions and solve problems.

### **W11: Water Treatment 201**

**Presenter: Kumar Sinha, Bechtel Power Corporation, Fredrick, MD**

This course reviews the topics covered in Water Treatment 101 and build on those to provide design and technical details on designing water treatment systems using supplier's equipment information. Unit processes covered in this course are pretreatment softening using lime and soda ash, sodium cycle ion-exchange for softening, demineralization of pretreated raw water using cation/ anion/ mixed-bed ion-exchange systems, reverse osmosis, and EDI. Boiler water chemistry guidelines and chemicals feeds for boiler chemistry control for high pressure power plant boilers, combined cycle plants, and industrial boilers (up to 1500 psi) will be discussed. Advanced wastewater treatment concepts for power plants, industrial plants, and refineries will be included with recycle and reuse when feasible.

### **W12: Cleaning and Troubleshooting of Reverse Osmosis Systems**

**Presenter: Jantje Johnson, Orangeboat, Eden Prairie, MN**

Effective cleaning of reverse osmosis systems is dependent on several key parameters. These key parameters include RO system design, membrane selection, cleaning skid design, operation, and membrane chemicals and cleaning procedures. Information on these key parameters and their impact on effective cleaning will be discussed in detail. Troubleshooting is necessary when cleaning does not restore the RO performance or when performance problems occur during the start-up/commissioning of new RO membrane elements. Different methods are discussed that can be used to identify and locate the performance problem in the RO system. Guidelines on the interpretation of results generated by these tools will be provided. Case studies of 2 plants will be presented. This workshop is designed for RO system operators and designers to gather information, ask questions, and solve problems in a workshop environment.

### **W13: Cooling Water Treatment Programs and Guidelines when switching from Fresh to Reuse Water Makeup**

**Presenter: Paul Puckorius, Puckorius and Associates, Inc., Arvada, CO**

This workshop will cover guidelines to be used in developing a cooling water treatment technology going from fresh to recycle waters as makeup. These guidelines will identify possible concerns and potential benefits with recycle water. A step by step approach is provided not only for existing cooling tower water systems but also new systems that can handle almost any recycled waters. A number of case histories are provided. Attendees are encouraged to bring not only any questions but also details on their cooling tower water systems and the recycle water quality being considered. A must workshop for operators, utility managers, and for water treatment suppliers.

# 2012 INTERNATIONAL WATER CONFERENCE® REGISTRATION FORM

NOVEMBER 4 - 8, 2012  
CROWNE PLAZA RIVERWALK  
SAN ANTONIO, TX USA

## ATTENDEE INFORMATION

LAST NAME \_\_\_\_\_ FIRST \_\_\_\_\_ M.I. \_\_\_\_\_ NAME FOR BADGE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ POSTAL (ZIP) CODE \_\_\_\_\_ COUNTRY \_\_\_\_\_

E-MAIL \_\_\_\_\_ TELEPHONE \_\_\_\_\_ FAX \_\_\_\_\_

### Attendee Profile

- Academic/Research
- Consulting engineer
- Government
- Manufacturing
- Supplier
- Utility
- Other, please specify: \_\_\_\_\_

### Area of Specialization

- Engineering
- Management
- Operations
- R&D
- Sales
- Other, please specify: \_\_\_\_\_

## INDIVIDUAL REGISTRATION

Before 10/14/12      After 10/14/12

Full Conference*	\$425.00	\$525.00
One-Day* <input type="checkbox"/> Monday <input type="checkbox"/> Tuesday	225.00	275.00
<input type="checkbox"/> Wednesday	150.00	175.00
Government (full time employed)	375.00	425.00
Exhibit Hall-Only Registration	75.00	75.00
Full-time Student Registration (Student ID required)	50.00	50.00

### Technology Focus: (Check all that apply)

- Boiler Water
- Chemical Treatment
- Cooling Water
- Corrosion/Fouling
- Filtration
- Ion Exchange
- Membranes
- Wastewater
- Other, please specify: \_\_\_\_\_

## CORPORATE REGISTRATION (registrations must be submitted together under one payment)

<input type="checkbox"/> Bronze* – up to 5 individuals; includes 1 copy of conference proceedings	\$2,000.00	\$2,200.00
<input type="checkbox"/> Silver* – up to 10 individuals; includes 2 copies of conference proceedings	4,000.00	4,400.00
<input type="checkbox"/> Gold* – up to 15 individuals; includes 3 copies of conference proceedings	6,000.00	6,600.00
____ Additional individuals within your Corporation	350.00	400.00

\*Includes all technical programs, mixers & exhibits luncheons

REGISTRATION FEE:

## CONTINUING EDUCATION WORKSHOPS (Tentative listing of topics, subject to change)

All Workshops are 4 hours and are scheduled based upon minimum reservations; if the workshop you have chosen is cancelled, you will be contacted to change to a different workshop, or receive a refund. An additional fee of \$250.00 is required (\$300.00 without Conference Registration). Deduct \$100.00 for 2 or more workshops.

### Wednesday, Nov. 7, 1-5:00 P.M.

- W1 Treatment of Water for Steam Generation in SAGD Enhanced Oil Recovery Plants
- W2 Water Treatment 101\*
- W3 Electrodeionization (EDI) Presents
- W4 Water and Wastewater Treatment for Natural Gas Development
- W5 HRSG and High Pressure (above 900 psig/60 bar) Boiler Water Treatment and Operation

### Thursday, Nov. 8, 8:00 A.M.-12:00 Noon

- W6 Reverse Osmosis - Back to Basics\*
- W7 Thermal Zero Liquid Discharge Processes
- W8 Industrial Boiler Water Treatment (up to 1800 psig/120 bar)
- W9 Introduction to Cooling Tower Water Systems and How to Develop a Cooling Tower Water Treatment Program

### Thursday, Nov. 8, 1-5:00 P.M.

- W10 Ion Exchange Technology and Practical Operating Practices\*
- W11 Water Treatment 201
- W12 Cleaning and Troubleshooting of Reverse Osmosis Systems
- W13 Cooling Water Treatment Programs when switching from Fresh to Reuse Water Makeup
- Workshop Packages \*Water Treatment Basic Training: Includes 3 Workshops\* at a package price of \$550

WORKSHOP FEE:

## A LA CARTE

- Additional Conference Proceedings: \_\_\_\_ @ \$35.00 each
- Pre-Prints of IWC '12 papers on 1GB Flash Drive @ \$25.00 each
- Please send me information about the IWC Spouse Program

TOTAL DUE:

## METHOD OF PAYMENT

- Check (enclosed)     Visa\*     MasterCard\*     American Express\*     Discover     ESWP Account # \_\_\_\_\_

ACCOUNT NUMBER \_\_\_\_\_ EXP. DATE \_\_\_\_\_ CW NUMBER \_\_\_\_\_ AUTHORIZED SIGNATURE \_\_\_\_\_

\*Due to fraud protection measures, if credit card billing address is different from the attendee address listed above, please include billing address below:

BILLING ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

MAIL TO: Engineers' Society of Western PA, 337 Fourth Avenue, Pittsburgh, PA 15222, USA  
 FAX this form to: 412-261-1606  
 ON-LINE: www.eswp.com/water  
 All refund requests must be received in writing and are subject to a \$25 cancellation fee. No refunds after October 26, 2012. If you register and not attend, you will be responsible for the full registration fee. Substitute attendees are welcome at no extra charge.