

Municipal Utility

1. Marilyn Hall, Senior Water Resources Planner, Athens-Clarke County Public Utilities, GA
2. Jeremy Johnston, Chief Operations Officer, Clay County Utility Authority, FL
3. Jennifer Kong, Environmental Engineer, LA Sanitation, City of Los Angeles, CA
4. Paul Liu, Managing Water Utility Engineer, Los Angeles Department of Water and Power, CA
5. Jeff Prevatt, Deputy Director, Pima County Wastewater Reclamation, AZ
6. Rick Warner, Senior Engineer, Washoe County Community Services Department, NV

Marilyn Hall, AICP

Athens-Clarke County Public Utilities
124 E. Hancock Ave.
Athens, Georgia 30601

Marilyn.Hall@accgov.com
706-621-2036

Statement of Intent

I would be honored to serve on the Board of the Water Reuse Association. I am the Senior Water Resources Planner for the Public Utilities Department of Athens-Clarke County, Georgia and am responsible for implementing our new water reuse program. In the short term the program includes a non-potable distribution system for irrigation and industrial processes. The long term plan adds potable reuse in the form of surface water augmentation. I am also responsible for long term capital improvements and service delivery planning, managing the Water Loss Program, overseeing the Water Conservation Office, and special projects.

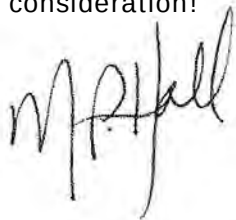
I have spent more than 20 years in Environmental Planning and Public Utilities. I started out in watershed planning and public outreach, then moved on to consulting with a focus on financial and capital planning for water utilities and comprehensive planning. Ten years ago I took a position with the Athens-Clarke County Public Utilities Department where I have led a variety of efforts in conservation, low income assistance, watershed protection, capital projects, and other initiatives.

Over the last few years I have focused my attention on water reuse in an effort to implement a reuse program here. Athens' leadership, including elected officials, agree that water reuse is a necessary component of Athens' water supply portfolio. In fact, I will be presenting our strategy for explaining the need for a diverse water supply portfolio to elected officials at the Symposium next month.

I have contributed to the water industry and planning profession in many ways over the years. I am currently Vice-Chair of the Georgia Association of Water Professionals' Reuse Committee and recently helped judge the awards to be given at the upcoming Water Reuse Symposium. I just finished my term as Chair of the Georgia WaterWise Council and am a former Board Member of the Georgia Association of Water Professionals. I also serve on the Board of the Georgia Chapter of the American Planning Association. My goal with working with the American Planning Association is to bridge the gap between planning and the water industry. That is why I am pleased to serve on the steering committee of the Water and Planning Network, an initiative of the American Planning Association.

I am committed to serving on the board and have confirmed my ability to attend quarterly board meetings, including one at the Symposium and one via conference call. I am excited to work on special projects and in committees. I have a diverse background and bring a fresh perspective to the Water Reuse Association.

Thank You for your consideration!



Leadership

- Water and Planning Network Steering Committee, American Planning Association (2018 - present)
- Georgia Association of Water Professionals Reuse Committee (2018 – present, Vice Chair)
- Georgia Association of Water Professionals, Board Member (2015 - 2017)
- Georgia Planning Association, Board Member (2014 – present)
- Georgia WaterWise Council, (Chairman 2015-2017, Immediate Past Chair 2017 - present)
- One of seven invited guest experts for American Planning Association Drought Mitigation/Preparedness Symposium in Chicago (Summer 2012)

Education

Georgia Institute of Technology, Atlanta, Georgia
Master of City Planning, 1997

Northwestern University, Evanston, Illinois
Bachelors of Arts in Economics, 1991

Awards

- 2017 EPA WaterSense Sustained Excellence Award – Under Marilyn’s leadership Athens-Clarke County earned several EPA WaterSense Partner of the Year and Excellence Awards. The Sustained Excellence Award recognizes a consistent commitment to advance the overall mission of EPA WaterSense, increasing awareness of the WaterSense brand in a measurable way, and increasing the adoption of water-efficient practices among constituents and community
- GAWP Public Education Award 2013 & 2017 - Presented to ACC Public Utilities for its outstanding water conservation education program.
- Project WET 2016 & 2018 Organization of the Year – Recognized effort to promote water stewardship curricula in schools and to teachers.

Publications

- *J.G. Beacham Water Treatment Plant: 80 Years of Heritage and Innovation*, Journal of the American Water Works Association, October 2016 (coauthored with Regina Lucas)
- *Promoting Drought Resilience Through Plans and Codes*, Zoning Practice/American Planning Association, April 2014
- Contributed to *Planning and Drought* (PAS 547), American Planning Association, Edited by James C. Schwab, October 17, 2013

Projects and Positions: Utilities

- Currently serves as Senior Water Resources Planner for the **Unified Government of Athens-Clarke County**. Manages the water reuse program, capital improvements planning, water loss program, and responsible for all public information and outreach for a Utility serving more than 120,000 people.
- Worked with Halcrow for the **City of Sandy Springs** Water Assessment Plan. Responsible for projecting population, employment, and other factors related to projected water demand.
- Completed a Revenue Sufficiency Study for the Marietta Board of Lights and Water in the **City of Marietta, Georgia**. Developed a financial model in Excel that included projected operational and capital expenses and revenues to allow analysis of different capital improvement programs and rate increase alternatives.
- Completed a Study of the City of Madison's water and sewer department in **Madison, Georgia**. The study reviewed historical and projected system expenses and revenues and evaluated the department's ability to meet future expenses. The financial model used projected expenses and revenues to allow analysis of different capital improvement programs, rate increases, and other financing options.
- Researched and recommended a variety of strategies for encouraging intergovernmental cooperation for the **North Georgia Metropolitan Water Planning District**.
- Prepared a Stormwater Utility feasibility study and assisted in the creation of a Stormwater Utility for the **City of Conyers, Georgia**.
- Prepared and presented demographics reports and profiles for the White House Utility District in **White House, Tennessee**, and for **Gordon County, Georgia**.
- Completed the Multi-Use Transportation System Master Plan for the **Town of Sharpsburg, Georgia**. Responsible for coordinating and facilitating the Public Involvement component of this effort.

Projects and Positions: City Planning

- Responsible for *Community Development and Housing Planning Study Services* for the City of Galveston, Texas which was performed as part of a Housing Acquisition Strategy for the **Texas General Land Office**. (under subcontract with another firm)
- Principal consultant and project manager for the Comprehensive Plans for the Cities of **Arcade, Jefferson, and Talmo in Jackson County, Georgia**.
- Principal consultant and project manager for the Comprehensive Plans for the City of **Waycross and Ware County, Georgia**.
- Responsible for the Community Facilities Element of the Comprehensive Plan for the **City of Columbus / Muscogee County, Georgia** Comprehensive Plan and

facilitation of several components of the Community Participation Program.
(under subcontract with another firm)

- Served as principal consultant and project manager for the Comprehensive Plan and Capital Improvements Program for the **Town of Sharpsburg, Georgia.**
- Served as principal consultant and project manager for the Comprehensive Plan for the **Town of Moreland, Georgia.**
- Worked with Jordan, Jones, and Goulding, Inc. on the Comprehensive Plans for **Newton County, Georgia** and the **Cities of Covington, Buford, and Snellville, Georgia.** Facilitated visioning workshops and larger group presentations and completed components of the Community Assessment.
- Worked with Jordan, Jones, and Goulding, Inc. to assist with the One Henry Comprehensive Plan in **Henry County, Georgia.** Responsible for writing population, community facilities, and natural and cultural resources components of Community Assessment. Also assisted with visioning and other elements of the Community Participation Program.
- Analyzed and assessed the feasibility of several housing code enforcement strategies for the **City of Marietta, Georgia.**
- Assisted with the Cartersville Transportation Impact Fee study for the **City of Cartersville, Georgia.** Wrote Transportation Impact Fee Ordinance. Helped prepare Capital Improvement Element.
- Assisted with the completion of Zoning Ordinances and Land Development Regulations for **Cherokee County, Georgia.**

Sampling of Professional Presentations

- National/International
 - Using Land Use and Historic Billing in Mitigating Apparent Water Losses (North American Water Loss Conference 2015)
 - How Can a Utility Use Social Media to Its Advantage? (October 2014, National WaterSmart Innovations Conference, Las Vegas NV)
 - Partners on Social Media Athens-Clarke County Public Utilities (EPA WaterSense Webinar, August 2013)
- State of Georgia
 - An Athenian in Cape Town, Lessons Learned From the Worst South African Drought on Record (GAWP, Summer 2018)
 - Same Drought, Different Day (GAWP, Summer 2018)
 - Water Use Tracking (GAWP, Summer 2017)
 - Drought Management and Conservation Partnership Conference (GAWP, Spring 2017)

- Strategies to Implement EPD's Drought Response Menu (GAWP Forum for Managers of Small to Medium Water and Wastewater Systems Jan, 2017 and GAWP Fall Conference 2017)
- Conservation or Efficiency? Where do we go from here? (Spring, 2015)
- An Update on Regional Water Planning in Georgia (Georgia Planning Association, Fall 2014)
- Apparent Loss Abatement, Using historic consumption and land use data to mitigate apparent losses (GAWP Fall, 2013)
- Water Conservation On the Ground and Creating a Conservation Program (GMA Mayor's Day Conference, Jan 2013)
- Using Social Media for Drought and Water Planning (November 2012, GMA/ACCG)
- Is your Community Drought Ready? (Georgia Planning Association, Fall 2012)
- Creating a Conservation Program (GAWP Fall 2011)
- How Will the Georgia Water Stewardship Act Affect Planning in Georgia? (Georgia Planning Association, Fall 2010)
- Water Stewardship Bill Update (GAWP, Fall 2010)
- "How Low Can You Go?" (Spring 2010)



Clay County Utility Authority

3176 Old Jennings Road
Middleburg, Florida 32068-3907
Telephone (904) 272-5999
Facsimile (904) 213-2469
www.clayutility.org

*Working together to
protect public health,
conserve our natural
resources, and create long-
term value for our
ratepayers.*

August 20, 2018

Ms. Patricia Sinicropi, JD
1199 North Fairfax Street
Suite 900
Alexandria, VA 22314

RE: Letter of Interest to serve on the WaterReuse Association Board of Directors

Dear Ms. Sinicropi,

I recently spoke to Ms. Amy Tracy regarding the WaterReuse Association. The Clay County Utility Authority (CCUA) recently joined the association. CCUA has been a leader in reclaimed water systems since the late 1990's. I am committed to continuing CCUA's leadership in the reclaimed water industry with the development of CCUA's Alternative Water Supply (AWS) Initiative. I am very interested in maintaining CCUA's leadership in the reclaimed water industry by serving on the WaterReuse Association Board of Directors.

Clay County, Florida, will experience significant growth over the next 20 to 25 years. The Florida Department of Transportation's construction of the First Coast Expressway will likely double the population we serve. This rapid growth makes our innovation and transformation using AWS all that more important. As a member of the CCUA leadership team, I am committed to providing safe and reliable drinking water through an economically and environmentally sustainable strategy.

CCUA aims to maintain its leadership position in Florida and in the utility industry by focusing our energy on environmental and economic sustainability now and well into the future. We are committed to expanding our development of the reclaimed water system to either direct or indirect potable reclaimed water through our AWS Initiative. This year we launched our testing of the hydrogeology underlying Clay County. We are planning the launch of the studies to evaluate our treatment systems and provide recommendations to improve those systems to address Constituents of Emerging Concern (CEC's). The knowledge we gain from evaluating the underlying hydrogeology of our service area and improving our treatment systems will allow us to effectively use all the water resources that flow through our system.

Beyond my leadership role in CCUA's AWS initiative, I currently represent CCUA with the North Florida Utility Coordination Group (NFUCG). Nine Northeast Florida utilities comprise the NFUCG membership. The NFUCG focuses on coordinating water policy and regulatory issues between the member utilities. Issues that the NFUCG has dealt with include water supply planning in the North Florida Regional Water Supply Plan and Minimum Flows and Levels with various

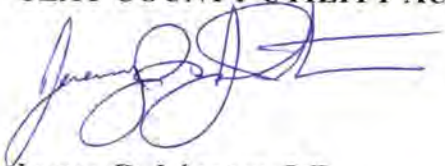
springs and lakes.

With this letter of interest, I am attaching my resume for your consideration. I currently serve CCUA as their Chief Operations Officer. I have over 20 years of experience in engineering design, construction, and utility operations. My education includes Bachelor of Science in Agricultural and Biological Engineering and a Master of Business Administration, both from the University of Florida.

Please accept this letter of interest as my application to serve on the WateReuse Association Board of Directors. I am confident I will be able to significantly contribute to the WateReuse Association's efforts. I am also more than willing to commit to the four quarterly board meetings, the Annual Symposium, and participation in WateReuse Associate committees and initiatives. Please feel free to contact me if you require any additional information. I look forward to hearing from you.

Respectfully,

CLAY COUNTY UTILITY AUTHORITY

A handwritten signature in blue ink, appearing to read 'Jeremy D. Johnston', with a stylized flourish at the end.

Jeremy D. Johnston, P.E.
Chief Operations Officer
Florida Licensed Professional Engineer

cc: File

Jeremy D. Johnston, P.E.

2746 Sunnybrook Road ~ Jacksonville, FL 32216 ~ (904) 629-2042 ~ jerj1996@gmail.com

EXECUTIVE LEADER IN OPERATIONS MANAGEMENT, STRATEGIC PLANNING, AND ENGINEERING

Solutions focused executive with over 20 years of experience successfully managing operations to provide safe and reliable water related utility services in a service area experiencing significant growth. Proven leadership and experience strategically envisioning, planning, and budgeting capital improvements within a long-range capital improvement program, managing the engineering and regulatory processes to build planned capital improvements and place into productive service.

KEY STRENGTHS, SKILLS & KNOWLEDGE

Leadership
Operational and Capital Budgeting
Contract Management
Stakeholder Engagement

Operations Management
Project Management
Engineering Design
Communications

Strategic Planning
Risk Management
Regulatory Compliance
Public Presentations

CAREER EXPERIENCE

Clay County Utility Authority *Chief Operations Officer (2014 – Present)*

2012 – Present
Middleburg, FL

Lead utility operations, planning, engineering, and construction efforts through the management of an annual operating budget of \$30M, a capital improvement budget of \$35M, and staff management of 160 team members. Coordinate the utility's regulatory compliance efforts with state agencies that include the Florida Department of Environmental Protection (FDEP) and the St. Johns River Water Management District (SJRWMD).

- Leading the modernization of the utility's custom made financial management system that will streamline utility operations resulting in an electronic purchasing process, journalizing transactions in real-time, automating financial reports, and providing management with immediate data for improved decision making and planning. Total effort will result in the savings of an estimated \$500,000 to \$700,000 in labor costs.
- Overseeing the implementation of a computerized asset management system that will manage and monitor the progress of inspection, repair, and renewal activities on the utilities existing capital assets valued at about \$300M. Determining the most effective use of the repair and renewal capital funds identified in the capital budget and five-year capital improvement program that accounts for 60% of the annual \$35M capital budget.
- Managing the modernizing of the utility's capital improvement planning and budgeting processes that will create an electronic system for proposing, evaluating, and placing projects in the capital budget and the five-year capital improvement program. Developing the system to model future project funding needs and cash flows using factors such as service area population growth, inflation, and weighted cost of capital.
- Leading the utility's Alternative Water Supply (AWS) initiative that focuses on the development of new technologies and processes for water resources and economic sustainability, a forecasted \$103M investment for the utility over the next twenty years. Evaluating the economic impacts of this initiative on our service rates to develop an economically sustainable approach to necessary rate increases.

Utility Engineer (2012 – 2014)

Middleburg, FL

Designed and managed underground utility extension projects from concept to completion with budgets from \$250,000 to \$3.1M. Included the supervision and coordinating the efforts of multiple consultants and contractors in disciplines that included surveying, geotechnical, civil, environmental, mechanical, electrical, and structural engineering, as well as general and underground utility contractors.

- Managed a major \$3M pipeline project from bid to completion, resulting in an on-time completion target and 3% below the original bid due to value engineering efforts during construction.
- Took over the management and oversight of major pipe-bursting project through a highly urbanized area during the bidding process. The project was completed within the original schedule and within 5% of the original budget.

J.F. Civil Engineering, Inc.**2011-2012****Professional Engineer**

Jacksonville, FL

Pursued potential clients and projects to develop billable work backlog. Reviewed project related documents for clients that included Southeast Recycling. Prepared project proposals for organizations that included the City of Jacksonville and Martin Marietta Materials.

- Completed the record drawings for Walbridge to close-out the required documents for Ft. Stewart 4th Infantry Brigade Combat Team (IBCT) project for the United States Army Corps of Engineers (USACE).

PBS&J (now Atkins member of the SNC-Lavalin Group)**2006-2011****Senior Engineer II**

Jacksonville, FL

Managed the development of project proposals, civil engineering design drawings, calculations, and regulatory submittals for public and private sector clients for one of the world's largest design, engineering and project management consultancy firms.

- Designed the potable water distribution and the sanitary sewer collection system for the Ft. Stewart 4th IBCT USACE. Served as an observer, inspector, and project coordinator for the USACE while the Ft. Stewart 4th IBCT was under construction. Received the Charles F. Trainor Award in 2010 from the USACE for my work on the Ft. Stewart 4th IBCT design and construction teams.
- Designed the potable water distribution, sanitary sewer collection, and the storm water collection and management systems for the Shands Cancer Hospital in Gainesville, Florida, as part of the design team subcontracting to Flad Architects. Shands Healthcare, Flad Architects, and design team received the Best Healthcare Building of 2010 award by the McGraw Hill-Southeast Construction Magazine for the newly completed Shands Cancer Hospital.

Kimley-Horn and Associates, Inc.**2003-2006****Professional Engineer / Office Coordinator**

Jacksonville, FL

Managed the development proposals, designs, calculations, and regulatory submittals for residential, commercial, and industrial clients for a \$722M planning, engineering, and design firm.

- Managed the design development of the potable water distribution, sanitary sewer collection, and storm water collection and management systems for the JaxPort Dames Point Container Terminal.
- Worked with residential clients such as Toll Brothers and industrial clients that included Martina Marietta Materials and Florida Rock Industries, Inc.
- Received the Outstanding Career Development Award, Kimley-Horn and Associates, 2004

EDUCATION**University of Florida****April 2018****Master of Business Administration (MBA), Hough Graduate School of Business**

Gainesville, FL

University of Florida**August 1996****Bachelor of Science (BS), Agricultural and Biological Engineering**

Gainesville, FL

Santa Fe Community College**May 1992****Associates of Arts**

Gainesville, FL

PROFESSIONAL CONTINUING EDUCATION

Smart City Integration into the Utility Industry
Strategic Planning for Utilities
Project Management

Developing Asset Management Programs
Aquifer Management
Project Risk Management

ADDITIONAL DATA

- Florida Licensed Professional Engineer, License Number 58649
- Member of the American Water Works Association
- Member of the American Society of Civil Engineers
- Member of the WaterReuse Association

Associate Environmental Engineer III

Jun 2012 - Dec 2015

Prepares, reviews, schedules and tracks the work activity of Environmental Engineering Associates and student engineers in the group. Engages in recruitment, selection and training of new associates and student engineers. Prepares for and conducts meetings, presentations and workshops and effectively communicate City's Pretreatment Program goals, objectives and strategies with other City bureaus and departments, industrial users and stakeholders, and the Board of Public Works and other regulatory agencies.

Selected Contributions:

- Strategized and led investigation on treatment plant incidents, and developed control mechanism to reduce impact on wastewater collection, conveyance and treatment system, and maximized beneficial use of recycled water and biosolids
- Assessed the potential impacts on treatment system from emerging pollutants of concerns and stayed abreast of legislative changes, preventive measures and new risks

LA Sanitation, Industrial Waste Management

Los Angeles, CA

Associate Environmental Engineer I and II

July 2002 - May 2012

Developed and implemented regulatory standards for industrial waste generators; authored Local Limits development report and annual report to EPA and RWQCB. Collaborated with other agencies and stakeholders to promote green initiatives and recognize industries with outstanding compliance. Partnered with Los Angeles County Sanitation Districts and Orange County Sanitation District to launch "No Drugs Down the Drain" program in Southern California.

Selected Contributions:

- Led pilot study for route optimization project with ArcLogistics software and maintained geospatial data for the Industrial Waste Management and Pretreatment Program with ArcGIS
- Awarded CWEA Public Education Grant to fund pollution prevention and sustainability outreach programs
- Launched over 3 million "No Drugs Down the Drain" postcards to local pharmacies in LA
- Delivered environmental stewardship program to over 20,000 LA high school students

EDUCATION & LICENSURE

Oakland University

Rochester Hills, MI

Master of Science, Chemistry/Ecotoxicology, May 2002

University of California Los Angeles

Los Angeles, CA

Bachelor of Science, Chemical Environmental Engineering, June 1999

Registered Professional Engineer, Board for Professional Engineers and Land Surveyors, California, January 2009

AWARDS & HONORS

"New Outstanding Engineer" Award, Los Angeles Council of Engineers and Scientists, 2006

Meritorious Award, City of Los Angeles, 2004 & 2017

Michael Romero

From: Jennifer Kong <jennifer.kong@lacity.org>
Sent: Tuesday, August 21, 2018 7:53 PM
To: Pat Sinicropi
Subject: WaterReuse Association Board of Director Nomination
Attachments: Water Reuse Board of Directors - JK.docx; JK Board of Director Resume.pdf

Hi Ms. Sinicropi,

I am submitting an application for the Board of Director. I am an environmental engineer with the City of Los Angeles, LA Sanitation. My passion aligns with my agency's commitment to safe and sustainable water supply. Please see my statement of interest and resume attached.

Sincerely,
Jennifer

Jennifer Kong, P.E.
LA Sanitation
Industrial Waste Management Division
Phone: (323) 342-6074
Fax: (323) 342-6111



Water Reuse Board of Directors - Statement of Interest

Just yesterday, more than 320 million gallons of wastewater was cleaned through our four water reclamation plants in the City of Los Angeles and 122 million gallons are reused because of the commitment to protect the environmental and dedication to providing a safe and sustainable supply of clean water to our citizens. I am proud to be part of LA Sanitation and take part in its commitment to promote acceptance of recycled water and increase water reuse. As a source control and pretreatment program manager, I am an advocate for reducing the source of pollution through green chemistry and a change agent towards a circular economy. Source control is the first barrier to protect the beneficial reuse of recycled water, and it is vital to the sustainability of water reuse. I will be asserting LA Sanitation to convert all water purification plant to 100% beneficial reuse. I sincerely request your consideration in accepting my nomination to join the WaterReuse Association Board of Directors.

Over the past 15 years, I dedicated my water and wastewater engineering background into communicating the benefits of having a pollution prevention program to LA's industrial and manufacturing sectors. I pioneered the LA Industry Business Outreach Program to merge the need to balance regulatory compliance with the need to maintain a business-friendly environment where local business may thrive. LA Industry aims to enhance economic development through one-stop concierge assistance, as well as supporting innovation in alternative technology and compliance assistance. Companies has benefited from being informed and act proactively to anticipate upcoming federal, state and local regulatory mandates; as pollution prevention and water reuse offers an effective and promising solution to avoid, eliminate, or reduce contamination of our air, land and water; it represents a proactive approach to environmental protection, cost savings, as well as securing a safe and sustainable water source.

I am nominated by the Executive team to serve on the Strategic Planning Oversight Committee for LA Sanitation. My role for the past three years is to formulate Departmental strategy and execute of organizational goal through tracking and analyzes key performance metrics. I enjoy working with numbers and data as well as communicating our organization strategy to employees. This year I will work on strategizing operation and process improvements to align with our organization's commitment to One Water, Zero Waste and Environmental Justice. I am passionate about developing sustainable water supply not just locally for LA, but it's a globally. I was the vice-chair on the Water Environment Federation's Public Education and Outreach Committee. I strongly believe that my background in water regulation and my experience in public engagement and communication, collaboration with regulatory agencies, non-profit organizations and the business community will benefit my role as Board of Director for the WaterReuse Association.

JENNIFER M. KONG

5418 Cochin Avenue, Arcadia, California 91006

Phone: 626-617-7626 | Email: Jennifer.Kong@lacity.org

ENVIRONMENTAL MANAGEMENT

Self-directed, dedicated and results driven problem solver and personable leader, adept at program development and implementation, and promoting cohesive team environment. Gift for recruiting, training, empowering and fostering professional growth in staff. Known for creating a positive work environment through strong interpersonal skills and service orientation. Exceptional oral and written communicator who is persuasive and articulate.

AREAS OF EXPERTISE

- Wastewater Quality and Compliance
- Performance Management
- Stakeholder Communications
- Wastewater Treatment Plant Response
- Team building and Training
- Policy and Procedure Development

PROFESSIONAL EXPERIENCE

LA Sanitation, Industrial Waste Management

Los Angeles, CA

Environmental Engineer

Jan 2016 - Present

Direct the development and evaluation of industrial pretreatment program requirement to achieve environmental compliance. Incorporate strategies and develop policy to address environmental justice concerns in current programs. Design pilot projects in support of a sustainable pollution prevention program that enables our industries to perform beyond compliance and forecasts technological advancement in their source reduction and pollution elimination processes. Collaborate with LADWP on corrosion control, salinity management and recycled water projects. Participate in stakeholder-based drought response and water reuse planning group. Supervise associate engineers and student interns.

Selected Contributions:

- Hosted LA Industry Sustainable Business Symposia to over 200 major manufacturing industries
- Expert support for research studies for the mitigation of data gaps in alternative chemical assessment and characterization of CECs in hospital waste stream

LA Sanitation, Executive Strategic Management Unit

Los Angeles, CA

Dr. SPOC-Strategic Planning Oversight Committee

October 2014 - Present

Formulate Bureau Strategy and execute goal through tracking and analyzes key performance matrices. Counsel the executive team to steer LASAN towards performance breakthroughs and goal alignment. Adopt the Balanced Scoreboard, T10 report and LASAN Statistics to help communicate this strategy to employees. Guide and monitor the execution of strategy, and provide continual affirmation that the Bureau is making progress towards the set goals and outcomes.

Selected Contributions:

- Coauthor LASAN Five year Strategic Plan
- Manage and analyze LASAN Balanced Scoreboard, T10 report and LASAN Statistics and report to Executive Managers

LA Sanitation, Industrial Waste Management

Los Angeles, CA

Associate Environmental Engineer III

Jun 2012 - Dec 2015

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Master of Science, Chemistry/Ecotoxicology, May 2002

University of California Los Angeles

Los Angeles, CA

Bachelor of Science, Chemical Environmental Engineering, June 1999

Registered Professional Engineer, Board for Professional Engineers and Land Surveyors, California, January 2009

AWARDS & HONORS

"New Outstanding Engineer" Award, Los Angeles Council of Engineers and Scientists, 2006

Meritorious Award, City of Los Angeles, 2004 & 2017

August 17, 2018

STATEMENT OF INTEREST

Dear 2018 WaterReuse Nominating Committee,

My name is Paul Liu and I am currently a Managing Water Utility Engineer with the Los Angeles Department of Water and Power (LADWP). I currently oversee the Water Recycling Policy/Outreach, Water Rights, and Resource Management Section of the Water Resources Division. I have been with LADWP for over 25 years and have served in multiple internal and external leadership positions. I am currently a member of the Association of California Water Agencies (ACWA) Groundwater and Water Quality Committees, California Urban Water Agencies (CUWA) Recycled Water Committee, and American Water Works Association's (AWWA) Cal-Nevada Advanced Water Treatment Operator Certification Committee.

My main experience with recycled water was between 2005 to 2014 as the manager in charge of planning and program management. During that time LADWP was able to meet or exceed all three of our annual Mayor's goal of increasing recycled water usage, new customer sites, and footage of purple pipe. I was fortunate enough to lead a wonderful team that developed innovative solutions such as the first customer on-site retrofit and incentive program that increased our customer count, secured up to \$78 million dollars of external funding, worked with our union to contract out purple pipe to be able to exceed our annual goals, developed partnerships with other agencies that increased recycled water usage, conducted outreach with key stakeholders, and advocated for the development and research of direct potable reuse.

Another unique and challenging experience was in my previous job from 2014 to May 2018 where I was the program manager/lead negotiator working with the United States Environmental Protection Agency (USEPA), State Water Resources Board Division of Drinking Water, Potential Responsible Parties (Lockheed Martin and Honeywell), and other agencies on developing and implementing the \$125 million dollar North Hollywood Operable Unit 2nd Interim Remedy that will provide up to 20,000 acre-feet per year (AFY) of remediated groundwater. The key lessons I learned was to be able to actively listen to the other side to foster an environment of understanding, come up with true consensus building ideas, and develop strong relationships with the other side even in the midst of conflict. Construction of the first phase started this year and the entire project is anticipated to be in-service by 2024.



CUSTOMERS FIRST

Eric Garcetti, Mayor

Board of Commissioners

Mel Levine, President

William W. Funderburk Jr., Vice President

Jill Banks Barad

Christina E. Noonan

Aura Vasquez

Barbara E. Moschos, Secretary

David H. Wright, General Manager

Lastly, one of the most rewarding experiences was starting a ministry in 2012 aimed at providing clean water to disadvantaged parts of the world by partnering with local agencies that shared a long-term vision of changing lives. I was blessed to be able to form a top-notch team that raised \$25,000 initial funding that provided 60 bio-sand filters that provided clean drinking water to more than 700 people in the Philippines. We've since built two water tanks serving villagers in the mountains of Thailand where they now have clean water, can grow their own crops to bring income so that they do not have to sell their children to prostitution, and more importantly provide a more hopeful outlook for theirs and their children's future.

Bringing a passion for recycled water, providing leadership for challenging and innovative programs, and taking initiative for changing lives for the better are some of the traits I will bring to WateReuse if given the opportunity. Thank you for your consideration and taking the time to read my statement. Please feel free to contact me at 213-367-4048 or email at paul.liu@ladwp.com if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads 'Paul Liu'.

Paul Liu

Managing Water Utility Engineer

Water Recycling Policy/Outreach, Water Rights, Resource Management Section

Water Resources Division

Los Angeles Department of Water and Power

PAUL LIU

EDUCATION

- **BS Civil Engineering, UCLA 1993**
- **MS Civil & Environmental Engineering, UCLA 1997**
- **PE License #C055822**
- **Board Certified Environmental Engineer AAEES, October 2016**

• SUMMARY OF KEY EXPERIENCE

Managing Water Utility Engineer – Recycling Policy, Water Rights & Resource Management Section (5/2018 – present)

- **Manage a section overseeing water recycling outreach and policy, water rights, and resource management within LADWP.**
- **Cal-Nevada AWWA Advanced Water Treatment (AWT) Operator Certification Committee Member (2014 – current)**

Waterworks Engineer – Groundwater Remediation Group (4/2014 – 4/2018)

- **Program manager/negotiator working with the United States Environmental Protection Agency, Potential Responsible Parties, City of Burbank, and other regulatory agencies on developing and implementing the \$125 million North Hollywood Operable Unit by 2020 that will provide up to 20,000 acre-feet per year (AFY) of clean water. LADWP Board approved term sheets with both Honeywell International (August 2016) and Lockheed (December 2017). First phase construction began March 2018.**
- **PAC Member for Water Research Foundation Study 4536 “Blending Requirements for Water From Direct Potable Reuse Treatment Facilities. (2017)**
- **Oversee staff members involved in the strategic development, coordination, and implementation of achieving LADWP’s groundwater cleanup and remediation goals.**
- **Oversee pilot studies, groundwater monitoring programs, and groundwater hydraulic modeling.**
- **Lead liaison with Division of Drinking Water (DDW) and the Los Angeles Regional Water Quality Control Board (LARWQCB) on groundwater and contamination cleanup issues.**

Waterworks Engineer – Recycled Water Program Management Group (11/2005 – 4/2014)

- **Oversee 16-20 staff members including civil & mechanical engineers, administration staff, and utility service specialists (marketers).**
- **Conducted over 100 presentations on the recycled water program to City Council members, Mayor’s office, LADWP and LA Public Works Board members, Neighborhood Councils, homeowner groups, environmental groups, State and local regulators, and other interested individuals.**

- **Planning and Program Highlights:**

- **Met or exceeded all 3 recycled water annual goals (Recycled Water Deliveries, Footage of Purple Pipe, and New Customers) since FY 07/08.**
- **Recycled Water Master Plan (2009-2012):** Oversaw and developed an \$11.7 million dollar recycled water master plan with a team of consultants, City staff, and other personnel.
- **Los Angeles Groundwater Replenishment Project (2009 – ongoing):** Project management for the proposed \$400 million 30,000 AFY GWRS. Environmental Notice of Preparation issued in September 2013. Draft EIR expected September 1, 2015.
- **Terminal Island Treatment Plant AWWP Expansion MOU with BOS (2012-2013):** Developed new MOU with BOS on expanding the AWWP at 11.5 MGD and established a \$/AF rate for recycled water delivered.
- Coordinated with Water Distribution and Local 18 on an LOA to contract out 140,000 feet of pipeline within the next 5 years. **(LOA approved 12/16/2014)**
- Development of LA's Water Supply Action Plan, Urban Water Management Plan, and Local Water Supply Development Plan. **(ongoing)**
- **Street Sweeper Truck Retrofit (2009-2011):** Designed specialized air gap assembly for street sweeper trucks which have been installed in 11 Bureau of Street Services trucks to use recycled water instead of potable water for street sweeping.
- **Playa Vista Oxidation Station (2008-2012):** Provided design criteria on different disinfection themes for odor control.

- **Customer Development/Marketing/Account Management Highlights:**

- **Increased recycled water customers from 20 sites in 2005 to over 140 sites in 2014.**
- **Recycled Water Customer Incentive Program (2012):** Developed Board adopted incentive program to cover on-site customer's retrofit costs with an annual budget of \$500,000 per year.
- **Recycled Water On-Site Retrofit Contract (2012-2015):** Developed and administered \$1.25 million dollar contract. Worked with Local 18, Purchasing, etc. for approvals.
- **Lead a team in resolving complex recycled water rate and operational issues at Playa Vista, Forest Lawn, Lakeside Golf Course, Mt. Sinai and NBC Universal.**
- **Developed brochures, fact sheets, and other information for various customer groups on the importance of recycled water.**

- **Staff Development**

- Lead informal Q&A sessions with upper management on career advice and lessons learned.

- **Contract Development/Administration Highlights:**

- **Recycled Water Master Plan with RMC/CDM Consultants (2009-2012):** Developed scope and administered \$11.7 million dollar contract. Worked with Local 18, Purchasing, etc. for approvals.
- **Metropolitan Water District LRP Funding (2005 – current):** Secured up to \$75 million dollars of funding for 7 recycled water projects over the lifetime of the projects. Administering contracts on annual basis with MWD.
- **Proposition 84 Funding (2012):** Secured \$2.5 million of funding for Griffith Park South Water Recycling Project. Providing contract document updates.
- **Bureau of Reclamation (2010):** Secured \$600,000 grant for groundwater replenishment pilot testing of Tillman Plant recycled water.

- **Working with Local 18 Highlights:**

- **Recycled Water Master Plan (2008-2009):** Worked with Local 18 representatives, Labor Relations, and management to approve \$11.7 million dollar contract.

- **Water Recycling Letter of Intent (2014):** Developed an agreement with Local 18 to contract up to 140,000 feet of purple pipe in the next 5 years.
- **Clarification of DDRs for Utility Service Specialists**
- **Project Management Highlights:**
 - **Los Angeles Groundwater Replenishment Project (2009 – current):** Project management for proposed \$400 million dollar 30,000 acre-feet per year (AFY) GWR system utilizing recycled water from the Tillman Plant.
 - **Harbor Water Recycling Projects (2006 – current):** Project management for various projects in the Harbor developing recycled water infrastructure totaling over \$200 million to deliver up to 25,000 AFY of recycled water for seawater barrier, use at refineries for oil production, lake benefits, and irrigation.
 - **Downtown/USC Water Recycling Project (2012 – current):** Project management for proposed 70,000 feet of pipeline to deliver recycled water to downtown customers and USC. Project CEQA anticipated to be approved by March 2015.
 - **Los Angeles World Airport Central Utility Plant (2008 – current):** Project management lead for treatment station for LAX in use for cooling towers.
 - **Hansen Tank Water Recycling Project (2002-2007):** Project management for the \$10 million dollar Hansen Tank that provides storage for Valley Generating Station and irrigation customers within the Sepulveda Basin.

CE Associate III – WETS Stone Canyon WQIP Project Manager (12/2004 – 11/2005)

- **Project Management** duties include approving change orders, tracking and overseeing the budget, analyzing monthly CPM Primavera schedules, determining future operating scenarios, conducting meetings with CPOR representatives, local neighborhood council representatives, local politicians, and other special interests groups. Also initiated and conducted weekly RFI & Submittal meetings on-site which have reduced LADWP response time to contractor by 75% since 12/2004.
- **Contract administration** duties include issuing task orders, scope of works, tracking invoices, preparing Board packages for approval, and ensuring MBE/WBE participation for 3 design firms (Black & Veatch, CH2MHill, and Parsons).
- **Design Manager** duties include conducting on-site meetings between designer and contractor, resolving design conflicts and issues, approving design changes, overseeing the updating of 2,200 design drawings, obtaining permits, approvals, and exemptions from other agencies.

CE Associate II & III – WETS Planning Section (3/1994-12/2004)

- **Supervised 3-7 associates and students between 1/1998 – 12/2004.**
- **Silver Lake Reservoir Complex Storage Replacement Project (2000-2004):**
 - Developed planning and alternative studies including cost-benefit analysis, baseline budget and schedules for various on-site and off-site alternatives.
 - Interfaced with the **LA Regional Water Quality Board** and **DHS** regarding issues and policies associated with spreading recycled water and on the EIR process.
 - Formed and led the **LA City Headworks Workgroup** which included representatives from LADWP, LA Bureau of Sanitation, LA Rec & Parks, LA Environmental Affairs Division, Mayor's office, CD 4 & 13, and the Army Corps of Engineers.

- Drafted and finalized a **Letter of Agreement between LADWP, LA Bureau of Sanitation, and LA Rec & Parks** on the long-term maintenance roles for both Headworks Restoration and Reservoir Projects (dated May 26, 2004).
 - Secured **Feasibility Cost Sharing Agreement (50/50) with Army Corps of Engineers** for the parallel Headworks Ecosystem Restoration Project (dated January 6, 2004).
 - Development of the Scope of Work document (80% completed December 2004).
 - Coordinated and provided input on the **EIR** with CH2MHill and was the lead presenter at an initial public meeting on September 17, 2003 attended by over 150 stakeholders.
 - Conducted public outreach meetings with CPOR, Council Districts 4 & 13, Silver Lake Neighborhood Council, state and federal agencies, and other special interest groups.
 - Coordinated with ISS representatives on contracting out issues. Received Certificate of Review from ISS on 6/7/2004.
 - Performed hydraulic analysis for different alternatives using H₂ONet.
-
- **Santa Ynez Water Quality Improvement Project (2000-2004):**
 - Developed planning and alternative studies including cost-benefit analysis, baseline budget and schedules for various on-site and off-site alternatives.
 - Conducted meetings with design, geotech, operations, and other internal staff.
 - Supervised the development of the Scope of Work document.
 - Coordinated the development of the Santa Ynez Landscape Master Plan (Completed in 2004).
 - Coordinated and provided input on the **Mitigated Neg Dec** document (Completed in 2003).
 - Conducted public outreach meetings with local homeowners, Pacific Palisades Neighborhood Council, Council District 11, and other special interests groups.
 - Interfaced with DHS on floating cover maintenance requirements.
 - Performed hydraulic analysis for different alternatives using H₂ONet.
-
- **Elysian Reservoir Water Quality Improvement Project (2003-2004):**
 - Supervised the development of the planning and alternative studies including cost-benefit analysis, baseline budget and schedules for various on-site and off-site alternatives.
 - Conducted meetings with design, geotech, operations, and other internal staff.
 - Supervised the development of the Scope of Work document.
 - Conducted public outreach meetings with CPOR representatives, 3 adjacent Neighborhood Councils, Council District 1, and other special interests groups.
 - Participated in the development of the Elysian Park Master Plan.
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- **Water Rate Increase Presentations (2004):**
 - Met with Toluca Lake Neighborhood Council, Chinatown Business Improvement District, & North Hollywood Chamber of Commerce. Meeting formats ranged from formal PowerPoint presentations to informal Question and Answer sessions.
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- **System-Wide Detention Time Analysis (2003-2004):**
 - Project Lead for implementing a mass-balance algorithm to evaluate detention times within LADWP's tanks and reservoirs. Algorithm was applied to Sunland-Tujunga area using LAUSDAC data. Coordinating with Water System IT Group to implement algorithm into new LAUSDAC to provide operators a tool to evaluate detention time for storage facilities.
-
- **AWWARF Spatial Demand Allocation Study (2000-2003):**

- Project Manager and Contact Administrator for a \$300,000 tailored collaboration study that developed improved empirical depictions of the spatial distribution of water demand utilizing water consumption data, hydraulic modeling information, GIS and LAWSDAC tools. Participants involved the Irvine Ranch and Callegus Water Districts.
- **Chloramine Conversion Study (1999-2002):**
 - Team member involved in evaluating RFPs, determining criteria for system evaluation, participated in consultant-led workshops, provided information on reservoirs and performed hydraulics for various parts of the system.
- **Chlorine Dioxide Pilot Study (1998, 2000):**
 - Project Engineer for the LA Reservoir Pilot Study of applying chlorine dioxide for algae control. Study concluded that chlorine dioxide was successful in arresting algae during nighttime application. Authored a study report to DHS (2/19/1999).
- **Planning Hydraulic Model Development (1998-2000):**
 - Project Engineer for the development of a City-wide Planning Model. Duties included evaluating RFPs, contract administration, developing modeling criteria including demand allocation procedure, model calibration, water quality analysis, sub model development, and incorporation of real-time LAWSDAC data into the model.
- **Stone Canyon Water Quality Improvement Project (1995-2000):**
 - Project Engineer within the planning phase of the project. Duties included developing storage criteria and alternative studies, performing hydraulic analysis, calculating project costs, and coordinating with community members on different options. Helped develop the HDPE pipeline concept within the bottom of Lower Stone Canyon Reservoir.
- **Hollywood Water Quality Improvement Project (1994-1998):**
 - Project Engineer within the planning phase of the project. Duties included developing storage criteria and alternative studies, performing hydraulic analysis, calculating project costs, and coordinating with community members on different options. Sized and located the existing by-pass line and the Toyon Tanks.

CE Assistant – Corporate Environmental Services (3/1993-3/1994)

- Researched federal, state, and local regulations regarding the handling, storage, and transport of hazardous materials and wastes. Set Department policy within Green Manuals for hazardous materials. Met and interfaced with local regulatory agencies on interpretation of regulations.

Student Engineer – Power Distribution Division (1/1992-3/1993)

- Hazardous materials & wastes coordinator for Palms Service Center. Developed HAZWASTE system for field personnel to sort and recycle oily rags, antifreeze, automotive equipment, etc.

RELEVANT TRAINING/WORKSHOPS

- **LADWP 10 Course Supervisor Certificate Series (2003)**
 - Making The Transition to Supervisor
 - Interview Selection Training
 - Developing Effective Two-Way Communication
 - Clarifying Team Roles and Responsibilities
 - Delegation: Working Together to Get Things Done
 - Setting Expectation and Evaluating Performance
 - Managing Your Time Before It Manages You
 - Coaching and Counseling for Peak Performance
 - Documenting and Disciplining Unacceptable Behavior
 - Preventing and Resolving Grievances
- **UCLA Computer/Networking Courses**
 - Quality of Service in IP Networks (2000)
 - Introduction to Network Design and Internetworking (2000)
 - Introduction to Router Configuration and Protocols (2000)
 - Advanced Router Configuration, Switching, and VLANs (2000)
- Mutual Gains Bargaining Training (2013)
- Introduction to Primavera (2005)
- Construction Delay Claims in California (2005)
- The Art Of Winning (2004)
- Advanced Project Management (2003)
- JSI Training (2003)
- Purchasing (2003)
- AWWA Ultra-Violet Workshop (2003)
- MWD Nitrification Control Workshop (2002)
- Project Delivery System (2000)
- Mutual Gains Bargaining (2013)
- Safe Start (2013)

CONFERENCE SPEAKER

- “Capture, Conserve, Reuse, and Remediate – The Los Angeles Strategy”
2015 American Groundwater Association Annual Meeting
- “Direct Potable Reuse Plenary Session Panel Discussion”
2013 California Watereuse Conference
- “Securing LA’s Water Supply Through Water Recycling”
(25th Annual Watereuse National Conference in Washington D.C., September 2010)
- “Recycled Water Program for the City of Los Angeles”
(5th Annual California Construction Expo in Pasadena, August 2010)
- “Water Recycling and the City of Los Angeles 10-Year Water Plan”
(Ontario Waterworks Association Conference, October 2008)
- “Creating a Hydraulic Model for LADWP”, with Inge Wiersema
(Cal-Nevada AWWA Conference, San Diego 2003)

- “Chlorine Dioxide for Algae Control”
(Joint Instrumentation Conference, Orange 1999)
- 2003 Geospatial Modeling Conference Awards Committee Member
(Pasadena 2003)

PUBLICATIONS/PAPERS

- “Economic and Environmental Drivers for Direct Potable Reuse”,
2013 California WaterReuse Annual Conference, Monterey, March 2013
Co-authors Tom Richardson, Emmalyne Roy
- “Securing New Water Sources: Groundwater Replenishment Planning for the City of Los Angeles”,
2012 California WaterReuse Annual Conference, Sacramento, March 2012
Co-authors Jennifer Thompson, Doug Walters
- “Potable Reuse: A Reliable Source for the Future”,
WaterReuse Association 2nd Specialty Conference on Direct Potable, Florida, November 2011
Co-authors Rob Morrow, Tom Richardson
- “Water Recycling: Pathway to Sustainable Wastewater Management in Los Angeles”,
Water Environment Federation Technical Conference, Los Angeles, October 2011
Co-authors Lenise Marrero, Doug Walters, Heather VanMeter Boyle, Tom Richardson, Rob Morrow
- “Optimizing Reverse Osmosis Design Criteria for Indirect Potable Reuse”,
AWWA Membrane Technology Conference, Long Beach, March 2011
Co-authors Greg Wetterau, Bruce Chalmers, Tom Richardson
- “Optimizing Preliminary Disinfection for Indirect Potable Reuse”,
Water Environment Federation Technical Conference, New Orleans, October 2010
Co-authors Greg Wetterau, Heather VanMeter Boyle, Tom Richardson, Doug Walters, John Hinds
- “Securing LA’s Water Supply Through Water Recycling”,
25th Annual WaterReuse National Conference, Washington D.C., September 2010
Co-authors John Hinds, Doug Walters, Tom Richardson, Heather VanMeter, Rob Morrow
- Lower Stone Canyon Bypass Line No. 2, Los Angeles, California - Lessons Learned from Reservoir Bottom and Tunnel Pipeline Design and Construction, Bentwood, Liu ASCE Pipelines Conference 2006
- “Spatial Demand Allocation for Distribution System Design”,
AWWARF Tailored Collaboration Study #90934, 2003
- “Chlorine Dioxide for Algae and THM Control: The Los Angeles Experience”,
co-author with Gary Stolarik, 1999 Water Quality Technology Conference, Utah
- “Developing Real-Time Models of Water Distribution Systems”,
co-author with Paul Boulos, 1998 Drinking Water Symposium, England
- “Hydraulic Modeling of Chlorine Dioxide Decay Within a Potable Water System”,
UCLA Master’s Thesis, 1997

OUTSIDE ORGANIZATIONS

- Hurricane Katrina Relief Team with Habitat for Humanity (2008)
- Wells Around the World Ministry (providing clean water to 3rd world countries) – (2012 to current)



August 20, 2018

Patricia Sinicropi
Executive Director
WateReuse Association

RE: Nomination for WateReuse Association Board of Directors

Ms. Sinicropi

Like yourself, I too share a passion for our industry and advancing water reuse. Therefore, I would like to be considered to fill one of the vacancies on your Board. I am currently the Deputy Director for Pima County Wastewater Reclamation where I oversee treatment operations, research and Innovation. I hold a B.S. in microbiology, a Ph.D. in chemistry and have over 24 years of experience in the water sector. I also currently chair WRF's LIFT committee on disinfection and co-chair the reuse committee along with Mehul Patel.

I served as the microbial chairperson for the Arizona Panel on Emerging Contaminants and more recently was project manager and team lead for the AZ PURE Water Challenge which introduced potable reuse technology to Arizona through our mobile demonstration facility, which coincidentally will be displayed at the WateReuse Symposium in Austin. This hugely successful project received the first DPR permit in Arizona and was instrumental in getting a multi-decade prohibition removed thus allowing potable reuse within the state. This innovative project achieved extensive recognition nationwide and allowed people normally unfamiliar with our industry an opportunity to see and touch the technologies that make potable reuse possible in a very informative way. We have taken the demonstration facility to Denver, CO and in August will be hosted in Boise, ID and Clean Water Services in Oregon is currently constructing a similar version that will be on display at WEFTEC 2018.

I am likewise committed to the WateReuse mission as demonstrated by the management activities and similar philosophies shared by our organization. Altogether Pima County generates over 60 MG of water that goes towards beneficial reuse and aquifer recharge each day and we are always looking for higher value beneficial uses.

In 2012, I created the Pima County Water Campus and in 2015 created the Water, Energy & Sustainable Technology (WEST) Center in conjunction with the University of Arizona for the purpose of advancing water treatment technologies. This world class research and pilot demonstration facility provides on-site access for manufacturers to validate and improve technologies for advancing our industry.

I hope we have a chance to meet in Austin and share ideas. Whether selected or not, I am both happy and eager to assist WateReuse.

Best regards and thank you for your consideration,

Jeff Prevatt

Jeff Prevatt

12791 N. Yellow Bird Road

Oro Valley, AZ 85755

Phone: 520-256-5685

Email: jeff.prevatt@pima.gov

Professional Profile

University of Arizona, Microbiology & Immunology, B.S., 1991

University of Arizona, Chemistry, Ph.D., 2000

Employment

Deputy Director for Treatment, research & Innovation, Pima County RWRD, 2018 – Present

Oversee Treatment operations and maintenance for eight water reclamation facilities consisting of 175 personnel and an operational budget of \$36,000,000 annually while continuing to develop and pilot new technologies for improving our utility.

Research & Innovation Leader, Pima County RWRD, 2016 – 2018

Develop, pilot and implement new technologies targeted at water utility process improvement. I serve as chairman for multiple Water Environment & Research Foundation programs and supervise the design and implementation of pilot systems covering a variety of process areas and disciplines. I also serve as the technical liaison with for university research collaborations.

Owner and CEO of S. I. Photonics, Inc., 2003 – Present

S. I. Photonics is a manufacturer of high performance spectroscopy equipment utilized by universities and corporations worldwide.

Regulatory Compliance Manager, Pima County RWRD, 2008 - 2016

Responsible for the management of multiple departments including pretreatment programs, laboratory operations, data management & compliance, and staff development & training. Over 75 personnel in total.

Technical Services Manager, Pima County RWRD, 2002 – 2008

Responsible for direct management of laboratory operations, pretreatment programs and process troubleshooting teams at multiple locations. Over 55 personnel in total.

Inorganic Laboratory Supervisor, Pima County RWRD, 1994 – 2003

Direct supervision of inorganic laboratory operations including a variety of analytical methods and 13 personnel. Highlights included the development of multiple analytical testing methods processed through EPA's alternative testing procedure (ATP) process to obtain nationwide approval. These activities improve our industry and the protection of public health.

Laboratory Chemist, American Analytical Laboratories, 1989 – 1994

Activities included sample collection, sample preparation and analysis.

Related Professional Activities

WESC/WEST Water Campus - Conceived, developed and implemented a 62,000 sq. ft. Water Campus that consolidates water quality laboratories and research and development. This facility houses over 40,000 sq. ft. of laboratories, staff training classrooms, workshops, research and piloting facilities dedicated to improving water utilities.

Disinfection Byproduct Abatement – Conceived, bench tested and piloted a process that utilizes an existing waste stream byproduct to minimize total trihalomethane (TTHM) production.

CO₂ Sequestration for Struvite Mitigation - I serve as the primary investigator for this WERF funded research in collaboration with the University of Arizona and the City of Chicago. Currently constructing a pilot demonstration to capture waste CO₂ from a biogas cleaning operation and utilize the CO₂ to reduce centrate pH to prevent struvite (magnesium ammonium phosphate) precipitation.

Arizona Panel on Emerging Contaminants (APEC) – A Governor's Office sanctioned panel to address pathogenic organisms and chemical contaminants that pose a threat to our state but for which are currently not regulated. APEC is a coalition panel comprised of academic and regulatory officials throughout the state with a microbial, chemical and outreach subcommittees and I chair the microbial committee.

Engineering Industry Partner Board – Active member of the University of Arizona's College of Engineering Industry Partner Board. The purpose of the board is to provide industry feedback for improving the types of courses and curriculum offered to better serve the various industries represented by the board members. My role represents public utilities. It is through this interaction that we have expanded the Pima County Wastewater Management's role and now offer Science, Technology, Engineering and Mathematics (STEM) training programs and a Bio-Science Academy at our WESC facility.

WERF Leaders Innovation Forum for Technology - I am currently chairperson for the LIFT Disinfection committee and co-chairperson for the Water Reuse committee. LIFT activities for our utility are coordinated under my direction and I actively participate and engage in technology discussions and pilot testing of new and innovative process at a number of our treatment facilities.

NEW Arizona Prize: Water Innovation Challenge Winner - Developed a concept and collaborative team to advance potable reuse awareness throughout Arizona through the creation of the AZ Pure Water Brew Challenge. A mobile advanced water treatment facility that toured the state producing ultra-pure water from municipal recycled water and soliciting 32 craft brewers to prepare specialty beer with the product water. Awarded a \$252,500 in prize money.

Anammox Evaluation for Side Stream Treatment – Awarded \$350,000 National Science Foundation grant for demonstrating and evaluating the efficacy of anammox process for both side stream and full scale nitrogen removal at a full scale water reclamation facility.

Rick Warner *Letter of Interest*
WaterReuse Board of Directors

Dear WaterReuse Association 2018 Nominating Committee –

I am very pleased to have an opportunity to submit a *letter of interest* to serve on the WaterReuse Association Board of Directors. As a passionate and experienced water champion, I've had opportunities to travel globally to share my insights, knowledge and enthusiasm for water. I am an advocate for smart water policies, progressive regulations, research, and innovation to secure resilient water portfolios through implementing water recycling and sustainable practices at the local, state, national, and international levels. I would be honored to serve on the Board of Directors to promote the WaterReuse Association's vision, mission, and values.

My 30-year public service career has been focused on providing water policy development, strategic planning, design services, project management, construction management, and operations. My expertise spans watershed protection, drinking water, wastewater treatment, and water recycling, with essential experiences in non-potable reuse systems for agriculture, landscape irrigation, and industrial uses. I'm also presently co-leading a northern Nevada regional team developing Nevada's first potable reuse project.

My recent leadership positions within the water sector, including 2016/17 President of the Water Environment Federation (WEF) and 2014-2018 Board of Directors for The Water Research Foundation (TWRf) have prepared me well to be an effective and impactful member of the WaterReuse Association Board of Directors. Through my agency, Washoe County (Nevada) Community Services Department, I am a current member of the WaterReuse Association, and have had the privilege to attend several WRA events, including several recent *Annual Symposiums*.

I take pride in creating impact and sharing. As WEF President in 2016/17, I made the development of a ***Water Reuse Roadmap*** – a publication crafted by dozens of expert contributors - intended to help communities successfully navigate the complexities of developing local water recycling programs, a top priority. In just the past 3 years, I've traveled to over 50 conferences in the United States and often delivered keynote and technical

presentations relating to water recycling and resource recovery. I also have had the honor of speaking about water recycling and sustainability at international conferences, including recent events held in Sweden, Korea, Japan, Australia, Canada, and Colombia.

I have collaborative leadership style. In the role of WEF President, I chaired the WEF Board of Trustees, and worked effectively with the Executive Director to develop programs to achieve a higher functioning volunteer board. In addition to enhancing the Board's fiduciary and strategic roles, we introduced a new *generative-mode*, which relates to positioning the organization for the future by intentionally creating space for envisioning new ideas to advance the organization's vision and mission.

More locally, I'm helping lead Nevada to advance water research and innovation by serving as the Chair of the Board of Advisors to the *Nevada Water Innovation Campus*. This program was founded by the University of Nevada, Reno and local agencies to accelerate adoption of water technologies, while enhancing the economic, social, and environmental aspects of the water environment.

I have been an effective regulatory and policy advocate. In 2015-17 I was invited to serve on the Nevada Division of Environmental Protection's *Water Reuse Regulatory Steering Committee* - a collaborative team of agency and international experts that crafted Nevada's newest reclaimed water regulations – allowing for expanded uses of non-potable recycled water, and also developed regulations for indirect potable reuse. At WEF, I have participated at Water Week in Washington DC to advance federal funding and federal regulations. In 2016 and 2018, I joined a group organized by TWRF/EPA/WEF in Cartagena, Colombia to promote water reuse regulations in Central America and South America. At international events, I typically promote attaining United Nations Sustainable Development Goals through water reuse and resource recovery.

In Nevada, I'm presently co-leading a collaborative team of utilities developing Nevada's first indirect potable reuse reclaimed water for groundwater replenishment. The regional team is implementing a feasibility study by conducting triple bottom line analysis, demonstrating

advanced reclaimed water treatment technologies, and evaluating aquifer infiltration/injection for indirect potable reuse. In support of this project, our team is supporting research by partnering with The Water Research Foundation (Project 15-10), National Science Foundation, and the Bureau of Reclamation (BOR). The BOR has awarded our team a grant to conduct low energy advanced treatment for inland potable reuse and conducting water rights/markets analysis for the northern Nevada region – with the hope this work will lead to greater adoption of potable reuse in other regions. Additional funding and research opportunities are being driven by innovative *utility – university - technology provider* partnerships.

I have also led several local and national water sector *change-initiatives* to bring together diverse stakeholders to achieve common goals. In 2016, I formed the first ***Partnering for Impact*** event, which attracted over 50 global water leaders from nearly 20 organizations, including representatives from the WaterReuse Association, The Water Research Foundation, and the American Water Works Association to explore synergies in the advancement of water recycling, resiliency, and sustainable practices. This effort led to a ***Shared Vision Movement***, where stakeholders are still meeting today to share ideas and keep the momentum for water research and innovation through impactful collaborations. In 2018, I organized a ***Partnering for Impact: Nevada Water Forum*** to accelerate innovation, research, and practical solutions for the Nation's most arid state.

I am a current member of the WaterReuse Association, The Water Research Foundation, Water Environment Federation, Nevada Water Environment Association, University of Nevada Civil Engineering Advisory Board, and the Nevada Water Innovation Campus. I am also active with *Imagine H2O*, and served as an industry-mentor for the past 3 years. I am a registered professional engineer in the state of Nevada. Academically, I have a B.S. and an M.S. in civil engineering from the University of Nevada, Reno.

Related to volunteer Board service, I also have a strong fiduciary background – serving as WEF Treasurer from 2012-2014, which provided me invaluable knowledge relating to organizational budgeting, finance, investing, insurance, and risk.

Rick Warner *Letter of Interest*
WateReuse Board of Directors

Lastly, I am eager to serve the WateReuse membership to the best of my ability. At the conclusion of WEFTEC 18 on October 3, 2018, my tenure on the WEF Board concludes, and I would then continue my advocacy for water recycling, resiliency, and resource sustainability by solely serving the membership of the WateReuse Association.

Sincerely,

Rick Warner

Rick Warner



Rick Warner, P.E. is the Senior Engineer at the Washoe County (Nevada) Community Services Department. As a passionate and recognized water leader, Rick has served in numerous leadership positions. He has traveled globally to share his insights, knowledge and enthusiasm for water and sustainability.

Mr. Warner has over 30 years of experience in the public-sector. He has devoted his career to providing water policy development, strategic planning, design, project management, construction management, and operations to northern Nevada. Mr. Warner's expertise spans watershed protection, drinking water, wastewater treatment, and water recycling. Rick has essential experiences in non-potable reuse systems for agriculture, landscape irrigation, and industrial uses, and is presently co-leading a regional team developing Nevada's first potable reuse project.

Rick has led Nevada in advanced research and innovation by serving as the Chair of the Board of Advisors to the *Nevada Water Innovation Campus*. This program was founded by the University of Nevada, Reno and local agencies to advance water science and technology, while enhancing the economic, social, and environmental aspects of the water environment.

Mr. Warner has held several leadership positions within the water sector, including 2016/17 President of the Water Environment Federation (WEF), Board of Directors for The Water Research Foundation (2014-2018), and President of the Nevada Water Environment Association (2000). As WEF President, Rick inspired the development of a **Water Reuse Roadmap** – a publication crafted by dozens of expert contributors - intended to help communities successfully navigate the complexities of developing local water recycling programs and sustainable water management practices.

Rick has led several water sector initiatives to bring together diverse stakeholders to achieve common goals. In 2016, he formed the first **Partnering for Impact** event, which attracted over 50 global water leaders to explore synergies in the advancement of water recycling and sustainable practices. This effort led to a **Shared Vision Movement**, where stakeholders are still meeting today to share ideas and keep the momentum for water research and innovation through impactful collaborations. In 2018, Rick organized a **Partnering for Impact: Nevada Water Forum** to accelerate innovation, research, and practical solutions for the Nation's most arid state.

Mr. Warner is a member or the Water Resue Association, The Water Research Foundation, Water Environment Federation, Nevada Water Environment Association, University of Nevada Civil Engineering Advisory Board, and the Nevada Water Innovation Campus. Rick is a registered professional engineer in the state of Nevada. He received a B.S. and an M.S. in civil engineering from the University of Nevada, Reno.



Rick Warner

2505 Peavine Valley Road
Reno, NV 89523
rick.warner@att.net
(775) 843-7939

SKILLS and ATTRIBUTES

Strategist
Innovator
Facilitation
Problem Solving
Leadership
Integrity
Passion
Mentoring
Collaborating

WORK EXPERIENCE

Senior Engineer, 1997-2018

Washoe County, Nevada

Community Services Department

Regional Potable Reuse Leader

Major Capital Projects Project Manager

Master Planning, Capital Investments, Project Management, and Design Engineering

Chemist, 1987-1997

Truckee Meadows Water Reclamation Facility

Reno, Nevada

Routine and complex physical, chemical, and biological analyses.

EDUCATION

M.S., Civil Engineering,
University of Nevada, Reno

B.S., Civil Engineering,
University of Nevada, Reno

ABOUT ME

I am a civil engineer, strategist, and industry steward. As a passionate and accomplished water leader, I have served in numerous leadership positions and traveled globally to share my experience, insights and knowledge.

RECENT EXPERIENCES AND CONTRIBUTIONS

Regional Potable Reuse Feasibility Study

- Leading a collaborative multiple-agency partnership.
- Creating the space for diverse stakeholder engagement.
- Navigating complex technical, regulatory, and implementation challenges.
- Shaped regulatory framework, pilot testing, demonstration projects, and financing elements.

Recycled Water Planning and Operations Optimization Project

- Leading a water recycling utility optimize water quality, level-of-service, and future needs.
- Developing strategies to expand irrigation, agriculture, on-site, and industrial usages.
- Creating collaborations with stakeholder and regulatory communities.

Nevada Water Innovation Campus

- Co-creator of a water research center at the University of Nevada, Reno.
- Driving innovation and applied research capacity at the regional level.
- Creating pathways for workforce development.
- Partnering with statewide utilities, universities, and national research centers.
- Created *Partnering for Impact: Nevada Water Forum* to engage water leaders.

National Water Association President

- Served as President, and Chair of the Board of Trustees for the Water Environment Federation.
- Led strategic development, business planning, and partnering task forces.
- Created *Partnering for Impact* and *Shared Vision for Water 2030* initiatives.
- Inspired development of the *Water Reuse Roadmap* to help communities navigate the complexity of sustainable water management practices.
- Effective keynote speaker and technical contributor at international water forums.

Water Reclamation Facility Master Planning and Implementation

- Program Manger overseeing regional collaborations, planning, design, construction, and financing.
- Exceeding \$100 million in essential infrastructure investment.
- Creating flexibility to produce multiple recycled water qualities.

VOLUNTEER/LEADERSHIP

- | | |
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| • Nevada Water Innovation Campus, Chair, Board of Advisors: | 2017-Current |
| • UNR College of Engineering, Board of Advisors: | 2017-Current |
| • Water Environment Federation, Trustee: | 2009-2018 |
| • The Water Research Foundation, Director: | 2014-2018 |
| • Water Environment Federation, President: | 2016-2017 |
| • Nevada Water Environment Association, President: | 2000-2001 |
| • American Society of Civil Engineers, Reno Branch, President: | 2001-2002 |

NGO/Academic

1. James Englehardt, Ph.D., Professor, College of Engineering, University of Miami, FL

UNIVERSITY OF MIAMI
COLLEGE of ENGINEERING



James D. Englehardt, Ph.D.
Professor
Civil, Architectural & Env
Engineering

1251 Memorial Drive
MEB Room 325
Coral Gables, FL 33146

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jenglehardt@miami.edu

August 14, 2018

Patricia Sinicropi, Staff Liaison and Executive Director
WaterReuse Association
1199 North Fairfax Street, Suite 900
Alexandria, VA 22314

Dear Ms. Patricia Sinicropi:

Thank you for your letter regarding the opportunity to serve on the Board of Directors of the WaterReuse Association. As you know, I am Professor of Environmental Engineering at the University of Miami, appointed January 1, 1992, and would like to apply. My background is summarized briefly in the attached CV.

To place my interest in this position in a broader context, let me highlight two basic and important functions supporting our democratic model of government in the modern world: education and infrastructure. Education not only combats economic stratification, instability, and violence, while informing voters, but empowers people to construct the anthropogenic infrastructure needed to prosper, and to protect the natural infrastructure we call the “environment.” Infrastructure, in turn, empowers people to rise above subsistence activities to invest time and resources in education.

Both man-made and natural “infrastructure” are needed to support basic human needs such as clean water, and infrastructure is ripe for advances. In particular, I suggest to students that the most efficient system known is the ecosystem, in which the outputs of all components are inputs to others, closing the loops and eliminating waste. Water reuse can not only close the loop in a water cycle, but can close many more through integration with energy and food systems to support step changes in efficiency.

In support of this belief, I have been making the following points in talks across the US since 1999:

- Treated wastewater already meets 87 of the 93 numerical drinking water requirements without further treatment, based on data from across S. Florida;
- Routine disposal of treated wastewater to saltwater bodies increases total impurities by a factor of ~100, while ocean water is being desalinated for treatment to drinking water standards. Treated wastewater, on the other hand, represents a clean, non-seasonal freshwater source sufficient to satisfy urban demand; and

- The total load of toxic chemicals and pesticides released to the environment in the US is ~2 mg/L, not a trace level. Environmental engineering systems are needed to address the accumulation of such chemicals routinely and economically in large volumes of water.

With the help of a stellar team, I built a research effort to design and build a system to recycle 100% of municipal wastewater (85% indoor, 15% outdoor use), while permanently mineralizing total organics to below detection. We were thus awarded \$2,748,000 from the National Science Foundation. The system we built operated Jan. 1, 2013 through Dec. 31, 2014, with a team of 10 faculty investigators, 90 graduate, undergraduate, and high school students and one postdoctoral associate sampling, analyzing, and recording water quality parameters across the system at least 3 times daily. After 18 months, chemical oxygen demand (COD) was below detection, all 115 Florida drinking water standards were met, and microbial inactivation standards were substantially surpassed.

Uniquely, no stream of concentrated contaminants is generated by the NZW process and, importantly, the system can be energy-positive, saving more hot water energy than it uses in treating and conveying water and wastewater combined. The latter benefit arises by closing an energy loop, because the hot water that goes down our drains contains substantial thermal energy, which is retained in the water so that it returns to the tap warm and needing little re-heating. As a result, the term “net-zero water” was recommended at a meeting of international water reuse professionals¹ for retention as a term distinct from the more general “direct potable reuse.”

In addition to 40 years of experience in water and wastewater engineering, I am active in probabilistic health risk analysis research, and serve as Associate Editor of the American Society of Civil Engineering and American Society of Mechanical Engineering *ASCE-ASME Journals of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering and Part B: Mechanical Engineering*. Hence, I am cognizant of potential and perceived risks of water consumption, and versed in their assessment and control. In fact, the NZW project included development of the artificial intelligence algorithms to allow near-real time detection of chemical health risk in drinking water, as well as study of psycho-social motivations for and against such NZW living.

I am a WaterReuse Association member in good standing, able to commit time and resources towards the WaterReuse mission and vision. I can arrange to attend four quarterly board meetings, including one during our Annual Symposium in September, and would endeavor to participate in WaterReuse Association committees and initiatives as needed.

In terms of skills and experience, I have 27 years of experience as Professor of Environmental Engineering at the University of Miami, with direct responsibility for \$5 million in scientific and engineering research with national and international focus, centering in large part on water and water reuse and risk analysis. As such, I have substantive experience managing cross-campus and

¹ Englehardt, J., T. Wu, F. Bloetscher, Y. Deng, P. du Pisani, S. Eilert, S. Elmir, T. Guo, J. Jacangelo, M. LeChevallier, H. Leverenz, E. Mancha, E. Plater-Zyberk, B. Sheikh, E. Steinle-Darling, and G. Tchobanoglous (2016) “Net-Zero Water Management: Achieving Energy-Positive Municipal Water Supply, *Environmental Science: Water Research & Technology*, 2, 250 – 260, DOI: 10.1039/C5EW00204D.

inter-institutional research projects, including financial, regulatory, managerial, outreach, dissemination, educational, and reporting aspects.

Previously I held professional positions at Western Filter Co. (now within GE Water) and Johns Manville Filtration and Minerals Div. (now Celite Corp.) Awards have been received for service as Chair of the Student Services Committee of the Association of Environmental Engineering and Science Professors, as well as for several research advances. Also, our research has involved detailed economic modeling of capital and operating costs of water and wastewater treatment and reuse systems. This work lends insight into the diverse economic aspects impacting and favoring implementation of water reuse at all scales, including tradeoffs and advantages of different engineered and natural approaches involving both segregation and comingling of various wastewater streams, which I would be glad to share.

I appreciate your consideration, hope to meet in Austin, and look forward to hearing from you.

Sincerely,

James D. Englehardt, Ph.D., P.E.
Professor

JAMES D. ENGLEHARDT

Professor

Civil, Architectural, and Environmental Engineering

University of Miami

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11408 Smathers Circle

Pinecrest, FL 33156

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U.S. Citizen



SUMMARY

Dr. James Englehardt, P.E., is Professor of Environmental Engineering at the University of Miami, appointed 1992. Before receiving his Ph.D. from the University of California, Davis, Dr. Englehardt led filtration research projects for Johns Manville Corporation (1983-1987), and supervised water treatment laboratory development and field service for the Western Filter Company (now GE Water) (1978-1980). He currently directs the Water Quality Engineering Laboratory. Developments include the first energy-positive treatment system for management of municipal water and wastewater; and machine learning/evidence fusion technology for sensor-based detection of health risk in drinking water in near-real time, both under support of the National Science Foundation and the U.S. Environmental Protection Agency (EPA). Discoveries in the field of risk analysis include the first explanation of $1/f$ noise (the power law Fourier transform signature of complex system-generated time series of outcome magnitudes); derivation of discrete and continuous probability distributions for illness severities, microbial concentrations in water over time, and other complex system outcome sizes; and derivation of the first general multivariate dose-response function for mixtures of chemical toxicants in water and other media.

Dr. Englehardt serves on the EPA Science Advisory Board, Drinking Water Advisory Committee, and as Associate Editor for ASCE-ASME Risk and Uncertainty in Engineering Systems, Parts A Civil Engineering and ASCE-ASME Risk and Uncertainty in Engineering Systems, Part B Mechanical Engineering B. Awards include the WaterReuse Association 2018 Award for Excellence in Transformation Innovation, two Johnson A. Edosomwan Outstanding Publication Awards, University of Miami; the Science Advisor's Award, EPA National Center for Environmental Assessment; the Robert C. Barnard Environmental Science & Engineering Award for Advances in Risk Assessment, American Association for the Advancement of Science and EPA; and two University of Miami Eliahu I. Jury Awards for excellence in research.

EDUCATION

Ph.D., University of California, Davis, Civil/Environmental Engineering, 1992.

M.S., Colorado State University, Agricultural/Environmental Engineering, 1983.

B.S., University of Pittsburgh, Chemistry, 1976.

LICENSURE

Professional Engineer, Florida no. 0048821, 1995.

PROFESSIONAL AWARDS AND SERVICE

WaterReuse Association 2018 Award for Excellence in Transformation Innovation for the National Science Foundation project "EFRI-SEED: Design for Autonomous Net-Zero Water Buildings."

Johnson A. Edosomwan 2017 Outstanding Publication Award, "Electrochemical Oxidation for of Landfill Leachate Treatment," *Water Research*, University of Miami College of Engineering, \$500, 2018.

Nominee, *2017 Clarke Prize for Outstanding Achievement in Water Science and Technology*, National Water Research Institute, Fountain Valley, CA, \$50,000.

Member, U.S. Environmental Protection Agency Science Advisory Board, Drinking Water Advisory Committee, Office of the Administrator, Washington, DC, May 10, 2016 – present.

Associate Editor, *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 2017 – present.

Associate Editor, *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering*, 2017 – present.

Albert Nelson Marquis Lifetime Achievement Award, Marquis Who's Who Publications Board, 2017.

Small Business Advisory Board, Architecture and Engineering, Miami-Dade County, 2016 – 2017.

Who's Who in America, Marquis Who's Who, 2010 – present.

Johnson A. Edosomwan Outstanding Publication Award, "Treatment of Landfill Leachate by Fenton Process," *Water Research*, University of Miami College of Engineering, \$700, 2014.

Editorial Board Member, *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems*, 2013 – present.

Selection Committee Panel, *Miami-Dade Water and Sewer Department Multi-Year Capital Improvement Plan*, Program and Construction Management Services related to the Wastewater System Priority Projects, 2013-2014.

Nominee, *Board of Directors*, Association of Environmental Engineering & Science Professors, 2009.

Distinguished Service Award, Chair, Student Services Committee, Association of Environmental Engineering & Science Professors, 2009.

Faculty Board, Abess Center for Ecosystem Science and Policy, University of Miami, 2008 – 2015.

Chair, Research and Education Standing Committee, Green U Task Force, University of Miami, 2007 - 2015.

Blue Ribbon Selection Committee, Reverse Osmosis Water Treatment Plant Contract, City of Hialeah, FL, 2008 – 2010.

Chair, Student Services Committee, Association of Environmental Engineering & Science Professors, 2005 – 2008.

Who's Who Among American Teachers & Educators, Who's Who Among American Teachers & Educators, Austin TX, 2007.

Science Advisor's Award, "Predictive Bayesian Microbial Dose-Response Assessment Based on Suggested Self-Organization in Primary Illness Response: *C. Parvum*," U.S. Environmental Protection Agency, National Center for Environmental Assessment, Cincinnati (with J. Swartout), 2006.

Eliabu I. Jury Excellence in Research Award, "Predictive Population Dose-Response Assessment for *Cryptosporidium Parvum*: Infection Endpoint," University of Miami College of Engineering, 2005.

Eliabu I. Jury Excellence in Research Finalist, "Analytical Predictive Bayesian Assessment of Occupational Injury Risk: Municipal Solid Waste Collectors," University of Miami College of Engineering, 2004.

Invention Recognition Award, "Metal Mediated Aeration for Water and Wastewater Purification," University of Miami, 2004.

Outstanding Service Award, Student Chapter Coordinator, Florida Water Environment Association 1998, 1999, 2000, 2003.

Eliabu I. Jury Excellence in Research Finalist, "Scale Invariance of Incident Size Distributions in Response to Sizes of Their Causes," University of Miami College of Engineering, 2002.

National Academy of Sciences, Nominee, National Research Council Committee on Restoration of the Greater Everglades Ecosystem, 1998.

Peer Review Committee, South Florida Water Management District Lower East Coast Water Supply Plan, Southeast Florida Utility Council in cooperation with the South Florida Water Management District and the U.S. Army Corps of Engineers, 1997 - 1998.

Robert C. Barnard Environmental Science and Engineering Award, “Benefit-Risk Analysis of Everglades Stormwater Treatment Area Phase I Discharge Alternatives,” American Association for the Advancement of Science and U.S. Environmental Protection Agency, 1997.

Eliahu I. Jury Excellence in Research Award, “Predicting Incident Size from Limited Information,” University of Miami College of Engineering, 1996.

Environmental Science and Engineering Fellow, “Advances in Probabilistic Methods for Environmental Policy Analysis,” American Association for the Advancement of Science and U.S. Environmental Protection Agency (AAAS-EPA), 1996.

Research Initiation Award, “Development of Process for Detoxifying Nuclear Reactor Cooling Water,” Engineering Foundation, 1993 - 1994.

Junior Faculty Enhancement Award, “Risk-Based Design of Advanced Oxidation Treatment Processes,” Oak Ridge Associated Universities, 1993 - 1994.

Knight Junior Faculty Fellow, “Risk Analysis and Process Development for Waste Minimization,” University of Miami, 1992 - 1993.

TOPS (Towards Outstanding Postgraduate Studies) Research Fellow, University of California, Davis, 1989.

ACADEMIC EXPERIENCE

University of Miami, Professor, Department of Civil, Architectural, and Environmental Engineering, 2004-present.

University of Delaware, Visiting Scholar, Department of Civil and Environmental Engineering, 2007.

University of New Hampshire, Visiting Scholar, Department of Civil Environmental Engineering, 2006.

University of Miami, Associate Professor, Department of Civil, Architectural, and Environmental Engineering, 1998-2004.

University of Miami, Assistant Professor, Department of Civil, Architectural, and Environmental Engineering, 1992-1998.

University of California, Davis, Postgraduate Research Engineer, 1989-1991, Associate-in-Civil Engineering, 1988-1989, Department of Civil Engineering.

PROFESSIONAL EXPERIENCE

Lawrence Berkeley National Laboratory, Visiting Professor, Sustainable Energy Systems Group, Sustainable Energy & Environmental Systems Department, Energy Technologies area (ETA), 2016.

Consulting Expert, Viles and Beckman, LLC Attorneys at Law, Ft. Meyers, FL, 2013-2014.

U.S. Environmental Protection Agency, Visiting Scientist, National Center for Environmental Assessment, Cincinnati, OH, 2001.

National Center for Environmental Assessment, Expert Panelist, Models and Tools for Including Susceptibility, Immunity, and Secondary Spread into Microbial Risk Assessment: EPA-NCEA Workshop, U.S. Environmental Protection Agency, Cincinnati, OH, November 18-19, 2004.

Florida Water Environment Association Utility Council, Consulting Professional Engineer. Review of U.S. Environmental Protection Agency Report “Relative Risk Assessment of Management Options for Treated Wastewater in South Florida” as Related to Wastewater Management in Southeast Florida, 2003.

BFI, Inc., Miami, Florida, Consulting Professional Engineer. Sieve analysis of mixed reject recycled glass for recovery, 2002.

Broward County Office of Solid Waste Management, Ft. Lauderdale, Florida, Consulting Professional Engineer. Sieve analysis of mixed reject recycled glass for recovery, 2002.

Elmer Marmorstein AIA CSI, Miami, FL, Consulting Professional Engineer. Cleanup of metals contamination in groundwater and soil at industrial site, 1997.

Cauffiel Machinery Corp., Toledo, Ohio, Consulting Engineer. Pickling liquor iron recovery process development research, 1989.

Manville Corporation, Filtration and Minerals Division, Lompoc, California, Contract Research Engineer. Development of pollution prevention alternatives for diatomaceous earth filtration processes, 1988.

Manville Corporation, Filtration and Minerals Division, Denver, Colorado, Research Engineer. Research and development into the manufacture and application of mineral filter media, including surface chemical and thermo-structural investigations, 1983-1987.

Western Filter Company, Denver, Colorado, Chemical Laboratory Supervisor, Water Treatment System Field Technician. Water treatment equipment field service, supervision of water quality and treatment analytical wet laboratory, treatment process optimization, new process research, new laboratory design, 1978-1980.

PROFESSIONAL ORGANIZATIONS

Water Reuse, 2013 – 2014, 2018 – present.

Association for Environmental Engineering and Science Professors, 1992 – present; Chair, Student Services Committee (2005 – 2008) and Committee member (1999 – 2008).

Society for Risk Analysis, 1995 - present.

Florida Water Environment Association, University of Miami Student Chapter Coordinator, 1993 - present.

American Society Civil Engineers, 1983 – 1997, 2017 – 2018; Waste Minimization Steering Committee Member (1993).

HONORARY ORGANIZATIONS

Tau Beta Pi (Engineering)

Chi Epsilon (Civil Engineering)

Alpha Epsilon (Agricultural Engineering)

Gamma Sigma Delta (Agricultural)

Sigma Xi (Research)

REFEREED JOURNAL ARTICLES UNDER REVIEW

- Perera, M.K., J.D. Englehardt, and A.C. Dvorak (2018) “Processes for Recovering Nutrients from Wastewater: A Critical Review,” *Water Research*, submitted.
- Gassie, L. W., J.D. Englehardt (2018) “Mineralization of greywater organics by the ozone-UV advanced oxidation process: Kinetic modeling and efficiency,” *Water Research*, submitted.
- Gassie, L. W., J.D. Englehardt, N. Brinkman, J. Garland, and M.K. Perera (2018) “Ozone-UV Net-Zero Water Wash Station for Remote Emergency Response Healthcare Units: Design, Operation, and Results,” *Water Research*, submitted.
- Englehardt, J. (2018) “A general dose-response relationship for chronic chemical and other homogeneous health stressors and mixtures based on an autocorrelated first-order illness severity model,” *PLoS ONE*, submitted.

REFEREED JOURNAL ARTICLES

- Wu, T., J. Englehardt, T. Guo, and L. Gassie (2017) “Applicability of Energy-Positive Net-Zero Water Management in Alaska: Technology Status and Case Study,” *Environmental Science and Pollution Research*, in press, published online Nov. 22, 2017, <http://rdcu.be/zdFk>.
- Gassie, L. and J. Englehardt (2017) “Advanced oxidation and disinfection processes for onsite net-zero greywater reuse: A review,” *Water Research*, 125, 384–399.
- Perera, K., J. Englehardt, G. Tchobanoglous, and R. Shams (2017) “Control of Nitrification/Denitrification in an Onsite Two-Chamber Intermittently Aerated Membrane Bioreactor with Alkalinity and Carbon Addition: Model and Experiment,” *Water Research*, 115, 94–110. DOI: 10.1016/j.watres.2017.02.019.
- Martinez, O., R. Dabarera, K. Premaratne, M. Kubat, and J. Englehardt (2017) “LFDA Model for the Assessment of Water Quality through Microtox® using Excitation-Emission Matrices, *Intelligent Data Analysis*, 21, 181–203.
- Wu, T. and J. Englehardt (2016) “Mineralizing Urban Net-Zero Water Management: Field Experience for Energy-Positive Water Management,” *Water Research*, 106, 352–363.
- Gassie, L., J. Englehardt, J. Wang, N. Brinkman, J. Garland, P. Gardinali, and T. Guo (2016) “Mineralizing Urban Net-Zero Water Treatment: Phase II Field Results and Design Recommendations,” *Water Research*, 105, 496–506.
- Guo, T., J. Englehardt, and H. Fallon (2016) “Modeling the Economic Feasibility of Large-Scale Net-Zero Water Management: A Case Study,” *Water Environment Research*, doi:10.2175/106143016X14609975747487, 88(9), 811–823.
- Englehardt, J., T. Wu, F. Bloetscher, Y. Deng, P. du Pisani, S. Eilert, S. Elmir, T. Guo, J. Jacangelo, M. LeChevallier, H. Leverenz, E. Mancha, E. Plater-Zyberk, B. Sheikh, E. Steinle-Darling, and G. Tchobanoglous (2016) “Net-Zero Water Management: Achieving Energy-Positive Municipal Water Supply, *Environmental Science: Water Research & Technology*, 2, 250 – 260, DOI: 10.1039/C5EW00204D.
- Englehardt, J. (2015) “Distributions of Autocorrelated First-Order Kinetic Outcomes: Illness Severity,” *PLoS ONE* 10(6): e0129042. doi:10.1371/journal.pone.0129042, <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0129042>.
- Echavarria Gregory, M. A., and J. Englehardt (2015) “A Predictive Bayesian Data-Derived Gaussian Model of Sunken Oil Mass (SOSim),” *Environmental Modelling & Software*, 69, 1–13.
- Guo, T. and J. Englehardt (2015) “Principles for Scaling of Distributed Direct Potable Water Reuse Systems: A Modeling Study,” *Water Research*, 75, 146–163, <http://www.sciencedirect.com/science/article/pii/S0043135415001062>.

- Wu, T. and J. Englehardt (2015) "Peroxone Mineralization of Chemical Oxygen Demand for Potable Water Reuse: Kinetics and Process Control," *Water Research*, 73, 362-372, <http://www.sciencedirect.com/science/article/pii/S0043135415000585#>.
- Guo, T., J. Englehardt, and T. Wu (2014) "Review of Cost versus Scale: Water and Wastewater Treatment and Reuse Processes," *Water Science & Technology*, 69(2):223-34, doi: 10.2166/wst.2013.734.
- Englehardt, J., T. Wu and G. Tchobanoglous (2013) "Urban Net-Zero Water Treatment and Mineralization: System Modeling and Design," *Water Research*, 47(13), pp. 4680-4691, <http://authors.elsevier.com/sd/article/S004313541300434X>.
- Deng, Y., J.D. Englehardt, S. Abdul-Aziz, T. Bataille, A. Narayanan, P. Gardinali, M. Wright, J. Polar, and S. Tomoyuki (2013) "Ambient Iron-Mediated Aeration (IMA) for Water Reuse," *Water Research*, 47, 850-858, available online November 21, 2012, <http://dx.doi.org/10.1016/j.watres.2012.11.005>.
- Englehardt, J., C. Loewenstine, E. Gadzinski, N. Ashbolt, and A. Ayenu-Prah Jr. (2012) "Methods for Assessing Long-Term Mean Pathogen Count in Drinking Water and Risk Management Implications," *Journal of Water and Health*, vol. 10, no. 2, pp. 197-208, doi:10.2166/wh.2012.142, available online March 8, <http://www.iwaponline.com/jwh/up/default.htm>.
- Wu, Tingting and J. Englehardt (2012) "A New Method for Removal of Hydrogen Peroxide Interference in the Analysis of Chemical Oxygen Demand," *Environmental Science & Technology*, vol. 46, pp. 2291–2298.
- Li, R., J. Englehardt, and X. Li (2012) "A Gradient Markov Chain Monte Carlo Algorithm for Computing Multivariate Maximum Likelihood Estimates and Posterior Distributions: Mixture Dose-Response Assessment," *Risk Analysis*, vol. 32, no. 2, pp. 345-359, published online September 13, 2011, DOI: 10.1111/j.1539-6924.2011.01672.x).
- Avellaneda, P., J. Englehardt, J. Olascoaga, E. Babcock, L. Brand, D. Lirman, W. Rogge, H. Solo-Gabriele, and G. Tchobanoglous (2011) "Relative Risk Assessment of Cruise Ships Biosolids Disposal Alternatives," *Marine Pollution Bulletin*, vol. 62, no. 10, pp. 2157–2169.
- Englehardt, J. and R. Li (2011) "The Discrete Weibull Distribution: An Alternative to the Discrete Growth Distribution with Verification for Microbial Counts in Water," *Risk Analysis*, vol. 31, no. 3, pp. 370-381.
- Iudicello, J. and J. Englehardt (2009) "A Predictive Bayesian Dose-Response Assessment for Evaluating the Toxicity of Carbon Nanotubes Relative to Crocidolite Using a Proposed Emergent Model," *Human and Ecological Risk Assessment*, vol. 15, no. 6, pp. 1168 - 1186.
- Deng, Y., and Englehardt, J. D. (2009), "Kinetics and Oxidative Mechanism for H₂O₂-Enhanced Iron-Mediated Aeration (IMA) Treatment of Recalcitrant Organic Compounds in Mature Landfill Leachate," *Journal of Hazardous Materials*, vol. 169, no. 1-3, pp. 370-375.
- Englehardt, J., J. Swartout, and C. Loewenstine (2009) "A New Theoretical Discrete Growth Distribution with Verification for Microbial Counts in Water," *Risk Analysis*, vol. 29, no. 6, pp. 841-856.
- Deng, Y. and J. Englehardt (2008) "Hydrogen Peroxide-Enhanced Iron-Mediated Aeration for the Treatment of Mature Landfill Leachate," *Journal of Hazardous Materials*, vol. 153, pp. 293-299.
- Englehardt, J., D. Meeroff, L. Echegoyen, Y. Deng, F. Raymo, and T. Shibata (2007) "Oxidation of Aqueous EDTA and Associated Organics and Coprecipitation of Inorganics by Ambient Iron-Mediated Aeration," *Environmental Science & Technology*, vol. 41, no. 1, pp. 270-276, web edition released November 18, 2006.
- Deng, Y., and J. Englehardt (2007) "Electrochemical Oxidation for Landfill Leachate Treatment," *Waste Management*, vol. 27, no. 3, pp. 380-388, available online April 24, 2006.

- Deng, Y., and J. Englehardt (2006) "Treatment of Landfill Leachate by the Fenton Process," *Water Research*, vol. 40, pp. 3683 – 3694.
- Meeroff, D., J. Englehardt, L. Echegoyen, and T. Shibata (2006) "Iron-Mediated Aeration: Evaluation of Energy-Assisted Enhancement for In Situ Subsurface Remediation," *Journal of Environmental Engineering*, vol 132, no. 7, pp. 747-757.
- Englehardt, J. and J. Swartout (2006) "Predictive Bayesian Microbial Dose-Response Assessment Based on Suggested Self-Organization in Primary Illness Response: *C. Parvum*," *Risk Analysis*, vol. 26, no. 2, pp. 543-554.
- Bloetscher, F., J. Englehardt, D. Chin, J. Rose, G. Tchobanoglous, V. Amy, and S. Gokgoz (2005) "Comparative Assessment of Municipal Wastewater Disposal Methods in Southeast Florida," *Water Environment Research*, vol. 77, no. 5, pp.480-490.
- Englehardt, J. and J. Swartout (2004) "Predictive Population Dose-Response Assessment for *Cryptosporidium Parvum*: Infection Endpoint," *Journal of Toxicology and Environmental Health Part A: Current Issues*, vol. 67, no. 8-10, pp. 651-666.
- Englehardt, J. (2004) "Predictive Bayesian Dose-Response Assessment for Appraising Absolute Health Risk from Available Information," *Human and Ecological Risk Assessment*, The Association for Environmental Health and Sciences, vol. 10, no. 1, pp. 69-74.
- De, D., E. Kalu, P. Tarjan, and J. Englehardt, (2004) "Kinetic Studies of the Electrochemical Treatment of Nitrate and Nitrite Ions on Iridium-Modified Carbon Fiber," *Chemical Engineering & Technology*, vol. 27, no. 1, pp. 56-64.
- Englehardt, J., H. An, H., L. Fleming, and J. Bean (2003) "Analytical Predictive Bayesian Assessment of Occupational Injury Risks: Municipal Solid Waste Collectors," *Risk Analysis*, Society for Risk Analysis, vol. 23, no. 5, pp. 919-927.
- Englehardt, J. (2002) "Scale Invariance of Incident Size Distributions in Response to Sizes of Their Causes," *Risk Analysis*, Society for Risk Analysis, vol. 22, no. 2, pp. 369-381.
- Rogers, J., J. Englehardt, H. An, and L. Fleming (2002) "Solid Waste Management Health and Safety Risks: Survey of Municipal Solid Waste Workers," *The Journal of Solid Waste Technology and Management*, Widener University School of Engineering and the University of Pennsylvania National Center for Resource Management and Technology, vol. 28, no. 3, pp. 154-160.
- Fleming, L., J. Bean, J. Englehardt, H. An, M. Danits, N. John, and J. Rogers (2002) "Solid Waste Workers: Occupational Exposures and Health Risks," *The Journal of Solid Waste Technology and Management*, Widener University School of Engineering and the University of Pennsylvania National Center for Resource Management and Technology, vol. 28, no. 2, pp. 79-96.
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RESEARCH GRANTS

- Principal Investigator, "Inferential/Parametric Forecasting of Subsurface Oil Trajectory Integrating Limited Reconnaissance Data with Flow Field Information for Emergency Response," Gulf of Mexico Research Initiative, \$499,813, 2018-2020.
- Principal Investigator, "Non-Academic Research Internships for Graduate Students (INTERN)", supplement to EFRI SEED: Design of Autonomous Net-Zero Water Buildings," National Science Foundation, \$40,563, 2017-2019.
- Principal Investigator, "Third-Party testing proposal – Aqualoop-AOP Direct Greywater Recycle for Human Contact Applications," Sustainable Engineered Buildings Inc., \$81,314, 2017-2018.
- Principal Investigator, "Chemical-Free Nutrient Recovery: Next-Generation Energy-Positive Net-Zero Water Treatment," Electric Power Research Institute, 2017-2020, \$334,956.
- Principal Investigator, "RAPID/GOALI: Development of a Field-Deployable Net-Zero Water Wash Station for Remote Ebola Decontamination," National Science Foundation, 2015-2017, \$182,994.
- Principal Investigator, "EFRI SEED: Design of Autonomous Net-Zero Water Buildings," National Science Foundation, US Environmental Protection Agency, University of Miami, Engineered Control Systems, Inc., \$2,748,000, 2010-2018.
- Principal Investigator, "Relative Assessment of Human Health and Ecological Risks of CLIA Cruise Line Biosolids Disposal Alternatives," Cruise Line Industry Association, \$141,178, 2008-2009.
- Principal Investigator, "Development of a Predictive Bayesian Data-Derived Multi-Modal Gaussian Maximum-Likelihood Model of Sunken Oil Mass," Coastal Response Research Center, University of New Hampshire/National Oceanographic & Atmospheric Administration, \$189,409, 2008-2010, <http://cae.miami.edu/sunken-oil-mass/projects.html>.

Principal Investigator, “Development of Predictive Bayesian and Related Microbial Dose-Response Methods to Assess Untestable Risk,” U.S. Environmental Protection Agency, National Center for Environmental Assessment, through Oak Ridge Institute for Science and Education, \$195,893, 2005-2007.

Co-Principal Investigator, “Study of Reclaimed, Surface, and Groundwater Quality,” WasteReuse Foundation/University of Miami, \$91,547 of \$533,333 (CH2MHill, lead), 2005-2006.

Co-Principal Investigator, “Cost Allocation Implementation Strategies and Guidelines for Coordinating Transportation Services for Disadvantaged Populations,” U.S. Federal Transit Administration, \$8,398 of \$388,350 (Florida International University, lead), 2004-2005.

Principal Investigator, “Investigation of Options for Management of Leachate and Wastewater,” Florida Center for Solid and Hazardous Waste Management/University of Miami, \$36,912, 2004-2005.

Principal Investigator, “Development of In-Situ Chelation/Reduction Process for Remediation of Subsurface Metals and Radionuclides,” National Energy Technology Laboratory, U.S. Department of Energy/University of Miami, \$263,532, 2001-2002.

Principal Investigator, “Development of an Information-Theoretic, Predictive Bayesian Dose Response Model for Assessing Microbiological Health Risks from Available Information,” U.S. Environmental Protection Agency, National Center for Environmental Assessment/University of Miami, \$78,379, 2001.

Principal Investigator, “Assessment of Relative Risks of Human and Ecological Impacts from Municipal Wastewater Disposal Methods in Southeast Florida,” Florida Water Environment Association Utility Council/University of Miami, \$125,986, 2000-2001.

Principal Investigator, “Solid Waste Management Health and Safety Risks: Epidemiology and Assessment to Support Risk Reduction,” Florida Center for Solid and Hazardous Waste Management/University of Miami, \$239,711, 1998-2000.

Principal Investigator, “A Comparative Cost Analysis of the District’s Water Quality Monitoring Laboratory and Contract Laboratories,” South Florida Water Management District, \$24,748, 1997.

Principal Investigator, Robert C. Barnard Environmental Science and Engineering Award, “Benefit-Risk Analysis of Everglades Stormwater Treatment Area Phase I Discharge Alternatives,” American Association for the Advancement of Science/U.S. Environmental Protection Agency, \$3000, 1997.

Principal Investigator, “Advances in Probabilistic Methods for Environmental Policy Analysis,” AAAS-EPA Environmental Science and Engineering Fellowship, American Association for the Advancement of Science/U.S. Environmental Protection Agency, \$17,600, 1996.

Principal Investigator, “Development of Benefit-Risk Assessment Model for Sustainable Process Design,” The Gauntlett Group, Inc., San Francisco, CA, \$42,424, 1996.

Principal Investigator, “Filtration Studies for Removal of Orimulsion® from Water in Ports,” U.S. Coast Guard/University of Miami, \$48,137, 1995-1996.

Co-Principal Investigator, “Commercial Exploitation of Electron Beam Sterilization of Infectious Hospital Waste: Task 3, Analysis of Medical Waste Management Options,” U.S. Department of Energy/University of Miami, \$63,331 (of \$1,000,000 with T. Waite), 1995-1996.

Task Principal Investigator, “National Marine Oil Transportation System, Task 3: Risk Assessment Model Development,” U.S. Coast Guard, \$52,070 (of \$1,000,000, Oil Pollution Research Center, with C. Mooers and B. Rosendahl), 1994-1995.

Co-Principal Investigator, “National Marine Oil Transportation System, Task 1: Oil Spill and Transportation Database Acquisition,” U.S. Coast Guard, \$11,181 (of \$1,000,000, Oil Pollution Research Center, with C. Mooers and B. Rosendahl), 1994-1995.

Principal Investigator, “Development of Process for Detoxifying Nuclear Reactor Cooling Water,” Engineering Foundation Research Initiation Award/University of Miami, \$46,558, 1993-1994.

Principal Investigator, “Risk-Based Design of Advanced Oxidation Treatment Processes,” Oak Ridge Associated Universities Junior Faculty Enhancement Award/University of Miami, \$10,000, 1993-1994.

Co-Principal Investigator, “Design of Prototype South Florida Oil Spill Information Management System,” U.S. Coast Guard/University of Miami, \$17,411 (of \$2,039,000, Oil Pollution Research Center, with C. Mooers and B. Rosendahl), 1993-1994.

Principal Investigator, “Pollution Prevention Research Opportunities Development,” Summer Award in Engineering and Physical Sciences, University of Miami, \$9,300, 1994.

Principal Investigator, University of Miami, Summer Award in Engineering and Physical Sciences, “Heavy Metals Detoxification and Risk Analysis, University of Miami,” \$9012, 1993.

Principal Investigator, “Risk Analysis and Process Development for Waste Minimization,” Knight Junior Faculty Fellowship, University of Miami, \$11,000, 1992.

Principal Investigator, “Hazardous Waste Detoxification,” General Research Support Award, University of Miami, \$3115, 1992.

Principal Investigator, “Toxicity Testing of Detoxified Waters and Wastes and Associated Risk Analysis Methods Development,” Microbics Corporation, Gift in Kind (\$10,000) 1992.

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OTHER PROFESSIONAL ACTIVITIES

- Presentation: Englehardt, J., K. Perera (2018) “MD-WASD Reuse and Nutrient Reduction: EPRI-UM Net-Zero Water and Nutrient Recovery,” Miami-Dade Water and Sewer Department, Miami, FL, March 22.
- Expert Panel Member (expenses paid) (2017) Project #4665, Conventional Drinking Water Treatment of Alternative Water Sources: Source Water Requirements, WaterReuse Foundation, now *Water Environment & Reuse Foundation*, Alexandria, VA, University of Colorado, Boulder, January 31 and April 17.
- Presentation: Englehardt, J., Wang, J., Wu, T., Gardinali, P., Guo, T. (2017). Mineralizing Urban Net-Zero Water Treatment. Emerging Researchers National Conference. Washington, DC, March 2017.
- Invited presentation (expenses paid) (with G. Tchobanoglous, T. Wu, L. Gassie, J. Garland, P. Gardinali, N. Brinkman, J. Wang, and T. Guo) (2016) “Net-Zero Water: Energy-Positive Municipal Water Management,” expenses paid presentation, *WTHAH (Water Innovations for Healthy Arctic Homes)*, Hilton Anchorage, Anchorage, AK, 21 Sept. 2016.
- Invited presentation (with G. Tchobanoglous, T. Wu, L. Gassie, J. Garland, P. Gardinali, N. Brinkman, J. Wang, and T. Guo) (2016) “Net-Zero Water: Energy-Positive Municipal Water Management,” invited presentation, The William and Cloy Codiga Resource Recovery Center (CR2C), *Stanford University*, Palo Alto, CA, July 27.
- Invited presentation (with T. Wu, L. Gassie, J. Garland, P. Gardinali, N. Brinkman, J. Wang, T. Guo, and G. Tchobanoglous) (2016) “Net-Zero Water: An Energy-Positive Complete Wastewater Reuse System,” invited presentation, *Lawrence Berkeley National Laboratory*, Berkeley, CA, July 14.
- Presentation (with T. Wu, L. Gassie, J. Garland, P. Gardinali, N. Brinkman, J. Wang, T. Guo, and G. Tchobanoglous) (2016) “Design of Energy-Positive Municipal Water Supply Systems: Field Demonstration of a Net-Zero Water System,” 20th Annual WaterReuse Research Conference, Westin-Denver, *WaterReuse Research Foundation*, Alexandria, VA, May 24.
- Presentation, (with Gassie, L., Perera, K., Dvorak, A., Garland J., Brinkman, N. (2016) “RAPID-GOALI: Development of a Field-Deployable Net-Zero Water Wash Station for Remote Ebola Decontamination,” Ebola Research Workshop, Alexandria, VA, May 11-12.
- Co-author (with Wu, T.) (2015) “Carbon-Negative Low-Emission Urban Net-Zero Water Treatment,” Environmental Engineering and Science: At the Nexus, *Association of Environmental Engineering & Science Professors (AEESP)* 2015 Conference, Yale University, New Haven, CT.
- Co-author (with Wu, T.) (2015) “Peroxone Mineralization of Non-Biodegradable Organics for Direct Potable Water Reuse,” 19th Annual Water Reuse & Desalination Research Conference, The Waterfront Beach Resort, Huntington Beach, CA, May 4-5, *WaterReuse Association*, Alexandria, VA.
- Presentation (2014) “Emergent Dose-Response Function: Cumulative Risk,” poster presentation, *Society for Risk Analysis Annual Meeting: Risk Analysis: The Common Denominator*, Sheraton Denver, Denver, CO, December 8.
- Invited Presentation (2014) FSAWWA Region VII - *FWEA Southeast Chapter Joint Membership Meeting*, Wyndham Deerfield Beach Resort, Deerfield Beach, FL, November 18.
- Workshop Chair (2014) “Design of Distributed Urban Net-Zero Water Systems,” Courtyard-Miami Coconut Grove, Miami, FL, Water Quality Engineering Laboratory, Dept. of Civil, Arch., and Environmental Engineering, *University of Miami*, May 29 – 30, 2014.
- Presentation (2014) (coauthor with T. Wu), “Urban Direct Potable Reuse of Commingled Black and Grey Water without Reverse Osmosis: Operation, Performance, and Recommendations,” 18th Annual Water Reuse & Desalination Research Conference, Westin Las Vegas, Las Vegas, NV, *WaterReuse Association*, May 19 – 20.

- Invited Presentation (2014) “The UM Autonomous Net-Zero Water Residence Hall Project: Regulatory Resistance to the Evolution of Water Management,” *Defending and Celebrating the Public Sector: The South Florida Chapter of ASPA 8th Annual Best Practices Conference*, Miami-Dade College North Campus Conference Center, Miami, FL, April 11.
- Invited presentation (2014) “Urban Net-Zero Water Buildings: Laboratory, Modeling, and Initial Field Data,” *South Florida Building Officials Association*, 94th Aero Squadron, NW 57th Avenue, Miami, FL, Jan 8.
- Presentation, with T. Wu (2013) “Urban Net-Zero Water Treatment & Mineralization: Laboratory, Modeling, and Initial Field Data,” *Water Reuse and Desalination Research Conference*, Sheraton Phoenix Downtown Hotel, Phoenix AZ, WaterReuse Foundation, Alexandria, VA, May 7.
- Invited Presentation (2013) “Design for Autonomous Net-Zero Water Buildings,” *Miami Dade Environmental and Water Resources Institute* (EWRI), 94th Aero Squadron, NW 57th Avenue, Miami, FL, Jan 23.
- Invited panelist (2013) State of M-DCWS facilities and the potential for net-zero water technology, *Key Biscayne Community Foundation*, Key Biscayne Yacht Club, Key Biscayne, FL, October 10.
- Invited Panelist (2012) “Design for Autonomous Net-Zero Water Buildings,” *Executive Office of the President of the United States*, Association of Climate Change Officers, Marriott Wardman Park, Washington, DC September 24-26, www.GreenGov2012.org.
- Presentation (2012) EFRI-SEED: Design for Autonomous Net-Zero Water Buildings, *National Science Foundation*, EFRI Grantees Conference, Washington, DC, March 8.
- Presentation (2011) Autonomous Net-Zero Water Dorm, *National Science Foundation*, EFRI Grantees Conference, Washington, DC, April 2.
- Abstract and Presentation (with T. Wu) (2011) “A Low-Energy Treatment Scheme for Autonomous Net-Zero Water Buildings,” *Association of Environmental Engineering and Science Professors* (AEESP) Education & Research Conference, University of South Florida, Tampa, FL, July 12.
- Presentation, Çek, D., Fieldstone, S. C., Marker, C.D., Eilert, S., Plater-Zyberk, E., Englehardt, J. D., Broad, K. (2011, May). “Ideology, Moral Disgust and Waste Water Reuse,” Annual Meeting for the NSF Center for Research on Environmental Decisions, Columbia University. New York, NY.
- Expert Panelist (2010) Roundtable Discussion with Florida Governor Charlie Crist, State Senator Alex Villalobos, Miami-Dade Mayor Carlos Alvarez, County Commissioner Katy Sorenson, and other local politicians and scientists, on state response to the Horizon deepwater spill crisis and the need to ban oil drilling off the coast of Florida, July 14, <http://www.nbcmiami.com/news/local-beat/Governor-on-Oil-Dont-drill-near-our-shores-98458644.html>.
- Invited Expert Panelist (2010) Horizon Deepwater Oil Spill: Occurrence, Response, and Consequences,” *Butler Center for Volunteer Service and Leadership Development*, University of Miami, Coral Gables, FL, September 14.
- Invited Lecture (2010) “Discovery Pad: A Living Lab for Sustainability,” Environmental Science Series, *Osher Lifelong Learning Institute*, University of Miami, Founders Hall, Coral Gables, FL, September 14.
- Invited presentation (with A. Echavarria-Chavez and P. Avellaneda, 2009) “Development of a Predictive Bayesian Data-Derived Multi-Modal Gaussian Maximum-Likelihood Model of Sunken Oil Mass,” *Clean Gulf*, Ernest N. Morial Convention Center-New Orleans, New Orleans, Louisiana, November 17-19.
- Invited presentation (2008) “Predictive Bayesian Microbial Dose-Response Assessment in a Multiplicative Correlated World,” Bloomberg School of Public Health, *Johns Hopkins University*, September 23.

- Invited presentation (2008) “A Suggested Alternative to the Central Limit Theorem in Nonlinear Correlated Systems and Networks and Its Use in Dose-Response Assessment,” *Mathematics Department*, University of Miami, April 25.
- Presentation (2008) “Turning Wastewater into Drinking Water: Treatment and Risk Analysis,” *Engineering for the Americas (EFTA)*, January session, Miami Florida, January 6-12.
- Presentation (2007) “A new discrete “scaling” probability distribution of microbes in environmental samples and associated dose-response function,” *Society for Risk Analysis*, Risk 007: Agents of Analysis, Annual Meeting, San Antonio, TX, December 9-12.
- Invited presentation (with C. Loewenstine and A. Ayenu-Prah) (2007) “The Effect of Record Length on the Assessed Microbial Dose in Drinking Water,” *2007 Toxicology and Risk Assessment Conference*, West Chester, OH, April 25.
- Invited presentation (2007) “Sustainable Water Management: Molecular Decomposition and Risk Analysis for Potable Wastewater Reuse,” invited presentation, *Drexel University*, Department of Civil, Architectural, and Environmental Engineering, April 11.
- Invited presentation (2007) “Sustainable Water Management: Molecular Decomposition and Risk Analysis for Potable Wastewater Reuse,” invited presentation, *Johns Hopkins University*, Department of Geography and Environmental Engineering, February 6.
- Invited presentation (2006) “Assessment of Microbial Drinking Water Risks: Why Microbe Counts and Illnesses are Incidents,” invited presentation, *University of New Hampshire*, Department of Civil and Environmental Engineering, November 3.
- Invited presentation (2006) “Clean Water for a Growing World: Progress in Iron-Mediated Aeration for Potable Wastewater Reuse,” invited lecture, *University of Massachusetts*, Department of Civil and Environmental Engineering, October 19.
- Invited presentation (2006) “Clean Water for a Growing World: Progress in Iron-Mediated Aeration for Potable Wastewater Reuse,” invited presentation, *University of New Hampshire*, Department of Civil and Environmental Engineering, September 8.
- Coauthor (with Deng, Y.) (2006) “Hydrogen Peroxide-Enhanced Iron Mediated Aeration for the Treatment of Mature Municipal Landfill Leachate,” presentation, *2006 Florida Water Resources Conference*, Orlando, FL.
- Invited Session Chair, “Reactions and Degradation of Wastewater Contaminants,” First International Conference On Environmental Science And Technology, American Academy of Sciences, New Orleans, LA, January 23-26, 2005.
- Invited Presentation, “Predictive Bayesian Dose-Response Assessment: Integration of Empirical, Theoretical, and Simulated Results to Assess Untestable Risk,” Models and Tools for Including Susceptibility, Immunity, and Secondary Spread into Microbial Risk Assessment: EPA-NCEA Workshop, National Center for Environmental Assessment, *U.S. Environmental Protection Agency*, Cincinnati, OH, November 18-19, 2004.
- Invited Presentation, “Predictive Bayesian Dose-Response Assessment: Microbial Illness and Next Steps,” National Center for Environmental Assessment, *U.S. Environmental Protection Agency*, Cincinnati, OH, June 25, 2004.
- Invited presentation, “Emergence and Treatment of Bio-Toxics in Water and Wastewater,” Technology & Tools for Pollutant Management: 2003 Annual Meeting, *South Florida Association of Environmental Professionals*, Miami, FL, October 30, 2003.
- Invited presentation, “Predictive Bayesian Microbial Dose-Response Models: Cryptosporidiosis Versus Infection Endpoints,” *2003 Toxicology and Risk Assessment Conference*, Air Force Research Laboratory, U.S. Environmental

Protection Agency, Naval Health Research Center, Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis, USACHPPM, National Institute for Occupational Safety and Health, Agency for Toxic Substances and Disease Registry, Fairborn, Ohio, April 28 – May 1, 2003.

Invited presentation, “Determining Illness Probability from Available Information: Predictive Bayesian Microbial Dose-Response Assessment,” *The Sixth Annual Meeting on Chemical Adjustment Factors in Health Risk Assessment*, UMDNJ-New Jersey Medical School, Newark, NJ, Nov. 14-15, 2002.

Presenter, “Predictive Bayesian Microbial Dose-Response Functions for Mutually Adaptive Populations,” 2001 Society for Risk Analysis Annual Meeting, Seattle, Dec. 2-5, *Society for Risk Analysis*, McLean, VA.

Presenter (2001) “In-Situ Chelation and Removal of Subsurface Metals,” presentation, Industry Partnerships for Environmental Science and Technology Conference, U.S. Department of Energy, National Energy Technology Laboratory, Morgantown, WV, October 30 - November 1.

Presenter, “Comparative Assessment of Human and Ecological Impacts From Municipal Wastewater Disposal Methods in Southeast Florida,” presentation to U.S. Environmental Protection Agency Region IV, Florida Department of Environmental Protection, and other public agencies, for the *Florida Water Environment Association Utility Council*, Pompano Beach, FL, 17 October 2001.

Presenter, “Predictive Bayesian Microbial Dose Response Functions for Mutually Adaptive Populations,” 2001 *Society for Risk Analysis Annual Meeting*, Atlanta, Dec. 5-8, Society for Risk Analysis, Seattle, WA.

Presenter, “Shannon Entropy and Complexity: Bases for Predictive Bayesian Microbial Dose-Response Functions to Assess Absolute Risk,” by invitation to the *Santa Fe Institute*, Santa Fe, New Mexico, 30 July 2001.

Presenter (with J. Swartout), “Shannon Entropy and Complexity: Bases for Predictive Bayesian Microbial Dose-Response Functions to Assess Absolute Risk,” National Center for Environmental Assessment, U.S. Environmental Protection Agency, Cincinnati, OH, Washington, DC, 3 July 2001.

Presenter, “Predictive Bayesian Assessment of Dose Response in Adaptive Populations,” by invitation to National Center for Environmental Assessment, U.S. Environmental Protection Agency, Cincinnati, OH, Washington, DC, 8 March 2001.

Presenter, “Predictive Bayesian Estimation of Waste Collector Injuries,” 1999 *Society for Risk Analysis Annual Meeting*, Atlanta, Dec. 5-8, Society for Risk Analysis, McLean, VA.

Session Organizer and Chair, “Risk Assessment I and II,” 1999 ASCE-CSCE Conference on Environmental Engineering, Norfolk, VA, July 25-28, *American Society of Civil Engineers and Canadian Society of Civil Engineers*.

Plenary session presentation coauthor (1998, with Weisskoff, R., L. Lave, and A. Horvath) “An Input-Output Analysis of Ecosystem Restoration: the Missing Piece,” 12th International Conference on Input-Output Techniques, New York, 18-22 May, *International Input-Output Association*, Vienna, Austria.

Presenter, “Benefit-Risk Analysis of Everglades Construction Project Phase I Discharge Alternatives,” *Society for Risk Analysis*, McLean, VA, Annual Meeting and Exposition, Washington, DC, 7-10 December 1997.

Conference Program Committee Member, *Fourth International Congress on Environmentally Conscious Design & Manufacturing*, July 23 through July 25, 1996, Cleveland Marriott Society Center, Cleveland, Ohio.

Session Organizer and Chair, “Risk Analysis for Environmentally Conscious Design and Manufacturing,” *Fourth International Congress on Environmentally Conscious Design & Manufacturing*, July 23 through July 25, 1996, Cleveland Marriott Society Center, Cleveland, Ohio.

Session Organizer and Chair, “Industrial Process Evaluation using Emissions Data,” *Fourth International Congress on Environmentally Conscious Design & Manufacturing*, July 23 through July 25, 1996, Cleveland Marriott Society Center, Cleveland, Ohio.

Session Co-Chair, “Managerial Issues in ECDM,” *Fourth International Congress on Environmentally Conscious Design & Manufacturing*, July 23 through July 25, 1996, Cleveland Marriott Society Center, Cleveland, Ohio.

Invited Lecture, “Analysis of Risks of Non-Indigenous Species Introduction,” *National Research Council*, Marine Board, Washington, DC, October 2, 1995.

Invited Plenary Session Presenter, “Benefit-Risk Analysis and Industrial Source Reduction,” at Seeing Green: A Workshop on Business Waste Prevention, INFORM, Inc., U.S. Environmental Protection Agency, Florida Department of Environmental Regulation, University of Florida, Florida Center for Solid and Hazardous Waste Research, Dade County Department of Environmental Resources Management, Orlando, July 13, 1993.

Presenter, *25th Mid-Atlantic Industrial & Hazardous Waste Conference*, University of Maryland, College Park, MD, 1993.

Panelist, Waste Minimization Panel, Industrial and Hazardous Waste Conference, *California Water Pollution Control Association*, Sacramento, February 13, 1991.

Presenter, “Economic Risk Analysis for Waste Reduction Planning,” Environmental and Water Resources Seminar, *Department of Civil Engineering, University of California, Davis*, November 6, 1990.

Presenter, “Maintenance and Repair,” Mountain Areas On-Site Well and Sewage Disposal System Workshop, *Association of Engineering Geologists*, Denver, May 19-20, 1983.

Reviewer (books, articles, and proposals): *Water Research*, 2018 (3), 2017 (3), 2015 (2), 2007; *University of Miami Provost's Research Awards*, 2017 (14); *Environmental Science & Technology*, 2017, 2016, 2013, 2012 (2), 2007; *Process Safety and Environmental Protection*, 2016; *University of Miami Institutional Review Board*, 2016, 2015, 2014; *Quality and Reliability Engineering International*, 2015; *PLoS ONE*, 2015 (2); *Risk Analysis*, 2015, 2014, 2013, 2012 (2), 2009 (3), 2008 (2), 2007, 2004, 2000, 1993; *ASCE-ASME Risk and Uncertainty in Engineering Systems, Part B. Mechanical Engineering*, 2014; *National Science Foundation*, 2013, 2012 (7), 2011, 2010 (9), 2004, 2003, 2002, 1998, 1997, 1996, 1995; *Journal AWWA*, 2012; *Quarterly of Applied Mathematics*, 2010; *Journal of Hazardous Materials*, 2009 (2), 1993; *Inorganic Chemistry*, 2008; *Journal of Applied Statistics*, 2008; *IE&EC Research*, 2007; *Water Practice*, 2007; *Journal of Infrastructure Systems*, 2005, 2006; *Electrochimica Acta*, 2004; *Journal of Applied Electrochemistry*, 2004; *Journal of Environmental Engineering*, 2003, 2002, 1999, 1998, 1997, 1996, 1995, 1993, 1992, 1991; *Journal of Industrial Ecology*, 2003; *U.S. Geological Survey and National Institutes for Water Resources*, 2003, 2002; *Journal of Water Resources Planning and Management*, 2002, 1998; *Environmental Management*, 2002; *U.S. Civilian Research and Development Foundation*, 2002, 2001; *Sea Grant, Virginia*, 2001; *University of Wisconsin – Water Resources Institute*, 2001; *Environmental Science and Technology*, 1999; *WCB McGraw-Hill*, 1999, 1998; *American Society of Civil Engineers/Canadian Society of Civil Engineers*, 1998; *International Journal of Environment and Pollution*, 1998; *University of Miami Office of Technology Assessment*, 1998; *Journal of the Air & Waste Management Association*, 1997; *Water Science and Technology*, 1997; *Environmental Engineering Science*, 1997; *Valuing Potential Environmental Liabilities for Managerial Decision-Making*, (EPA742-R-96-003), U.S. Environmental Protection Agency, 1996; *University of Miami General Research Awards*, 1996 (10); *Waste Management*, 1996; *Advances in Environmental Research*, 1996; *University of Miami Research Council*, 1996; *Water Resources Research*, 1995; *ACS Symposium Series, American Chemical Society*, 1994; *Environmental Progress*, 1993.

TEACHING

Teaching and course development, including integration of ecologically-sustainable design concepts, emphasis on relationships among courses, and use of physical, chemical, and mathematical models for concept development:

CAE635 Water and Wastewater Treatment and System Design (developed course)

CAE 643 Risk Analysis (developed course)

CAE 542 Solid and Hazardous Waste Engineering (developed course)

CAE 540 Environmental Chemistry

CAE 440 Design and Analysis of Water Quality Treatment Systems

CAE 340 Introduction to Environmental Engineering

CAE 240 Introduction to Environmental Pollution

CEN 530 Water and Wastewater Engineering

GRADUATE STUDENTS AND POSTDOCTORAL RESEARCH FELLOWS

Committee Chair

Mary Jacketti, “TBA: Inferential/Parametric Forecasting of Continuous Subsurface Oil Trajectory Integrating Limited Reconnaissance Data with Flow Field Information for Emergency Response,” PhD, 2021.

Chao Ji, “TBA: Inferential/Parametric Forecasting of Instantaneous Subsurface Oil Trajectory Integrating Limited Reconnaissance Data with Flow Field Information for Emergency Response,” PhD, 2020.

Kusumitha Perera, “Development of a Device to Detect Health Risk in Drinking Water in Real Time,” Ph.D., 2019 (est.)

Lucien Gassie, “Development of a New Electrochemical Denitrification Process, Ph.D., 2017 (est.)

Oscar Martinez, “LFDA: A Probabilistic Graphical Model for the Study of Excitation Emission Matrices,” PhD (Co-Chair with M. Kubat), 2016.

Ana Dvorak, M.S., non-thesis, 2016.

Mary Semaan, “Design of a Net-Zero Water Treatment Systems for Use on Mars,” MS., 2015, Ph.D. student, Dept. Civil and Environmental Engineering, Virginia Polytechnic Institute, Blacksburg, VA.

Raul Velarde, M.S., non-thesis, 2015, SPD Assistant Estimator, Turner Construction, Miami, FL.

Eric Antmann, M.S., non-thesis, 2015, Assistant Engineer, Hazen and Sawyer, Miami, FL.

Tingting Wu, Postdoctoral Associate, 2011-2014, Assistant Professor, University of Alabama, Huntsville, AL.

Tianjiao Guo, “Optimal Scaling of Distributed Net-Zero Water Treatment Systems,” *Ph.D.*, 2014, Postdoctoral Associate, College of Chemical and Biological Engineering, Zhejiang University, China.

Guanghai Wang, “Potable Reuse without Environmental Buffer: Operation to Control the Urban Nitrogen Cycle,” M.S., 2013, Dot-Net Developer, UPMC WorkPartners, Pittsburgh, PA.

Kusumitha Perera, Visiting Scholar, B.Sc. Eng. Hons. Student, University of Moratuwa, Chemical and Process Engineering, "Process Design and Modeling for Control of Nitrogen in Net-Zero Water Treatment Systems," May – November, 2012.

Yuri Almeida, M.S., non-thesis, 2012.

David Hernandez, M.S., non-thesis, 2012, Assistant Engineer, Hazen and Sawyer, Boca Raton, FL.

Lin Liu, M.S., non-thesis, 2012.

Jason Lecker, M.S., non-thesis, 2012.

Erik Gadzinski, M.S., non-thesis, 2011, Environmental Engineer at Valero - St. Charles Refinery, New Orleans, Louisiana.

Angelica Echavarria-Gregory. "Predictive Data-Derived Bayesian Statistic-Transport Model and Simulator of Sunken Oil Mass," *Ph.D.*, 2010. Carollo Engineers, Lake Worth, FL.

Aarthi Anand, "Development of Hydrogen Peroxide-Assisted Electrocatalytic Advanced Oxidation Process for Tertiary Treatment of Municipal Wastewater, M.S., 2010. Senior Chemist, Nalco.

Ruochen Li. "Development of a Gradient Markov Chain Monte Carlo Algorithm for Computing Multivariate Maximum Likelihood Estimates and Posterior Distributions: Mixture Dose-Response Assessment," M.S., 2010. Financial Systems Analyst, Hang Seng Bank, Shanghai, China.

Pedro Avellaneda, Risk Assessment Thrust Area Leader, Post-Doctoral Fellow, 2008-2009. Assistant Professor, National University of Colombia at Bogotá,
http://www.docentes.unal.edu.co/pmavellanedal/cvpedrom_short.pdf.

Samer Abdul Aziz, "Laboratory Study of Hydrogen Peroxide-Assisted Electrocatalysis for Oxidation of Dilute Recalcitrant Organics in Municipal Wastewater," *M.S.*, 2008.

Deng, Yang, "Iron Mediated Process for Treatment of High Strength Recalcitrant Organic Wastewater: Landfill Leachate," *Ph.D., First Place, Engineering Category, University of Miami Graduate School Research and Creativity 2005 Competition*, 2006. Assistant Professor, Environmental Engineering, Montclair State University, NJ,
<http://www.linkedin.com/pub/dir/yang/deng>.

Legrenzi, Yves, Visiting Scholar, fifth year student at ENTPE, Ecole Nationale des Travaux Publics de l'Etat, Bureau des Stages, Yves DEPLACE, France, "Design and Testing of Fluidized Bed Iron-Mediated Aeration Reactor for Oxidation of COD in Leachate," 2004.

Mognol, Joel, Visiting Scholar, fifth year student at ENTPE, Ecole Nationale des Travaux Publics de l'Etat, Bureau des Stages, Yves DEPLACE, France, "Optimization of Fixed Bed Iron-Mediated Aeration Reactor for Oxidation of COD in Leachate," 2004.

Bataille, Tristan, Visiting Scholar, fifth year student at ENTPE, Ecole Nationale des Travaux Publics de l'Etat, Bureau des Stages, France, "Disinfection of Water by Mediated Aeration," 2003.

Meeroff, Daniel, "Development of an In-Situ Chelation/Oxidation/Co-Precipitation Process for Subsurface Remediation of Metals, Radionuclides, Volatiles, and Biodegradable Organics," Post-Doctoral Research Fellow, University of Miami, 2001-2003, Assistant Professor, Florida Atlantic University, Boca Raton, FL
<http://www.civil.fau.edu/~daniel/>.

Bloetscher, Frederick, "Development of a Predictive Bayesian Microbial Dose-Response Function," *Ph.D., First Place, Engineering Category, University of Miami Graduate School Research and Creativity Competition*, 2001. Assistant

Professor, Florida Atlantic University, Boca Raton, FL http://www.civil.fau.edu/faculty_staff.htm; President, Public Utilities Management Professional Services (PUMPS), Inc., Dania Beach, FL.

An, Huren, "The Use of Markov Chain Monte Carlo Gibbs Sampling to Determine Reference Dose in Health Risk Assessment," *M.S.*, 2000. Assistant Director, City of North Miami Beach Public Services Department, N. Miami Beach, FL.

De, Dibyendu, "Characterization of Kinetics and Mechanisms of Electrochemical Nitrate Reduction Using Surface Modified Carbon Fiber Electrode," *Ph.D., Honorable Mention, University of Miami Graduate School Research and Creativity Competition*, 1999. Research and Development Scientist, Baxter-Althin Medical, Inc., Miami, FL.

Meeroff, Daniel, "Development of Filtration Processes for Separation of Emulsified Bitumen Fuels from Water," *M.S.*, 1997; *First Place, Water Environment Federation Student Paper Competition*, Masters Category, 1998, <http://www.civil.fau.edu/~daniel/>.

Robert P. Anex, "Development of Benefit-Risk Assessment Model for Sustainable Process Design," Postdoctoral Research Fellow, 1996. Assistant Professor/Research Fellow, Science and Public Policy, University of Oklahoma, <http://www.abe.iastate.edu/faculty/anex.asp>.

Singh, Samaresh, "Destruction of Aqueous Trihalomethanes in High-Surface Area, Zero-Valent Cobalt Bed Reactors," *M.S.*, 1997. Software Developer, Intel Corporation, Beaverton, OR.

Peng, Chengjun, "Development of a Process for Detoxifying Nuclear Reactor Cooling Water," *M.S.*, 1995. Project Engineer, Parsons Brinckhoff Tudor-Tuner Associates (MARTA General Consultant), Atlanta, GA.

Committee Member

Athena S. Jones, "TBA: Fate, transport, and/or toxicity of emerging constituents dibrom aerial pesticide and/or PFAS in sanitary landfills," *PhD*, 2020.

Eleonora Spisni, "Toxicity assessment of industrial- and sunscreen-derived ZnO nanoparticles," *M.S.*, 2016.

Andrea Galletti, "Toxicity evaluation of TiO₂ nanoparticles embedded in consumer products," *M.S.*, 2016.

Diego F. Romero, "Evaluating the feasibility of cathode-ray tube glass as a substitute aggregate in concrete mixtures," *Ph.D.*, 2013.

Iudicello, Jeff, "New Methods for Improving Modeling Capabilities of In-Stream Pathogen Indicator Bacteria," *Ph.D.*, 2012.

Rojas, Richard "Development of Stochastic Models for Fate and Transport of Contaminants in the Environment," *M.S.*, (2010).

Ph.D. Kiger, Tommy (2011) Hydrological Studies of the Everglades System, *M.S.*, 2011 (est.).

Gonzales Ramirez, Noemi, "A 2-D Model to Improve Flash Flood Predictions in Urban Areas Using Radar Precipitation Estimates," *Ph.D.*, 2010.

Sakura-Lemessy, Donna-May, "A Multi-Model Approach to Using Pathogen Indicator Bacteria Loading in TMDL Analyses," *Ph.D.*, 2010.

Chimba, Deo, "Analysis of Safety and Operational Deficiencies on Access Roads to Tri-Rail Stations," *Ph.D.*, 2008.

Signor, Ryan S., "Probabilistic Microbial Risk Assessment & Management Implications for Urban Water Supply Systems," *Ph.D.*, University of New South Wales, Sydney, Australia, 2007.

Elmir, Samir, "Evaluation and Development of Microbial Water Quality Indicators," *Ph.D.*, 2006.

- Li, Jibing, "Accuracy Standards & Size Requirement for Four-Step Planning Model," *Ph.D.*, 2006.
- Gu, Xiaojun, "Multi-criteria signal timing control strategies for critical intersections," *Ph.D.*, 2005.
- Xu, H., "The Urban Hydrology of South Florida," *M.S.*, 2002.
- Zygnerski, Michael "Comparison of Microbial Water quality Indicators," *M.S.*, 2002.
- John, Nicolette, "Statistical Analysis of Municipal Solid Waste Collectors Workers' Compensation Data for Risk Analysis," *M.S.*, Environmental Health and Safety, 2000.
- Nemeth, Mark, "Transient Seepage Rates in a Hydraulically Interconnected System of Groundwater and Surface Water," *Ph.D.*, 2000.
- Swain, Eric, "Relative Effects of Variability in Recharge and Hydraulic Conductivity on Dispersion in Groundwater," *Ph.D.*, Civil Engineering, 1998.
- Chittaluru, Prasad, "Soil Washing Groundwater Remediation: Enhancement through High-Energy Electron Irradiation," *Ph.D.*, 1997.
- Ding, Li, "A Study of the Application of Ocean Surface Current Radar Systems to the Delineation of Outfall Mixing Zones," *M.S.*, 1997.
- Richards, April, "IMMUNISE Integrated Medwaste Management Utilizing New Inventory System Evaluation: A Spreadsheet Model to Assist in the Management of Hospital Waste," *M.S.*, 1995.
- Chinthamreddy, Supraja, "Validation of a Diagnostic Model of Ocean Currents," *M.S.*, Environmental Engineering, 1995.
- Zhao, Sifang, "An Assessment of the Evaporation and Rain Gauge Networks in the South Florida Water Management District," *M.S.*, 1995.
- Fu, X., "Incineration of Medical Waste in LFH," *M.S.*, Mechanical Engineering, 1995.
- Galav, Vivek, "Recycling of Surfactants Used for Washing PAH-Contaminated Soils Using High Energy Radiation," *M.S.*, 1994.
- Wang, Tiezheng, "Radiation Treatment of Sewage Sludge For Reuse," *Ph.D.*, 1993.
- Patey, Michael, "Inactivation of Selected Bacteria By Electron Beam in the Presence of Radical Scavengers," *M.S.*, 1993.

UNIVERSITY SERVICE

- Senator (alternate), University of Miami Faculty Senate, 2014 – 2016, 2018 - present.
- College of Engineering Tenure and Promotion Review Board Representative, Department of Civil, Architectural, and Environmental Engineering, 2004 – 2010, 2017.
- Faculty Board, Abess Center for Ecosystem Science and Policy, University of Miami, 2008 – 2015.
- Tenure and Promotion Review Board Member, University of Miami Faculty Senate, 2008 - 2009.
- Graduate Program Director, Department of Civil, Architectural, and Environmental Engineering, 1995 – 1996, 2007 - 2016.

Chair, Research and Education Standing Committee, Green U Task Force, University of Miami, 2007 - present.

Student Chapter Coordinator, Florida Water Environment Association, 1993 - present.

College of Engineering Engineers Without Borders Student Chapter, Co-Advisor, 2007 – 2010.

College of Engineering Research Council Representative, Department of Civil, Architectural, and Environmental Engineering, 1999 - 2008.

Graduate Studies Committee Member, Civil, Architectural, and Environmental Engineering, 1992 - present.

College of Engineering Council Representative, Department of Civil, Architectural, and Environmental Engineering, 1997 - 2000.

Library Committee Member, University of Miami Faculty Senate, 1995 - 1996.

Concrete Canoe Advisor, ASCE Student Chapter, 1992 - 1995.

Innovative Curriculum Committee Member, College of Engineering, 1994.

Chi Epsilon Advisor, 1992 - 1994.

United Way Representative, Department of Civil, Architectural, and Environmental Engineering, 1992 - 1993.

COMMUNITY SERVICE

Mentor, Maritime & Science Technology (MAST) Senior High students: Bryan Ibarra, Ana Sicilia, 2014

Mentor, Archimedean Academy students: Alejandro Rodriguez, Luis Fornes, Michael Pichardo, 2013

Big Brother, Big Brothers/Big Sisters of America, Jamal Thomas, 1999 - 2009.

Mentor, Dade County Public Schools Advanced Academic Internship Program, Gagan Sharma, “Technical Challenges to Laser Decomposition of Organic Contaminants in Water and Wastewater,” High School Advanced Internship, 1997.

Mentor, Dade County Public Schools Advanced Academic Internship Program, Michael Liu, “Programming of Oil Spill Risk Analysis Model and Use for Analysis of Oil Spill Risks in the Gulf of Mexico,” High School Advanced Internship, 1996.

Leader, Lost Faculties, University faculty musical group, University and student functions, 1994 - 1999.

Business/Technology

1. Lisa Marchewka, Vice President, Brand and Strategy, Evoqua Water Technologies
2. Joseph Vesey, Senior Vice President and Chief Marketing Officer, Xylem
3. Dileep Agnihotri, Chief Technology Officer, WaterSurplus



August 21, 2018

WateReuse Board of Directors:

I am Lisa Sorgini Marchewka, Vice President of Brand and Strategy at Evoqua Water Technologies. My 20-year career has been dedicated to the water and wastewater treatment industry. This letter is to express my interest in a position on the WateReuse Association Board of Directors.

Having worked as an engineering consultant, as well as in positions of increasing responsibility at major technology firms and groundbreaking start-ups, I have focused predominantly on innovation and advanced technologies for water reuse and desalination applications across both municipal and industrial markets. I believe you will agree I am uniquely qualified to represent a broad constituency of WateReuse members.

A copy of my resume is attached. I look forward to the opportunity to answer any questions you may have or to present myself in person to discuss my qualifications with you.

Thank you for your consideration.

Sincerely,

Lisa Marchewka

Lisa Marchewka
VP, Brand and Strategy
617-852-2787
Lisa.Marchewka@evoqua.com

LISA SORGINI MARCHEWKA

PROFESSIONAL HIGHLIGHTS

EVOQUA WATER TECHNOLOGIES

Vice President, Brand and Strategy, July 2018 to Present

Responsible for a global team with oversight of global communications, public policy and strategic planning across the enterprise reporting into the Chief Growth Officer.

GRADIANT CORPORATION, Woburn, MA

Senior Vice President, Marketing, November 2017 to June 2018

Responsible for growth initiatives, new market identification, branding and product management.

PALL WATER (FORMERLY PROCESS SYSTEMS), A DIVISION OF PALL, Westborough, MA

Vice President, Global Strategic Marketing, April 2015 to October 2017

Recruited to lead marketing and product management teams for combined \$250M energy and water systems business. Led carve-out of a water-only entity and drove branding and awareness campaigns. Responsible for developing the annual strategic plan, driving strategic initiatives, reviewing M&A opportunities and forging relationships with strategic partners to grow operating margins and gain share across municipal and industrial membrane markets. Graduate of Danaher Accelerated Leadership Program (ALP), a select group of 30 global associates chosen annually for advancement.

OASYS WATER, INC., Boston, MA

Vice President, Strategy and Marketing, February 2010 to April 2015

Recruited to the executive team reporting to CEO. Responsible for all commercial aspects of the company including oversight of business development, corporate development, sales, marketing and communications. Set market strategy and focused product development to grow the company from a single idea to over \$6M in revenue in less than five years with a first-in-kind forward osmosis technology.

- § Developed company's positioning strategy and identity, building it into a globally recognized brand and securing major international awards including coveted "Water Technology Company of the Year" from Global Water Intelligence, Bloomberg "New Energy Pioneer", World Economic Forum "Tech Pioneer" and numerous local and clean-tech accolades. Secured articles with CNBC, Forbes, Fortune, WSJ, Bloomberg, etc.
- § Secured first sale of the company's patented product to a Fortune 200 company, the largest forward osmosis system in the world at time of sale. Expanded first sale into a strategic partnership for global oil and gas produced water treatment.
- § Built and led a team of highly skilled sales and marketing professionals in key geographies to expand brand presence, build pipeline and increase bookings.

SIEMENS WATER TECHNOLOGIES, Shrewsbury, MA (previously USFilter Corporation, Veolia)

Initially recruited and repeatedly promoted through the commercial organization. Member of the Siemens Emerging Leader Forum (ELF), a 2-year intensive management-training program for the top 0.1% across Siemens Corp.

Senior Marketing Director, Global Municipal Water and Wastewater, November 2008 to February 2010

- § Responsible for setting global market strategy, defining initiatives, facilitating stage-gate process and developing sales channels working with internal product teams to reposition municipal offerings in key geographies for a \$900M business.
- § Expanded municipal water reach by leveraging other Siemens operating companies to develop differentiated solutions that offer superior customer value, resulting in 10% overall bookings growth.

Global Brand Manager, Memcor Membranes, October 2005 to November 2008

- § Newly created role within a \$200M business. Led global product launch activities including coordination with R&D, engineering, and sales for a new membrane system targeted for large-scale projects. Product attained early market success, boasting sales of over \$40M in less than 12 months.
- § Reinvigorated the Memcor brand. Responsible for messaging and communication activities including media relations, technical writing, trademarks, product naming and international branding.

Technical Sales Manager, Memcor Membranes, October 2001 to October 2005 (Denver, CO)

§ Highest grossing municipal sales manager in North America, for FY 2003 (\$8M) and highest grossing sales manager internationally for FY 2004 (\$15M). Negotiated contracts totaling over \$42M.

CAMP DRESSER & MCKEE INC (CDM), Cambridge, MA

Project Manager/Engineer, July 1998 to October 2001

§ Conducted various projects, including the first pilot using microfiltration for surface water treatment in Massachusetts to gain state acceptance for membranes as an approved drinking water technology.

EDUCATION

BOSTON COLLEGE, Chestnut Hill, MA

Master of Business Administration (MBA), Marketing, August 2006 to May 2008

WORCESTER POLYTECHNIC INSTITUTE (WPI), Worcester, MA

Bachelor of Science (BS) with Distinction, Civil/Environmental Engineering, May 1998

AFFILIATIONS/AWARDS

Academic Advisory Board, WPI Civil/Environmental Engineering, 2008-present

Top 10 “Leaders to Watch” in Water Desalination, GWI 2015

PUBLICATIONS ON LOW-PRESSURE MEMBRANES

Low-Pressure Membranes Help Solve Water Scarcity through Water Reuse, Journal of the Australian Water Association, November 2007

Maintaining and Extending Membrane Life, Opflow, October 2007

Water Reuse – An Evaluation of the Technologies and their Benefits, Water Environment and Technology Magazine, Aug 2007

Physikalische Barriere, cav (Germany), January 2007, page 44

Packaged Membrane Systems Offer Cost Effective Solutions, Journal of the American Water Works Association, Nov 2004

Evaluation of Low Pressure Membranes: Submerged versus Pressure, IDS Water 2004 On-line Journal (American Site); American Water Works Association Membrane Technology Conference Proceedings, March 2003

Microfiltration Membranes Help California Water District Become EPA-Compliant, Environmentally Friendly, Water World, February 2003

MF Secondary Stage Filtrate for Potable Water Use: A Case Study, American Water Works Association Membrane Technology Conference Proceedings, March 2003

Design and Regulatory Considerations for Microfiltration in MA, American Water Works Association Conference, June 2002

Filtration Comparison for Small Systems, presented at the Third National Sanitation Foundation International Small Drinking Water and Wastewater Systems Symposium, Washington D.C., April 2001

Implementing the First Surface Water Microfiltration System in Massachusetts, American Water Works Association Membrane Technology Conference Proceedings, March 2001

Microfiltration: Meeting Water Quality Challenges for Small Systems, presented at the AWWA Annual Conference and Exposition, Denver, CO, June 2000

Xylem Inc.

Joseph P. Vesey
SVP & Chief Marketing Officer
1 International Drive
Rye Brook, NY 10573
Tel +1.914.323.5753 Fax +1.914.323.5752
Joseph.Vesey@Xyleminc.com

August 21, 2018

Esteemed Colleagues,

It is with great interest and excitement that I submit my application for one of the two board seats with the WaterReuse Association.

We all know the startling statistics on the gap between available water resources and the demand for fresh water in the foreseeable future. There is truly important work to be done as a partnership between public and private sectors, in order to drive improvements in technology, regulatory, cultural and political landscapes. This work will also help us move towards a common goal of embracing and enabling water reuse for indirect and direct potable consumption.

This Association has a compelling mission and vision, which Xylem has willingly and happily participated in within recent years. We have attended and sponsored events at both a regional and national level, and are very excited about having a leading presence at the 33rd Annual WaterReuse Symposium next month. Our presenters, as well as executive management team, look forward to sharing our expertise and thought leadership to members and other attendees.

If selected, I am prepared to make the required commitment to the Association. My current role at Xylem as our SVP & Chief Marketing Officer allows me regular exposure to our company's efforts in applying world-class technology to solve industry's most challenging water issues, including a heavy emphasis on water reuse. I have advocated in Washington for expanded reuse standards and goals; worked with our global commercial teams and customers to successfully startup reuse projects; and spoken at industry events advocating for expanded sources of water to include reuse.

Thank you in advance for your time and consideration. I appreciate that you will receive a number of very qualified applicants, and am honored to be among this respected group. If you have any questions on my background, qualification, or vision, please do not hesitate to contact me at your earliest convenience. Otherwise, I look forward to sharing my expertise and passion to further the Association's efforts.

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph Vesey", with a stylized, flowing script.

Joseph P Vesey



JOSEPH P. VESEY
SVP & CHIEF MARKETING OFFICER



Joe Vesey was named Senior Vice President and Chief Marketing Officer of Xylem in January 2015. Mr. Vesey leads the Company's marketing function including vertical marketing, commercial IT, global public affairs, branding, communications, digital marketing and commercial excellence. He currently serves as Chair of the Xylem Watermark Committee, which is the company's corporate citizenship and social investment program.

Mr. Vesey joined Xylem in 2008 as Director, Strategy & Business Development. In November 2009, he was named Director, Commercial Excellence, running a transformational sales and marketing change program. In 2011, he was named Chief Marketing Officer of Xylem and from 2013 to 2017 led the Americas Commercial Team with commercial P&L responsibility for Xylem's Treatment and Transport businesses in North America, South America and Australia.

Prior to joining Xylem, Mr. Vesey worked at General Electric for ten years in a number of commercial positions of increasing responsibility, including Vice President of Access GE (a commercial consulting role), Global Product Manager (GE Water), Global Product Manager for Lexan Sheet, Industry Leader and Regional Sales Leader (GE Plastics).

He earned a Bachelor of Science degree in chemical engineering from Lehigh University and a Masters of Business Administration (MBA) from Boston University.

Xylem is a leading global water technology company committed to developing innovative technology solutions to the world's water challenges. The Company's products and services move, treat, analyze, monitor and return water to the environment in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced infrastructure analytics solutions for water, electric and gas utilities. The Company's more than 16,500 employees bring broad applications expertise with a strong focus on identifying comprehensive, sustainable solutions. Headquartered in Rye Brook, New York with 2017 revenue of \$4.7 billion, Xylem does business in more than 150 countries through a number of market-leading product brands.

Michael Romero

From: Dileep Agnihotri <Dileep.A@watersurplus.com>
Sent: Tuesday, August 21, 2018 2:12 PM
To: Pat Sinicropi
Cc: Gilbert Trejo; Paul Jones
Subject: RE: Call for Nominations for WateReuse Association Board of Directors
Attachments: RESUME DILEEP AGNIHOTRI Director Role.pdf

Patricia,

I would be interested in serving as BoD for the WaterReuse Association. Please see attached 1-page resume summary. I do have a BoD experience with a public company and I am currently an executive in a Water company with significant focus on reuse and recycling (Watersurplus). I have a track record of demonstrated leadership and commitment to the cause of water industry. I work with several professors across the country as a interface between technology and market needs and a strong proponent of Desalination.

As you will see from my resume, I would bring nearly 10 years of industry experience in the space of water treatment. Also, if it helps, I am located in Austin TX and remote employee for my organization in Illinois. I would be happy to speak with current board members and would be willing to serve the need as described below. Please feel free to reach out if you have further questions.

You are welcome to reach out to following local members for any personal references.

Mr. Jorge Arroyo (ex TWDB, Austin)

Mr. Richard Saline (Accelerate H2O Chair/executive director, San Antonio)

Thank you!

Best Regards,
Dileep Agnihotri, PhD
Chief Technology Officer
WATERSURPLUS
512.740.7941

From: Pat Sinicropi <psinicropi@watereuse.org>
Sent: Thursday, August 2, 2018 4:24 PM
To: Dileep Agnihotri <Dileep.A@watersurplus.com>
Subject: Call for Nominations for WateReuse Association Board of Directors

Dear Dileep:

The Nominating Committee of the WateReuse Association Board of Directors is issuing a call for nominations to fill two Board vacancies. Individuals interested in being nominated should submit an application to either [Patricia Sinicropi](#), Executive Director for the WateReuse Association, or to a member of the Nominating Committee by **COB Tuesday, August 21st**. The Nominating Committee will review nominations and select candidates for approval by the full Board at its 3rd Quarter meeting in Austin, Texas on September 9th. Directors are appointed for up to three two-year terms for a total of six years of service.

Selection Criteria for Board Appointment

WateReuse is committed to recruiting the best and brightest leaders in the water industry to serve on its Board of Directors. The criteria for determining qualified candidates are:

Leadership

- A belief that water reuse and desalination are essential components of the water supply portfolio of the future.
- Significant professional credentials in the water industry.
- Stature and recognition within the water community.
- Recognized change agent/thought leader/innovator in the area of administration, technology, management, communication and/or education.

Commitment

- Membership in good standing with the WaterReuse Association;
- A commitment to the success of WaterReuse's mission and vision with sufficient time and resources dedicated to their implementation;
- Ability to attend four quarterly board meetings, including one during our Annual Symposium in September, and one via conference call;
- Ability to participate in WaterReuse Association committees and initiatives, as necessary, in pursuit of the mission and vision;

Skills and Experience (one or more areas)

- Executive and managerial leadership of public, private, or not-for-profit organization;
- Stature in an international, national, regional, or state water agency;
- Experience in federal or state advocacy of laws, rules or funding for water and water reuse;
- Experience in science, education, outreach, or social research associated with water and water reuse;
- Experience with financial management or investment associated with water and water reuse infrastructure;
- Experience on professional association boards or committees;

Other Factors

WaterReuse is committed to creating a diverse board that reflects and represents the membership and population of members. To ensure both balance and diversity, the following factors should be considered as part of the nominating process:

- Geographic Location
- Industry Sector
- Public, Private, Not-for-Profit Sector

Application Requirements:

Statement of Interest along with a resume or bio via email by COB Tuesday, August 21st.

Nominating Committee for 2019 WaterReuse Association Board of Directors Nominations:

[Gilbert Trejo, El Paso Water](#), Chair and Vice President of WaterReuse Association

[Paul Jones, Eastern Municipal Water District](#), Vice Chair and President of WaterReuse Association

[Karen Pallansch, Alexandria ReNew](#), Member

[Jon Freedman, Suez North America](#), Member

[Halla Razak, Inland Empire Utilities Authority](#), Member

[Patricia Sinicropi, Staff Liaison and Executive Director of WaterReuse Association](#)

Dileep Agnihotri, PhD (Austin, Texas based)

Education

PhD in Nuclear Chemistry and an MS in Physical Chemistry
University of Rochester, New York
Published 50+ articles, 12+ patents and more than 800 citations.

Experience Summary

Dr. Agnihotri, a technology entrepreneur with a proven track record and technical background in water and wastewater. He spearheads the technology and process development for projects in the space of beverage production, domestic drinking water, mining, wastewater remediation, and general water management/plant optimization. He advises the leadership on enterprise level efficiency improvements and spearheads efforts in desalination, beverage industry and waste-water reuse.

He licensed UT-Austin and Northwestern technology for commercialization in membrane space and founded Advanced Hydro, Inc. (AHI). He managed engineering, development and execution of projects at AHI targeting oil-field wastewater and the Navy's advanced seawater desalination needs. His efforts resulted in innovative patents and products that were well recognized by US-Navy and Bureau of Reclamation and allowed development of an integrated open-architecture UF/RO system for the US-Navy from the early stage technology demonstration, product conceptualization, prototyping, followed by beta-system manufacturing and full scale demonstration at Brownsville shipping channel. At AHI, he also scaled the Navy advanced desalination technology to a mobile brackish water treatment system for 0.25 MGD scale and further developed new market opportunities for desalination in West Texas towns with population less than 10,000 to provide high-quality drinking water from brackish well water.

Dr. Agnihotri has 20+ years of experience in managing cross disciplinary technical teams, technology development and commercialization. Dr. Agnihotri's professional experience can be summed as water desalination, waste-water treatment, recycling, membranes (MF/UF, NF, RO), system design and engineering and related chemistry processes. Dr. Agnihotri has more than dozen patents with some in the space of Desalination and MF/UF technology.

Licenses & Certifications

Pending Certification for P.E. in Texas

Relevant Experience

Chief Technology Officer at WaterSurplus

Currently, as a CTO, supervising a diverse team of engineers and project managers at Watersurplus, a diverse water treatment company providing solutions beverage, municipal, mining, and other industrial needs.

Beverage Production Plant in Texas

Managed all aspects of the project from design and engineering to start-up for a mobile (trailer based) 800 GPM RO plant for temporary production needs during 4 months of plant refurbishment.

Beverage Production Plants in Florida, Pennsylvania and New Jersey

Technical consultant for plant process improvements and further increase in capacity via utilizing exiting set of equipment or adding new equipment.

Wastewater Remediation in Mining, Nevada

Designed, engineered, supervised fabrication and Factory acceptance testing of a 1.5MGD RO treatment plant for mining customer in Nevada

US Navy and Bureau of Reclamation

Lead multi-year technology demonstration and prototype development followed by full pilot testing of an Integrated Open Architecture UF/RO system for use in defense for drinking water from various sources such as seawater, well-water, or surface water.

Drinking Water for Several Indian Nations/Territories

Supported technical evaluation, design and recommendation for treatment of well water for drinking purposes. Company provided trailer-based treatment for one location and put bid on two additional projects utilizing RO technology

Business/Consulting

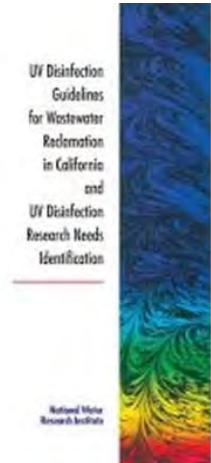
1. Jamal Awad, Principal Manager, GHD, CA
2. Katherine (Kati) Bell, Director of Water Strategy, Brown and Caldwell, TN
3. Nitesh Dullabh, CEO, 2 POD Ventures, California
4. Val Frenkel, Vice President Process Engineering, Greeley and Hansen
5. Sara Katz, CEO & Founder, Katz and Associates, CA
6. Jonathan Loveland, Global Practice Leader for Alternative Water Solutions, Black & Veatch, CA
7. Christine Owen, Director of Water and Reuse Innovation, Hazen & Sawyer, FL
8. Hala Titus, Vice President, Regional Manager, CDM Smith Inc., CA

Statement of Interest

Nomination for WaterReuse Association Board of Directors

Although water reuse both direct and indirect has always been in practice, it is increasingly challenging to address the regulatory and public perceptions as to when the “nature” of the water molecule changes from “wastewater” to “water”. The WaterReuse Association is in the best position because of its focus to find the best ways in advancing discussions and solutions to current and future issues, thus my interest in this nomination.

My interest in water reuse started when I took on the assignment to be Operations Manager of the Santa Ana Watershed Project Authority (SAWPA) rapid infiltration/extraction (RIX) demonstration project back in 1993. The project included the first demonstration testing of UV Disinfection to achieve Title 22 reclamation criteria for bacteria and virus. Both RIX effluent and filtered effluent from the San Bernardino WWTP were tested. The SAWPA RIX demonstration testing results were confirmed by the demonstration testing performed by Dr. Chen at the LACSD. **The results of the two demonstration tests were the basis for establishing the 1st NWRI UV Disinfection Guidelines to meet Title 22 criteria.**



The project included significant stakeholder and regulatory participations. Bi-monthly workshops were conducted during the 1-year operation to evaluate data from the demonstration facility and approve testing plan for the next period. The project workshops included operating staff, senior management staff from Cities of Colton and San Bernardino, national committee of experts, and several regulators from the Regional Water Quality Control Board and the then Department of Health Services (DHS). **The demonstration project won the approval of the California DHS for meeting the water reclamation criteria for both the RIX and UV processes. This project received the Engineering Excellence Honor Award from the Consulting Engineers and Land Surveyors of California in April 1993.**

I envision a number of subjects will be the focus of work for the WaterReuse Association in the next decade including:

- Emerging contaminants detection and removal from recycled water
- Finding other “vehicles” (e.g., wetlands) beside groundwater recharge to change water “identity”
- RO concentrate management including reduction and resource recovery
- Changing treatment approach for irrigation water reuse applications; i.e., preserving nutrients in recycled water while maintaining disinfection levels
- Applying different concepts of water reuse to address various regional requirements; e.g., great lakes region
- Introducing water reuse concepts into middle and high school curriculums to enhance public outreach

These are very important and significant topics, and I would love to be part of the discussions at the WaterReuse Association Board of Directors to address these and other challenges. I have attached a brief CV and endorsements from selected references for your consideration. Please feel free to contact me at 949-294-9912, to expand on any particulars in this statement or my CV. Thanks in advance.

Best regards,

Jamal Awad, PhD, PE

Principal Manager – Project Delivery & Client Services



Curriculum Vitae

Jamal Awad, PhD, PE

Technical Consultant



Education:

PhD, Environmental Engineering, Marquette University;
MS, Civil and Environmental Engineering, UW-Madison;
BS, Civil Engineering, Louisiana Tech University.

Professional Registration: Professional Engineer: California, Wisconsin, Illinois, Texas, Arizona

Professional Qualifications: Over 25 years of experience with extensive experience in water quality and advanced treatment technologies. Jamal is sought after nationally to support creative implementation of engineering solutions and innovative technologies assessments.

Distinguished Qualifications

- International UV Association-**Founding Member**, former **Regional Vice President**-Americas, and current **Board Director**
- Member of the **Blue Ribbon Panel** that assisted the California Department of Public Health in the development of guidelines for **Title 22 UV disinfection criteria**
- Past **Chair of the Water Quality Division, AWWA California-Nevada Section**
- Technical Consultant for **AWWARF Research Advisory Council** on 2003 Project Funding
- Project Advisory Committee member for the "Impact of UV Disinfection on Biological Stability" project Funded by AWWARF
- Reviewer of Chapter 29 Ultraviolet Disinfection, Water Treatment Plant Design, 4th Edition, AWWA/ASCE
- Contributor to Water Treatment: Principles and Design / Edition 2
- **Water Quality Manager** for the Long Beach Water Department (**US 34th largest City**)

Awards

- AWWA CA-NV Section; 1998 Chair's **Award for dedication and leadership** in providing ongoing training to Section members
- AWWA CA-NV Section; 2002 **Section's Service Award** for service as Water Quality Chair

Career Highlights

- **Deputy Project Manager/Technical Services Lead** as the Owner Engineer for the **\$110M** Water Replenishment District of Southern California's (WRD's) GRIP Advanced Water Treatment Facility (AWTF) **Progressive Design-Build** project for **indirect potable reuse (IPR)**.
- **Project Manager** for the **IEUA Engineering Design Guidelines** to communicate design preferences of IEUA to its consulting engineers/designers to improve consistency and efficiency of project deliveries. **Significant workshops and staff interactions** were utilized to build consensus regarding Guidelines format. The Guidelines were developed in **tabulated forms to improve their read and ease of future modifications** and/or additions. The level of completeness and usefulness of these Guidelines will improve with their use and updates. The level of details included in the Guidelines was targeted to the 30-percent design level
- **Task Lead** for Milwaukee Metropolitan Sewerage District (MMSD)'s **high-rate treatment (HRT) and UV disinfection treatment demonstration testing of wet-weather flows**. The project received the **2007 Grand Award in the Small Project Category by the American Academy of Environmental Engineers** in the annual



Curriculum Vitae

Excellence in Environmental Engineering Competition® for its exemplary application of innovative technology combined with proven engineering practices.

- **Task Lead** for process design, preliminary design, equipment selection, final design, and regulatory approval for Eastern Municipal Water District's 50-mgd UV disinfection facility (**Trojan 24" Reactor**) and North Shore Water Commission's 18-mgd UV disinfection facility (**Trojan 24" Reactor**). The facilities are **first** to be approved for primary disinfection with *Cryptosporidium* and *Giardia* credits in **California and Wisconsin**.
- **Project Manager** for Olivenhain Municipal Water District's Construction Management services for the WTP and the Treated Water Pipeline West of the Aqueduct. **The WTP was the largest ultrafiltration membrane treatment plant of its kind in the world at the time.**
- **Project Manager** for the **Masdar Brine Beneficial Use** study and pilot testing emphasizing the "Sustainable City" concept for this new development. The focus of this study is primarily on recovering beneficial and saleable products from the two on-site sources. Water production would be a beneficial by-product of the salt/mineral recovery process
- **Task Lead** to develop the Operations Plan, Control Strategy, and Regulatory Approval for **EMWD's Reject Recovery Facility (RRF)**. The 1-mgd GE ultrafiltration facility is first in California. It receives reject water from the 24-mgd Perris WFP for further recovery
- **Technical Consultant** for the **12-reactor, 2,500-m³/h each, UV disinfection facility for Syndicat des Eaux d'Ile de France (SEDIF)**, providing 1 million m³ of potable water to some 4 million people through three major treatment facilities around Paris. Provided technical detailed evaluations of the bid documents and made recommendation for selection. The system is currently under construction
- **Technical Director** of the Hydraulic Feasibility and Demonstration-Scale UV Testing at the Greater Cincinnati Water Works
- **240-mgd Richard Miller Treatment Plant and UV/Chlorine DBP** evaluation. Coordinated a detailed assessment of UV impacts on chlorination **DBPs** potential. The impacts of UV doses on the formation of **seven classes of DBPs** (THMs, HAAs, HANs, CP, TCP, Haloacetamides, and TOX) during the subsequent chlorination process were evaluated for three different effluent samples from the GCWW's RMTP
- **Project Engineer** for the conceptual design evaluations and **for Metropolitan's the 520 mgd Robert B. Diemer, Henry J. Mills, CPA Project, and the 520 mgd F. E. Weymouth filtration plants.** The evaluations **established the rated capacity of the plants and developed a uniform process design criteria** and approach for the design of storage capacities and pumping systems for chemicals
- **Operations Manager of the state-of-the-art pilot facilities for the Color Removal Project** conducted for the Irvine Ranch Water District (IRWD). Demonstration testing included **MF and NF membranes and NF brine beneficial use was evaluated.**
- **Water Sector CMC Manager--** completed a short-term expat assignment to establish and kick-start MWH's Construction Management Contract (CMC) services for **USAID's** funded multiple water projects with a construction value of approximately \$80M located throughout West Bank. The short-term assignment was completed in December of 2009.
- **Technical Consultant and Design Lead** for the Cedar Rapids' J-Avenue (42 mgd) and Northwest (40 mgd) WTPs UV disinfection facilities. The UV reactors (**Trojan 30" Diameter**) are **first** to be designed for **virus inactivation** under EPA UVDGM requirements.
- **Technical Consultant** for the Long Beach Water Department (LBWD) Demonstration Testing of UV and Chlorine Dioxide for Biogrowth Control and Pathogen Inactivation Systems as Pretreatments for **Seawater Desalination NF/NF Prototype.**

Endorsements

Ernest R. Blatchley III, Ph.D., P.E., BCEE, F. ASCE, Professor, Purdue University

It is a pleasure to write to offer my enthusiastic endorsement of Dr. Jamal Awad for one of the open positions on the WaterReuse Association Board of Directors. I have known Jamal for roughly 25 years and have had the pleasure of working with him professionally on several occasions. The majority of our interactions have come in the context of disinfection process engineering, largely as related to applications of UV radiation. Jamal and I served together on the Board of Directors of the International Ultraviolet Association (IUVA), where he also held the position of Vice President for the Americas. He often went the extra mile in his work on the IUVA's Board and he was also a strong advocate for the IUVA to take on leadership positions in the UV industry. As an example, Jamal led IUVA's outreach to the leadership at *Ten States Standards* to revise and update their standards that apply the use of UV disinfection in wastewater treatment. His extensive technical knowledge and practical experience related to UV disinfection, as well as his creativity were important as he led this effort. In summary, I wholeheartedly endorse Jamal's application for the WaterReuse BOD; he will be a dedicated contributor and a great team player.

Ernest R. Blatchley III, Ph.D., P.E., BCEE, F. ASCE

Professor, Lyles School of Civil Engineering and Division of Environmental & Ecological Engineering
Purdue University
550 Stadium Mall Drive
West Lafayette, IN 47907, USA
+1-765-494-0316
blatch@purdue.edu

Jim Herberg, PE, General Manager, Orange County Sanitation District

I have known Jamal Awad for nearly 25 years. During that time, I've worked with Jamal on projects and studies related to water recycling. When I worked for Orange County Water District, Dr. Awad was a consultant conducting live virus testing for UV disinfection of recycled water. This was an important study that was used in establishing dosage and reactor design guidelines for UV disinfection of recycled water. Dr. Awad's expertise was vital in this industry-leading effort.

Jim Herberg, PE, General Manager

Orange County Sanitation District
10844 Ellis Avenue
Fountain Valley, CA 92708
(714) 593-7110
JHERBERG@OCS.D.COM

Kenan Ozekin, PhD, Senior Research Manager, The Water Research Foundation

To The Selection Committee

I would like to nominate Jamal Awad to the WaterReuse Association Board of Directors. I have known Jamal for a long time and I think he would be a natural as a WaterReuse board member. He has extensive experience and good knowledge on water reuse and desalination topics which is essential for the person selected for the board. He is dedicated, detailed oriented, works well with a wide variety of people and possess leadership qualities. Jamal always has been an effective and tireless advocate for WaterReuse Association's mission. I highly recommend him for the board position.

Kenan Ozekin, PhD

Senior Research Manager
The Water Research Foundation
6666 W. Quincy Ave., Denver, CO 80235
P 303.734.3464
kozekin@waterrf.org

Kenneth Mercer, PhD, Editor-in-Chief, *AWWA Water Science & Journal AWWA*

Dear Nomination Committee,

Please consider this my endorsement for Jamal Awad's candidacy for the WateReuse Association Board of Directors. Dr. Awad is an internationally recognized expert in water treatment planning and engineering and he has extensive experience with in reuse and recycling projects. I had the opportunity to work directly with Jamal for almost two years, even traveling to the UAE together for work on Masdar City. I learned a lot from Jamal over the course of working together, and his knowledge of the technical aspects of our projects, combined with his savvy for project management (especially overseas) made him an invaluable team member and leader. In addition to being personable, Dr. Awad possesses a truly unique technical skill set, and I think his perspectives and future contributions as a Board member will prove significant as the WateReuse Association navigates its future.

Best regards - Ken

Kenneth Mercer, Ph.D.

Editor-in-Chief, *AWWA Water Science & Journal AWWA*

American Water Works Association | www.awwa.org

Direct: 303.347.6191

kmercerc@awwa.org

Roy A. Hesemann, Plant Manager, City of Cedar Rapids

To Whom It May Concern:

It is with great pleasure and honor that I endorse Mr. Jamal Awad for a position on the WateReuse Association Board of Directors. I have personally worked with and known Mr. Awad for the past 12 years when he was a technical expert and part of the engineering team that designed the ultraviolet disinfection treatment system for the City of Cedar Rapids Utilities Department. He is a leader within the Water Industry, one who constantly strives to help people have clean, safe, and affordable water. Mr. Awad would be an excellent choice to serve on the Board of Directors. I would be happy to discuss his qualification in more detail and can be contacted using the information below.

Roy A. Hesemann, Plant Manager

City of Cedar Rapids, Water Pollution Control Facility

7525 Bertram Road SE

Cedar Rapids, Iowa 52403

319-286-5972 desk

319-521-5752 cell

r.hesemann@cedar-rapids.org

**Ken Ortega, Assistant General Manager, Water Replenishment District
of Southern California**

Jamal Awad is currently serving as the WRD's Owner Engineer Team's Deputy Project Manager/Technical Services Lead for the GRIP AWTF Progressive Design-Build project for indirect potable reuse. I have known Jamal Awad for nearly two decades and consider him to be not only a close and valuable friend, but a man of high integrity and remarkable experience. Jamal's commitment and dedication to his trade and the water industry as a whole make him an excellent candidate for the WateReuse Association's Board of Directors. I wholeheartedly endorse Mr. Awad's nomination.

Ken Ortega, Assistant General Manager

WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

4040 PARAMOUNT BLVD

LAKEWOOD, CA 90712

+1-562-921-5521

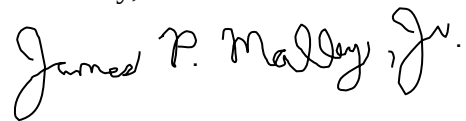
kortega@wrd.org

August 20, 2018

Dear: **Members of WateReuse Association Board of Directors:**

It is my pleasure to write this letter of endorsement for the **WateReuse Association Board of Directors Nomination of Dr. Jamal Awad, PhD., PE.** I have known and worked with Dr. Awad since 1997. Jamal worked closely with me on the organizing committee for the International UV Association (IUVA) and we served together on their board of directors for many years. Dr. Awad has provided excellent service and leadership to IUVA as their Vice-President for the Americas and a member of the IUVA News editorial board. Dr. Awad has also been active in and served AWWA and WEF as well as their associated California member associations. Dr. Awad and I have also worked together on a wide array of water projects, involving advanced treatment and UV disinfection, during his time as a vice president and global technology leader in the consulting engineering firms CH2M Hill (now Jacobs) and H.R. Green and now at GHD. Dr. Awad is an excellent leader, has good insights and the highest of ethical standards. He has demonstrated strong knowledge of association issues and challenges and knows how to grow the influence and membership of the associations he has helped lead. I give Dr. Awad **my highest endorsement** and know he will be an excellent contributor to the **WateReuse Association Board of Directors.** If you have any questions or need other specific information, do not hesitate to contact me.

Sincerely,



James P. Malley, Jr., Ph.D.
Professor of Civil and Environmental Engineering
Founding President IUVA
Past Member of the AWWA Board of Directors
Deputy Editor, AWWA Water Science
Editor-in-Chief IUVA News

220 Athens Way #500
Nashville, TN 37228

T: 615.255.2288
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August 21, 2018

Patricia Sinicropi
WaterReuse Association
1199 N Fairfax St # 900
Alexandria, VA 22314

Subject: Letter of Interest for WaterReuse Association Board Nomination

Dear Ms. Sinicropi:

Understanding water reuse and desalination are key to closing the gap on water supply and demands both nationally and globally, I have been dedicated to working on both technical and regulatory policy aspects of water reuse practices for more than 20 years. My contributions to the industry have included serving as project manager for the development of the US EPA Guidelines for Water Reuse (2012) as well as negotiating the Co-operative Research and Development Agreement with the US EPA and providing significant technical contributions to the more recently published Potable Water Reuse Compendium (2017).

Over the last two decades, I have had significant engagement in the conversation around the paradigm shift on how we implement water reuse. My long-standing membership with the WaterReuse Association, project and policy work, and research (detailed in the attached resume) has been a means of developing important relationships and has provided opportunities to help shape water reuse approaches and practices, throughout the US as well as internationally.

Considering my passion for advancing water reuse, I am submitting this statement of interest to request nomination to serve on the WaterReuse Association Board of Directors. My previous work on the International UV Association (IUVA) Board of Directors and Executive Committee (as Secretary, Treasurer, and President) demonstrates my working experience with professional association boards. And, my collaborative research with stakeholders, including utilities, universities, foundations, and others has expanded my technical knowledge and understanding for the need to continue to support education and outreach on water reuse.

Currently, I am currently the past-President of the IUVA, however, I will be rolling off the Executive Committee when my term completes in February 2019. With Brown and Caldwell's commitment to water reuse, I will have both the time and support resources to commit to WaterReuse Association committees, initiatives and leadership.

With WaterReuse being the only trade association that focuses solely on advancing laws, policy and funding to increase water reuse, I respectfully submit this statement of

interest along with my resume for consideration of a nomination to the WaterReuse Association Board of Directors. If you have any questions or need additional supporting materials, please feel free to email me at kbell@brwncald.com or call me at 615-478-7950.

I look forward to supporting WaterReuse in implementing its vision of creating a culture that embraces water reuse and to engage the membership in the national movement for safe and sustainable water supplies, to promote acceptance and support of recycled water, and to advocate for policies and funding that increase water reuse.

Very truly yours,



Katherine Y. Bell, PhD, P.E., BCEE
Brown and Caldwell
Director of Water Strategy

Attachment: Curriculum vitae, Katherine Y. Bell

Katherine (Kati) Y. Bell, Ph.D., P.E., BCEE

Director of Water Strategy

Dr. Bell currently serves as Brown and Caldwell's Director of Water Strategy. Her primary role is developing and implementing a Water Strategy, which includes working with clients, regulators, and other industry leaders manufacturers to identify efficient, sustainable solutions in Water. Her experience with regulatory guidance development, coordination, and negotiations along with her extenesive professional background provides the necessary skills to identify key areas of research and technolgy application meet client and regulatory goals.

She has conducted selection, design and optimization of advanced treatment processes including biological treatment and nutrient removal, membrane processes, sorption and advanced oxidation processes for emerging contaminants, and water and wastewater disinfection. In support of her primary work, she is involved in ongoing applied research focusing on optimization of disinfection and advanced oxidation processes and minimization of disinfection by-products, evaluating the fate, transport and treatment of emerging pollutants, development of UV fluorescence as a tool to aid in characterization of bulk organic matter, and use of data platforms to support treatment process monitoring, control and operations.

Kati is actively involved in client and industry research leading to development guidance documentation; she led the development of the IUVA/WEF publication on UV Disinfection for Wastewater (2015) and is currently chair of the ongoing development of a similar guidance document for peracetic acid disinfection for wastewater.

In addition to serving as technical director for water, wastewater and reuse projects summing to over 3 billion gallons per day of capacity, another highlight of Dr. Bell's work includes her role as the project manager for the U.S. Environmental Protection Agency 2012 *Guidelines for Water Reuse*. Kati also negotiated the Cooperative Research and Development Agreement and provided significant technical input for the recently published EPA Potable Reuse Compendium.

With respect to state regulatory support, Kati led a study with the City of Raleigh to investigate the fate of trace chemical constituents and microbial indicators in a river system impacted by treated wastewater that serves as a downstream drinking water source; the work led to development of legislation lifting the statewide ban on direct potable reuse and the bill was signed into law in August 2014. She also served as co-PI on a Water Research Foundation project that was led by Gwinnett County Department of Water Resources (GA) to examine a non-reverse osmosis treatment process for implementing direct potable reuse; the project has received numerous awards for research excellence and impact on the industry perspective of direct potable reuse.

Education

Ph.D. –
Environmental
Engineering,
Vanderbilt
University, 2004

M.S. – Civil
Engineering,
Tennessee
Technological
University, 1997

M.S. – Biology,
Tennessee
Technological
University, 1991

B.S. – Biochemistry,
University of Dallas,
1989

Registration

Professional
Engineer

Ohio, Tennessee,
Kentucky, and Texas

Board Certified
Environmental
Engineer, American
Academy of
Environmental
Engineers

1.0 Reuse, Concentrate Management and Integrated Planning

Reuse is one of Dr. Bell's key areas of expertise. She has conducted many significant projects, including managing the development of the 2012 EPA Guidelines for Water Reuse and the follow-on EPA Potable Reuse Compendium. Kati has been extensively involved in policy and regulatory support in this practice area. As an international expert in reuse, Kati is involved in research and pilot studies that are focused on innovative approaches to enhancing reuse options.

Technical Advisor, Pure Water Program, City of San Diego, CA. The City of San Diego (City) is embarking on the Pure Water Program to reduce the dependence on imported water from Colorado River and Northern California which accounts for about 85% of the current water consumption, and to satisfy the USEPA to advance Pure Water Program to avoid the construction of secondary treatment at Point Loma Wastewater Treatment Plant (PLWTP), which would cost \$ 1.8 Billion, during permit renewal. Facilities under the Pure Water Program will be built at three locations. Dr. Bell provided technical support for process design of various aspects of the North City Advanced Water Purification Plant (NCAWPF), which will have a nominal capacity of 34 million gallons a day and will be operational by year 2023. The product water from the NCAWPF will be used as a source of supply for indirect potable reuse. Kati is currently supporting the project team as a technical advisor on various advanced water treatment options for Phase II of the program.

Technical Specialist, Southern Water Services, Brighton, UK. Given the water-stress challenges facing the South of England, it is imperative that Southern Water start to build expertise in water reuse solutions. In addition to the water-stress, too much water being withdrawn from rivers, causing environmental damage, Southern Water needs reuse to meet goals of the water efficiency and T100 programs, Ofwat wants companies to display ambition in their business plans for resilience and innovation, and water efficiency is a key theme from the ongoing customer engagement program. And, although potential water reuse trials have been identified in AMP7 and AMP8, there is a growing sense of urgency to accelerate our capability in water reuse solutions, in AMP6. To support this goal, Dr. Bell is supporting Southern Water with several phases of work. Phase 1 is nearing completion and has defined research needs (regulatory, operational, financial, commercial and how to manage public perceptions), and has explored potential technologies for use in on-site water reuse trials. Phase 2, which is anticipated to begin in early 2019 will be conducted in collaboration with Brighton University and will trial a matrix of water reuse technologies and innovations at bench-scale. In the third phase of work, a demonstration system will be installed at one of Southern Water's facilities to provide an opportunity for the project team to conduct trialing that will allow data collection and coordination to support final regulatory approval of the selected process/project.

Technical Specialist, South County Regional Wastewater Authority (SCRWA) UV Disinfection System Optimization, Gilroy, CA. As part of a larger treatment plant upgrade, SCRWA has selected a 9 mgd low-pressure, high-output open-channel UV system for both river discharge and California Title 22 recycled water. As part of the system testing, challenges were encountered with respect to meeting

specifications; Dr. Bell was brought in to oversee and advise the equipment manufacturer and construction team to identify the root cause and address these issues.

Technical Specialist, Confidential Client, CA. Potable Reuse Investigation and Demonstration of Alternative Treatment Trains. Potable reuse has been identified as an alternative water supply option that could provide additional water supplies for the City's water users. Considering the inland location and the lack of access to a brine disposal line, Dr. Bell is serving as a technical advisor on the team that is conducting a comprehensive potable reuse study that includes stakeholder outreach, regulatory coordination and technical evaluations. Phase I is currently underway with a roll out of the communications program; once implemented, the ongoing stakeholder outreach will continue through a demonstration study that will ultimately be used to support variances in water recycling regulations.

Technical Advisory Committee Member, Clearwater, FL. In an effort to optimize water management and meet future water supply needs, the City of Clearwater (City) has been investigating replenishment of local aquifer systems via indirect potable reuse with highly-purified water sourced from the Northeast Water Reclamation Facility (NEWRF). The City's Groundwater Replenishment (GWR) Program began in 2009 with the development of a Preliminary Feasibility Study, which was followed by a Full Feasibility Study in 2011. In 2012, the City initiated operation of a pilot water purification treatment system from June 2013 to June 2014 at the City's NEWRF. The pilot treated reclaimed water to a finished water quality that met or was better than drinking water standards. With the successful completion of the 12-month pilot testing phase, the City is moving forward with the full-scale implementation of their GWR program. Dr. Bell served on the external technical advisory panel as a paid consultant to provide input and oversight of the advanced water treatment plant.

Water Reuse Practice Leader, Global Reclaimed Water Program, Confidential Client, Portland, OR. A confidential computer chip manufacturer required support with process selection, design, construction, start-up and performance guarantees, for wastewater treatment and reclaimed water production for fabrication facilities around the globe. The project approach included Client and Consultant collaboration to find the best technical solution that balances meeting system water quality performance requirements with system costs to result in the optimal solution for the treatment and recovery of process waste water streams, initially at four facilities. One of the four sites will become the Client's system of record for waste treatment and reclaimed water. Dr. Bell worked collectively with project team to develop stream profiles and conceptual treatment process layouts. Kati's specific focus, while integrating with the biological treatment processes and membrane processes, is on oxidation, physical/chemical treatment, and process monitoring and control. The work is a systematic evaluation of each process unit, challenging process selection decisions, relevant boundary conditions and performance objectives for both conveyance and treatment in a sequential manner to achieve the overall objective of jointly selecting the best treatment strategy that meets the client's cost target. Following final design, the treatment process will be used as a backbone for addressing similar needs at additional facilities that have minor site-specific variations in treated water quality criteria.

Water Reuse Practice Leader, Los Angeles' Bureau of Sanitation (LASAN), TOS-SN36 Hyperion Regional Water Reuse Alignment Study, Phase 2, Los Angeles, CA. LASAN is committed to develop opportunities

that fully use Hyperion's water. The implications of full use will be a dominant factor in the ultimate configuration and operational philosophy of Hyperion WRP. Dr. Bell is serving as the process lead for the project which is providing a technical analysis on the impacts of full reuse on the Hyperion Water Reclamation Plant and one on the development of an overall Strategy for full reuse at Hyperion. The project approach will result in a regional reuse plan that couples the long-term full utilization of the 420 million gallons per day of capacity at Hyperion with the demands in the Los Angeles Basin.

Co-Principal Investigator, WaterReuse Research Foundation, Project #15-11 - Demonstration of High Quality Drinking Water Production Using Multi-stage Ozone-Biological Filtration: a Comparison of Direct Potable Reuse (DPR) with Existing Indirect Potable Reuse (IPR) Practice. Dr. Bell is collaboratively leading the recently funded Tailored Collaboration project with Gwinnett County Department of Water Resources to demonstrate how ozone-biological filtration can serve as a viable treatment technology for DPR and eliminate the costs and technical issues associated with membrane concentrate disposal issues. This project leverages two other ongoing research projects, Water Research Foundation Project #4555 and Water Research Foundation Project #4508 (see below).

Technical Specialist, Research Data Management Platform, Gwinnett County Department of Water Resources, GA. To continue to provide superior water quality at an excellent value for its customers, under increasingly more stringent regulatory conditions and in the face of increasing variability in climatic events, DWR has invested significant resources in research. DWR is involved in WE&RF and WRF-supported projects that include running two pilot plants which are generating significant volumes of data. In order to best manage the data from the two pilot plants and incorporate and manage associated research data, Dr. Bell helped lead data management support services. This project includes support with design of system architecture, logistics and other services associated with collecting, storing and managing research data associated with ongoing WE&RF and WRF research projects and will allow DWR to advance to use of data analytics in later phases of this project.

Project Manager and Technical Specialist, EPA, Potable Reuse Compendium (2017), Washington, DC. With her management and technical role in the 2012 Guidelines for Water Reuse, and the increasing interest in potable reuse, Dr. Bell conceived and negotiated a Cooperative Research and Development Agreement (CRADA) with EPA to collect existing data on the state of industry to inform the decision process regarding potable reuse practices. The Compendium supplements information provided in the 2012 guidelines to document current practices and approaches in potable reuse, including the existing technical and policy information. While this document does not intend to provide guidance or norms for potable reuse, it does present the current state of practice in the U.S. This effort is consistent with the Agency's mission of protecting human health and the environment in that the document will provide a transfer of scientific and technical information to states, tribes, water industry stakeholders and the general public. Dr. Bell served as project manager until her departure from CDM Smith in 2015 and provided significant technical input for the document.

Technical Specialist, Potable Reuse Investigation in North Florida, St. Johns River Water Management District (SJRWMD), FL. Potable reuse has been identified as an alternative water supply option that could provide additional water supplies for the SJRWMD water users. Dr. Bell led the technical team that

conducted a preliminary water quality sampling and analysis program that included effluent from the SW Wastewater Treatment Plant (WWTP) and groundwater collected from the JEA Cecil Water Treatment Plant (WTP), which draws from the Upper Floridan aquifer (UFA) and Lower Floridan aquifer (LFA). Dr. Bell used information from the program to evaluate potential reclaimed water treatment trains that could be applied to meet potable reuse requirements for aquifer recharge. Based on the analysis, the ozone-biologically enhanced activated carbon (BAC) process is anticipated to meet requirements for indirect potable reuse (IPR). Although this process is anticipated to be a significant cost savings compared to the full advanced treatment model, based on microfiltration/ reverse osmosis/UV-AOP that has been repeatedly demonstrated, it must be demonstrated that ozone-BAC can achieve FDEP requirements for IPR and address other public concerns associated with other unregulated compounds such as pharmaceuticals, personal care products and endocrine disrupting compounds. As a result SJRWMD is moving forward with additional demonstration testing.

Co-Principal Investigator, Water Research Foundation, Project #4508 - Assessment of Techniques to Evaluate and Demonstrate the Safety of Water from Direct Potable Reuse Treatment Facilities. Dr. Bell is serving as co-principal investigator with Dr. Channah M. Rock and Dr. Shane A. Snyder of University of Arizona to review and identify key criteria to assess the safety of direct potable reuse (DPR) systems with respect to both microbial and chemical compounds of public health concern; conduct two expert panel workshops to identify existing and emerging analytical methods used to evaluate the safety of water from DPR systems; and, evaluate the effectiveness of identified methods to characterize water quality from a variety of treatment processes on the prevalence and safety of DPR systems compared to existing drinking water sources throughout the country. The outcomes of this project will be a framework that water utilities can use to support the safety of their product water and help facilitate an engaged monitoring process that is protective of public health.

Technical Director, Reuse Water System Master Plan Update, City of Raleigh Public Utilities Department (CORPUD), Raleigh, NC. CORPUD is examining water reuse as an alternative to reduce pressures on the city's water resources. In order to introduce a legislative bill to allow the practice in the state, Dr. Bell provided technical support to demonstrate that direct potable reuse could provide drinking water quality that is equivalent to the current source. Kati served as technical director for designing and implementing a study to characterize the water quality of the Neuse River, which is the receiving water for effluent from the City's Neuse River WWTP and as the source water for downstream users. The study included a baseline water quality assessment of the Neuse River basin to define the environmental fate and transport of contaminants from point and non-point sources. A range of parameters that are important indicators of water quality with respect to public health, including six microorganisms, nearly 100 chemical contaminants including endocrine disrupting compounds, and one measure of bulk genotoxicity were investigated. The results of the study showed that the highly treated effluent was technically not different from the current drinking water source; these results were used to support a bill that was signed into law in August 2014.

Lead Practitioner, Mandarin WRF UV Conversion, Jacksonville, FL. Dr. Bell is serving as a technical resource to lead pre-selection and design of a new low-pressure UV disinfection system for high-level

disinfection of up to 8 mgd of reclaimed water flow. The replacement of the existing medium pressure UV system will provide disinfection compliance at a significantly lower power consumption rate.

Technical Specialist, City of Franklin WWRF UV Disinfection Upgrades, Franklin TN. Dr. Bell served as a technical resource to lead the pre-selection and design of a new low-pressure UV disinfection system for a 32 mgd peak flow; up to 12 mgd of the reclaimed water will be distributed for irrigation uses. The replacement of the existing medium pressure UV system will provide disinfection compliance for both effluent discharge and reuse at a significantly lower power consumption rate.

Technical Specialist, Miami-Dade Water and Sewer Department (MDWSD), South District Water Reclamation Plant Hydrogeochemical Modeling Analysis, Miami, FL. As part of the 20-year Water Use Agreement between Miami-Dade County and the South Florida Water Management District for developing alternative water supplies and water conservation measures to meet future water needs, the MDWSD evaluated indirect potable reuse of reclaimed water via aquifer recharge at the Miami Metro Zoo. Dr. Bell conducted the technical analysis for evaluating the compatibility of highly treated reclaimed water for recharging the Biscayne Aquifer. Kati used the U.S Geological Survey PHREEQC model to assess geochemical conditions of the aquifer recharge/mixing zone that would potentially result when source water (RO and UV treated reuse water) is used to recharge the aquifer. Information including the predicted saturation indices of the dominant minerals under constant recharge conditions and the potential for release of arsenic in the aquifer system was developed. The modeling scheme also considered two conditions that could be encountered in either the shallow aquifer system or in the deep aquifer system. Results of the analysis showed that potential impacts of aquifer clogging would not be a concern; however, the potential for arsenic release under continuous recharge conditions is probable and as such, a flow-paced chemical pretreatment system was recommended and included in the design.

Lead Practitioner, Arlington East WRF UV Conversion, Jacksonville, FL. Dr. Bell provided regulatory coordination and technical support for replacement of the gas chlorine disinfection system with a new UV disinfection system for basic disinfection of effluent discharged to surface water; additionally, the high-level disinfection system used for treatment of public access reuse water is was converted to a bulk liquid sodium hypochlorite disinfection system. The use of existing structures and equipment were maximized to reduce construction costs.

Technical Specialist, City of Franklin Integrated Water Resources Plan, Franklin TN. Dr. Bell served as project manager and technical director to support and guide a broad scope of work for the City of Franklin during development of their Integrated Water Resources Plan (IWRP). The IWRP was conducted in two major phases. Phase I of the project was completed in 2010, and included the formation of a stakeholder advisory group and steering committee to formulate objectives that the IWRP will address. A preliminary evaluation of potential water, wastewater, stormwater, and reclaimed water projects was performed using an integrated systems simulation model and performance measures derived by the stakeholders. The purpose of Phase II was to perform in-depth analyses of costs and benefits of project options identified in Phase I. A dynamic river water quality model, detailed engineering studies of infrastructure including water and WWTPs, and conceptual designs provided refined estimates of performance and costs of project options over the 30-year planning period. The integrated systems

model was updated with the information developed in Phase II, which assisted stakeholders in understanding tradeoffs and making informed decisions on project options including indirect potable reuse. The IWRP process allowed communication of technical aspects of potentially controversial projects to the stakeholders in an educated, productive manner that facilitated public acceptance.

Technical Specialist, NW WWTP, St. John's County, FL. As part of a larger project to design a new WWTP for St. John's County to initially treat an average annual daily flow (AADF) of 3 mgd, ultimately reaching a build-out capacity of 12 mgd (AADF), Dr. Bell supported the design and implementation of a UV disinfection system for the reclaimed water system. Dr. Bell provided regulatory support and design guidance for this project which is in operation.

Project Manager, EPA and USAID, EPA 2012 Guidelines for Water Reuse, Washington, DC. With increasing interest in reclaimed water and significant new technology developments since its last update in 2004, the EPA Guidelines for Water Reuse were updated in 2012 under a Cooperative Research and Development Agreement (CRADA) with EPA and USAID. Dr. Bell served as project manager as well as provided technical support for the document update which was conducted as a collaborative effort for collecting information from a broad base of reuse experts, regulators, and other stakeholders. This approach allowed development of a document that is technically robust and broadly acceptable to the EPA, USAID, and U.S. Department of Agriculture/National Institute of Food and Agriculture (USDA/NIFA), as well as other members of the regulatory community, end users, advocacy groups, and the interested public. The approach of using stakeholder participation, integrated planning and documentation allows the updated document to be used across a spectrum of geographies, and types of water reuse planning and implementation projects. Specific experience is also drawn from case studies demonstrating how reuse has been successfully applied in communities and cities across the U.S. and internationally.

Process Engineer, City of Wichita Aquifer Storage Recovery (ASR), Phase II Water Treatment Plant, Wichita, KS. Dr. Bell served in a technical role to select and design the treatment process for the 30-mgd ASR project that utilized stormwater flows as a source for the advanced treatment facility. She developed testing protocols to evaluate treatment processes in conjunction with ultrafiltration. The project was to address atrazine, a regulated endocrine disruptor. Testing that Dr. Bell conducted led to selection of an ozone-based advanced oxidation process following membrane filtration to provide atrazine removal and disinfection credits as required by the State regulatory agency. Dr. Bell provided additional support during testing to establish critical design parameters for the final design.

Technical Specialist, Frito-Lay Process Water Recovery Treatment Plant (PWRT) Casa Grande, AZ. A key component of this project was a PWRT that eliminates the need for land application of the facility's wastewater. The design-build project incorporates innovative water treatment technologies and best practices applied at Frito-Lay plants across the country into a single plant that now serves as a model for other facilities. While the process was proven at pilot scale, there were operational challenges with the UV disinfection and low pressure reverse osmosis processes during start up. Dr. Bell supported troubleshooting and supported implementation of remedies to address these challenges and the 450 gpm facility now produces product water meets EPA primary and secondary drinking water quality for reuse in washing, cooking and sanitation of food production.

Technical Specialist, Rainmaker – Water for the Future Designing, Testing, and Implementing a Water Recovery and Reuse Program for Beverage Plants to Support Zero Liquid Discharge, Coca-Cola, Atlanta, GA. As a global water stewardship leader, the Coca-Cola Company not only conserves and manages water resources as a strategic business imperative, but as a responsibility in the communities where the Company operates around the world. Coca-Cola Company's global water stewardship goal is to safely return to nature and communities an amount of water equivalent to what we use in all our beverages and their production by 2020. In support of these objectives, the Company has developed the Rainmaker Report which Dr. Bell was tasked with reviewing. Dr. Bell provided specific comments on treatment technologies, monitoring and risk management aspects of the report to improve the overall content quality of the document.

Technical Specialist, Pinewoods Injection Well, Lee County Utilities, Ft. Myer, FL. Lee County Utilities owns and operates the Pinewoods Water Treatment Plant deep injection well which injects a blend of reverse osmosis (RO) concentrate from Lower Hawthorn aquifer water and nanofiltration concentrate from the water table aquifer. Over time the monthly specific injectivity data indicated a significant reduction in specific injectivity. Dr. Bell investigated the issue that was identified through a mechanical integrity test (MIT) and the corresponding video log. This information indicated that a precipitate build-up in the pipe casing and open hole had reduced the pipe diameter. Dr. Bell led efforts for collection and analysis of water quality of the injectate streams to develop a geochemical model that was used to evaluate process sequencing, blend ratios, potential for precipitate formation, and provide possible process alternatives for minimization or elimination of adverse chemical reactions. This analysis identified contributors to precipitate formation which were induced by chemical mixing so that a viable and cost-effective solution could be implemented.

Technical Specialist, J.R. Simplot Process Water Treatment and Recovery Plant (PWTRP), Caldwell, ID. Dr. Bell was part of the design-build team that designed the process for a new PWTRP to treat process water from J.R. Simplot's new potato production facility in Caldwell, ID. The PWTRP which has recently been completed, will enable Simplot to operate efficiently and cost-effectively while meeting permit limits and providing a consistent source of return water meeting drinking water standards.

Technical Specialist, Southern Region Tertiary Treatment Plant, Camp Pendleton, CA. When the facility was experiencing compliance issues with respect to color, Dr. Bell conducted a facility assessment that included sampling and analysis of color and other related parameters throughout the SRTTP. The nature of and root causes of the color in the reclaimed water effluent were identified through a rigorous sampling and analysis program and Kati provided specific recommendations that allowed the facility to meet permit compliance.

2.0 Disinfection and Advanced Oxidation

Disinfection and destruction of recalcitrant compounds are a focal point Dr. Bell's of expertise. In addition to chairing the development of the IUVA/WEF UV for Wastewater Disinfection, and the ongoing development of the WEF Peracetic Acid for Wastewater Disinfection guidance, she has served as technical lead for feasibility studies, design and implementation of recommended alternatives. Kati has extensive experience with selection, design and implementation of UV, chlorine, ozone and PAA

disinfection systems and she is skilled at troubleshooting facilities that experience challenges with disinfection compliance.

2.1 UV, Ozone and Advanced Oxidation

Dr. Bell is a leader in the North American wastewater UV industry; as the chair of the recently published WEF/IUVA UV Disinfection for Wastewater, Kati has a strong understanding of the application of UV for wastewater disinfection. She also has significant experience in application of ozone and advanced oxidation processes to address A summary of the projects that have included evaluation and/or design of various UV, ozone and advanced oxidation equipment systems is provided here; additional details are provided in project descriptions.

Water Treatment Plant Process Lead, Confidential Client. The City owns and operates a public water system (PWS) that provides treated drinking water to the city's residents. The City's current water supply consists of five Floridan Aquifer System (FAS) water supply wells in which 1,4-dioxane (1,4-D) has been detected. The current Florida Department of Environmental Protection (FDEP) groundwater cleanup target level (GCTL) for 1,4-D is 3.2 micrograms per liter (µg/L) [Florida Administrative Code (F.A.C.) Chapter 62-777]. The Florida Department of Health (FDOH) has published a health advisory level (HAL) that suggests that the concentration of 1,4-D in drinking water should not exceed 0.35 µg/L, based on a possible lifetime exposure (FDOH 2013). While exposure to drinking water with the highest reported 1,4-D concentration would pose an "extremely low" increased risk of adverse health effects (FDOH 2016), as a conservative measure, private parties have agreed to assess treatment alternatives, test, design, and implement a selected treatment alternative to reduce 1,4-D concentrations to below the HAL (0.35 µg/L). The project consisting of UV-AOP and GAC, is currently under design with Dr. Bell has supporting process selection, design, and implementation.

Technical Advisor, Pure Water Program, City of San Diego, CA. The City of San Diego (City) is embarking on the Pure Water Program to reduce the dependence on imported water from Colorado River and Northern California which accounts for about 85% of the current water consumption, and to satisfy the USEPA to advance Pure Water Program to avoid the construction of secondary treatment at Point Loma Wastewater Treatment Plant (PLWTP), which would cost \$ 1.8 Billion, during permit renewal. Facilities under the Pure Water Program will be built at three locations. Dr. Bell provided technical support for process design of various aspects of the North City Advanced Water Purification Plant (NCAWPF), which will have a nominal capacity of 34 million gallons a day and will be operational by year 2023. Her specific technical input included development of design and procurement documents to support the implementation of UV-AOP at the NCAWPF.

Technical Advisor, Central WWTP Optimization, Metro Water Services, Nashville, TN. As follow on work to the previous investigation at the MWS Central WWTP, Dr. Bell is supporting the process team with development of design criteria, specifications and preselection documents. The project is ongoing and because of the unique nature of UV equipment systems from various manufacturers, the design includes preselection of the equipment system, which will be based on cost and non-cost factors.

Technical Specialist, South County Regional Wastewater Authority (SCRWA) UV Disinfection System Optimization, Gilroy, CA. As part of a larger treatment plant upgrade, SCRWA has selected a 9 mgd low-pressure, high-output open-channel UV system for both river discharge and California Title 22 recycled water. As part of the system testing, challenges were encountered with respect to meeting specifications; Dr. Bell was brought in to oversee and advise the equipment manufacturer and construction team to identify the root cause and address these issues.

Technical Specialist, Union County, Twelve Mile Creek UV Expansion Project, NC. Dr Bell supported the pre-selection and design of UV disinfection system upgrades to increase current peak flows of 15 mgd in phases at the Twelve Mile Creek wastewater reclamation facility. The first phase will increase the peak hour flow to 22.5, and the next phase will increase the peak hour flow to 30 mgd.

Technical Specialist, Narragansett Bay Commission (NBC) Bucklin Point Wastewater Treatment Facility, Rumford, RI. Dr. Bell supported NBC with an evaluation of the feasibility of upgrading the existing medium pressure UV system to a low pressure UV system. The evaluation stemmed from NBC's desire to improve efficiency and meet anticipated future requirements in its discharge permit for enterococcus. The evaluation included analysis of data from the existing system to determine the design criteria for a new UV system. Based on this information, information from four UV manufacturers was obtained to establish lifecycle costs. The design criteria for a new system have been documented and based on lifecycle costs and non-cost factors, recommendations were provided to NBC.

Technical Specialist, Town of Stonington, CT. The town currently owns and is responsible for three separate wastewater collection systems and water pollution control facilities (WPCFs). Recommended upgrades for the Mystic WPCF included the BioMag™ process, and UV disinfection for bacteria compliance. Following start up and optimization of the process upgrades at the Mystic WPCF, there have been reported issues with respect to disinfection compliance at the facility, including exceedances of the monthly geometric mean for enterococcus in the first quarter of 2015. These issues were not observed at the other WPCFs that have been upgraded with the same UV disinfection equipment to meet the same effluent criteria. Dr. Bell supported testing and analysis that has identified the root cause of these performance challenges and has made recommendations for optimizing process operations.

Lead Practitioner, UV Disinfection System Upgrade, Wichita, KS. The City of Wichita owns the Plant No. 2 WWTP which has an average flow of 40 mgd, with a maximum hydraulic capacity of 80 mgd. Plant No. 2 is a secondary plant that achieved disinfection using a medium pressure UV disinfection system. Dr. Bell supported the evaluation of the existing facility to select new low pressure UV disinfection equipment that could be retrofit into existing structures, to address hydraulics, capacity and performance issues associated with the existing UV disinfection system. The project has recently bid and the City will be able to obtain 80 mgd of treatment capacity for less than \$2M in construction costs.

Lead Practitioner, Mandarin WRF UV Conversion, Jacksonville, FL. Dr. Bell is serving as a technical resource to lead pre-selection and design of a new low pressure UV disinfection system for high-level disinfection of up to 8 mgd of reclaimed water flow. The replacement of the existing medium pressure UV system will provide disinfection compliance at a significantly lower power consumption rate.

Technical Specialist, City of Franklin WWRF UV Disinfection Upgrades, Franklin TN. Dr. Bell served as a technical resource to lead the pre-selection and design of a new low pressure UV disinfection system for a 32 mgd peak flow. The replacement of the existing medium pressure UV system will provide disinfection compliance at a significantly lower power consumption rate.

Lead Practitioner, Arlington East WRF UV Conversion, Jacksonville, FL. Dr. Bell provided regulatory coordination and technical support for replacement of the gas chlorine disinfection system with a new UV disinfection system for basic disinfection of effluent discharged to surface water; additionally, the high-level disinfection system used for treatment of public access reuse water is was converted to a bulk liquid sodium hypochlorite disinfection system. The use of existing structures and equipment were maximized to reduce construction costs.

Technical Specialist, Colorado Springs Utilities Alternative Disinfection, Colorado Springs, CO. Dr. Bell supported the design team on an expedited but thorough alternatives evaluation of commercially available UV systems for the Las Vegas WWTF to address peak flows up to 135 mgd. Dr. Bell also provided support on equipment sizing, conceptual layout drawings, development of capital, O&M and life-cycle costs, and a non-economic evaluation.

Technical Specialist, Regional Water Reclamation Facility (RWRF) Disinfection System, Jefferson City, MO. Dr. Bell supported selection and design of a disinfection system at the City of Jefferson RWRF. The project included providing disinfection for the 11-mgd average, 66-mgd peak sequencing batch reactor system. A new UV system was designed based on the batch decant flow. Kati supported the team that provided full service from planning through construction for the RWRF.

Process Engineer, City of Wichita Aquifer Storage Recovery (ASR), Phase II Water Treatment Plant, Wichita, KS. Dr. Bell served in a technical role to select and design the treatment process for the 30-mgd ASR project. She developed testing protocols to evaluate treatment processes in conjunction with ultrafiltration. The project was to address atrazine, a regulated endocrine disruptor. Testing that Dr. Bell conducted led to selection of an ozone-based advanced oxidation process following membrane filtration to provide atrazine removal and disinfection credits as required by the State regulatory agency. Dr. Bell provided additional support during testing to establish critical design parameters for the final design.

Technical Specialist, Disinfection, Macon, MO. New regulatory requirements for Macon required disinfection to be implemented to meet new Missouri water quality standards. Dr. Bell provided technical support for evaluation of disinfection alternatives and design services at Macon Municipal Utilities. As part of this process, UV disinfection was identified as the preferred alternative and as a result the UV design process focused on opportunities for identifying factors to minimize energy costs while meeting discharge standards. Kati supported the project team that provided full service from planning through construction for the MMU facility.

Technical Specialist, NW WWTP, St. John's County, FL. As part of a larger project to design a new WWTP for St. John's County to initially treat an average annual daily flow (AADF) of 3 mgd, ultimately reaching a build-out capacity of 12 mgd (AADF), Dr. Bell supported the design and implementation of a

UV disinfection system for the reclaimed water system. Dr. Bell provided regulatory support and design guidance for this project which is in operation.

Design Engineer, WWTP Improvements, City of Kingsport, TN. Due to increasing concern over public safety and regulatory requirements, the City of Kingsport eliminated use of gas chlorine. Dr. Bell served as the lead design engineer for the project. As part of the conversion to UV disinfection at the Kingsport WWTP, Dr. Bell conducted an alternatives analysis for various UV systems which focused on identifying the system that provided the required disinfection for the lowest lifecycle cost. The project design was completed with cost savings realized under a larger WWTP upgrade completed under a construction management at risk contract. The UV disinfection upgrade project was partially funded with stimulus funds through the Start Revolving Fund, requiring special design and bidding considerations.

Project	Design Flow (mgd)	Bench Testing	Pilot Testing	Design	Construction
City of San Diego North City Advanced Water Purification Plant; IPR	34		X	X	
Confidential Client WTP; UV-AOP for 1,4-dioxane removal	10	X	X	X	X
Narragansett Bay Commission Bucklin Point WWTP, Rumford, RI; NPDES	46	X			
Town of Stonington Mystic WPCF, Stonington, CT; NPDES	2.1	X		X	X
Union County Twelve Mile Creek, WWTP, North Carolina; NPDES	15, 22.5, 30			X	
City of Wichita, KS Plant No. 2, Wichita, KS; NPDES	80			X	X
Jacksonville Electric Authority Mandarin WRF, Jacksonville, FL; Reuse and NPDES	8			X	X
City of Franklin Franklin WRF, Franklin, TN; Reuse and NPDES	32			X	X
Metro Water Services Central WWTP, Nashville, TN; NPDES	350 UV (+80PAA)	X		X	X
Trinity River Authority CRWS Plant, Dallas, TX; NPDES	405	X	X		
Green Bay Metropolitan Sewerage District DePere WWTP, Green Bay, WI; NPDES	21	X		X	X
St. John's County Utility Department Northwest WWTP, St. Augustine, FL; Reuse	12			X	X
Macon Municipal Utilities Macon WWTP, Macon, MO; NPDES	5.4				
Jefferson County Environmental Services Department Trussville WWTP, Trussville, AL; NPDES	17			X	X
Colorado Springs Utilities Las Vegas Street WWTF, Colorado Springs, CO; NPDES	135			X	X
Jefferson City Regional WRF, Jefferson City, MO; NPDES	66			X	X
City of Memphis T.E. Maxson WWTP, Memphis, TN; NPDES	160	X	X		
Jacksonville Electric Authority Arlington East WRF, Jacksonville, FL; NPDES	25			X	X
City of Kingsport Kingsport WWTP, Kingsport, TN; NPDES	35			X	X

2.2 Peracetic Acid Disinfection

Dr. Bell has led the North American industry in developing understanding and application of wastewater disinfection using peracetic acid (PAA); she has been involved in every facility >100 mgd in the US that has implemented the innovative process. A summary of the projects that have included evaluation and testing of PAA is provided here and additional details are provided in project descriptions.

Technical Specialist, Peracetic Acid Disinfection Pilot and Demonstration, Metropolitan Wastewater Reclamation District, Denver, CO. Dr. Bell supported implementation of an initial, side-stream PAA Pilot Project for MWRD, completed in 2016. The side-stream pilot project confirmed *E. coli* compliance could be met with PAA. To develop an understanding of the impact of plant hydraulics under various flow regimes, Kati also supported the implementation of a full-scale demonstration project. The project, which was started up in January 2018 will provide the District the necessary information to evaluate and make decisions regarding the long-term solution for the disinfection system at the RWTHF.

Principal Investigator, Water Environment & Research Foundation, Washington, D.C. Dr. Bell served as the lead researcher for this research project until her departure from MWH/Stantec in 2018. The effort will document the current state of the technology and develop implementation guidance to support the growing interest in PAA. PAA applications are growing due to its ability to disinfect at costs competitive to other mature technologies, with secondary benefits of a chemical oxidant. And, while the list of PAA installations in North America is growing, there are yet hurdles to implementation state regulatory agencies struggling with permitting, even though USEPA has approved four PAA products for wastewater. This research provides additional data and necessary documentation and stakeholder outreach to overcome these challenges.

Technical Advisor, Denver Metropolitan Wastewater Reclamation District, Denver, CO. Dr. Bell is provided technical guidance to Metro Wastewater Reclamation District (District) during their evaluation of peracetic acid (PAA) disinfection as a short-term solution to meeting disinfection requirements until ultraviolet irradiation (UV) disinfection is constructed at the Robert W. Hite Treatment Facility (RWHTF). Supplemental to this work, Dr. Bell supported a research effort that evaluated various indicators with respect to understanding the potential implementation of a USEPA bacteriophage criteria. The study included an evaluation of the impact of PAA and UV on virus inactivation as well as the current disinfection scenario which uses chloramines. Of particular note is that the work also incorporated murine norovirus, which is similar to human norovirus, in addition to bacteriophage.

Technical Director, Langley WWTP PAA Disinfection Pilot Project, Metro Vancouver, BC. Dr. Bell led a study to evaluate PAA as a disinfection alternative to address total residual chlorine concerns at the Langley WWTP. The study includes supplemental sampling to establish disinfection kinetics to aid in optimizing PAA dose. One of the most unique aspects of this project is that plant staff were able to force the plant into nitrite lock to validate bench-scale results that showed nitrite does not impact PAA disinfection control as it does with chlorine disinfection. PAA has been deemed a favorable alternative and Kati is providing regulatory support and coordination for Metro Vancouver to design and implement PAA disinfection at the Langley WWTP.

Technical Director, Disinfection Pilot, City of Fort Worth, TX. Dr. Bell conducted an evaluation of PAA as an alternative disinfection option to the current practice using gas chlorine and sulfur dioxide for dechlorination at the Village Creek WWTP. The pilot included testing to determine the applicability of peracetic acid (PAA) as a low capital cost disinfection alternative to eliminate gas chlorine. Additionally, Kati has supported regulatory discussions with TCEQ to determine the requirements for implementation of PAA disinfection if the final analysis shows that PAA is a cost-effective alternative for disinfection.

Technical Director, WWTP Disinfection Alternatives Evaluation, Metro Water Services, Nashville, TN. Dr. Bell conducted an evaluation of alternative disinfection options for conversion of gas chlorine at Metro's Dry Creek WWTPs. The plant has a peak flow capacities of 63 mgd. Peracetic acid was evaluated to address all flows at the Dry Creek WWTP as an interim (5 years) treatment measure while other process upgrades are being implemented. Recommendations for long-term disinfection was UV for full-scale flows, with provisions for implementation of PAA as a backup disinfection option.

Technical Director, Disinfection Alternatives Study, Gulf Coast Authority, Pasadena, TX. Dr. Bell led the development of a disinfection alternatives evaluation for the facility, permitted to discharge flows up to 77 mgd. The facility receives primarily industrial wastewater with challenging characteristics with respect to providing disinfection. The alternative selected for design and implementation included application of peracetic acid in a new contact basin that will provide disinfection in a 7.5-minute contact time without the concerns regarding disinfection by-products which have been a challenge for chlorine-based disinfection methods. Following the disinfection evaluation, the client sole-sourced the \$11M project to the team as a construction management at risk contract; the project has been operating with no compliance challenges since January 2016.

Technical Director, Disinfection Alternatives Study, Oklahoma City Water Utilities Trust, Oklahoma City, OK. Dr. Bell led the project team in conducting a study to evaluate disinfection alternatives to address disinfection by-products (DBP) concerns at the Chisholm Creek WPCF. To avoid potential DBPs, the use of chlorine based disinfectants will be discontinued and this study is investigating the use of alternate disinfection including UV disinfection and peracetic acid. Because of a compliance schedule challenge, Dr. Bell supported OCWUT with a fast track PAA pilot along with a parallel desk-top evaluation of UV disinfection. Kati provided regulatory support and coordination as OCWUT identified the best treatment option to meet permit requirements.

Technical Director, F. Wayne Hill Water Resource Center (WRC) and Crooked Creek Water Reclamation Facility (WRF), Gwinnett County, GA. Dr. Bell provided support related to optimization of the disinfection and biofiltration processes at the F. Wayne Hill WRC. While the primary work is centered on optimization of disinfection processes at this facility, Kati is also leading an investigation into whether there are ancillary benefits to the use of peracetic acid at Wayne Hill WRC, which provides return flows to Lake Lanier, one of the primary drinking water supplies in the Atlanta metropolitan area. Literature suggests that PAA provides similar benefits to ozone, including removal of endocrine disrupting activity of effluent. Kati also supported testing to determine whether PAA could be used as a full-scale back-up to the ozone disinfection system at F. Wayne Hill WRC as well as at the Crooked Creek WRF.

Project	Design Flow	Bench Testing	Pilot Testing	Design	Construction
Metropolitan Wastewater Reclamation District, R.W. Hite WTF	200	X	X	X	X
Gwinnett County Department of Water Resources Crooked Creek WWTP, Buford, GA	60	X	X	X	
Gwinnett County Department of Water Resources Crooked Creek WWTP, Norcross, GA	20	X	X	X	
New York City DEP Hunts Point WWTP, New York, NY	200	X	X		
City of Fort Worth Village Creek WWTP, Fort Worth, TX	200	X	X		
Metro Water Services Central WWTP ETFU, Nashville, TN	80 of 370	X		X	X
Gulf Coast Waste Disposal Authority Washburn Tunnel Facility, Houston, TX	43	X	X	X	X
Trinity River Authority Central Water Reclamation System Plant, Dallas, TX	405	X	X		
Western Lake Superior Sanitary District WLSSD WWTP, Duluth, MN	125	X			
City of Memphis M.C. Stiles WWTP, Memphis, TN	160	X	X	X	X
Metro Water Services Dry Creek WWTP, Nashville, TN, <i>Interim Disinfection</i>	63	X	X	X	X
Green Bay Metropolitan Sewerage District Green Bay WWTP/DePere WWTP, Green Bay, WI	68/21	X			
City of Memphis T.E. Maxson WWTP, Memphis, TN	160	X	X	X	X
Oklahoma City Water Utilities Trust Chisholm Creek WPCF, Oklahoma City, OK	8	X	X	?	

2.3 Chlorine Evaluations and Conversions

While chlorine disinfection has its regulatory challenges, it is still the most widely used disinfectant for wastewater disinfection and is a necessary element of most drinking water facilities in the US to provide protection of public health. Dr. Bell has been engaged in many evaluations as well as gas chlorine conversions to sodium hypochlorite or on-site generation.

Technical Director, Western Lake Superior Sanitary District (WLSSD), Duluth, MN. Dr. Bell supported the WLSSD in evaluating its existing disinfection system at the wastewater treatment facility and identify opportunities for system improvements. The evaluation detailed alternative disinfection technologies including pertinent regulatory requirements and other critical design considerations. Next, potential disinfection alternatives are discussed. Following discussion of disinfection alternatives, the basis of design was identified to compare alternatives. Lifecycle costs and non-economic factors were compared to identify the optimal alternative which was optimization of their existing system.

Technical Director, Wastewater Disinfection System Study/Design, Kansas City Missouri Water Services Department (WSD), Kansas City, MO. The City of Kansas City was required to provide disinfection of its wastewater at its Westside WWTP in a new permit. The WWTP is in the west bottoms area of downtown Kansas City, Missouri, within a predominantly industrial and commercial area that is served by combined sewers. Westside is an activated sludge treatment plant with primary and secondary clarifiers and an average daily flow of 22.5 mgd. Dr. Bell directed the technical aspects of development of a Preliminary Engineering Study (PES) to identify the design criteria for the new bulk liquid sodium hypochlorite system to meet bacterial inactivation requirements in its new NPDES permit. Dr. Bell supported the design team through bidding, construction and start-up.

Lead Practitioner, Arlington East WRF UV Conversion, Jacksonville, FL. Dr. Bell provided regulatory coordination and technical support for replacement of the gas chlorine disinfection system with a new UV disinfection system for basic disinfection of effluent discharged to surface water; additionally, the high-level disinfection system used for treatment of public access reuse water is was converted to a bulk liquid sodium hypochlorite disinfection system. The use of existing structures and equipment were maximized to reduce construction costs.

Technical Specialist, Gulf Coast Waste Disposal Authority, Houston, TX. Dr. Bell supported the evaluation and design of disinfection upgrades at the Bayport Facility to provide disinfection for up to 40 mgd. She supported review of dose-response data for disinfection to meet enterococcus limits using bulk liquid sodium hypochlorite. The recommendations were used in development of design requirements for the construction of new chlorine contact channels in Pond 9 and the associated chemical storage and feed facilities.

Technical Director, Disinfection Feasibility Study, North Texas Municipal Water District, Dallas, TX. Dr. Bell was the lead technical specialist for a feasibility study to evaluate alternatives for effluent disinfection for three wastewater treatment facilities at the North Texas Municipal Water District (NTMWD), including Wilson Creek, Rowlett Creek and Mesquite WWTFs. The final report provided recommendations regarding the reduction of risks associated with the current disinfection practices that include gas chlorine and sulfur dioxide at the three facilities. The report compared the technologies for disinfection, described the improvements and developed planning level costs required for continued use of the current disinfection system. Ultimately, UV disinfection will be implemented at all three facilities with PAA as a back-up at each facility.

Technical Director, Western Lake Superior Sanitary District Disinfection Alternatives Evaluation, Duluth, MN. Dr. Bell conducted an alternatives analysis for the WLSSD WWTP, which included preparation of conceptual level costs. As part of this analysis, operational data and facility information, including existing disinfection process performance was collected and analyzed. The evaluation outlined several disinfection alternatives under consideration (including the current process as the basis of evaluation) and provided preliminary level cost opinions for these technologies, and a recommendation and discussion of the preferred disinfection alternative based on both cost and non-cost factors.

Technical Director, Disinfection Pilot, Trinity River Authority, Dallas, TX. Dr. Bell conducted an evaluation of PAA along with four UV disinfection systems as an alternative disinfection option to the current practice using gas chlorine and sulfur dioxide for dechlorination at TRA's Central Reclamation Water System plant. While the facility has the hydraulic grade to support gravity flow through a UV system, when the receiving Trinity River is high, effluent pumping may be required. The pilot included testing to determine the applicability of peracetic acid (PAA) as a low capital cost disinfection alternative to eliminate gas chlorine. Additionally, Kati is supporting additional pilot testing to evaluate the potential for use of PAA to meet TCEQ requirements for Type I reclaimed water.

Technical Director, Green Bay Metropolitan Sewerage District (GBMSD) Disinfection System Facility Plan, Green Bay, WI. The GBMSD owns and operates two WWTPs, the Green Bay Facility (GBF) and the De Pere Facility (DPF), and their associated collection systems. The WPDES permits for these facilities require seasonal disinfection prior to discharge to the Fox River. Dr. Bell supported GBMSD in preparation of a comprehensive and detailed Disinfection System Facility Plan for both WWTP. The results of the project included recommendations of UV disinfection at the DPF and upgrades to the bulk hypochlorite/sodium bisulfite system at the GBF, both of which have been implemented.

Technical Director, WWTP Disinfection Alternatives Evaluation, Metro Water Services, Nashville, TN. Dr. Bell conducted an evaluation of alternative disinfection options for conversion of gas chlorine at Metro's Central WWTP. The plant has a peak flow capacity of 450 mgd. Peracetic acid was selected to address wet-weather flows at the Excess Flow Treatment Unit. Recommendations for full-scale implementation of UV for the main treatment process, and PAA at the EFTU.

Lead Practitioner, Disinfection Alternatives Study, Montecito Sanitary District, CA. Dr. Bell supported an evaluation of disinfection alternatives at the Montecito Sanitary District Wastewater Treatment Facility (WWTF). The WWTF provides disinfection utilizing sodium hypochlorite injected prior to one of two chlorine contact tanks (CCTs) followed by dechlorination using sodium bisulfite. Montecito was keenly interested in evaluating alternatives that could provide better compliance assurance during high peak flows during wet-weather events. Additionally, alternative disinfection methods that could reduce disinfection byproducts, which would improve the effluent water quality discharged were evaluated.

Project Engineer, Fourche Creek WWTP, Little Rock, AR. Dr. Bell developed an alternatives evaluation for the most widely used, mature technologies that had practical application at the Fourche Creek WWTP. She assessed requirements and developed planning level cost estimates for implementation. Alternative was evaluated on economic and non-economic criteria and to develop a recommendation.

3.0 Wastewater Treatment and Regulatory Support

Dr. Bell has been actively involved with wastewater treatment plant design, operations and optimization. Understanding that the regulatory process for NPDES permitting and compliance is critical to designing a facility that is easy to operate while maintaining compliance has been a key driver for the projects that Kati has supported to guide clients through the process of permitting, design, implementation, operation and compliance of wastewater treatment facilities across the country.

Technical Director, Environmental Compliance Support, City of Memphis, TN. The City has identified damages in lift stations that are receiving industrial discharges that may be attributing to the corrosive conditions. While the City has previously allowed variances to Section 33-103 of their Sewer Ordinances, this practice of allowing variance may be related to the challenges of managing collection system and treatment plant assets. To simplify the permitting, monitoring and reporting process for the industrial pretreatment program (IPP), Dr. Bell is supporting the City with review of its current Sewer Ordinance. She is leading the team that is conducting technical review of the current industrial permitting and monitoring data to provide a basis for decision support on whether modifications to the Sewer Ordinance are merited. Dr. Bell will support the City in evaluating a number of options available and support in defining the viable alternatives for remedying these issues. This will allow the City to support the recommended solution for implementation, such that the City can continue to provide a high level of wastewater service at a reasonable cost, while protecting health and safety of City of Memphis personnel and wastewater system assets.

Technical Specialist, WWTP Permitting and Legal Support, Franklin, TN. As part of its IWRP, the City of Franklin has designed significant upgrades to its existing WWTP to address treatment challenges and capacity needs. Dr. Bell has coordinated all permitting and permit negotiations related to the facility upgrades. More recently, a local environmental group has exercised its intent to sue for a list of issues related to the proposed upgrades. Kati is coordinated with the City's internal and external legal counsel to support the City in addressing these complaints.

Technical Specialist, Biologically Enhanced High Rate Treatment, Piqua, OH. Dr. Bell provided support for evaluation of data collected during piloting of BioActiflo™. The pilot was conducted because a desktop analysis identified this process as the most cost effective means of addressing requirements of the Ohio EPA NPDES permit to implement full secondary treatment for all flows at the City's WWTP. While the process provided excellent treatment, additional evaluation of the main liquid treatment process train showed that the available biomass could not support the treatment objectives of the project and the next higher cost alternative was selected for implementation. Design of a new facility is currently underway and Kati will continue to support Piqua in meeting full secondary.

Technical Specialist, Evaluation of Emerging Chemicals of Concern in Onsite Wastewater Treatment Systems (OWTS), Suffolk County, NY. Dr. Bell provided an overview of the occurrence and fate of emerging chemicals of concern in OWTS with a focus on the conditions that are representative of the local subsurface environment. Suffolk County has approximately 365,000 onsite sewage disposal systems that represent about 74% of the county. Compounds including pharmaceuticals and personal care products have been detected in ground and surface waters; these are continuously introduced into

the environment by sewage treatment plants and by on-site wastewater disposal systems (e.g., septic tanks and leach fields) in unsewered areas. The focus of this project was to identify trends in occurrence and fate of emerging chemicals of concern to inform the County with respect to managing this issue, including investigating the implementation of more advanced OWTSSs.

Technical Director, NPDES Permit Negotiations, Memphis, Tennessee. Dr. Bell is providing negotiations support to the City of Memphis on NPDES permitting and associated process upgrades for the 250-mgd peak flow at the M.C. Stiles and 160-mgd peak flow at the T.E. Maxson WWTPs. As part of these projects, Dr. Bell has, and continues to review various drafts of the facility permits and documenting the major issues that should be addressed with TDEC to result in a fair and equitable permit for the city. Concurrently, with permit negotiations, Dr. Bell is conducting detailed evaluations of WWTP operating data, overall treatment capabilities, and previous studies that have been generated during development of the permit. She is also providing technical support for Memphis in designing and implementing studies to address permit issues including color, foaming and pending disinfection requirements. The information developed during these studies is being used to design and implement appropriate treatment upgrades at both facilities, once a final permits have been issued.

Lead Practitioner, Fox River Water Reclamation District, Elgin, IL. Dr. Bell provided technical support for evaluation of the Fox River Water Reclamation District's (FRWRD) North Plant. The evaluation included identification of options that could be implemented to increase the average-day flow capacity from 7.75 to 10 mgd as well as identifying alternatives that could be implemented to address high flows. This evaluation also included identifying process options for phosphorus removal, because total phosphorus (TP) limits could be included in the future NPDES permits at concentrations less than 1.0 mg/L TP. The overarching goal of this study was to identify the aforementioned benefits by implementing operational improvements to minimize capital expenditures for facility modifications.

Technical Specialist, Jefferson County, Alabama Environmental Services Department, Birmingham, AL. Dr. Bell provided study and report phase services related to the Cahaba River WWTP TMDL Compliance Master Plan. Part of this project included an evaluation of the liquid treatment processes at the Trussville and Cahaba WWTPs to produce recommendations for improvements necessary to effectively and cost efficiently operate the WWTP and comply with a future total phosphorous limit of 0.2 mg/L with contemplation of a future more stringent limitation of 0.043 mg/L. Dr. Bell provided technical support for developing and implementing the on-site testing protocol for jar testing to understand the practical limits of treatment to make recommendations for facility improvements at both plants.

Project Manager, NPDES Permit Coordination, Metro Nashville Airport Authority (MNA), Nashville, TN. Dr. Bell provided technical support in preparation of the NPDES permit application, and permit review and negotiations. As part of this process Dr. Bell conducted a review of the MNA's NPDES permit, including operational data, completed the permit application for the Tennessee Department of Environment and Conservation. During the re-permitting process Dr. Bell worked with MNA staff to coordinate communications and negotiations throughout the application and permitting process.

Project Manager, WWTP Relining Project, Metro Nashville Airport Authority, Nashville, TN. Dr. Bell managed design and construction services and associated inspection services for installation of a new liner on the existing deicing treatment lagoon and north and south stormwater collection ponds. As part of this project, the existing liner in the treatment lagoon was replaced as part of the project while the other ponds have never been lined and will be lined for the first time. The three lagoons had a total required lining area of 20,000 sq. ft., 55,000 sq. ft., and 95,000 sq. ft. respectively for the North Pond, South Pond, and Treatment Lagoon. Work during this project included evaluation of liner options, design and production of construction documents, bidding assistance, construction and inspection services.

Project Engineer, Biologically Enhanced High Rate Clarification (BEHRC) Pilot Study and Process Design, Knoxville Utilities Board, Knoxville, TN. In accordance with the requirements of the Consent Decree and the approved Composite Correction Program (CCP), KUB will implement full secondary treatment for all flows that reach the Kuwahee WWTP and the Fourth Creek WWTP. The BEHRC process has been selected for treatment of flows that exceed the capacity of existing secondary treatment facilities. Because traditional HRC is not considered secondary treatment, addition of a biological solids contactor (i.e. pre-aeration) introducing return activated sludge (RAS) to the treatment train and enhances performance of the high rate clarifier through the removal of soluble BOD. Because BEHRC was a relatively new process, pilot testing was required to identify design criteria to meet secondary treatment limits. Dr. Bell developed a pilot work plan and coordinated extensive sampling and analytical work; she also developed pilot reports for the facilities that identified full-scale design criteria.

Technical Specialist, Pine Island WWTP Assessment, National Park Service, Everglades, FL. Dr. Bell provided technical review of the process performance of the Pine Island WWTP. The Pine Island facility is a package membrane bioreactor (MBR) designed to provide advanced wastewater treatment to achieve high levels of nutrient removal followed by disinfection prior to discharge in rapid infiltration basins in the Everglades National Park. Process control issues and low transmittance of the filtered required an evaluation to identify operational adjustments to optimize plant performance. During the assessment, it was determined that plant staff had modified the facilities and the supernating practice associated with the solids holding process was not consistent with the original design of the plant. Dr. Bell worked with the project team to make specific recommendations plant staff for restoring plant performance and coordinated regulatory discussions.

Technical Specialist, Blower Demonstration Study, City of Fort Myers, FL. Rising energy costs and an interest in sustainability prompted Fort Myers, FL, to investigate mean of reducing energy consumption. One option identified for decreasing energy was to replace the aging and inefficient blowers that supplied air to the aerobic digesters at the Central Advanced WWTP with more efficient turbo blowers. Overall results from the pilot test showed that simply replacing the existing blower with an appropriately sized turbo blower could reduce power draw by more than a third for the aerobic digestion process. Also, while results of the demonstration study were quite good, it is expected that additional energy savings could be realized if automatic DO control were implemented. Results of this study were published in WE&T, in May 2010.

Technical Specialist, Lift Station Precipitation Study, Indian River County, FL. The county owns and operates two reverse osmosis (RO) water treatment plants and through the course of operation, the formation of precipitant has been observed in the odor control lift station at both facilities. This precipitation has also formed inside of the downstream lift station force mains and if left untreated has the potential to block future flow. Dr. Bell performed a study to identify the chemistry responsible for the lift station precipitation and recommended possible solutions. Dr. directed data collection efforts and developed the geochemical model to assess the potential sources of mineral precipitation. The evaluation showed that the mixing ratios of blow-down water, RO reject water, raw water, and wastewater in tile collection system were the root cause of mineral precipitation. Additional modeling was conducted to evaluate the viability of potential engineering solutions.

Project Engineer, Chemically Enhanced Primary Treatment, Knoxville, TN. Dr. Bell provided engineering support services to the Knoxville Utilities Board to assist with implementation of improvements included under the EPA-approved Composite Correction Program (CCP). One of these process improvements was to implement chemically enhanced primary treatment (CEPT) to augment TSS removal efficiency and decrease the concentration of TSS in the primary clarifier effluent. Dr. Bell coordinated bench-testing and selection of process chemicals and worked with KUB to implement full-scale pilot testing. The project has been completed and the CEPT will help KUB reduce TSS and BOD which can positively impact downstream process during wet weather flows.

Technical Specialist, Process Optimization at the Stiles WWTP, City of Memphis, TN. Dr. Bell provided support services for staff at the Stiles WWTP to evaluate potential causes of foaming and color issues at the facility. While both foaming and color have been consistently observed over years of operations, redevelopment and activity along the riverfront has made the foaming and color an issue. Dr. Bell collaborated with plant staff to implement a preliminary sampling and analysis plan and has coordinating with City of Memphis engineers to develop a database of industrial discharger information to identify potential contributors to both the foaming and color in the plant. The analysis showed that these issues were primarily related to industrial discharges, and as such Kati continues to support the City in addressing these issues that are required to be addressed in the new draft permit for the facility.

Project Engineer, Hallsdale-Powell Utility District (HPUD), Beaver Creek WWTP - Phase 3 Solids Train Upgrade, Knoxville, TN. The solids treatment process at the HPUD Beaver Creek WWTP was not capable of consistently meeting Class B biosolids requirements. To proactively address the solids treatment process and plan for future biosolids management needs, Dr. Bell supported HPUD in conducting an evaluation of technologies for improved thickening, stabilization, and dewatering of biosolids under current and future operations. Dr. Bell supported cost and non-cost evaluations and client workshops to select and implement a strategy. Also, as part of this project, Dr. Bell led a pilot testing program which included: a screw press, rotary press, and centrifuge.

Project Engineer, Wastewater Treatment Facility Plan, Knoxville, TN. Dr. Bell provided engineering support to the Knoxville Utilities Board (KUB) for WWTP Facilities Planning. Similar to most utilities, KUB faces rising energy costs and an increasing consumer demand for sustainable practices. The project used an integrated approach to implementing projects to lower energy consumption and life-cycle costs to

offset rising energy costs and improve treatment operations. Dr. Bell coordinated development of the Kuwahee Facility Plan which included prioritization of short-term capital improvement projects that were consistent with long-term planning and budgeting. The report is a culmination of assessments, evaluations, cost estimates, and lifecycle analyses from various engineering disciplines.

Project Engineer, Kuwahee Wastewater Treatment Plant Blower Upgrades, Knoxville, TN. As part of the facility upgrades at the WWTP, Dr. Bell supported the design, installation and start-up of new high-speed turbo blowers to replace the 2,000-hp blowers. Because the discharge pressure requirements for the nitrification basins is significantly different than that for the aerated grit chamber and pre-aeration basins, smaller blowers were installed close to the head of the plant to meet these the process air demands for aerated grit and pre-aeration. While the small blower installation was seamless, there were challenges during start up with the larger blowers feeding the nitrification basins due to the manufacturer providing standard discharge orifice plates that did not provide adequate backpressure during restart. Kati supported the investigation and remedy of the issues with the manufacturer and the blowers have resulted in power consumption reductions for aeration of approximately 30%.

Technical Review Engineer, Mud Creek Water Pollution Control Plant (WPCP), Valdosta, GA. Plans for expansion at the Mud Creek WPCP included UV disinfection and chemical phosphorous removal. Preliminary engineering indicated that UV transmittance would exceed 60 percent however, measurements of tertiary effluent resulted in transmittance data between 40 and 50 percent. Dr. Bell developed a work plan for determining if the proposed phosphorus removal process could improve UVT. She oversaw protocol development and testing which demonstrated that chemical precipitation could remove UV absorbing compounds to improve transmittance to the extent that the required UV equipment and associated electrical costs could be significantly reduced for the project.

Project Engineer, WWTP Facility Plan, Knoxville, TN. Dr. Bell provided engineering support services to the Knoxville Utilities Board for WWTP Facilities Planning. She, coordinating the development of the Kuwahee Facility Plan which will include prioritization of short-term capital improvement projects to be consistent with long-term planning and budgeting. The Report is a culmination of assessments, evaluations and cost estimates from various engineering disciplines. As a multidisciplinary team member, she is also conducting an alternatives evaluation for disinfection of treated wastewater to replace the gas chlorine system and for options to upgrade/replace the aging aeration system equipment which includes large multistage centrifugal blowers.

Project Engineer, Combined Sewer System Long Term Control Plan, Paducah, KY. Dr. Bell provided engineering support to the Paducah McCracken County Joint Sewer Agency and developed and managed the water quality monitoring and analysis task, which included evaluating the effect of wet-weather (storm) events on receiving water quality.

Project Engineer, Pump Station Facility Plan, Knoxville, TN. Dr. Bell assisted the Knoxville Utilities Board develop their 20-year Facility Plan as part of their Continuing Sewer System Assessment Program (CSSAP). The Plan included a 5-year breakdown of priority projects and cost estimates for these projects.

Priorities were developed based on a pump station condition and criticality assessment, force main condition and criticality assessment, and modeling.

Project Engineer, Overflow Abatement Program (OAP), Metropolitan Water Service (MWS), Nashville, TN. Dr. Bell researched the effects of septic tank systems and urban stormwater runoff on tributaries of the Cumberland River through the OAP. Additionally, Kati assisted Nashville MWS with an evaluation of data on pump stations, flow monitoring, discharges from industrial customers, as well as modeling to project future flows and develop alternatives.

Project Engineer, Preliminary Engineering Study, Cumberland River Water Improvement Authority, TN. Dr. Bell conducted a preliminary engineering study for an NPDES permit application for a proposed wastewater treatment facility that would discharge into the Cumberland River.

Project Engineer, WWTP Process Evaluation, Oak Grove, KY. Dr. Bell evaluated WWTP process operations to develop recommendations for optimizing waste treatment and solids management. Additionally, she reviewed design criteria for the plant and current operating data to determine the capacity limiting processes.

Project Engineer, Evaluation of Alternatives for Treatment, George Dickel, Tullahoma, TN. Dr. Bell developed and evaluated alternatives for treatment and disposition of stillage waste in a distillery stillage waste management plan.

Project Engineer, Nitrogen Removal Research, Ardmore, TN. For the Tennessee Department of Transportation, Dr. Bell conducted research on optimizing nitrogen removal using re-circulating sand filters (RSF) at the I-65 Welcome Center in Giles County in conjunction with Vanderbilt University. The work proved that denitrification could be enhanced and capacity of plants can be increased, making RSF technology cost-effective for larger facility flows.

4.0 Water Treatment and Regulatory Support

Drinking water treatment has been a long interest with Dr. Bell having specific interest in treatment processes that offer facilities the capability of addressing emerging contaminants of concern, addressing disinfection by-product formation and compliance, and disinfection practices. Kati has extensive experience with selection, design and implementation of numerous drinking water unit processes and she is skilled at troubleshooting facilities that experience challenges with treatment compliance.

Water Treatment Plant Process Lead, Confidential Client. The City owns and operates a public water system (PWS) that provides treated drinking water to the city's residents. The City's current water supply consists of five Floridan Aquifer System (FAS) water supply wells in which 1,4-dioxane (1,4-D) has been detected. The current Florida Department of Environmental Protection (FDEP) groundwater cleanup target level (GCTL) for 1,4-D is 3.2 micrograms per liter ($\mu\text{g/L}$) [Florida Administrative Code (F.A.C.) Chapter 62-777]. The Florida Department of Health (FDOH) has published a health advisory level (HAL) that suggests that the concentration of 1,4-D in drinking water should not exceed 0.35 $\mu\text{g/L}$, based on a possible lifetime exposure (FDOH 2013). While exposure to drinking water with the highest reported 1,4-D concentration would pose an "extremely low" increased risk of adverse health effects (FDOH 2016), as a conservative measure, private parties have agreed to assess treatment alternatives, test, design, and implement a selected treatment alternative to reduce 1,4-D concentrations to below the HAL (0.35 $\mu\text{g/L}$). The project consisting of UV-AOP and GAC, is currently under design with Dr. Bell has supporting process selection, design, and implementation.

Technical Specialist, Water Treatment Plant Evaluation and Withdrawal Permitting, Franklin, TN. As part of its Integrated Water Resources Plan (IWRP) the City of Franklin (City) has undertaken an evaluation of its water treatment facility. Dr. Bell supported the project team in reviewing previous studies and identifying issues related to regulatory compliance. To address compliance with the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 D/DBPR) and the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), Dr. Bell supported the development of cost estimates to address these issues and this information was incorporated into the IWRP, with the recommendations for UV disinfection and other upgrades being implemented at the water treatment plant. In addition to the treatment process evaluation and recommendations, Kati has developed the materials necessary to support a contentious renewal of the Aquatic Resource and Alteration Permit that allows the City to withdraw water from the Harpeth River under very strict flow and water quality conditions.

Technical Specialist, USAID Water/Wastewater Infrastructure Project, Amman, Jordan. Dr. Bell supported development of a feasibility study to evaluate a proposed connection of brackish water wells in the Jordan Valley to the Wadi Mujib-Zara-Ma'in (MZM) water treatment and conveyance system to Amman or the resort areas along the Dead Sea. The study included an evaluation of the yield of existing wells, their associated water quality, and the potential for expansion within the Hisban area that would include the potential for leveraging existing infrastructure assets in the area. Dr. Bell led the technical task to define the Hisban water quality and treatment requirements, and supported the engineering team in identifying and assessing alternatives for incorporating the Hisban water into Amman's supply.

Technical Specialist, Waukegan Water Department, Waukegan, IL. Dr. Bell provided technical support and guidance for evaluation of replacement of the gas chlorine disinfection system with bulk sodium hypochlorite either be generated onsite or provided in bulk delivery. The evaluation and design considered current and pending regulations related to sodium hypochlorite generation, handling and feed. Ultimately, the cost and non-cost evaluation resulted in selection of conversion to bulk hypochlorite delivery and the project was ultimately designed and implemented.

Project Engineer, Water Treatment Plant Disinfection Conversion, Nashville, TN. Dr. Bell provided engineering support for evaluation of alternative disinfection options at the Omohundro and K.R. Harrington water treatment plants (WTPs). Each of the approximately 50-mgd plants provided disinfection utilizing chlorine gas. While the primary focus was to find alternatives to decrease risk management efforts and increase public safety, it was important to also minimize operation costs. An assessment of the cost and non-economic factors for four different alternatives was conducted; recommendations were to provide a phased conversion to onsite generation of sodium hypochlorite at both facilities, to ease transition of operations. These projects are currently being implemented.

Technical Specialist, Miami-Dade Water and Sewer Department (MDWSD), South District Water Reclamation Plant Hydrogeochemical Modeling Analysis, Miami, FL. As part of the 20-year Water Use Agreement between Miami-Dade County and the South Florida Water Management District for developing alternative water supplies and water conservation measures to meet future water needs, the MDWSD evaluated indirect potable reuse of reclaimed water via aquifer recharge at the Miami Metro Zoo. Dr. Bell conducted the technical analysis for evaluating the compatibility of highly treated reclaimed water for recharging the Biscayne Aquifer. Kati used the U.S Geological Survey PHREEQC model to assess geochemical conditions of the aquifer recharge/mixing zone that would potentially result when source water (RO and UV treated reuse water) is used to recharge the aquifer. Information including the predicted saturation indices of the dominant minerals under constant recharge conditions and the potential for release of arsenic in the aquifer system was developed. The modeling scheme also considered two conditions that could be encountered in either the shallow aquifer system or in the deep aquifer system. Results of the analysis showed that potential impacts of aquifer clogging would not be a concern; however, the potential for arsenic release under continuous recharge conditions is probable and as such, a flow-paced chemical pretreatment system was recommended and included in the design.

Project Engineer, Geochemical Modeling for Aquifer Storage and Recovery (ASR), Sanford, FL. ASR is a component in many water supply initiatives in Florida. The challenge to this technology is undesirable water chemistry changes in the aquifer storage zone; these changes are specifically arsenic dissolution from the subsurface storage zone and subsequent detection in recovered water. Dr. Bell conducted geochemical modeling to evaluate interactions of injected source water and native groundwater with the storage aquifer matrix to evaluate the potential for arsenic leaching at the Sanford Auxiliary Water Treatment Plant site. Results of this geochemical modeling were used to establish design criteria for pretreatment of source water by dechlorination and degasification to reduce arsenic leaching potentials.

Project Engineer, Aquatic Resource Alteration Permit (ARAP) for a Water Supply Reservoir (Dam), Portland, TN. Dr. Bell assisted with evaluation of several alternatives, including groundwater, water

harvesting, connection to existing systems, transmission of water from other water supplies (the Cumberland River), and construction of a reservoir for meeting the City's water supply demands.

Project Engineer, Source Water Evaluation, Hartsville, TN. For Hartsville Utility District, Dr. Bell evaluated source water from the Cumberland River to determine optimum process design for a new 4-mgd membrane facility. The focus was on characterizing organic carbon to select a process for optimizing removal of disinfection by-product precursors.

Project Engineer, Source Water Evaluation, Bristol Bluff City, TN. For Bristol Bluff City Utility District, Dr. Bell evaluated source water from the South Fork Holston River to determine optimum process design for expansion of their existing water treatment facility. The focus was on characterizing organic carbon to select a process for optimizing removal of disinfection by-product precursors.

Project Engineer, Source Water Evaluation, Sewanee, TN. For Sewanee Utility District, Dr. Bell evaluated source water from impoundments in a protected watershed to determine optimum process design for a new 1-mgd membrane facility. The focus was on removal of iron and manganese and disinfection by-product precursors.

Project Engineer, Aquatic Resource Permit Application (ARAP), City of Red Boiling Springs, TN. Dr. Bell developed an ARAP application for increasing water withdrawal from Sabin Springs.

Project Engineer, Mock Sanitary Survey, Madison, TN. For Madison Suburban Utility District (MSUD), Dr. Bell conducted a mock sanitary survey of MSUD to prepare for an impending sanitary survey by state regulators. The identified deficiencies were addressed and new scores were significantly higher.

Project Engineer, Twin States, TN and AL. Dr. Bell evaluated groundwater under the direct influence of surface water for possible use as a drinking water source. She also conducted work for permitting bottled water facilities near Rascaltown (TN) and Shoal Creek (AL).

Project Engineer, Source Water Evaluation, Dickson, TN. For the Water Authority of Dickson County, Dr. Bell evaluated source water and selected chemicals and designed a plan for eradication of an Asiatic clam infestation at the Cumberland River Plant.

Project Engineer, Evaluation of Plant Hydraulics and Process Operations, Adams-Cedarhill, Adams, TN. Dr. Bell evaluated plant hydraulics and process operations to develop recommendations for optimizing treatment. Recommendations were to repair and replace filter components; additional process testing with streaming current showed alum was the ideal coagulant for treatment of source water.

Project Engineer, Source Water Evaluation, Dickson, TN. For the Water Authority of Dickson County, Dr. Bell designed bench tests to evaluate source water and alternative coagulants for pretreatment to optimize total organic carbon (TOC) removal at the Cumberland River Plant. She implemented plant-scale tests to optimize enhanced coagulation with selected alternative to meet Stage 2 Disinfectants and Disinfectant By-Product rules. She also monitored and evaluated TOC removal using UVT and disinfection by-product formation potentials.

Project Engineer, Assessment of Treatment Efficiency, Clairfield, TN. For Clearfork Utility District, Dr. Bell assessed treatment efficiency for an iron/manganese removal plant. She developed bench and jar test protocols to evaluate treatment kinetics, chemical addition requirements and point of application. Results of laboratory tests were used in preparation of final plant modification designs.

Project Engineer, Groundwater Assessment, Caryville, TN. For Caryville - Jacksboro Utility Commission, Dr. Bell provided assessment of groundwater to determine the appropriate chemical treatment processes for removal of iron and manganese from groundwater.

Project Engineer, City of Kingsport Water Treatment Plant, Kingsport, TN. Dr. Bell evaluated plant hydraulics and helped develop a plan to balance flow through the plant to maximize clarifier efficiency. She evaluated raw water and plant process operation/control to develop recommendations for procedures to monitor total organic carbon and disinfection by-product precursors.

5.0 Environmental Remediation and Stormwater Management

Dr. Bell originally started her engineering career in environmental remediation and has gained a breadth of experience in water management practices, particularly as related to management of stormwater on these sites. With her background in biology and environmental science, she has supported numerous clients with site remediation and regulatory support.

Project Director, Wastewater Remediation at the General DeWitt Spain Airport, City of Memphis, TN.

The City of Memphis (City) experienced an overflow of raw wastewater being pumped to the M.C. Stiles wastewater treatment plant (WWTP) in March 2018. The release resulted in untreated wastewater pooling in the grassy areas near the runway at the General DeWitt Spain Airport, adjacent to the WWTP. The Tennessee Department of Environment and Conservation (TDEC) was appropriately notified immediately following the spill, and the City responded to the spill immediately to pump out raw wastewater that had been diluted by river and storm water to protect the airport and its resources (hangars, offices and aircraft). Dr. Bell supported the City with assessment of risks associated with microbial contamination and provided guidance with remedial actions, and coordination with TDEC.

Project Director and Technical Specialist, McKellar Lake Remediation Project, City of Memphis, TN.

The City of Memphis experienced a sewer line break in the Nonconnah Interceptor near McKellar Lake that released untreated wastewater into the mouth of South Cypress Creek. Dr. Bell has been supporting the City of Memphis with development of work plans, implementation of monitoring and testing, analysis of data and communications with the Tennessee Department of Environment and Conservation. Three major efforts have been associated with this project as follows.

McKellar Lake Monitoring – Dr. Bell supported the City in evaluation of monitoring data collected in McKellar Lake that was implemented immediately following the spill. She also provided data analysis and regulatory agency coordination and communication during the monitoring program. She also developed a report that summarized the monitoring data and showed how this data supported an assessment that water quality had returned to pre-spill conditions. As a result, TDEC allowed the City to utilize the report as rationale for discontinuing monitoring and sampling in McKellar Lake proper.

Documentation of Microbial Fate and Bacteria Testing - Several property claims have been filed in response to the spill, and there have been questions regarding continued dredging and disposal of McKellar Lake sediments on Treasure Island. Dr. Bell worked with the Johns Hopkins University Alliance to document the scientific understanding of information related to potential issues associated with the spill. In addition to the technical memorandum documenting data from peer-reviewed scientific literature, recommendations for additional sampling and analysis were provided to verify findings, based on site-specific conditions. Dr. Bell led the multidisciplinary, multi-company team to conduct additional sampling, analysis and reporting.

South Cypress Creek Remediation – Dr. Bell proposed an innovative system for restoring the dissolved oxygen and water quality at South Cypress Creek and led the development and implementation of a work plan that included installation of a skid mounted SDOX® system,

oxygen supply, and generator. The generator and SDOX® system were installed and oxygen was injected into South Cypress Creek in the vicinity of the wastewater spill. The system proved successful at adding dissolved oxygen into the system to support enhanced natural attenuation of wastewater derived contamination.

Project Manager and Technical Reviewer, Program Assistance for the City of Memphis Stormwater Program, Memphis, Tennessee. Dr. Bell provided regulatory coordination and engineering support services for program assistance to support various stormwater program tasks. Kati provided project management and technical support on the Wolf River bacterial source tracking (BST) program and the Wolf River visual stream (TMDL) assessment. During these tasks Dr. Bell provided oversight of staff in development of Work Plans as well as technical coordination with the state regulatory agency for approval and implementation of these plans.

Project Engineer, Copperhill Long-Term Environmental Cleanup, Glen Springs Holdings, Inc., TN. The Copper Basin Mining District site is a 50-square-mile area that includes two major mining impacted watersheds. The site includes the 10,000-acre North Potato Creek watershed and the 3,000-acre Davis Mill Creek watershed. Because of a unique, collaborative approach to clean-up, significant progress was made quickly to reduce contaminant loading to the Ocoee River. Dr. Bell was an integral part of the team that conducted work on the site and was responsible for providing technical guidance for developing the overall geographic information system (GIS) for the project. She was the task manager for developing methods for collection of field GIS data and QA/QC of field data; integration of laboratory (analytical) data with the project geodatabase; development of a portable x-ray fluorescence methodology for identifying acid-generating waste materials in the field; and, coordination of state regulatory and permitting efforts including Underground Injection Control (UIC) permitting for disposal of acid mine drainage impacted water in underground mine workings.

North Potato Creek Watershed

As part of the long-term cleanup in North Potato Creek, Dr. Bell developed work plans, collected field data, evaluated monitoring data, and wrote final reports for various remedial actions throughout the watershed. Using information collected through these efforts, Kati developed hydrologic and contaminant loading models from stormwater monitoring data to aid in design of innovative in-pit lime neutralization facility. The final plant design incorporated provisions for treating both base and 10-year storm flows originating from the mining impacted watershed. In addition to engineered treatment solutions, she also worked with biologists to develop a Stream Restoration Guidance Manual to address geomorphological and ecological issues to restore tributaries on site.

Davis Mill Creek Watershed

For the Davis Mill Creek long-term cleanup, Dr. Bell developed sampling and analysis plans and conducted field sampling for the Davis Mill Creek Remedial Investigation and the Ocoee River monitoring program. She evaluated surface water chemistry and performed geochemical modeling of water quality data to determine the fate and transport of environmental contaminants in the watershed as part of the Remedial Investigation. Using this information Kati

developed watershed hydrologic and contaminant loading models for stormwater flows to identify key areas for targeted remediation.

Project Manager, Groundwater Remediation of Assessment, Wilmington, North Carolina. Dr. Bell developed a conceptual plan for addressing groundwater contamination from a historic fertilizer plant. The plan included design of a system that would provide in-situ nitrification/denitrification of ammonia and nitrate using a combination of groundwater air sparging, and injection of soluble carbon at a downgradient permeable reactive barrier.

Project Engineer, Remediation Development for Subsurface Contamination, Newark, New Jersey. For Conrail, Dr. Bell developed the conceptual framework for conducting remediation of subsurface contamination at the Pavonia Rail Yard; contaminants of concern included petroleum hydrocarbons and associated degradation products.

Project Manager, Selection of Remedial Alternatives, Franklin, TN. For a confidential client, Dr. Bell provided technical guidance for selection of remedial alternatives that included bioremediation of subsurface contamination; contaminants of concern included BTEX compounds, as well as chlorinated solvents and their degradation products. She also managed geophysical investigations, site monitoring and reporting at the site.

Project Engineer, Cumberland River Compact, Franklin, TN. Dr. Bell developed Aquatic Resource Alteration Permit applications and the Storm Water Pollution Prevention Plan for a stream restoration project as part of the Cumberland River Compact's Building Outside the Box (BOB) Program. She also provided engineering quality control for the geomorphologic design of the restoration plan.

Project Engineer, Cumberland River Compact, Antioch, TN. Dr. Bell managed and designed a stream bank stabilization project to address the highly eroded banks of Quiet Creek. Bank erosion was a direct result of stormwater impacts from rapidly developing areas upstream of the reach. This project was funded through an EPA Targeted Watershed Grant.

Project Engineer, Tributary Stream Model Development, Franklin, TN. For Trillium Ventures, Inc., Dr. Bell developed a GIS used manage project data on tributary streams to the Harpeth River. She also used information stored in the geodatabase to run HEC-GeoRAS and HEC-RAS to establish the 100-year flood limits and required finished floor elevations for lots throughout the development.

Professional Activities

Industry Organization Participation

- International Ultraviolet Association, President (previously served as Secretary, Treasurer, and President-Elect, Past-President Ex-Officio Board Member)
- WEF Disinfection and Public Health Committee, and Technical Practice Committee Liaison
- WaterReuse Association: National Regulatory Committee, Vice-chair
- American Water Works Association: Disinfection Systems Committee
- American Academy of Environmental Engineers: Water Supply and Wastewater Committee

Project Advisory Committees

- Project Steering Committee Member for Water Environment & Reuse Foundation Project ENER16C15, Design and Validation Protocol for UV Disinfection Systems Used in Municipal Wastewater Treatment and Reuse Applications
- Water Research PAC, Project #4478 - Integrating Action Spectra and CFD Analysis for Optimizing Inactivation Credit of Regulated Pathogens in Medium Pressure UV Disinfection Systems
- PAC for National Water Research Institute (NWRI) Direct Potable Reuse Framework (2015)

Collaborative Document Development

- Technical Chair of the Water Environment Foundation Special Publication, Guidance for PAA Disinfection Implementation (ongoing, expected publication in 2019)
- Project Director for the US EPA Cooperative Research and Development Agreement (CRADA), EPA Potable Reuse Compendium (2017)
- Expert Panelist for the Water Environment Foundation Water Reuse Roadmap (2016)
- Technical Chair of the WEF/IUVA Special Publication, UV Disinfection for Wastewater (2015)
- Project Manager for the EPA CRADA, 2012 EPA Guidelines for Water Reuse

Scientific and Technical Advisory Positions

As an industry expert, Dr. Bell has been invited to participate in an advisory role for agencies and organizations to develop and apply knowledge of the state of the industry in these specific technical areas. A list of the current positions is summarized here:

- Georgia Environmental Protection Division, External Review Committee Member for Georgia Guidance on Planned Indirect Potable Reuse (IPR).
- Tennessee Department of Environment and Conservation (TDEC), Water Reuse Advisory Group Member for examining opportunities and make recommendations for how TDEC can incorporate water reuse into permits offered by the department
- US EPA Experts Panel for Peak Wet Weather Flows held June 2014, proceedings published 2015
- Scientific Advisory Board for PeroxyChem, a producer of an EPA registered a peracetic acid
- Scientific Advisory Committee for BlueInGreen, gas dissolution and transfer technology provider

Papers, Presentations and Publications

Hooper, J., Funk, D., Bell, K. (2018). Demonstration of Direct Potable Reuse using Multi-Stage Ozone-Biological Filtration (BAF) Direct Potable Reuse Using Ozone-Biological Filtration Without Reverse Osmosis, Water Environment Foundation WEFTEC, New Orleans, LA, *accepted*.

Funk, D., Hooper, J., Bell, K. (2018). Direct Potable Reuse Using Ozone-Biological Filtration without RO, WaterReuse Symposium, Austin, TX, *accepted*.

da Silva, A., Bell, K. Non-potable reuse – getting squeezed out in favor of potable reuse? WaterReuse Symposium, Austin, TX, *accepted*.

Funk, D., Hooper, J., Noibi, M., Oliva, R., Bell, K. (2018). Pilot-Scale Demonstration of Direct Potable Reuse Using Ozone and Biological Filtration, Georgia Association of Water Professionals Conference, Savannah, GA.

Holmer, M., Bell, K. Peracetic Acid Full-Scale Trial at East Bay Dischargers Authority for Disinfection of Secondary Effluent, AWWA – ACE, Las Vegas, NV.

Bell, K.Y. (2018) Do you know where your water comes from? Brighton University Centre for Aquatic Environments Launch Event, Brighton, UK, invited speaker.

Bell, K.Y. (2018) Do you know where your water comes from? The facts of de facto and planned potable reuse, 53rd Central Canadian Symposium on Water Quality Research, Toronto, Canada.

Weng, S.-C., Dunkin, N. Schwab, K.J., McQuarrie, J. Bell, K. Jacangelo, J.G. (2018). Infectivity Reduction Efficacy of UV Irradiation and Peracetic Acid-UV Combined Treatment on MS2 Bacteriophage and Murine Norovirus in Secondary Wastewater Effluent, submitted to Water Research, 221:1-9.

Bell, K. (2017). Trends in Disinfection and Water Reuse. CWEA, San Francisco Bay Section, Pleasant Hill, CA.

Funk, D., Bell, K., Hooper, J., Machek, E. (2017). Demonstration of Direct Potable Reuse using Multi-Stage Ozone-Biological Filtration (BAF) Water Quality Technology Conference, Portland, OR.

Stec-Uddin, E., Atwater, A. Cowan, K., Van Anderson, B., McQuarrie, J., Bell, K., da Silva, A. (2017). Evaluation of Peracetic Acid as an Alternative to Chloramine for Effluent Disinfection at the Robert W. Hite Treatment Facility – Part I, Water Environment Foundation WEFTEC, Chicago, IL.

Bell, K., da Silva, A., Jacangelo, J. (2017) Ambient Water Quality North America Virus Criteria Development Status, IUVA World Congress, Dubrovnik, Croatia.

Bell, K., da Silva, A., Jacangelo, J. (2017) Efficacy of UV and UV-PAA on MS2 and murine Norovirus in wastewater effluent IUVA World Congress, Dubrovnik, Croatia.

Bell, K.Y. (2017) UV 101 Workshop: Fundamentals, Basics, Applications, and Opportunities, UV Systems for Wastewater and Reuse: Validations and application case studies, IUVA World Congress, Dubrovnik, Croatia, *invited speaker*.

Funk, D., Bell, K., Hooper, J., Machek, E. (2017). Piloting Direct Potable Reuse with Multi-Stage Ozone Biofiltration – Key Findings and Lessons Learned, IOA World Congress, Washington, D.C.

Jacangelo, J.G., Bell, K., Schwab, K. (2017) Role of Water Reuse in a Total Water Solutions Paradigm, AWWA ACE, Philadelphia, PA.

Bell, K. (2017) One Water Workshop - Application and Disinfection Techniques across Storm Water and Combined Sewers. AWWA ACE, Philadelphia, PA.

Bell, K.Y. (2017) The microbiological quality of recycled water and how to define minimum water quality requirements - Introduction to Water Reuse and Opportunities for Potable Reuse Policy, UNC Water Microbiology Conference, Chapel Hill, NC.

Bell, K.Y. (2017). Water Reuse in Florida History, Regulations and Florida Reuse Initiatives, Florida Water Resources Conference, Palm Beach County, FL.

Wells, M.J.M., Mullins, G.A., Bell, K.Y. da Silva, A.K. and Navarrete, E.M. (2017). Investigation of *de facto* potable reuse in the Neuse River, North Carolina, USA using UV excitation-emission matrix fluorescence spectroscopy. *Environmental Science & Technology*, 51, 23, 13592-13602.

Bell, K.Y. (2017). Practical Application of UV and UV-AOP in Advanced Water Reuse. 100th Canadian Chemistry Conference and Exhibition, Toronto, Canada, *invited speaker*.

Dunkin, N., Weng, S.-C., N. Schwab, K.J., McQuarrie, J. Bell, K. Jacangelo, J.G. (2017). Comparative Inactivation of Murine Norovirus and MS2 Bacteriophage by Peracetic Acid and Monochloramine in Municipal Secondary Wastewater Effluent, submitted to *Environmental Science and Technology*, 51(5): 2972-2981.

Bell, K.Y. (2016). Potable Reuse Success Stories from across the Country. AWRA Annual Water Resources Conference, Orlando, FL.

Bell, K.Y., da Silva, A.K., and Jacangelo, J.G. (2016) Disinfection of Municipal Wastewater Effluent - What's in a Dose? NYWEA Currents.

Bell, K.Y., da Silva, A.K., and Parkin, M. (2016). Direct Potable Reuse and the Intersection of the Clean Water Act and Safe Drinking Act. *Water Environment & Technology*, November.

Hobbs, C., Hooper, J., Schulz, C., Funk, D., Bell, K.Y. (2016). Pilot-Scale Demonstration of Ozone and Biological Filtration for Direct Potable Reuse. Florida AWWA 90th Annual Conference, Orlando, FL.

Bell, K.Y. (2016). What's in a UV Dose? Implications of the US regulatory actions on our view of the water cycle. IUVA/Confluence Workshop, Covington, KY.

Bell, K.Y. (2016). Peracetic Acid Disinfection for Wastewater. California WEA Workshop – Wastewater Disinfection: Discharge and Reuse, Roseville, CA.

Bell, K.Y., da Silva, A.K. (2016). Implications of a Potential New Bacteriophage Criteria for Wastewater Disinfection. IOA Pan American Group Conference, Las Vegas, NV.

Bell, K.Y. (2016). Regulatory Considerations for Water Reclamation and Reuse and the Role of Ozone in Meeting Future Treatment Objectives, in the Developments in Ozone-Based Treatment for Water Reuse Workshop at the IOA Pan American Group Conference, Las Vegas, NV.

Angelotti, R., Funk, D. and Bell, K.Y. (2016). Planning for Surface Water Augmentation of Potable Water Supplies Using Reclaimed Water, American Water Resources Association, *IMPACT*, 18(4):7 – 9.

Bell, K.Y., da Silva, A.K. (2016). Status of EPA Development of New Ambient Water Quality Criteria for Bacteriophage, *IUVA News*, 18(2): 12-15.

Bell, K.Y. (2016). Case studies of UV for reuse applications: Fit-for-purpose treatment in Water Scarcity Solutions – Latest Advances in UV and Advanced Oxidation, a workshop in conjunction with the 31st Annual WaterReuse Symposium, Tampa, FL, *invited speaker*.

Seachrist, S., Bell, K.Y., Funk, D. (2016). Direct Potable Reuse Using Multi-stage Biologically Active Filtration. 31st Annual WaterReuse Symposium, Tampa, FL

Bell, K., Perciavalle, P., Abrera, J., Badruzzaman, M., da Silva, A., and Jacangelo, J. (2016). The Need for Application of Predictive Analytics for Potable Reuse. 31st Annual WaterReuse Symposium, Tampa, FL.

Bell, K.Y., da Silva, A.K., Parkin, M. (2016). Direct Potable Reuse and the Intersection of the Clean Water Act and Safe Drinking Act. WEFTEC, New Orleans, LA.

Wylie, V., Charnas, C., Bell, K.Y., da Silva, A.K., Jacangelo, J., Funk, D., and Block, P. (2016). Peracetic Acid Addresses Increasingly Challenging Regulations – What Else is Needed for Implementation? WEFTEC, New Orleans, LA

Murray, A., Sarathy, S., Goldman, J., Hilts, B., Bell, K. and Santoro, D. (2016). Disinfection of municipal wastewater secondary effluent ultraviolet irradiation and peracetic acid. WEFTEC, New Orleans, LA.

Bell, K.Y., da Silva, A.K., Parkin, M. (2016). Interpreting the Intersection between the Clean Water Act and the Safe Drinking Act – What else is needed for Potable Reuse? AWWA Annual Conference and Exhibition, Chicago, IL.

Funk, D., Bell, K., Hooper, J., Stanford, B., Seachrist, S. (2016). Demonstration of Direct Potable Reuse using Multi-Stage Ozone-Biological Filtration. AWWA Annual Conference and Exhibition, Chicago, IL.

Bell, K.Y. (2016). What do we need to know about geochemistry and groundwater recharge. Tristate Seminar (California, Nevada, Arizona), Las Vegas, NV.

Hooper, J., Funk, D., Bell, K., Stanford, B., Amador, J., and Schulz, C. (2016). Demonstration of Multi-Stage Ozone-Biofiltration for Treatment of Direct Potable Reuse Water. WaterReuse Foundation Research Conference, Denver, CO.

Hadacek, T. and Bell, K.Y. (2016). Innovations in Wastewater Disinfection Technology, California Water Environment Association Annual Conference, Sacramento, CA.

Bell, K.Y. (2016). Innovative engineering solutions for water reuse. Utah Water Quality Alliance 18th Annual Retreat, Salt Lake City, UT.

Bell, K.Y. (2016). Augmenting Drinking Water Supplies, Groundwater Recharge of Reclaimed Water. Nevada Water Environment Association Annual Conference and Exposition, Sparks, NV.

Bell, K.Y. (2016). One Water/Reuse/Direct Potable Reuse. 2nd Annual New Mexico Water Workshop, Joint New Mexico RMSAWWA and RMWEA, Albuquerque, NM.

Bell, K.Y. (2016). Water Reuse - The Price, Cost and Value of Water. Business of Water Summit, Phoenix, AZ, *invited speaker*.

Bell, K.Y. (2016). Innovative Engineering Solutions for Water Reuse, Centennial Water Symposium Water Reuse for a Thirsty World – Tapping Your Future, Johns Hopkins Department of Environmental Health Sciences, Baltimore, MD.

Bell, K.Y. and da Silva, A.K. (2016). Potable Reuse: The Regulatory Context for Florida and the U.S. Florida Water Resources Journal, April 2016, 48 – 50.

Bell, K., Antolovich, A., Funk, D., Hooper, J., Minton, J., Schimmoller, L. (2016). Ozone-biologically active filtration – an alternative treatment for potable reuse. *World Water: Water Reuse & Desalination*, Spring: 27 – 30.

Murray, A., Goldman, J., Sun, W., Morgan, S., Brower, M., Sarathy, S., Hilts, B., Bell, K. and Santoro, D. (2016). Disinfection of a low transmittance municipal wastewater with a combination of UV and PAA, IUVA World Congress, Vancouver, BC, Canada.

Bell, K.Y. (2016). US EPA Development of Ambient Water Quality Criteria for Coliphage – a Viral Indicator *Proposed Changes in International Regulations and their Potential Impacts on Disinfection Practices*, A workshop at the IUVA World Congress, Vancouver, BC, Canada, *invited speaker*.

Bell, K.Y. and Wylie, V. (2016). The Age of Peracetic Acid – A Solution to Increasingly Challenging Regulations, *WaterOnline*, January: 16 – 18.

Bell, K. (2016). The Cost of Direct Potable Reuse – Evaluation of Ozone-BAF as an Alternative Treatment Train. AWWA International Symposium on Biofiltration, Long Beach, CA.

Hooper, J., Funk, D., Bell, K., Seachrist, S., Harris, R. and Amador, J. (2016). A comparison of DPR with existing IPR - A Case Study of Biofiltration Treatment Trains at Gwinnett County, GA. AWWA International Symposium on Potable Reuse, Long Beach, CA.

Bell, K.Y. (2015). Communicating the science of UV to the regulatory and engineering community, an *invited presentation* for the symposium “UV Photochemistry for Water: Implications for Safe Water Disinfection and Oxidation Treatment Applications” at the International Chemical Congress of Pacific Basin Societies, Honolulu, HI, *invited speaker*.

Bell, K.Y. and Block, P. (2015). Peracetic Acid (PAA) Disinfection - Upgrading Wastewater Treatment Facilities to Reduce Ecosystem Toxicity. WEF Technical Exhibition and Conference, Chicago, IL.

Block, P., Morgan, S., Bell, K. and Stewart, S. (2015). Control Strategies for PAA Wastewater Disinfection Process with Variable Effluent Quality. WEF Technical Exhibition and Conference, Chicago, IL.

da Silva, A.K., Vandegrift, J.C. and Bell, K.Y. (2015). EPA Progression and Development of Water Reuse Guidance: Planning for the future through the Guidelines for Water Reuse Series and State of the Potable Reuse Industry Supplement. WEF Technical Exhibition and Conference, Chicago, IL.

Bell, K.Y. and da Silva, A.K. (2015) Disinfection Treatment Technology: Efficacy of Bacteriophage Inactivation. WEF Technical Exhibition and Conference, Chicago, IL, *invited speaker*.

Bell, K.Y. (2015). Case studies of UV for reuse applications: Fit-for-purpose treatment in Water Scarcity Solutions – Latest Advances in UV and Advanced Oxidation, a workshop in conjunction with the 30th Annual WaterReuse Symposium, Seattle, WA, *invited speaker*.

da Silva, A.K., Vandegrift, J.C. and Bell, K.Y. (2015). EPA Development of Potable Water Reuse Guidance: Planning for the future through the Guidelines for Water Reuse Series and State of the Potable Reuse Industry Supplement. Texas Water Reuse Conference 2015, Lubbock, TX.

Bell, K.Y. and Vandegrift, J. (2015) Potable Reuse – State of the Industry. 2015 KY-TN Water Professionals Conference, Covington, KY.

Gruss, A., Funk, D., Wilbanks, C., and Bell, K.Y. PAA – An Alternative for Wastewater Disinfection: Gwinnett County Pilot Study and Cost Analysis. Georgia Water Professionals 2015 Annual Conference and Exposition, Savannah, GA.

Rock, C., Bell, K., da Silva, A.K., Mosher, J., and Snyder, S. (2015). What monitoring tools do we need to ensure the safety of direct potable reuse? 19th Annual Water Reuse & Desalination Research Conference WaterReuse Research Huntington Beach, CA.

Bastian, R. and Bell, K.Y. (2015). Chapter 1 – Introduction, in Ultraviolet Disinfection for Wastewater – Low-Dose Application Guidance for Secondary and Tertiary Discharges. IUVA/WEF Special Publication, 210 pp.

Bell, K.Y and Goldman, J.E. (2015). Chapter 6 – Equipment Selection, Facility Design, and Project Delivery, in *Ultraviolet Disinfection for Wastewater – Low-Dose Application Guidance for Secondary and Tertiary Discharges*. IUVA/WEF Special Publication, 210 pp.

Bell, K.Y. (2015). *Wastewater Disinfection Technologies: State of the Science for Coliphage and Human Viral Pathogen Inactivation*, in the side event: Coliphage as Fecal Indicator Viruses in Recreational Water and Shellfish, convened by University of North Carolina at Chapel Hill’s Institute of Marine Sciences and the Department of Environmental Sciences and Engineering. UNC Water Microbiology Conference, Chapel Hill, NC, *invited speaker*.

Bell, K.Y. (2015). *Wastewater Disinfection - Low Dose UV Applications*, in the side event: Disinfection of Reuse Water, Wastewater and Biosolids – Established Methods and Emerging Trends in Pathogen Inactivation, convened by the WEF Disinfection and Public Health Committee. UNC Water Microbiology Conference, Chapel Hill, NC, *invited speaker*.

Bell, K.Y. and Wood, S. (2015). *Potable Reuse – The Regulatory Context for Florida and the US*. Florida Water Resource Conference, Orlando, FL.

Bell, K.Y. (2015). *Innovations in Wastewater Disinfection Technology*. Florida Water Resource Conference, Orlando, FL.

Bell, K. and Stewart, S. (2015). *Design of the Largest Peracetic Acid Disinfection System in North America*. Texas Water, Corpus Christi, TX.

Bell, K. and da Silva, A. (2015). *Potable Reuse – The Past, Present and Future: Regulatory Considerations*. *The Georgia Operator*, 52(1):27 – 32.

Keen, O.S., Bell, K.Y., Cherchi, C., Finnegan, B.J., Mauter, M.S., Parker, A.M., Rosenblum, J.S., and Stretz, H.A. (2014). *Emerging Pollutants – Part II: Treatment*, *Water Environment Research*, 86(10):2036-2096.

Bell, K.Y. (2014). “PAA – An Alternative for Wastewater Disinfection,” KY-TN Water Environment Association, 2014 Wastewater Technology Conference, Bowling Green, KY, *invited speaker*.

Bell, K.Y. (2014). “Water Reuse and the Role of UV,” UV Fundamentals Workshop, IUVA Americas Regional Conference, White Plains, NY, *invited speaker*.

Bell, K.Y., Goldman, J., Cleveland, P., Hunt, J., and Clement, L. (2014). *Large Scale UV Pilot at the Trinity River Authority’s Central Regional Wastewater System Plant*. IUVA Americas Regional Conference, White Plains, NY.

Wells, M.J.M., Sanes, J.M., and Bell, K.Y. (2014) *Excitation emission matrix (EEM) fluorescence spectroscopy as a screening tool for wastewater-derived emerging contaminants*. 66th American Chemical Society Southeast Regional Meeting (SERMACS), Nashville, TN.

Navarrete, E., da Silva, A. K., and Bell, K. (2014). *Potable Reuse: Defining Source Water Quality Requirements*, WEF Technical Exhibition and Conference, New Orleans, LA.

Bell, K., da Silva, A. K., Mosher, J., Rock, C., and Snyder, S. (2014) "Assessment of Techniques for Evaluating and Demonstrating Safety of DPR," 29th Annual WaterReuse Symposium, Dallas, TX.

Bell, K.Y. (2014) "Potable Reuse: A Framework for Implementation," Georgia Water Professionals Conference, Savannah, GA, *invited speaker*.

Bell, K.Y. and Grissom, C. (2014). "PAA as a Disinfection Alternative," KY-TN Water Professionals Conference, Chattanooga, TN.

Bell, K.Y. (2014). "Wastewater UV Disinfection Piloting," US EPA Region 6 Multimedia Inspectors Training, Dallas, TX, *invited speaker*.

Bell, K.Y. (2014). "Budgeting for UV Disinfection," IUVA Webinar Series, Facilities Management for UV Disinfection, online, June 2014.

Sandino, J, Wagner, D., Fitzpatrick, J, Gray, D., and Bell, K.Y. (2014). "Blending Wet Weather Operations: An Engineering Perspective," US EPA Public Health Forum, Washington, D.C., June 18 – 19.

Bell, K., Cotruvo, J., and da Silva, A. K. (2014) "Potable Reuse: Past, Present and Considerations for a Framework," 29th Annual WaterReuse Symposium, Dallas, TX.

Navarrete, E., Bell, K., da Silva, A. K. (2014) "Direct Potable Reuse (DPR) in Raleigh: Comparing Potable Reuse Scenarios to Current De Facto Reuse along the Neuse River," 29th Annual WaterReuse Symposium, Dallas, TX.

Navarrete, E., Bell, K., da Silva, A. K. (2014) "Direct Potable Reuse (DPR) in Raleigh: Assessing Baseline Conditions to Establish Treatment Objectives," Water Reuse and Desalination Research Conference, Las Vegas, NV, 2014.

Wells, M.J.M.; Bell, K.Y.; and da Silva, A.K. "Emerging Pollutants—An Overview of Occurrence, Fate, Transport, and Treatment," 248th National Meeting of the American Chemical Society, San Francisco, CA, 2014.

M.J.M. Wells, J.M. Sanes and K.Y. Bell. (2014) Excitation Emission Matrix (EEM) Fluorescence Spectral Separation and Detection of Refractory Wastewater Effluent Organic Matter (EfOM). 248th National Meeting of the American Chemical Society, San Francisco, CA.

Bell, K., da Silva, A. K. and Cotruvo, J. (2014) "Direct Potable Reuse – A Framework for Implementation," AWWA, Annual Conference and Exhibition, Boston, MA.

Bell, K., Crawford, S. and da Silva, A. K. (2014) "Potable Reuse, the Past, Present and Future: Regulatory Considerations and Case Study Examples," Texas Water, Dallas, TX.

Bell, K. and Stewart, S. (2014) "Engineering Design Considerations for PAA Disinfection of Wastewater," WATERCON, Springfield, IL.

Cotruvo, J. and Bell, K.Y. (2014). Need for Direct and Indirect Potable Water Reuse Specifications, Journal AWWA February 2014, p. 28-30.

Bell, K.Y and da Silva, A.K. (2013) Innovations in wastewater disinfection technologies. North Carolina AWWA-WEA Annual Conference, Concord, NC.

Bell, K.Y. (2013) UV and UV-AOP for reuse and disinfection. AWWA WQTC Conference, November 2013, Long Beach, CA.

Bell, K.Y., Bandy, J., Finnegan, B.J., Keen, O., Mauter, M.S, Parker, A.M., Sima, L.A. and Stretz, H.A., (2013). "Emerging Pollutants – Part II: Treatment." Water Environment Research, 85 (10), 2022-2071.

Bell, K.Y. (2013) Policy and regulatory aspects of direct and indirect potable reuse. Water and Health Conference, Chapel Hill, N.C.

Bell, K.Y. (2013) New USEPA Guidelines for water reuse and the role of UV IUVA/IOA 2013 World Congress, Las Vegas, NV.

Bell, K.Y. and Archer, T. (2013) PAA - An alternative for wastewater disinfection: engineering and cost considerations, WEF Technical Exhibition and Conference, Chicago, IL.

Charnas, C., Bell, K.Y., Barbato, L., Cohrs, D., Leyba, L. and Thompson, S. (2013) Lowering the dose leads to more "Dough" – A case study of UV operations at the Las Vegas Street Wastewater Treatment and J.D. Phillips Water Reclamation Facilities. IUVA/IOA 2013 World Congress, Las Vegas, NV.

Goldman, J. and Bell, K.Y. (2013) UV Disinfection – A pilot study of low UVT municipal effluent. IUVA/IOA 2013 World Congress, Las Vegas, NV.

Bell, K.Y. and Sun J.-W. (2013) Evaluating PAA Disinfection. Water & Wastes Digest, July: 26 - 27.

Bell, K.Y. (2013) UV equipment procurement - Understanding project lifecycle costs. KY-TN Water Professionals Conference, Louisville, KY.

Bell, K.Y., da Silva, A.K. and Sun J.-W. (2013) UV is Part of the Reclaimed Water Treatment Solution. EverythingAboutWater, August: 92 – 96.

Bell, K.Y. (2013) Advances in UV technology and energy considerations. Puerto Rico AWWA 19th Annual Drinking Water Seminar & Exposition, San Juan, Puerto Rico, *invited speaker*.

Bell, K.Y. (2013) New USEPA Guidelines for Water Reuse and the role of UV. Puerto Rico AWWA 19th Annual Drinking Water Seminar & Exposition, San Juan, Puerto Rico, *invited speaker*.

Bell, K., Osgood, J. (2013) UV disinfection knowledge base. IUVA News, Spring: 23 - 24.

Bell, K.Y. (2013) Wastewater Disinfection Unit Operations Lecture Series, April 2013, TN Technological University, Cookeville, TN.

Vandertulip, D., Bell, K. and da Silva, A. (2013). 2012 EPA Guidelines for Water Reuse Promotes Reclaimed Water as an Integrated Water Resource Management Tool. AWWA Sustainable Water Management Conference, Nashville, TN.

Bell, K.Y. (2013) UV for water reuse - 2012 EPA Guidelines and UV technology applications BlueTech Webinar Series: Water Reuse: Regulations and Future Market Trends, April, 2013.

Szerwinski, A.M. and Bell, K.Y. (2013) Chloramine disinfection in a partially nitrified effluent: Fundamentals, design and lessons learned from construction, Joint Conference of the Kansas AWWA and WEA, Wichita, KS.

Bell, K.Y. and Wet-weather treatment - innovative solution meets secondary effluent requirements. MWEA-MoAWWA Joint Conference, Osage Beach, MO.

Bell, K.Y. and da Silva, A.K. (2013). Emerging Technologies. WEF Disinfection Conference, Indianapolis, IN, *invited speaker*.

Bell, K.Y. and Archer, T. (2013). Innovations in Wastewater Disinfection Technologies. WEF Disinfection Conference, Indianapolis, IN, *invited speaker*.

Bell, K.Y. and da Silva, A.K. (2013). New USEPA Guidelines for Water Reuse and Role of UV. IUVA UV Treatment of Water for Municipal and Industrial Applications Workshop, San Juan, Puerto Rico, *invited speaker*.

Bell, K.Y. (2013). UV Equipment Procurement and Facility Costs. IUVA UV Treatment of Water for Municipal and Industrial Applications Workshop, San Juan, Puerto Rico, *invited speaker*.

Bell, K.Y. and LeBoeuf, E.J. (2013). Influence of temperature and macromolecular mobility on sorption of TCE on humic acid coated mineral surfaces. *Chemosphere*, 90:176–181.

Bell, K.Y. and Lawal, O. (2012). Low Wavelength Medium Pressure UV Disinfection – Communication Update. *IUVA News*, Winter: 18 – 21.

Daniel, Z.A., Bell, K.Y. and Lefkowitz, J. (2012). A road map for the future: Integrated Water Resource Plan, for Franklin, TN. *KY-TN WEA Streamlines*, Fall/Winter:34–36.

Townsend, B. and Bell, K.Y. Where are we, how did we get here and where are we going? Working group guidance for medium pressure UV systems. AWWA Water Quality Technology Conference, Toronto, Canada.

Bell, K.Y., Bandy, J. Beck, S., Keen, O., Kolankowsky, N., Parker, A.M., and Linden, K. (2012). Emerging pollutants – Part II: Treatment. *Water Environment Research*, 84(10):1909–1940.

Bell, K.Y., Mills, J. and Wiseman, L. (2012). Aquifer recharge through direct injection – Geochemical considerations. *Florida Water Resources Journal*, September:10–14.

US Environmental Protection Agency (EPA). (2012). Guidelines for Water Reuse EPA/600/R-12/618. EPA Office of Wastewater Management, Office of Water, Washington, D.C.

Bell, K.Y. (2012). Wastewater process modification for addressing TSS to improve UV disinfection. WEF Technical Exhibition Conference, Los Angeles, CA.

Szerwinski, A., Bell, K. and Bordewick, K. (2012). Chloramination in a partially nitrified effluent: Process control solutions and case study. WEF Technical Exhibition Conference, Los Angeles, CA.

Bell, K.Y. (2012). Exploring new themes in the 2012 EPA Guidelines in “A Sneak Peek at the 2012 USEPA Guidelines for Water Reuse.” WaterReuse Association Web Cast, September 27, 2012.

Jyh-Wei (Al) Sun, J.-W. and Bell, K.Y. (2012). Biologically enhanced high-rate clarification process solving peak wet weather flow challenges, IWA World Water Congress and Exhibition, Busan Korea.

Bell, K.Y., Hilty, M. and Lefkowitz, J. (2012). Tools for integrated water reuse planning – A case study in Franklin, TN. Water Reuse Association Symposium, Hollywood, FL.

Salveson, A. and *Bell, K. (2012). Sizing UV systems using the “right” bioassay, Water Reuse Association Symposium, Hollywood, FL, **invited speaker*.

Bell, K.Y. (2012). Innovative wet-weather treatment solution meets secondary effluent requirements. KWEA & KSAWWA Joint Annual Conference, Topeka, KS.

Bell, K.Y. and da Silva, A.K. (2012). Updates to the USEPA Guidelines for Water Reuse – Requirements and Case Study Examples of UV Disinfection. IUVA Americas Conference, Washington, D.C.

Bell, K.Y. (2012). Capital and operations cost considerations for ozone disinfection at municipal plants. KY-TN Water Professionals Conference, Memphis, TN.

da Silva, A.K. and Bell, K.Y. (2012) Alternatives for WWTP disinfection – Selecting a process that is effective, efficient, and minimizes disinfection byproduct (DBP) Formation KY-TN Water Professionals Conference, Memphis, TN.

Bell, K.Y. and Sun, J.-W. (2012). UV disinfection improved. Water & Wastes Digest, July:28–29.

Bell, K.Y., Hilty, M. and Westphal, K.S. (2012). Integrated Water Resources Planning – A case study in public participation. AWWA Annual Conference and Exhibition, Dallas, TX.

Bell, K.Y. (2012). Chlorine and alternative disinfectants. Flemming Training Center – Wastewater Treatment Seminar, Knoxville, TN, *invited speaker*.

Charnas, C.L., Bell, K.Y., Adams, D., Chambers, J., Cohrs, D., Hammer, D. and Schmidt, P. (2012). Wastewater UV disinfection systems – Lessons learned during performance testing. IUVA News, Summer:13–19.

Bell, K.Y. LeBoeuf, E.J., (2012). Mechanistic investigation of non-ideal sorption behavior in natural organic matter. 1. Vapor phase equilibrium. *Environmental Science and Technology*, 46:6689–6697.

Bell, K.Y., Norton, J.A., and Maloy, B. (2012). Biologically enhanced high-rate clarification solution under construction at Knoxville TN WWTPs. *KY-TN WEA Streamlines*, Spring/Summer: 35.

Bell, K.Y. (2012). Exploring new themes in the 2012 EPA Guidelines in “UV Applications in Water Reuse.” *WaterReuse Association-IUVA Web Cast*, May 27, 2012.

Bell, K.Y. and da Silva, A.K. (2012). New EPA Guidelines highlight UV as part of the reuse solution. *IUVA News*, Spring:9–12.

Bell, K.Y., Sáñez, J. and Wells, M.J.M. (2012). Optimizing disinfection pretreatment using excitation-emission matrix fluorescence spectroscopy. *Ozone: Science & Engineering*, 34(2):109–114.

Bell, K.Y. (2012). UV disinfection – Designing for secondary effluent. *California WEA*, Sacramento, CA, *invited speaker*.

Bell, K.Y. (2012). Wastewater process optimization for efficient UV disinfection of secondary effluent. *WATERCON*, IL AWWA and IWEA Joint Water Conference, Springfield, IL.

Bell, K.Y. (2012). Wastewater disinfection: Trends in technology and process optimization. *University of Colorado Environmental Engineering Seminar Series*, *invited speaker*.

Bell, K.Y., Wells, M.J.M., Morse, A., Bandy, J., Traexler, K.A., Pellegrin, M.L. (2011) Emerging Pollutants. *Water Environment Research*. 84(10):1909–1940.

Bell, K. (2011) Water Reuse - Treatment Technology Advances and Applications, *WEF Technical Exhibition Conference*, Los Angeles, CA.

Bell, K.Y. (2011) Wastewater Process Considerations for Optimization of UV Disinfection Systems, 2nd North American Conference on Ozone UV & Advanced Oxidation Technologies, Toronto, Canada.

Bell, K. and Abel, S. (2011). Optimization of WWTP Aeration Process Upgrades for Energy Efficiency, *Water Practice & Technology*, 6(2).

Charnas, C., Chambers, J., Adams, D., Schmidt, P., Hammer, D., Cohrs, D. and Bell, K.Y. (2011) Wastewater UV Disinfection Systems – Lessons Learned during Performance Testing, 2nd North American Conference on Ozone UV & Advanced Oxidation Technologies, Toronto, Canada.

M.J.M. Wells, J.M. Sanez, M.A. Easterly, and K.Y. Bell (2011) Natural organic matter (NOM) and effluent organic matter (EfOM) characterization in the urban water cycle by excitation-emission matrix fluorescence spectroscopy, *Fourth IWA Specialty Conference on Natural Organic Matter: From Source to Tap and Beyond*, Costa Mesa, California.

Bell, K.Y. (2011) Emerging Contaminants – Risk, Regulations and Treatment Technologies, *KY-TN Water Professionals Conference*, *Water Professionals Conference*, KY-TN AWWA and WEA, Covington, KY.

Bell, K.Y., Schulz, C. (2011) UV Disinfection for the Real World: Back to the Basics, AWWA Annual Conference and Exhibition, Washington, DC.

Bell, K.Y., Frye, D., Norton, J. (2011) Condition/Criticality Assessment - A Case Study for Collection System Asset Management WEF Collection Systems Conference, Raleigh, NC.

Bell, K.Y., Sáñez, J., Wells, M.J.M.W. (2011) A New Tool for Optimizing Pretreatment for UV Disinfection of Wastewater, IOA-IUVA World Congress, Paris, France.

Bell, K.Y., Mills, J., Wiseman, L. (2011) Aquifer Recharge through Direct Injection – What Do We Need to Know about Geochemistry, Florida Water Resources Conference, Kissimmee, Florida.

Bell, K.Y. (2011) WWTP Process Decisions Impacting Energy Use. Energy Efficient Wastewater Treatment and Solid Waste Management Workshop sponsored by the Edmonton Waste Management Center of Excellence, Edmonton, AB, Canada, *invited speaker*.

Bell, K.Y. and Hatcher, M. (2011) Up a Creek with a Paddle: Visual Stream Assessments for Non-Wadeable Rivers, Twenty-First Tennessee Water Resources Symposium, Montgomery Bell State Park, Burns, TN.

Macy, P. Bell, K., Matthews, R., Bastian, R., Vandertulip, D., and Prieto, L. (2011) EPA Guidelines for Water Reuse Update, INTERNATIONAL WORKSHOP I, IWA Efficient Conference, Dead Sea, Jordan.

Bell, K.Y. and Sun, J.W. (2011) Wastewater Process Modifications for Addressing TSS to Improve UV Disinfection. WEF Disinfection Conference, Cincinnati, OH.

Szerwinski, A.M., Bell, K.Y., Bordewick, K. (2011) Chloramines in a Partially Nitrified Effluent and the Impact of Future Nutrient Limits on Wastewater Disinfection, Missouri WEA, Osage Beach, MO.

Charnas, C., Chambers, J., Adams, D., Schmidt, P., Hammer, D., Cohrs, D. and Bell, K. (2011) Sizing UV Disinfection Systems: A Method for Comparing Apples to Oranges, Water Environment and Technology, 23(3), 36 - 41.

Bell, K.Y., Norton, J., Sun, J.W. (2010) Biologically Enhanced High Rate Clarification: A Pilot Study. International Water Association, Water & Energy Conference, Amsterdam, Netherlands.

Bell, K. and Abel, S. (2010). Optimization of WWTP Aeration Process Upgrades for Energy Efficiency International Water Association, Water & Energy Conference, Amsterdam, Netherlands.

Wells, M.J.M., Bell, K.Y., Traexler, K.A., Fono, L.J. Pellegrin, M.L., Morse, A. (2010) Emerging Pollutants. Water Environment Research, 82(10), 2095 - 2170

Charnas, C., Chambers, J., Adams, D., Schmidt, P., Hammer, D., Cohrs, D. and Bell, K. (2010) UV Disinfection Sizing: A Method for Comparing Apples to Orange, WEF Technical Exhibition Conference, New Orleans, LA.

Bell, K.Y., Maloy, B., Johnson, J. and Norton, J. (2010) Biologically Enhanced High Rate Clarification – A Pilot Study. Water Professionals Conference, Water Professionals Conference, KY-TN AWWA and WEA, Nashville, TN.

Thompson, D., Hughes, M., Bell, K., Porter, S., Robinson, K., Rudy, M. (2010) Atrazine Destruction, Bromate Control, and Virus Inactivation Using Advanced Oxidation Products for ASR Injection Water. AWWA Annual Conference and Exhibition, Chicago, IL.

Bell, K., Sciandra, J. and Wagner, K. (2010) Aerate for Less. Water Environment and Technology, 22(5): 40-45.

Bell, K.Y. and Young, N.A. (2010) Alternatives for Wastewater Disinfection – Selecting an Effective and Efficient Process. Missouri Water Environment Association, Osage Beach, MO.

Bell, K.Y. and Abel, S. (2010) Abwasserbelüftung – Möglichkeiten zur Energieeinsparung. gwf-Wasser I Abwasser, February 2010: 12-14.

Travaglia, A. and Bell, K.Y. (2010) Turbo Blowers Get the Job Done: Applying Sustainable Technology to Wastewater Treatment, WEA of SC & SC AWWA, Myrtle Beach, SC.

Thompson, D. and Bell, K. (2009) Risk, Regulations and Responsibility: What have we learned from microconstituents? Water Environment and Technology, 21(7): 40-43.

Bell, K.Y., Wiseman, L., Turner, L.A. (2009) Designing Pretreatment to Control Arsenic Leaching in ASR Facilities. Journal AWWA, 101(6):74-84.

Bell, K.Y., Johnson, J., and Norton, J.A. (2009) Optimization of Kuwahee WWTP Aeration Process Upgrades – A Case Study for Energy Efficiency. WEF Technical Exhibition Conference, Orlando, FL.

Bell, K.Y., Johnson, J., and Norton, J.A. (2009) Kuwahee WWTP: A Case Study for Optimizing Aeration. Water Professionals Conference, KY-TN AWWA and WEA, Lexington, KY.

Bell, K.Y. and Wiseman, L. (2009) Pretreatment Design for ASR – A Simple Geochemical Approach. AWWA Annual Conference and Exhibition, Chicago, IL.

Bell, K.Y. (2009) Impacts of Disinfection on Emerging Contaminants. WEF Disinfection Conference, Atlanta, GA.

Sanchez, J.M., Wells, M.J.M., Garden, G.C., Hamilton, W.P. and Bell, K.Y. (2008) Fluorescence Spectroscopy of Disinfection By-product Precursors in Untreated and Treated Tennessee Drinking Water Sources (Poster Presentation). 60th American Chemical Society Southeast Regional Meeting, Nashville, TN.

Wells, M.J.M., Pellegrin, M.L., Morse, A. Bell, K.Y., Fono, L.J. (2008) Emerging Pollutants. Water Environment Research, 80(10), 2026-2057.

Bell, K.Y. and Wiseman, L.P. (2008) Managing Geochemical Conditions - Selecting a Pretreatment Design. American Groundwater Trust ASR 8 Conference, Orlando, FL.

Bell, K.Y., Sanford, J., Frye, D. (2008) Integration of Risk-Based Analyses with a GIS Application for Collection System Asset Management. Water Professionals Conference, KY-TN AWWA and WEA, Knoxville, TN.

Sanez, J.M., Wells, M.J.M., Garden, G.C., Hamilton, W.P. and Bell, K.Y. (2008) Influence of Dissolved Organic Matter on Potable Water Production: Relationship between Fluorescence Spectroscopy and Disinfection By-products in Tennessee Surface Source Waters. Water Professionals Conference, KY-TN AWWA and WEA, Knoxville, TN.

Wells, M.J.M, Sanez, J.M., Garden, G.C., Hamilton, W.P., and Bell, K.Y. (2008) Relating Fluorescence Spectroscopy to Disinfectant By-product Formation Potential in Tennessee Surface Source Waters. Water Professionals Conference, KY-TN AWWA and WEA, Knoxville, TN.

Bell, KY. Stokes, C.L, Miller, F., and Faulk, K.L. (2007). Adaptive Watershed Management at the Copper Basin -A Case Study. 24th Annual Meeting of the American Society of Mining Reclamation, Gillette, WY.

Bell, K.Y., Bowers, M.R., and McComb, T.D. (2007). Development of a Field XRF Method for Identification of Acid Generating Mine Wastes. Society for Mining, Metallurgy and Exploration Meeting, Denver, CO.

Bell, K.Y., Wyatt, E.G., Faulk, K.L., and Miller, F. (2006). Implementation of Adaptive Watershed Management Plans in the Copper Basin. 2006 KY/TN WEA Watershed Conference, Nashville, TN, *invited speaker*.

Bell, K.Y., Wyatt, E.G., Faulk, K.L., and Miller, F. (2006). Reclamation of Mining Impacted Lands in the Copper Basin -A Case Study. Billings Land Reclamation Symposium, Billings, MT.

Bell, K.Y., Hamilton, W.P, and Haselow, J. (2006). An Economical In-Situ Alternative for Treatment of Nitrate Contaminated Groundwater. The Sixteenth Tennessee Water Resources Symposium, Burns, TN.

Stokes, C., Bell, K.Y., Faulk, K., and Miller, F. (2006). A Case Study: Reclamation of Mining Impacted Lands in the Copper Basin. The 16th Annual Association for Environmental Health and Sciences Meeting & West Coast Conference on Soils, Sediments and Water, San Diego, CA.

Bell, K.Y. and Rittenour, S. (2006). GIS: A Tool for Data Integration and Engineering Decision-Making at the Copper Basin Mining District Site. The 2006 Annual Tennessee Geographic Information Council Conference, Franklin, TN.

Murr, A.C, Mosley, J.H., Bell, K.Y. and Garden, G.C. (2005). Operating a Recirculating Sand Filter for Enhanced Denitrification. Annual Conference and Technical Program of Alabama's WEA, Orange Beach, AL.

Wyatt, E.G. Miller, F., and Bell, K.Y. (2005). A Streamlined Approach: Impacts of Early Actions on the Ecological Risks at the Copper Basin Mining District Site. 15th Tennessee Water Resources Symposium, Burns, TN.

Bell, K.Y., Wyatt, E.G., and Miller, F. (2005). A Streamlined Approach: Impacts of Early Actions at the Copper Basin Mining Site. TN EPSCor Environmental Summit, Cookeville, TN.

DeLapp, R.C., LeBoeuf, E.J. and Bell, K.Y. (2004). Thermodynamic properties of several soil- and sediment-derived natural organic materials. *Chemosphere*, 54: 527-539.

Miller, F., Wyatt, E.G. and Bell, K.Y. (2004). A Streamlined Approach: Impacts of Early Actions on the Ecological Risks at the Copper Basin Mining District. WEF Technical Exhibition and Conference, New Orleans, LA.

Garden, G., Mosley, J. and Bell, K.Y. (2004). Plastic Media to the Rescue. NOWRA 12th Annual Conference and Exposition, Franklin, TN.

LeBoeuf, E.J., DeLapp, R.C., Young, K.D. (2003). Effects of Soil Moisture and Other Factors on the Sorption and Release of Contaminants from Soils. Joint Session of INTERURBAN Scientists: Kinetics of Soil Physico-Chemical Processes, Berlin, Germany - KEYNOTE ADDRESS.

Young, K.D. and LeBoeuf, E.J. (2003). Influence of Organic Matter Macromolecular Mobility on Sorption Behavior of Organic Compounds. EGS-AGU-EUG Joint Assembly, Nice, France.

DeLapp, R.C., Young, K.D. and LeBoeuf, E.J. (2001). Characterization of Thermodynamic Properties of Several Soil- and Sediment-Derived Natural Organic Materials. 222nd ACS National Meeting, Chicago, IL.

Young, K.D. and LeBoeuf, E.J. (2001). Development of a glass ampoule system for evaluation of long-term sorption/desorption behavior of vapor phase volatile organic compounds in geosorbents. *The Analyst*, 126(10): 1816-1819.

Young, K.D. and LeBoeuf, E.J. (2000). Glass transition behavior in a peat humic acid and an aquatic fulvic acid. *Environmental Science and Technology*, 34(21), 4549-4553.

Thackston, E.L. and Young, K.D. (2000). Sources of fecal bacteria in urban runoff. *Coastlines*, 10(4): 14-15.

Young, K.D. and LeBoeuf, E.J. (2000). Equilibrium Sorption and Desorption Behavior of Trichloroethylene in a Sediment Derived Humic Acid. In *Extended Abstracts from the Society of Environmental Toxicology and Chemistry 21st Annual Meeting*, Nashville, TN.

Young, K.D. and LeBoeuf, E.J. (2000). Evaluation of Diffusion Mechanisms in Natural Organic Matter. In *Preprints of Extended Abstracts from the 220th ACS National Meeting*, Washington, D.C.

Young, K.D., and Thackston, E.L. (1999). Relationship between Housing Density and Sewage Bacteria in Nashville's Urban Streams. KY-TN Water Environment Association Meeting, Bowling Green, KY.

Young, K.D. and Thackston, E.L. (1999). Housing density and bacterial loading in urban streams. *Journal of the American Society of Civil Engineers*, 125(12): 1177-1180.

Young, K.D., Clark, Y.R., George, D.B., and Wells, M.J.M. (1998). A Linked Geographic Information System (GIS) Environmental Transport Model Applied to US Fish and Wildlife Service Refuges in the Lower Mississippi River Alluvial Plain. In Extended Abstracts from the 215th ACS National Meeting, Dallas, TX.

Young, K.D., Clark, Y.R., George, D.B., and Wells, M.J.M. (1998). Application of an Environmental Transport Model Using a GIS and Internet Resources. 8th Tennessee Water Resources Symposium, Nashville, TN.

Young, K., Clark, Y.R., and Wells, M.J.M. (1997). Environmental Fate and Transport Modeling Made Possible via the Internet. Seventh Tennessee Water Resources Symposium, Nashville, TN.

Young K., Wells, M.J.M., and Clark, Y.R. (1997). Internet Resources for Environmental Fate and Transport Modeling. 27th Annual Tennessee Higher Education EDP Symposium, Fall Creek Falls, TN.

Clark, Y.R., Wells, M.J.M., and Young, K. (1996). Geographical information Accessible from the Internet and Available to the Environmental Chemist for the Purpose of Fate and Transport Modeling. In Extended Abstracts from the 212th National Meeting of the American Chemical Society, Orlando, FL.

Summary of Academic and Professional History

- Brown and Caldwell, Nashville, TN (2018 – Present): Serving as Director of water strategy for the organization, focused on thought leadership and strategic planning for the water market.
- MWH/Stantec, Nashville, TN (2015 – 2018): Serving as the global practice leader for water reuse, and as a technical resource focused on disinfection, reuse, and research, she has supported a broad range of projects across the globe.
- CDM Smith, Nashville, TN (2007 – 2015): Serving as a technical resource in a number of roles, ultimately focusing on two key integrating areas in water. Her early role as a technical resource group leader in wastewater disinfection has led to participation in reuse projects; currently involved in a number of innovative wastewater disinfection and water reuse research projects.
- Barge, Waggoner, Sumner and Cannon, Nashville, TN (2002 – 2007): Served as a project scientist and engineer on a wide range of environmental and water resources projects. Project work was focused on characterization of environmental contaminants, fate, transport and remediation.
- Vanderbilt University, Nashville, TN (1997 – 2004): Evaluated the influence of natural organic matter on the fate and transport of organic contaminants in soil and sediment derived natural organic matter under a National Science Foundation Grant.
- Tennessee Technological University, Cookeville, TN (1994 - 1997): Developed a geographic information system (GIS) based application to evaluate the fate and transport sediment and nutrients throughout watersheds in the Lower Mississippi River Alluvial Plain. This research was funded through a grant from the US Fish and Wildlife Service.
- Tennessee Technological University, Cookeville, TN (1992 -1994): Managed the inorganics Operated and maintained metals analysis systems (ICP, AA) including maintaining laboratory certification; other duties included policy development, laboratory safety, and report writing.
- Kentucky State Police Crime Laboratory, Frankfort, KY (1991- 1992): Analyzed evidence submitted by law enforcement agencies using a variety of analytical techniques; other duties included reporting analytical results and providing testimony in state and local courts as an 'expert witness' as required by law.
- Tennessee Technological University, Cookeville, TN (1989 - 1991): Evaluated effects of thermal discharge on fish populations; other duties included project design, sampling, benthic habitat analysis, fish and benthos collection and analyses, limnological profiling and data analysis.

Michael Romero

From: Nitesh Dullabh <nitesh.dullabh@gmail.com>
Sent: Thursday, August 23, 2018 12:34 PM
To: Pat Sinicropi
Subject: Re: Call for Nominations for WateReuse Association Board of Directors
Attachments: Resume - Nitesh Dullabh (WRA).pdf

Hi Pat,

My sincere apologies getting back to you on this and hope that I can still be considered for this position. I was travelling for the last week and just got back in today.

I have attached a copy of my resume for your reference and would be happy to any further dialogues.

Thank you again and look forward to seeing you in Austin.

Regards,
Nitesh

On Thu, Aug 2, 2018 at 5:14 PM, Nitesh <nitesh.dullabh@gmail.com> wrote:
Hi Pat,

Thank you for considering me.

I will review and get back to you.

Regards,
Nitesh
650 704 0737

Sent from my iPhone

On Aug 2, 2018, at 2:08 PM, Pat Sinicropi <psinicropi@watereuse.org> wrote:

Dear Nitesh:

The Nominating Committee of the WateReuse Association Board of Directors is issuing a call for nominations to fill two Board vacancies. Individuals interested in being nominated should submit an application to either [Patricia Sinicropi](#), Executive Director for the WateReuse Association, or to a member of the Nominating Committee by **COB Tuesday, August 21st**. The Nominating Committee will review nominations and select candidates for approval by the full Board at its 3rd Quarter meeting in Austin, Texas on September 9th. Directors are appointed for up to three two-year terms for a total of six years of service.

Selection Criteria for Board Appointment

WateReuse is committed to recruiting the best and brightest leaders in the water industry to serve on its Board of Directors. The criteria for determining qualified candidates are:

Leadership

- A belief that water reuse and desalination are essential components of the water supply portfolio of the future.
- Significant professional credentials in the water industry.
- Stature and recognition within the water community.
- Recognized change agent/thought leader/innovator in the area of administration, technology, management, communication and/or education.

Commitment

- Membership in good standing with the WaterReuse Association;
- A commitment to the success of WaterReuse's mission and vision with sufficient time and resources dedicated to their implementation;
- Ability to attend four quarterly board meetings, including one during our Annual Symposium in September, and one via conference call;
- Ability to participate in WaterReuse Association committees and initiatives, as necessary, in pursuit of the mission and vision;

Skills and Experience (one or more areas)

- Executive and managerial leadership of public, private, or not-for-profit organization;
- Stature in an international, national, regional, or state water agency;
- Experience in federal or state advocacy of laws, rules or funding for water and water reuse;
- Experience in science, education, outreach, or social research associated with water and water reuse;
- Experience with financial management or investment associated with water and water reuse infrastructure;
- Experience on professional association boards or committees;

Other Factors

WaterReuse is committed to creating a diverse board that reflects and represents the membership and population of members. To ensure both balance and diversity, the following factors should be considered as part of the nominating process:

- Geographic Location
- Industry Sector
- Public, Private, Not-for-Profit Sector

Application Requirements:

Statement of Interest along with a resume or bio via email by COB Tuesday, August 21st.

Nominating Committee for 2019 WaterReuse Association Board of Directors Nominations:

[Gilbert Trejo, El Paso Water](#), Chair and Vice President of WaterReuse Association

[Paul Jones, Eastern Municipal Water District](#), Vice Chair and President of WaterReuse Association

[Karen Pallansch, Alexandria ReNew](#), Member

[Jon Freedman, Suez North America](#), Member

[Halla Razak, Inland Empire Utilities Authority](#), Member

[Patricia Sinicropi, Staff Liaison and Executive Director of WaterReuse Association](#)

[Nitesh A. Dullabh](mailto:nitesh.dullabh@gmail.com)
nitesh.dullabh@gmail.com
Palo Alto, CA - (650) 704 0737

Planning & Marketing, Project Manager, Research & Development

- Record of accomplishment in business strategy, project management & public, private partnerships (PPP's)
- Expert at developing and executing strategic and tactical projects with growth plans and operational plans across a variety of sectors in developed and emerging economies
- Expert in marketing and sales, business development, branding and cross-cultural business facilitation

- Skill Areas:**
- | | |
|--|--|
| • Strategic and Tactical Growth Planning | • Executive and Entrepreneurial Facilitation |
| • Program and Project Management | • Customer Service and Account Management |
| • Sales, Marketing and Branding | • Research and Development |
| • Operations Management in PPP's | • Coaching and Mentoring |

EDUCATION:

- **MBA**, Henley Management College (now University of Reading), United Kingdom, 2006
- **Mandarin Chinese**, National Taiwan Normal University, Taiwan, 1996
- **BA Honors and MA in International Studies**, Rhodes University, South Africa, 1993
- **BA in Public Management**, University of Durban-Westville, South Africa, 1990

EXPERIENCE:

2 POD VENTURES

July 2015 – Present

CEO

Palo Alto, CA

- Strategic market analysis for top beverage company for point of entry water filtration and reuse systems
- Development of supply chain and partnership modeling analysis for dealer and distribution channel marketing

STAGE 2 INNOVATIONS

November 2015 – June 2018

Director: Planning and Marketing (Energy & Water)

Palo Alto, CA & Farmington Hills, MI

- Project managed water reuse pilot with City of Palo Alto to treat final effluent with pre-treatment and RO applications
- Developed desalination and water reuse strategy for thermal and membrane based systems
- Built OEM partnerships for brackish and sea-water reverse osmosis (RO) systems in a newco - ReNew Water
- Managed cloud based API for continuous monitoring in water and waste water applications

2 POD VENTURES

February 2015 – October 2015

CEO

Palo Alto & San Jose, CA

- Set up demonstration center with trials for External Counter Pulsation (non-invasive blood circulation) units in San Jose. Created center of excellence for other operations in Singapore and Ireland
- Product development and field marketing studies of consumer products – gel-cooling band, sports travel kit and variable flow showerhead. Ecommerce set-up for gel cooling band and sports travel kit

BETTER FINANCE

November 2013 – January 2015

Director: Business Development

San Francisco, CA

- Grew broker dealer and banking channel on online platform, resulting in 5x new leads per week
- Funded 107 business loan applications valued at \$7m from December 2013 to January 2015 with revenue estimated at \$3m
- Reworked social media and events strategy with marketing team & developed training and mentoring programs
- Improved user (borrower, broker dealer, loan consultant and banking) processes on platform resulting in user productivity

KBR CAPITAL PARTNERS MANAGEMENT

October 2011 – July 2013

Vice President: Shared Services

Palo Alto, CA

- Grew broker dealer channel increasing wholesaler productivity & revenue by 30%
- Implemented salesforce.com (SFDC) CRM solution with third party applications - managing all salesforce web based applications and wholesaler training
- Started analytical tracking and reporting platforms in SFDC for wholesaler and broker dealer teams resulting in weekly/monthly tracking reports

THE BEIJING AXIS (TBA)

February 2010 – August 2011

Director and General Manager: Head of Africa

Johannesburg, South Africa

- Managed project team of 12 people in four businesses: (1) strategy (2) procurement (3) M&A and (4) commodity trading in Africa, China and Australia

- Built PPP solutions in procurement, product expansion and foreign direct investment for Bateman Engineering, NOSA, Aurecon and Robor with projects value of \$3.5m
- Built additional revenue streams through paid conferences, seminars, CEO forums and field visits/studies
- Directed all public media campaigns resulting in a 60% increase in business inquiries and a 20% increase in new assignments

MARSH (Subsidiary of Marsh & McLennan)

March 2008 – January 2010

Senior Risk Consultant

Johannesburg, South Africa

- Built risk management and governance solutions for corporate entities in mining, automotive and chemical sectors resulting in projects revenue of \$2.5m
- Built PPP risk management & governance solutions for state and federal entities resulting in projects revenue of \$3m
- Reworked client strategies with brokerage team resulting in lower insurance premiums through risk mitigation and business contingency planning. Increased revenue by \$800k

GAUTENG ECONOMIC DEVELOPMENT AGENCY

August 2002 – February 2008

General Manager

Johannesburg, South Africa

- Managed project team of 15 people in Africa, UK, US and South America
- Built strategic PPP foreign direct investment (FDI) projects into South Africa for clients - Virgin Group of Companies, IBM PLC, Heineken and Ferrero Roche. Managed FDI and international expansion projects in excess of \$8m
- Grew export expansion projects in mining equipment and machinery to China and South America, fruit and wine exports to the European Union and USA, chemical products to Russia and construction engineering technology to the Middle East. Projects value estimated at \$7.5m

DEPARTMENT OF TRADE AND INDUSTRY

August 1996 – August 2002

Assistant Director – Asia Desk & Deputy Director (Capital Equipment)

South Africa & China

SOUTH AFRICAN EMBASSY IN BEIJING, CHINA

Economic Attaché

- Managed project team of 10 people in China, Singapore and South Africa
- Facilitated South African exports to China in excess of \$1b in 2001 and increased new PPP investments from 8 Chinese major state owned enterprises. Estimated investments valued at \$20m
- Led first official government trade and investment business mission to China, Australia and India. Brokered 9 contracts in mining, automotive, agro-processing valued at \$7m
- Built PPP product expansion solutions and foreign direct investment strategies for corporates in mining and telecom equipment, FMCG, automobile, agro processing, water and offshore oil and gas. Projects value estimated at \$4.5m

TESSIE INDUSTRIAL CO. (Part-time)

June 1995 – July 1996

Marketing Consultant

Taipei, Taiwan

- Managed exports orders valued at \$600k for furniture and arts & craft executives in the USA and European Union

SOUTH AFRICAN INSTITUTE OF INTERNATIONAL AFFAIRS

March 1993 – April 1995

Research Officer

Johannesburg, South Africa

- Delivered market and investment analysis reports for key South African corporates and government entities, resulting in projects valued at \$1.2m
- Managed events calendar and hosted international trade and investment delegations resulting in increased visibility for the Institute

ADDITIONAL INFORMATION:

- 2017 - Mankind Project, NWT Training, USA
- 2017 - Board member of Water Reuse Association (CA Chapter), USA
- 2017 - Member of American Water Works Association (AWWA), USA
- 2016 - Member of Water Reuse Association (WRA) and the Water Research Foundation (WRF)
- 2012 - Board member of the Palo Alto Community Fund, USA
- 2012 - Giving Wisely Philanthropic Course, Presented by Christine Sherry, Stanford Continuing Studies, USA
- 2012 - Alumni of Leadership Palo Alto, USA
- 2010 - Board member of the Chartered Institute of Purchasing and Supply – Gauteng region, South Africa
- 2008 - Board member of Contact in Gauteng (Provincial led shared services agency), South Africa
- 2008 - Awarded Archbishop Tutu Leadership Fellowship by the African Leadership Institute - included leadership training at Said Business School, Oxford University, UK
- 1996 to 2001 - Awarded the top performance award in the Department of Trade and Industry, South Africa
- 1994 to 2009 – Published papers on foreign direct investment, export promotion and market entry strategies South Africa



Val S. Frenkel, Ph.D., P.E., D.WRE.

Dr. Val S. Frenkel is an eminent figure in the water industry with his expertise in water and wastewater treatment, water reuse, and membrane technologies, including desalination. Equally instrumental was Dr. Frenkel's role in the development of low pressure membrane technologies and applications which are used and taught at the university level.

Developing, leading and delivering near 300 projects globally Dr. Frenkel's works go far beyond his job scope as they are published extensively both in the US and abroad, authoring several patents in the process. He has more than 100 publications including 16 books and national manual of practices by WEF, AWWA and ASCE touching on the areas of water, wastewater treatment, desalination and salinity management. For his works, Dr. Frenkel has received numerous accolades from the likes of the International Desalination Association and American Academy of Environmental Engineering. At the same time, Dr. Frenkel is also a Diplomate, Water Resources Engineer (D.WRE) of the American Academy of Water Resources Engineers (AAWRE), which is part of the Academy of the Civil Engineering Certification, Inc. (CEC). Dr. Frenkel elected Fellow IWA and Fellow ASCE/EWRI.

Contact Information:

Val S. Frenkel, PhD, PE, D.WRE



Val S. Frenkel, PhD, P.E., D.WRE

Vice President of Process Engineering

Managing Director Pacific Coast

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greeley-hansen.com



Val S. Frenkel, Ph.D., P.E., D.WRE
Vice President Process Engineering
Managing Director Pacific Coast

Years of Experience: 29

Education:

Ph.D. Water and Ecology
Science

M.Sc. Civil Engineering,
Water and Wastewater

Professional Registration(s):

Professional Engineer – P.E.
California
Professional Engineer – P.Eng.
Ontario, Canada
Diplomate, Water Resource
Engineering – D.WRE
Fellow IWA
Fellow ASCE/EWRI
IDA Outstanding Professional in
Water Reuse 2018

Professional Societies:

- Water Environment Federation
- American Water Works Association
- Fellow International Water Association
- Fellow American Society Civil Engineers
- International Desalination Association
- American Membrane Technologies Association
- European Desalination Society
- Professional Engineers Ontario
- WaterReuse Association
- American Academy of Water Resources Engineers

Professional Experience

Dr. Frenkel is a well-recognized expert with near 30 years of experience and proven record to build from ground up market in water, wastewater, water reuse, salinity management, desalination, and membrane technologies. Dr. Frenkel has a successful record of applying technological approaches to provide project cost savings, often via development of new technologies and applications used worldwide for treating water and wastewater. He also serves as overall project manager responsible for delivery of complete treatment systems including coordination of permitting and ancillary design disciplines. Dr. Frenkel's expertise includes all aspects of water/wastewater business including, but not limited to business development, programme and project management, process design based on conventional and advanced technologies; membrane-based processes including MF, UF, NF, RO, ED, EDR, EDI, and MBR; potable water and wastewater treatment; water reuse; desalination; and salt management for industrial and municipal applications, food, power, semiconductor, oil & gas industries. His experience in detailed process and mechanical design encompasses key equipment design and calculations; equipment, controls, and instrumentation selection; and system specification, costing, and procurement.

Relevant Project Experience

Principal Project Manager and Technology and Process Lead Engineer for Ashghal IDRIS Terminal Pumping Station and Sewage Treatment Works, City of Doha, State of Qatar. Advanced membrane technologies capacity 130 MGD and expansion up to 260 MGD. Program management, project management, process design.

Technical Advisor and Technology and Process Lead Engineer for City of Sharjah Sewage Treatment Works expansion, City of Sharjah, UAE. Phase 4 and 5 based on Moving Bed Bio-Reactor (MBBR) technology.

Program Manager for City of Lathrop, California. Design of submerged membrane bioreactor up to capacity 2.5 MGD and expansion up to 9.0 MGD. Process design, BNR and MBR design, and equipment selection.

Project Manager, Lead Process Engineer for City of East Palo Alto, California. Designed well water treatment plant to treat Iron and Manganese to allow conformance with California drinking water secondary maximum contaminant levels (MCLs).

Val S. Frenkel, Ph.D., P.E., D.WRE
Vice President Process Engineering, Managing Director Pacific Coast

Jackson County Water Treatment Plant, Mississippi. Process Engineer for designing surface water treatment plant based on UF and RO technologies of 3.0 MGD capacity to allow conformance with strict standards for Trihalomethanes formation.

Private Industrial Client, CA. Treatment and technology leader developing optimized treatment concept for industrial wastewater reuse of 2.5 MGD capacity applying high and low load biological treatment, multi-stage double pass RO and deep well injection to achieve ZLD concept.

City of Muscat Wastewater Treatment Plant, HAYA Water, Sultanate of Oman. Technology Leader and Process and Design Engineer developing conceptual approaches and technology for wastewater treatment for the newly-designed treatment plant for tanker discharge water; capacity is 35 MLD (9.0 MGD).

Tanajib Wastewater Treatment Plant for Saudi Aramco, Kingdom of Saudi Arabia. Technology Leader and Process and Design Engineer developing the wastewater treatment process and technological approach for a new wastewater reuse program.

City of Santa Cruz/Soquel Water District, Desalination Program, CA. Desalination Program Technical Advisor. Desalination program development. Pilot study of open intake seawater desalination program based on Sea Water Reverse Osmosis, evaluating conventional pre-treatment and low pressure membrane, Microfiltration (MF) and Ultrafiltration (UF) pre-treatment. The objectives of the pilot study were to establish design criteria and verify costs for a proposed 2.5 MGD (expandable to 5.0 MGD) open intake SWRO facility. The study evaluated produced desalinated water quality, SWRO technological parameters, and provided information for public relations and outreach.

Marin Municipal Water District, Desalination Pilot Plant Study of San Francisco Bay Water, Corte Madera, CA. Desalination program development. Pilot Program Technical Director and Desalination Process Engineer for an open intake seawater desalination program based on Sea Water Reverse Osmosis (SWRO), evaluating conventional pre-treatment and low pressure membrane, Microfiltration (MF) and Ultrafiltration (UF) pre-treatment. Program goals were to establish design criteria and define costs for this proposed 15 MGD open intake SWRO for the District. The study evaluated the quality of the produced, desalinated water, refined SWRO technological parameters, and supported the District's public outreach program.

Pajaro/Sunny Mesa Community Services District, Desalination Program Development, Monterey Peninsula, CA. Program Leader and Desalination Process Engineer for a Desalination Program based on open intake seawater desalination program. The program objectives were to develop a cost-effective Sea Water Desalination project for the District and Monterey Peninsula, with the pilot study establishing design criteria and verifying costs for a proposed 20-MGD open intake SWRO. The study evaluated produced desalinated water quality, SWRO technological parameters, brine discharge criteria, and supported public outreach program.

Val S. Frenkel, Ph.D., P.E., D.WRE
Vice President Process Engineering, Managing Director Pacific Coast

City of Santa Paula, Membrane Bio-reactor (MBR) Design, Ventura County, CA. Design Lead and Process Engineer for the design of a 4.2 MGD submerged membrane bioreactor recycled water treatment and distribution system. Process design, BNR and MBR design, and equipment selection.

City of Fillmore, Membrane Bio-reactor (MBR) Design, Ventura County, CA. Process Engineer for the design of a submerged MBR based on GE Water - ZENON hollow-fiber membranes, plus recycled water treatment and distribution systems. Process design, BNR and MBR design, equipment selection, start-up and commissioning.

Crescent City, Membrane Bio-reactor (MBR) Design, Crescent City, CA. Process Engineer for the design of submerged MBR based on SIEMENS hollow-fiber membranes, plus recycled water treatment and distribution systems. Start-up and commissioning.

City of Lake of the Pines, Membrane Bio-reactor (MBR) Design, Lake of the Pines, CA. Process Engineer for the design of submerged MBR based on KUBOTA flat-plate membranes, including recycled water treatment and distribution systems. Process design, BNR and MBR design, and equipment selection, start-up and commissioning.

City of Coburg, Membrane Bio-reactor (MBR) Design, Coburg, OR. Process Engineer for the design of submerged MBR based on SIEMENS hollow-fiber membranes, along with recycled water treatment and distribution systems. Process design, BNR and MBR design, and equipment selection.

City of Arlington, Membrane Bio-reactor (MBR) Design, Arlington, WA. Process Engineer for the design of submerged MBR based on KUBOTA flat-plate membranes, plus recycled water treatment and distribution systems. Process design, BNR and MBR design, equipment selection, and start-up and commissioning.

City of La Center, Membrane Bio-reactor (MBR) Design, La Center, WA. Process Engineer for the design of submerged membrane bioreactor and recycled water treatment and distribution systems. Process design, BNR and MBR design, and equipment selection.

Cannery Row Market Place LLC, Ocean View Plaza, Seawater Desalination Preliminary Design, Monterey, CA. Program Manager and Project Engineer for the preliminary design of SWRO system for a proposed development in Monterey, a water-short area. Prepared design criteria and concepts to facilitate permitting of the project with the Department of Public Health, Regional Water Quality Control Board and the California Coastal Commission. The project is currently receiving final permits.

Confidential Food Processor Client, Dissolved Air Flotation (DAF) and Membrane Bio-Reactor (MBR) Pilot Study and Conceptual Project Design, Ontario, CA. Process Engineer for the pilot study and conceptual design of a 0.2-MGD capacity DAF and MBR systems to treat lemon production industrial effluent for recycling and reuse. Proposed to use DAF up-front of the MBR process, which allowed significantly reduce BOD load to MBR from 1,600 mg/l down to 400 mg/l, which resulted in the significant reduction of the aerobic process size

Val S. Frenkel, Ph.D., P.E., D.WRE
Vice President Process Engineering, Managing Director Pacific Coast

and energy saving. Developed pilot study protocol, evaluated and established design parameters for the DAF and MBR systems.

Confidential Food Processor Client, Membrane Bio-Reactor (MBR) and Reverse Osmosis (RO) Pilot Study and Conceptual Project Design, Tracy, CA. Process/Project Engineer for the pilot study and conceptual design of a 0.2-MGD capacity MBR and RO systems to treat olive production waste streams, creating an effluent suitable for recycling and reuse. He developed a flexible model to optimize and reduce the size of the treatment system, and evaluated and established design parameters for the MBR and RO systems.

City of Oxnard, Oxnard Desalter Project Design, Oxnard, CA. Desalination Process Engineer for the design of a 7.5-MGD capacity (expandable to 15-MGD) brackish water RO plant. The innovative plant design will use the well field pumps to provide the feed pressure for the RO system to conserve space and reduce noise in the process building. The RO system will also incorporate inter-stage boost energy recovery to enhance system performance and reduce operating costs.

Azusa Light and Water Department, Canyon Water Treatment Plant Membrane Pilot Study, Azusa, CA. Project and Process Engineer for pilot study of pressure and submerged MF and UF membrane treatment. The objective of the pilot study was to establish design criteria and verify costs for a proposed 16-MGD expansion of the Canyon WTP. Three different MF and UF systems were piloted on surface water from the San Gabriel Reservoir and San Gabriel River. The study evaluated water quality, organics removal, and membrane operation parameters to demonstrate the efficacy of membrane filtration on these surface waters.

City of San Buenaventura, Ventura Avenue WTP/Foster Park Facilities Improvement Project, Ventura, CA. Process Engineer for the preliminary and final design of improvements to the City of Ventura's Avenue WTP and their water supply facilities at Foster Park. The Avenue WTP was over 70 years old and required improvements to expand the facility and to meet new and upcoming water quality regulations. Improvements include a new 10-MGD submerged MF membrane filtration system (expandable to 15-MGD), new washwater recovery system, new water supply wells and piping, and rehabilitation of the City's historic administration building. The existing Avenue WTP will be maintained in operation during the construction of the new facilities. The project included pre-purchase of the membrane filtration equipment.

The Presidio Trust, Recycled Water System Phase 1, San Francisco, CA. Process and Project Engineer for the design of a 200,000 gpd submerged membrane bioreactor recycled water treatment and distribution system. Assisted with permitting and assisted with evaluation of construction techniques.

City of Camarillo, Municipal Water District Local Resources Program Funding Proposal, Camarillo, CA. Project Engineer for the preparation of a proposal for the City of Camarillo seeking funding for a 4 MGD membrane treatment facility for groundwater, under MWD's Local Resources Program.

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Delta Diablo Sanitation District, Antioch, CA Project/Process Engineer and Project Lead for salinity management program on wastewater effluent reuse by municipal and industrial clients, with a WWTP capacity of 14.0 MGD.

San Elijo Joint Powers Authority, Cardiff-by-the-Sea (San Diego County), CA. Project/Process Engineer and Project Lead for Advanced WWTP design and procurement for production of low-salinity reuse water.

Additional Selected Projects

Desalination/Reverse Osmosis/SWRO/BWRO/UPW

- Minera Escondida Drinking Water Treatment Plant, Chile. 0.5-MGD facility.
- GE Power Plant, New York. 1.5-MGD facility.
- APEX Silver Mines Drinking Water Treatment Plant, Denver, Colorado. 0.7-MGD facility.
- Industrial DI Water Treatment Plant, Canada. 2-MGD facility.
- DI Makeup Water Treatment Plant, Cooling Tower Blow Down Recycling Plant, Ireland. 3-MGD facility.
- DI Water Makeup System, Ireland. 0.5-MGD facility.
- Desalination Plant, City of Eilat, Israel. 12-MGD facility.
- Desalination Plant, City of Deir-El-Ballah, Gaza Strip, Palestine. 0.5-MGD facility.
- Desalination Plant, Ma'agan Michael, City of Haifa, Israel, 0.5 MGD Facility.
- Sea Water Reverse Osmosis Desalination Plant, City of Sharm-El-Sheikh, Sinai, Egypt. 2MGD facility.

Media Filtration

- Water Makeup System, Ireland. 0.5-MGD facility.
- Media Filters Redesign, City of Moscow, Russia. 660-MGD facility.
- Water Treatment Plant, City of Volgograd, Russia. 40-MGD facility.
- Iron and Manganese Removal Plant, City of Kovel, Ukraine. 13-MGD facility.
- Industrial Oil Removal Plant, City of Lvov, Ukraine. Dissolved Air Filtration (DAF), 2.6-MGD facility.
- Water Treatment Plant. City of Tiberia, Israel. 13-MGD facility.
- Water Treatment Plant, Dead Sea, Israel. 2-MGD facility.

Microfiltration

- Water Treatment Microfiltration Plant, City of Collingwood, Canada
- Shoal Lake Microfiltration Water Treatment Plant, First Nations, Manitoba, Canada

Activated Sludge

- Wastewater Treatment Plant, City of Lvov, Ukraine. Activated Sludge – Full Biological Treatment, 80-MGD facility.
- Wastewater Treatment Plant, City of Ivano-Frankovsk, Ukraine. Full Biological Treatment, Activated Sludge, 2-MGD facility.
- Wastewater Treatment Plant, City of Korolevo, Ukraine. Biological Aerated Filters, Biological Treatment, 1-MGD facility.

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Sequential Batch Reactor

- Wastewater Treatment Plant, City of Ra'anana, Israel, 5.3-MGD facility.

Membrane Bioreactor

- Membrane Bio-Reactor (MBR), City of Milton, Ontario, Canada. 2.5-MGD facility.

Electro Deionization

- DI Makeup Water Treatment Plant, Cooling Tower Blow Down Recycling Plant, Ireland. 3-MGD facility.

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Val S. Frenkel, Ph.D., P.E., D.WRE
Vice President Process Engineering, Managing Director Pacific Coast

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Val S. Frenkel, Ph.D., P.E., D.WRE
Vice President Process Engineering, Managing Director Pacific Coast

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Val S. Frenkel, Ph.D., P.E., D.WRE
Vice President Process Engineering, Managing Director Pacific Coast

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Additional Information

Languages

Fluent in 7 languages

Specialized Coursework/Areas of Study:

Lecturer at Stanford University, Palo Alto, California. Desalination, water reuse, membrane technologies.

Testimonials

References

https://www.linkedin.com/in/val-s-frenkel-a9b7746?trk=nav_responsive_tab_profile



SAN DIEGO
5440 Morehouse Drive
Suite 1000
San Diego, CA 92121

(858) 452-0031
katzandassociates.com

August 21, 2018

Patricia Sinicropi
Executive Director
WateReuse Association
1199 North Fairfax Street, Suite 900
Alexandria, VA 22314

ATTN: Members of the Board of Directors Nominating Committee

Dear Ms. Sinicropi,

Encouraging the public's acceptance of alternative water projects, including potable reuse, desalination and others, even when backed with incontrovertible science, has not been an easy journey. It has been a goal that I have been working towards these past 33 years to educate the public and improve their understanding about alternative water sources. This work has included highlighting reclaimed water and potable reuse, while also helping to strengthen the overall One Water movement along the way. It would be an honor to serve as a member of the WateReuse Association (WateReuse) Board of Directors. Specifically, to have an opportunity to work alongside many talented individuals guiding the organization to fulfill its mission to promote acceptance and support of recycled water and to advocate for policies and funding that increase the amount of water reuse projects across the country. I bring over three decades of helping to strategically guide projects and engage the public around water and wastewater issues in our industry, including hands-on experience designing and advancing recycled water communications initiatives in several cities and states.

In 1986, I founded Katz & Associates (K&A), an award-winning communications firm whose mission is to help people communicate effectively about things that matter. K&A specializes in developing strategic communications and outreach programs for local, state and federal agencies. Our experience with water and wastewater programs includes work in California, Washington, Nevada, Texas, Georgia, Florida, Iraq and Sydney, Australia, just to name a few. As the K&A Chief Executive Officer, I am dedicated to help train and prepare the next generation of water industry communication leaders through education and project work, as well as continuing to advance water reuse projects in as many places as we can.

In 2015, I worked as part of a larger team to develop a model communications plan to be used as a blueprint for planning and implementing potable outreach programs nationally (WRRF-13-02). My team and I now use these best practices to address negative perceptions often held by the public as well as translate the complexities of this emerging technology for a variety of audiences. I provided strategic communications and counsel on alternative water projects, including the City of Fresno Recharge Fresno Program, the City of San Diego's Pure Water San Diego Program, and various other initiatives including potable reuse for El Paso Water Utilities, Santa Clara Valley Water District's water reuse initiatives, Santa Barbara's Desalination Project and more.

Funding for important water/wastewater resource initiatives is also an imperative need for all utilities, and K&A has also been engaged on these types of issues, including my role as our firm's senior lead for the San Francisco Public Utilities Commission's 2018 and 2014 Infrastructure Investment Education Program, which resulted in successfully passing a multi-year rate increase to upgrade the water and wastewater systems and aging facilities. I have also served in this similar capacity for the Southern Nevada Water Authority, City of Fresno, City of San Diego and others.

I am a frequent speaker on public engagement and communications at water industry trade associations, including Water Environment Federation's Annual Technical Exhibition and Conference (WEFTEC), the U.S. Water Alliance's One Water Summit, and the WaterReuse Association nationally as well as the California WaterReuse Association Chapter. I have also served as the past chair of the American Water Works Association (AWWA) Public Involvement Committee and served as a member of AWWA's Public Affairs Council. More recently, I have worked to advance the literature on the nexus between communications and potable reuse by co-authoring two feature articles in Journal AWWA: "Public Outreach for Potable Reuse: Bringing the Public to a New Level of Acceptance" (2015) and "Coming Full Circle: Craft Brewers Demonstrate Potable Reuse Acceptance" (2018). Both articles focused on applying communications best practices to the potable reuse and exploring the resulting shifts in public opinion.

Due to our work on Pure Water San Diego, I was more than proud to work closely with the City of San Diego to advance a partnership with Stone Brewing, America's ninth largest commercial brewing company, in the spring of 2017 to produce the first commercial beer produced with potable reuse water. The event was attended by over 200 local and industry VIP's and the resulting media coverage went worldwide with nearly 100 outlets and print media covering this milestone. We timed this event to coincide with the Spring WaterReuse California Chapter conference held in San Diego that same week. Some of you may recall the Pure Stone Pale Ale Full Circle beer that was available at the first reception of that conference. I fondly refer to this event as when we broke the potable reuse beer ceiling!

My credentials highlight not only my experience but also my commitment to the water industry and the goals of advancing laws, policy, communications and funding for water reuse specifically. I welcome the opportunity to bring my skill set, experience and perspective to an impressive line-up of water professionals furthering the mission of WaterReuse. If accepted for this position, the board will gain an energetic and committed member who shows up and gets the job done. Included you will find three letters of recommendation from individuals that are well known in the water reuse industry and have at one time served on this distinguished board and a list of individuals that support my nomination and are willing to talk by phone to further discuss.

Thank you in advance for your consideration, and I look forward to working with WaterReuse in future. Please contact me with any questions.

Sincerely,



Sara M. Katz
Chief Executive Officer/Founder

Sara M. Katz

Chief Executive Officer/Founder

Sara has developed a recognized specialty in creating communication programs for local, state and federal agencies. She has strategized and advised on strategic communication efforts for water resources, land use planning, transportation and mass transit, education and consumer protection programs. Her wealth of experience ranges from issues management, coalition building and facilitation to strategic planning, media strategy and crisis management. Sara is past chair of the American Water Works Association (AWWA) Public Involvement Committee and a Board Member on their Public Affairs Council.



Select Career Highlights

- **2018 and 2014: San Francisco Public Utilities Commission (SFPUC) Infrastructure Investment Education Program**

Served as (Katz & Associates) K&As senior lead, which resulted in successfully passing two four-year rate increases to help fund critical water and sewer services for the city and county of San Francisco.

- **2017: Stone Brewing Full Circle Pale Ale**

Served as the lead architect who nurtured the Stone Brewing event in which they launched the Full Circle Pale Ale from concept to fruition. Stone Brewing is the first national commercial brewer to use potable reuse water to make beer.

- **2010 - 2016: Santa Clara Valley Water District's (SCVWD) Recycled Water Communications Program**

The focus was then on the Pure Water Silicon Valley program. The program's focus has changed slightly and now involves constructing five specific projects for groundwater recharge with purified water.

- **2008 - current: City of San Diego Pure Water San Diego Program**

Sara has led her K&A team that has supported the City of San Diego's journey to obtain public support of the first reservoir augmentation/potable reuse program in the state. This multi-faceted effort has resulted in national recognition by both the water industry as well as the Public Relations Society of America, winning several awards for creative innovation and successful public engagement and communications.

- **1995 - 1998: San Antonio Water System Water (SAWS) Conservation and Water Recycling Program**

Provided strategic counsel, designed and implemented a public information and involvement program to inform the citizens of San Antonio about important water issues and involve them in the decision-making process for developing the water conservation and

AREAS OF EXPERTISE

- Issues Management
- Public Affairs
- Strategic Counsel

EDUCATION

- Bachelor of Science, Economics, San Diego State University

AFFILIATIONS (PARTIAL LIST)

- American Water Works Association
- WaterReuse Association
- Association of California Water Agencies
- International Association for Public Participation
- San Diego Chamber of Commerce Water Committee
- Water for People

AWARDS

- 2013 Otto Bos Lifetime Achievement Award by the Public Relations Society of America San Diego 
- 2014 YWCA TWIN Visionary Award 
- 26 awards received between 2011 and 2018 for the Pure Water San Diego Public Education and Outreach Program 

See more in attached list.

recycling programs. Results of the program included The San Antonio Express-News issuing an editorial in strong support of the cost-effectiveness of water recycling and its benefits to the entire community, and the San Antonio Water System Board approving a Water Recycling Plan to deliver 35,000-acre feet of recycled water to be used for parks, golf courses and industrial users. Sara supervised a team of three K&A practitioners that were embedded on-site with SAWS for three years to manage and implement the day-to-day communications initiatives.

Select Project Experience

PROJECTS	DATE	PROJECT VALUE
City of Los Angeles Groundwater Replenishment Program	2017-current	\$435 million
City of Los Angeles One Water LA, Phase 2 Contract Value	2016-current	\$6 million
SCVWD's Recycled Water Program	2010-2016	Approx. \$500 million
Recharge Fresno (City of Fresno Groundwater Recharge Program)	2014-current	\$500 million
SFPUC Sewer System Improvement Program	2013-current	\$6.9 billion
City of San Diego Pure Water San Diego Potable Reuse Program	2008-current	\$3.1 billion
SFPUC Water System Improvement Program	2006-current	\$4.9 billion
City of Aurora, Colorado Prairie Waters Project	2005-2008	\$435 million
Rebuild Iraq Water Sector Program	2004-2007	\$4.7 billion
City of Detroit's Wastewater Enhancement Program	1999-2011	\$1 billion
El Paso Water Utilities (various programs and projects)	1997-2017	Approx. \$700 million
San Antonio Water Authority Water Recycling Program	1995-1998	\$400 million
City of Houston's Greater Houston Wastewater Program	1993-1998	\$1.6 billion
Southern Nevada Water Authority's Capital Improvement Program	1992-2015	Over \$2 billion
San Diego County Water Authority's Emergency Storage Program	1992-2011	\$2 billion
Sydney Australia's Clean Waterways Programme	1990-1993	\$4 billion Australian
City of San Diego's Clean Water Program	1988-2003	\$2 billion

Select Publications (full articles are included at the end of this document)

- **January 2018: Coming Full Circle:**
Craft Brewers Demonstrate Potable Reuse Acceptance 
- **November 2015: AWWA Journal:**
Public Outreach for Potable Reuse: Bringing the Public to a New Level of Acceptance 

Affiliations and Positions Held (partial list)

- **2010 – current:** Water for People, active member
- **1994 – 2000:** Member of AWWA Public Affairs Council
- **1996 – 1998:** AWWA Public Information Committee Chair
- **1990 – current:** American Water Works Association (AWWA)
- **1990 – current:** Water Environment Federation (WEF)
- **1990 – current:** WaterReuse Association (California and National)
- **1990 – current:** U.S. Water Alliance/One Water
- **1990 – current:** Attended, presented and participated in panels at more than 40 industry conferences

Select List of Personal and Client Shared Awards (partial list)

- **2013:** Otto Bos Lifetime Achievement Award by the Public Relations Society of America San Diego 
- **2014:** YWCA TWIN Visionary Award 
- **1996:** WaterReuse of California Associate Member of the Year
- **2008- current: San Diego Pure Water Program Awards:** Sara and the K&A team are more than proud to have supported the Pure Water San Diego program, including developing and submitting most award applications for the City of San Diego. Our collective efforts (City of San Diego and K&A) have been recognized by the following awards and organizations: 
 - » **2018:** Public Relations Society of America Award of Excellence, Events and Observances Seven Days or Fewer
 - » **2018:** California Association of Public Information Officers EPIC Award, One-Time Special Event
 - » **2018:** California Association of Public Information Officers Award of Distinction, Recurring Special Event
 - » **2017:** Public Relations Society of America San Diego/Imperial Counties Mark of Excellence Silver Bernays Award, Events and Observances Seven Days or Fewer
 - » **2017:** Public Relations Society of America San Diego/Imperial Counties Best of Show Silver Bernays Award, Events and Observances Seven Days or Fewer

- » **2017:** Public Relations Society of America San Diego/Imperial Counties
PR Team of the Year
- » **2017:** Public Relations Society of America San Diego/Imperial Counties
Mark of Excellence Silver Bernays Award, Community Relations
- » **2017:** American Planning Association San Diego Section
Public Outreach Award
- » **2017:** California Association of Environmental Professionals
Outstanding Public Involvement/Education Program
- » **2017:** Water Reliability Coalition
Public Private Partnership of the Year Award
- » **2016:** Public Relations Society of America San Diego/Imperial Counties
Mark of Merit Silver Bernays Award, Community Relations
- » **2016:** Public Relations Society of America San Diego/Imperial Counties
Mark of Merit Silver Bernays Award, Events and Observances Seven Days or Fewer
- » **2016:** Water Environment Federation
Utility of the Future Today
- » **2015:** U.S. Water Alliance
U.S. Water Prize
- » **2015:** California Association of Sanitation Agencies
Public Outreach and Education Achievement Award
- » **2014:** Public Relations Society of America San Diego/Imperial Counties
Mark of Merit Silver Bernays Award, Public Affairs
- » **2014:** American Water Works Association
Public Communications Achievement Award
- » **2014:** California WaterReuse Association
Recycled Water Community Outreach/Public Outreach Program of the Year
- » **2013:** Association of California Water Agencies
Huell Howser Best in Blue Award for Achieving Communications Excellence
- » **2012:** California WaterReuse Association
Small Project of the Year
- » **2011:** California WaterReuse Association
Public Education Outreach Program of the Year

Letters of Reference

3007 Quannah Wild Dr.

Las Cruces, New Mexico 88011

August 19, 2018

Water Reuse Association

1199 North Fairfax Street, Suite 900

Alexandria, Virginia 22314

ATTN: Members of the Nominating Committee, Water Reuse Association

My first time meeting Sara Katz was at the June 1997 AWWA ACE conference in Atlanta, Georgia. She was participating on the panel as a speaker on the topic of strategic communications and engagement with your rate payers. I was in the audience along with dozens of other people. While this was 21 years ago, I still remember this well as it was to be the start of a near 20-year working relationship (and friendship) with Sara and her firm. Over the many years, Sara and her team of communication specialists worked for and with my staff at El Paso Water Utilities on several of our more high profile and complex initiatives: the New Mexico/Texas Sustainable Water Resources Project, the Stormwater Masterplan, rates, conservation, and EPWU's most recent introduction of potable reuse into the mix of water resources for the City of El Paso.

Sara and her colleague Patricia Tennyson worked as an extension of our team, adding great strategic value, creative recommendations, facilitation, public participation counsel, and bilingual support, just to name a few their full portfolio of services. I also always appreciated the contributions they made in terms of industry trends and insights. Sara's political acumen and understanding was more than helpful as El Paso launched their first State of the Water Address, an event that helped profile the comprehensive efforts needed to ensure a sustainable water supply for what is recognized as a very dry part of Texas.

Early into the advancement of water recycling in various parts of the country, I am aware of the contributions that she personally made in Las Vegas, San Antonio as well as Fort Worth to help those communities introduce traditional recycled water in the 1990's and early 2000's. And thereafter, I

have closely followed her firm's path as they have established themselves as one of the premier communications firms in our industry with unique knowledge and experience. In Texas, as a subcontractor to Black and Veatch working for the Texas Department of Environmental Quality, Sara worked on one of the first statewide assessments of recycled water. She led the report chapter concerning effective communications to support water recycling and how other regions and jurisdictions outside of Texas communicated with their stakeholders about this "new" water source. In fact, Sara and her firm were part of the research team hired by the Water Research Foundation in 2014 to develop the Model Communications Plan for Advancing Direct Potable Reuse.

With this rich background in our industry, a unique understanding of potable reuse, and over 30-years of working on high profile water and wastewater initiatives, I am more than confident that Sara's contributions as a Water Reuse Association Board Member would be of great value. Please feel free to email me at egawater07@gmail.com if you have questions or need further information.

Sincerely,

Edmund "Ed" Archuleta, BCEE and PE(retired)

Former President/CEO of El Paso Water Utilities and
former Water Reuse Association and Foundation Board Member



August 20, 2018

To Whom It May Concern:

It is with pleasure that I recommend Sara M. Katz, Founder and CEO of Katz & Associates (K&A), for consideration by the nominating committee of the WateReuse Foundation. I have known Ms. Katz for more than ten years as she and her firm have worked as an extension of our SFPUC communications and program staff on various high profile and complex water and wastewater initiatives. In 2006, Sara and her team became an integral part of our Water System Improvement Program (WSIP) at a programmatic level. For nearly 10 years they worked diligently, each and every day, to ensure the SFPUC's communications and community engagement needs on this \$4.8 billion program were met, and often exceeded.

Today, Sara and her team continue to work on several of our higher profile programs including many of the projects that make up our \$6.9 Billion Sewer System Improvement Program. Also, Sara was personally brought in to help strategize and build a communications platform to advance our Rain Ready Communications program that supports our flooding mitigation strategies.

Sara has built and earned an industry reputation of excellence in the communications space. She is personally active in AWWA, WEF, the Global Water Alliance, WateReuse California and the WateReuse Foundation, often a speaker at or moderator for conference panels. She has also authored several articles that have been nationally published specific to water resource communications and specific to potable reuse. Sara's participation on the WateReuse Foundation Board would offer a fresh perspective and be a fundamental ingredient to successfully advancing potable reuse. Sara is always the first to offer a polite history lesson on the origin of the term "Toilet to Tap" when it is raised in small gatherings or even larger public forums. As she was part of the first US potable reuse pursuits in the 1990's both in San Diego and Los Angeles, and then was on the communications team in the mid-2000's for Orange County's Groundwater Replenishment Program, she has spent the past 25 years tirelessly working to advance water recycling and potable reuse in a variety of communities.

Today, Sara's team supports the City of San Diego's Pure Water program and the City of LA's Groundwater Replenishment Program, again focusing of the various communications aspects associated with each of these multi-billion dollar initiatives. I am more than happy to provide any additional insights that can help the nomination committee in their consideration of Sara's application.

Sincerely,

Michael P. Carlin
Deputy General Manager/COO
San Francisco Public Utilities Commission

London Breed
Mayor

Ike Kwon
President

Vince Courtney
Vice President

Ann Moller Caen
Commissioner

Francesca Vietor
Commissioner

Anson Moran
Commissioner

Harlan L. Kelly, Jr.
General Manager



19 August 2018

WateReuse Association
1199 North Fairfax Street, Suite 900
Alexandria, VA 22314
ATTN: Members of the Board of Directors Nominating Committee

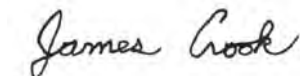
I have known Sara Katz since the mid-1990's, when both the City of San Diego and the City of Los Angeles were endeavoring to advance potable reuse as a way to diversify their water resource portfolios as well as meet secondary wastewater compliance mandates. Sara and her colleague Patricia Tennyson were heavily involved in the San Diego potable reuse proposal and also supported the City of LA's pursuit, working at every level to design and implement comprehensive communications programs for these new and somewhat controversial initiatives. At the same time, the Upper San Gabriel Valley Water District was also considering indirect potable reuse to the dismay and opposition of Miller Brewing Company. The term "toilet to tap" was born that, along with a variety of other political and regulatory factors as well as competing water resource initiatives that were less high profile, significantly contributed to setbacks for potable reuse in both San Diego and Los Angeles.

But Sara and her firm did not waiver in their personal drive and commitment to the advancement of water reuse for both nonpotable and potable applications. For more than 20 years our paths have crossed at conferences, on projects, and in other venues. She is as passionate today about this industry as she was 20 years ago. As it has become more evident that advances in treatment technology and other measures can ensure the safety of reclaimed water, and with rising costs for imported water in many communities, consideration of potable reuse makes sense for many jurisdictions and agencies. But the YUCK factor is alive and well, and there remains a significant public reluctance to accept the use of reclaimed water for some applications, particularly potable reuse.

Having a nationally-recognized communications professional on the WateReuse Association Board of Directors would add a valuable dimension to the diversity of expertise on the Board of Directors. In my opinion, Sara is an obvious choice to fill that role.

In summary, I strongly support the nomination of Sara Katz to be a member of the WateReuse Association Board of Directors.

Respectfully,



James Crook, Ph.D., P.E.

Letters of Appreciation



Sustainable Solutions for a Thirsty Planet®

March 18, 2014

Ms. Sara M. Katz
Katz & Associates, Inc.
4250 Executive Square, Suite 670
San Diego, CA 92037

Dear Sara:

As I look back on the past 13 years as the Executive Director of the WateReuse Association, I thought it appropriate to send this letter recognizing the outstanding work that you and your team of professionals have done over the years to advance this industry. From your early start in San Diego in the 1990's, working to advance the City of San Diego's first recycled water plant, to your solid work for that same agency – the recipient of WateReuse California's Recycled Water Community Outreach and Public Education Program of the Year – Katz & Associates has been instrumental in "moving the needle" on public perception of potable reuse in a positive direction.

I have appreciated the day-in, day-out volunteer efforts of both you and Patricia Tennyson, including Patsy's role both as a Board member of the California WateReuse Association for the past seven years and as a member of the WateReuse Research Foundation's Research Advisory Committee. You have both contributed substantially to many of the conference panel sessions that address the importance of community engagement and education. I have read the articles you have authored in several national publications and recognize the talents and strategic counsel you offer to our members across the nation.

Yesterday's session was exemplary of the good behind-the-scenes work you have done over the years. The prestigious 2014 Lee Kuan Yew Water Prize received by the Orange County Water District for their leadership in advancing the groundwater replenishment project, which is currently being expanded to meet the growing water needs of that region. I am aware that Katz was a key part of the initial outreach team for the Groundwater Replenishment System that is the "gold standard" for potable reuse projects worldwide. You continue to help your current clients gain recognition for their good work: WateReuse California awarded the Santa Clara Valley Water District Large Recycled Water Agency of the Year and the City of San Diego's Pure Water Program the outreach award mentioned previously.

Finally, your current efforts as co-principal investigators with Data Instincts on the WateReuse Research Foundation's project to develop model public communication plans for advancing direct potable reuse

acceptance will serve as a foundational element for any city or agency that plans to include potable reuse as part of their water supply portfolio in the future. The field of public outreach and engagement is truly a science that does not get enough credit for its importance and significance in the field of public works. I can say on behalf of this Association, we understand and greatly appreciate all that you have done and continue to do each day to contribute to the advancement of potable reuse in California and across the nation. Again, congratulations and thank you.

Sincerely,

A handwritten signature in black ink that reads "G. Wade Miller". The signature is written in a cursive, flowing style with a large initial "G" and a long, sweeping underline.

G. Wade Miller
Executive Director



April 28, 2017

THE CITY OF SAN DIEGO

Sara M. Katz
Katz & Associates, Inc.
5440 Morehouse Drive, Suite 1000
San Diego, CA 92123

Dear Sara,

I would like to thank you and your staff for assisting the City of San Diego Public Utilities Department in coordinating our recent two highly successful beer events that featured Pure Water. The "Pure Stone" partnership with Stone Brewing and the "Pure Brew San Diego" homebrewers competition at the WaterReuse California Annual Conference were excellent showcases for the safety of adding purified water to the City's drinking water supply.

In the 1990s, San Diego's attempts to implement a potable reuse project were negatively impacted by Miller Brewing Company's Los Angeles-based campaign to derail another potable reuse project with the introduction of the opposition brand of "toilet to tap." That slogan was very impactful and honestly set the potable reuse industry back many years. Now, twenty years later, Phase 1 of the Pure Water Program is underway and public support for water reuse is at an all-time high. With Stone Brewing becoming the first commercial brewery to use 100% advanced treated recycled water in one of their beers, which was appropriately named "Stone Full Circle Pale Ale," we have been able to break the stigma of potable reuse as a concern for a product and industry that relies on high quality and customer satisfaction to be successful. As you know, more than 80 local and national media outlets have covered the partnership, including Time, NPR and the Huffington Post.

These two events are emblematic of what Katz & Associates' expertise in strategic planning and community relations brings to the overall Pure Water education and outreach program. Having established partnerships with Stone Brewing and San Diego's Quality Ale and Fermentation Fraternity (QUAFF) will allow the City to continue to build on the excitement and the momentum that the recent events have provided the Pure Water Program.

I have overseen the activities for Katz & Associates for the last several years, and K&A staff has become more than just consultants – you are valued and trusted members of our team. Thank you again for the dedication that you and your team have to our success and I look forward to working with all of you in the years ahead.

Sincerely,

J. Brent Eidson
External Affairs Deputy Director
City of San Diego Public Utilities Department



SOUTHERN NEVADA WATER AUTHORITY

1001 South Valley View Boulevard • Las Vegas, NV 89153
(702) 258-3939 • snwa.com

February 2014

Wholeheartedly and with great pleasure I endorse the qualifications and expertise of the firm Katz & Associates and commend their long-standing efforts working with the Southern Nevada Water Authority and the Las Vegas Valley Water District.

For more than 20 years, Sara M. Katz and her team of professionals has created and implemented far-reaching community outreach, public affairs and public participation programs for the SNWA and LVVWD. Our community outreach and overall communications strategies have grown in meaningful and significant ways with the support of Sara and her colleagues. In the early years, Sara helped introduce and design our first significant outreach effort involving public participation for the Integrated Resources Project. She also worked one-on-one with my management team and the interest community coalition that was established to develop strategies for the successful passage of the quarter-penny sales tax, one of the key funding sources for our multi-billion dollar capital improvements program still active to this day. There are countless major conservation and educational programs and efforts that Sara and her team launched that to this day are critical ongoing efforts for our organization.

As the Las Vegas Valley grew, so did the need for a massive infrastructure expansion, and Katz & Associates (K&A) has provided construction relations support since 1993 for over \$3 billion in improvements. One of Sara's senior professionals, Robin Rockey, has been working on site with SNWA Engineering since 1997, providing a critical liaison role between prime contractors, the management team and the affected public. Robin's greatest achievement lies with the relationships she has built and the consequent access and understanding with each major construction project, resulting in repeated successful construction relations outcomes. Most recently, Robin has effectively met many media and public information challenges with the Lake Mead Intake No. 3 project, SNWA's final major construction project.

One of the firm's many valuable practice areas is facilitation, led by Lewis Michaelson. In our early days, Lewis facilitated a citizen's advisory committee examining future water options for the southern Nevada region. Using an Integrated Resource Plan approach, the committee assisted the Authority in developing water supply and management solutions to head off predicted water shortages. Mr. Michaelson assisted the 21-member committee in reaching consensus based on collaborative problem-solving. The main tool for analysis and decision-making was a matrix of criteria developed to evaluate 10 different options. Evaluation criteria included cost, public acceptability, flexibility, reliability, regulatory feasibility, efficiency, and environmental impacts. The recommendations encompassed issues related to water resources, capital improvements, conservation, water quality, and financing. I'm proud to say that the process Lewis brought to this effort won over not only the people, but us as well.

This was the beginning of several other facilitation efforts, including the Las Vegas Wash Coordination Committee, where the K&A team with Lewis serving as lead facilitator for

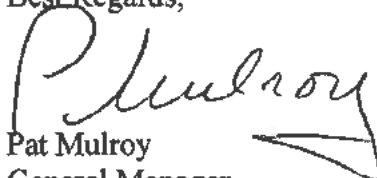
SNWA MEMBER AGENCIES

Big Bend Water District • Boulder City • Clark County Water Reclamation District • City of Henderson • City of Las Vegas • City of North Las Vegas • Las Vegas Valley Water District

a committee composed of federal, state, and local agencies, business interests, and public interest groups, were tasked with developing a comprehensive adaptive management plan for the Las Vegas Wash and Las Vegas Bay. Lewis' efforts with the Las Vegas Valley Groundwater Management Citizens Advisory Committee were also invaluable, leading to a regional consensus on establishing a comprehensive groundwater management program for the Las Vegas Valley aquifer to prevent overdrafting and contamination. This successful collaborative problem-solving dialog resulted in recommended legislation that was passed unanimously in the Nevada Legislature, and became a model of cooperation in the valley.

Sara and her team are personally and professionally dedicated to their work and to achieving successful client outcomes. Their long-lived presence with the Southern Nevada Water Authority attests to their commitment and success in the consistent delivery of valuable services and quality products. It has been a rich partnership over these past 20+ years that has served Southern Nevada well.

Best Regards,

A handwritten signature in black ink, appearing to read "Pat Mulroy". The signature is fluid and cursive, with a large initial "P" and a stylized "M".

Pat Mulroy
General Manager
Southern Nevada Water Authority

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SARA M. KATZ AND PATRICIA TENNYSON

Coming Full Circle: Craft Brewers Demonstrate Potable Reuse Acceptance

POTABLE REUSE OF
WASTEWATER HAS
STRUGGLED TO GAIN A
FOOTHOLD IN SOCIETY, BUT
PUBLIC SKEPTICISM IS
GRADUALLY BEING WASHED
AWAY AS CONVERGING
FACTORS ENCOURAGE
ACCEPTANCE.

Some 20 years ago, a well-known American beer brewer decided that a Southern California water district would damage its reputation for a quality brew—aided and abetted by competitive beer makers—if that district succeeded in its plan to build a recycling plant that would return purified water to the local groundwater basin that the brewery obtained its water from and, eventually, to the drinking water supply. Two decades later, a seemingly clever but ultimately inaccurate description of this forward-looking process of potable reuse, namely “toilet to tap” (T-to-T), still resurfaces among scare mongers and sensationalists who use it as pejorative shorthand in a hearts-and-minds battle for reliable water supplies.

T-to-T remains a phrase that haunts potable reuse projects more than 20 years after it was first coined. Cartoons still appear, showing the choice of drinking from your toilet, along with pithy captions. Yet if you believe that all bad things must come to an end, in large part that’s what is happening today: there are more potable reuse projects than ever being planned and implemented. And whether it’s drinking from a water tap or beer tap, public acceptance is becoming more prevalent than ever.

Starting with home brewers in the Northwest who introduced their beer brewed with purified recycled water in 2013 at the WaterReuse Symposium in Seattle, to the groundbreaking effort by Stone Brewing with its Stone Full Circle Pale Ale in 2017, beer brewers have become a vital symbol of

Layout photograph by Curtiss Lewis / Alamy Stock Photo

acceptance of potable reuse that water purveyors can drink to.

Encouraging the public's acceptance of water reuse projects, even when backed with incontrovertible science, has not been an easy journey. The San Diego (Calif.) water purification program was nearly stillborn during the late 1990s when politics and unsubstantiated fears seemed to outweigh the science. Like San Diego, Los Angeles (Calif.) experienced a similar backlash to water reuse in 2000. The Los Angeles Department of Water and Power had completed the lengthy process to design and construct its East Valley Water Reclamation Project, complete with a public outreach program to inform customers and garner support from local city council members. Both the *Los Angeles Times* and the *Los Angeles Daily News* had printed positive articles about the project before its completion. In April 2000, however, the *Daily News* headline "Tapping Toilet Water" appeared with a story alleging the public had not been informed about the project. This launched a political free-for-all in the Los Angeles mayoral race, as well as stories on every major television news outlet and late night comedy shows. It took until 2008 for the City of Los Angeles to begin to seriously explore new opportunities for potable reuse.

Times have changed, however, and now Pure Water San Diego is a beacon of progress that is expected to supply one-third of the community's drinking water by 2035. Likewise in Los Angeles, both the City of Los Angeles and the Metropolitan Water District of Southern California are in various stages of evaluating how to incorporate potable reuse without as much prejudice as in the past. To appreciate this change in mindset, one must first acknowledge the deep-seated human aversion to any contact with wastewater. With that in mind, it's easy to understand how improving the public's opinion of reuse was only achieved with hard work, a knowledgeable team

armed with facts and science, and a consistent commitment to communicate the truth.

HUMAN NATURE EXPLAINS THE "YUCK FACTOR"

A recent article, titled "Psychological Aspects of the Rejection of Recycled Water: Contamination, Purification

and Disgust" (Rozin et al. 2015), explores the public's resistance to reuse and concludes its basis lies in psychology. From a sample of 2,000 adults from five major metropolitan areas, it was reported that approximately 13% would definitely refuse to drink recycled water, 49% are willing to try it, and 38%



Stone Brewing and the City of San Diego, Calif., partnered in 2017 to create a new beer using 100% advanced treated recycled water.



San Diego mayor Kevin Faulconer (left) and Stone Brewing chief operating officer Pat Tiernan toast the first glasses of Stone Full Circle Pale Ale. The March 2017 Pure Stone event was covered by nearly 80 local, national, and international news outlets.

are uncertain, though it is likely that the “willing to try” percentage has risen in recent years. The authors found that “both disgust and contamination sensitivity predict

Stated another way, even though the science around reuse is settled, the psyche of some people just won’t allow them to accept it. Psychologically, an irrational lack of

reinforcement through loaded language like “T-to-T” and other slogans.

HOW PURE WATER OPPONENTS HAVE EMBRACED THE T-TO-T MENTALITY

San Diego, we have a problem: one of America’s most beautiful and coveted cities lies in a cul-de-sac at the southern end of California, a semiarid community that has long depended on outside water sources for survival. These sources are hundreds of miles away, require significant energy to transport the water long distances, and have become less reliable for a host of reasons, including droughts in these distant watersheds or political decisions made equally far away.

Returning to our story, at about the same time the well-known beer brewer was fighting the local water district’s plans for potable water recycling, the San Diego Water Utilities Department (as it was then known) began dreaming of a local, drought-proof, less expensive way to serve more than one million thirsty inhabitants. That dream—a nightmare at times—crossed well over the turn of the century before it even approached reality.

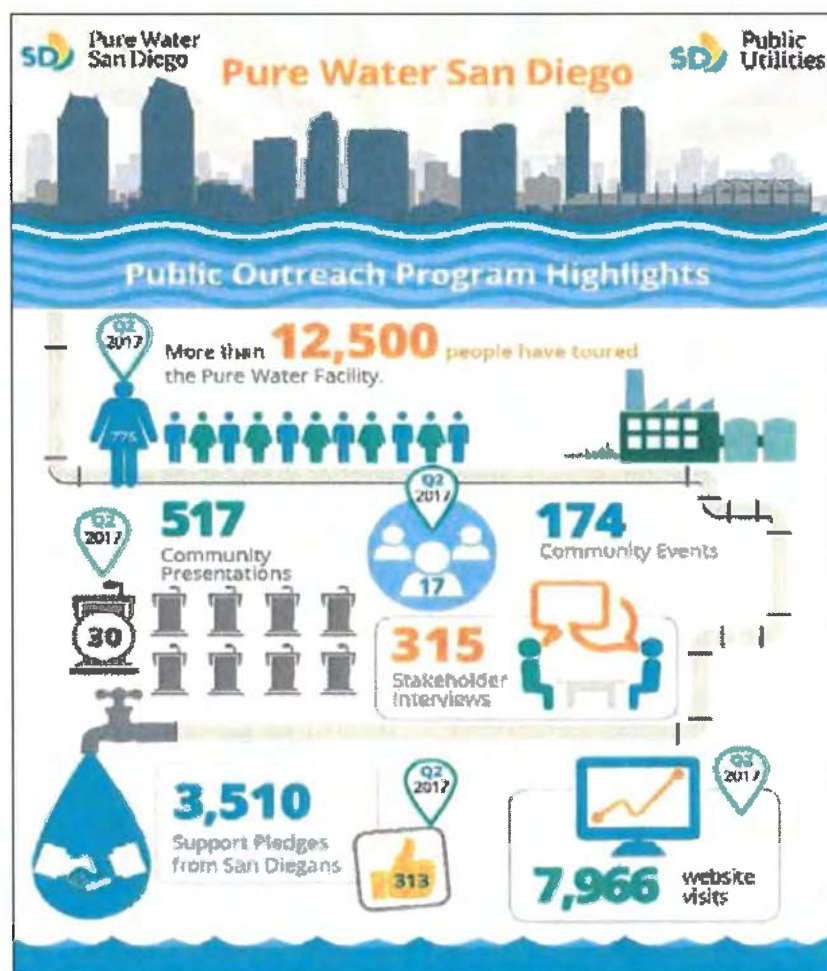
If you have a political race to fight, the T-to-T mentality is a gift that has kept giving for years, the stuff of headlines generated in local media with frenzied regularity. While the city launched proactive and accurate communication about the project and earned public support from key stakeholders and regulators, T-to-T was used to promote public distaste for potable reuse. Even talk show host Jay Leno mocked L.A.’s idea as T-to-T, instantly reinforcing negative connotations through his choice of words.

Starting in 1993, project communications for San Diego’s water utility dutifully included textbook examples of how to do it right: sound scientific research; an independent advisory panel; a broad-based and large coalition of medical, scientific, business, academic, and environmental supporters; dozens of presentations,

Pure Water San Diego is a beacon of progress that is expected to supply one-third of the community’s drinking water by 2035.

resistance to consumption of recycled water,” and that “for a minority of individuals, no overt treatment of wastewater will make it acceptable for drinking, even if the resultant water is purer than drinking or bottled water.”

acceptance trumps reason—it’s called the “yuck factor.” So while reuse systems can reliably purify water, the challenge for its wider acceptance is to overcome this very real yuck factor, a task made all the more difficult by negative



Sustained outreach and communication helps ensure that Pure Water San Diego keeps the support of stakeholders and the community at large (outreach statistics through June 2017).

events, and issue-specific workshops; and an initially willing city council that funded the exploration for five years. That's right—five years!

By the time the city effectively killed the project in late 1997 (the council said it wasn't ready for the commitment), opponents of potable reuse framed it negatively at every opportunity, and taken together with several other events occurring at the same time, the stakes were just too high for the political decision-makers to get over. Specific instances included the following:

- The mayor, running for reelection, didn't see water purification as a comfortable companion on the ballot that fall.
- The usual blame game between the two leading political parties led to finger pointing that defied the potential value of the project.
- As a way to discredit the Republican San Diego mayor at the time, a Democratic state senator—with no jurisdiction on the issue of water or this specific project—organized a high-profile state committee hearing with his local San Diego Democratic colleagues to continue exposing the project (and the mayor) in a negative light.
- A San Diego California Assembly candidate surveyed his constituents, asking if they supported drinking their own toilet water, prompting the expected negative and widely highlighted response.
- A television consumer affairs reporter—who years later supported the Pure Water project as a city council person—staged a multi-part series on potable reuse, using a makeshift display with a toilet connected to a mysterious black box, then to a drinking faucet. The piece innocently asked, "Do you have confidence that magic happens in this box?"
- The San Diego County Water Authority, the regional



Orange County Water District bottles its purified water and offers taste tests to community members throughout California and the United States. Photo courtesy of Orange County Water District

wholesaler, was steeped in its own pursuit of a large-scale water transfer program and, as such, had limited involvement or ability to advance the city's potable reuse initiative.

- One city council candidate raised the issue of environmental justice, saying that wastewater from a wealthier area in the city would be distributed as drinking water to minority community areas. He organized a group of African-American ministers to attend a city policy committee to raise these concerns in a high-profile and dramatic manner. The story was the top item on all major news networks for two days.
- While the National Academy of Sciences declared that even though a study by preeminent scientists supported the technology to be used by San Diego and other jurisdictions—as if to reassure doubters—the executive summary included a reference that potable reuse should be an "option of last resort."

- And finally, concurrent major issues, such as the staging of the 1996 Republican presidential convention and a critical vote to approve a new baseball park, sapped the electoral energy of the community. Potable reuse became an unwanted stepchild of the late 1990s.

BUT THAT WAS LAST CENTURY

What has changed the mindset of a skeptical public in this new century? Possibly it's a recognition that all of California, not just San Diego, has a water supply issue dominated by an unruly Mother Nature. Likely the recent five-year, statewide drought had sufficient power to light a bulb above many a doubting head. And certainly the growing acceptance of the evidence that potable reuse can be safe, which has been consistently demonstrated through research and full-scale projects, is a factor.

An excellent example of success is the Orange County Water District's (OCWD's) water purification system, which has been so successful that the OCWD now passes out small bottles of its purified water to

spread the purification gospel. OCWD's Groundwater Replenishment System (GWRS) continues to be a game changer for potable reuse projects. Legislation was passed in California in 2016 that allows GWRS to produce 8 oz. bottles of its purified water, which means OCWD can now bring its taste

(in the form of fertilizer). Schools have also done a better job providing education on the water cycle and its limitations. That being said, the authors have found continued resistance in select multicultural audiences, especially those that have moved to the United States from a country that frequently

water may once have helped to flush a toilet.

Regardless, in 2011, a variety of factors and a newly persistent San Diego city council commissioned a demonstration Pure Water Facility to provide tours of the process and explain the underlying concepts. The facility also offers officially sanctioned tasting of the final product. This undeniable demonstration of success was sufficient to rally strong political support for the implementation of a full-scale water purification system, which is currently in development. Credit city leaders with strategically using this hands-on approach in combination with consistent messaging to build interest, support, and excitement about Pure Water's potential in their region. This resulted in a 2016 vote to move ahead with the \$1.2 billion first phase of the Pure Water program, which includes a full-scale purification facility (to be located across the street from the demonstration facility).

"Advancing Pure Water San Diego is a marathon, not a sprint. We work closely with our elected officials, our public utilities staff, our diverse group of regional stakeholders, the media, our wastewater member agencies and the consultant teams we have retained to keep the lines of communication open and current, as well as ensure stakeholders are still engaged," says Halla Razak, former City of San Diego Public Utilities Department Director. "Pure Water San Diego is a multi-year program with full buildout to be completed in 2035. A lot can happen over two decades, so keeping the public well informed and maintaining their support is a top priority" (Razak 2017).

Even though the science around reuse is settled, the psyche of some people just won't allow them to accept it.

tests to a wide range of audiences in California and the United States. "We had over 4,000 people tour the GWRS facilities and taste our purified water in 2016, but being able to bottle this fabulous water allows us to reinforce how safe it really is and to support other projects no matter where they are located," says OCWD president Denis Bilodeau (Bilodeau 2017).

Also, younger audiences seem to have higher confidence in technology and have grown up recycling their trash, blood, and even excrement

experiences health issues due to questionable or contaminated drinking water. The drinking water situation in Flint, Mich., generally raised questions about a governmental entity's ability to operate its water system. Concerns are often raised by women in their 30s and 40s as they are primary child-care providers or are caring for aging parents with compromised immune systems. And returning to the previous discussion, a certain percentage of the general public just can't get over the fact this



Home brewers from the Quality Ale and Fermentation Fraternity served their beers to attendees of the Pure Brew event at the 2017 WaterReuse California Annual Conference in San Diego.

THE TIDE IS TURNING

In the decades since potable reuse was first proposed, San Diego's thinking has evolved to a surprising degree. Case in point, Stone Brewing was asked to turn T-to-T on its head by producing Stone Full Circle Pale Ale, mentioned earlier, for a City of San Diego event. The beer was

made with purified water from the city's demonstration facility, and its name is a full-on attack of that outdated trope.

And this isn't an isolated incident: a home brewing contest using recycled water was held at the 2017 WaterReuse California Conference. Members of the Quality Ale and Fermentation Fraternity, or QUAFF, brewed beer with names such as I Pee Ale and Sweet Reclamation, made from San Diego's purified water. Ballast Point Brewing Company provided its Padre Dam Pilsner (brewed from water produced at Padre Dam Municipal Water District's East County Advanced Water Purification Program) for the 11th International Water Association International Conference on Water Reclamation and Reuse held in Long Beach, Calif., in 2017.

When one of the most respected technology leaders and philanthropists in the world, Bill Gates, cajoles the host of *The Tonight Show* to sample drinking water created from wastewater, it is a sure bet the tide is turning. More and more observers believe supporting water purification is the side of history to be on. For Gates, the mission is humanitarian: developing water purification technology to serve millions of third-world citizens without sufficient water.

Many in the public are willing to accept that wastewater can be purified to safely augment drinking water supplies, but there are some who will not or cannot. Groups that resist potable reuse still trot out tired terms like T-to-T, but when this occurs, it should be called out immediately and refuted with the truth. Agencies must not lower their guard by lessening their outreach and communication programs. At the same time, communicating about potable reuse is not the same as talking about traditional water supplies. Words are important! What you say, the words you use, how you frame the context, the need for a broader support base, and so on—all are necessary ingredients.

Negative attacks can erode support, and as San Diego's former director Razak said, these projects are a marathon, not a sprint. A lot can happen to derail projects that often take more than a decade for designs, environmental reviews, funding, and construction. Consistent, sustained, and comprehensive outreach is still the key, but communicating creatively can certainly help. The efforts of Stone Brewing and other intrepid craft brewers have created a great symbol of progress, changing the steady drip-drip-drip of T-to-T's irrational fear to a refreshing sip-sip-sip of malt-and-hop ingenuity.

ABOUT THE AUTHORS



Sara M. Katz is the founder and chief executive officer of Katz & Associates, a full-service public communication and outreach firm, 5440 Morehouse Dr., Ste. 1000, San Diego, CA 92121 USA; skatz@katzandassociates.com. She has spent the last three decades working on environmental and public works programs representing over \$25 billion in capital improvement program investments. Her water and wastewater experience has taken her to projects in Australia, Iraq, and throughout the United States. Katz's experience ranges from issues management, public affairs, coalition building and facilitation to strategic planning, media relations, and crisis management. Patricia Tennyson is executive vice-president of Katz & Associates. She has more than 30 years of experience in the water industry developing and managing communication, government/community relations, and public affairs/media strategies for water, recycled water, potable reuse, and wastewater projects for cities and water agencies throughout the

United States. Her experience includes designing presentations to inform policymakers and the community about a variety of technical issues, facilitating community workshops, environmental hearings and citizen advisory committees, and providing strategic counsel to a wide range of clients.

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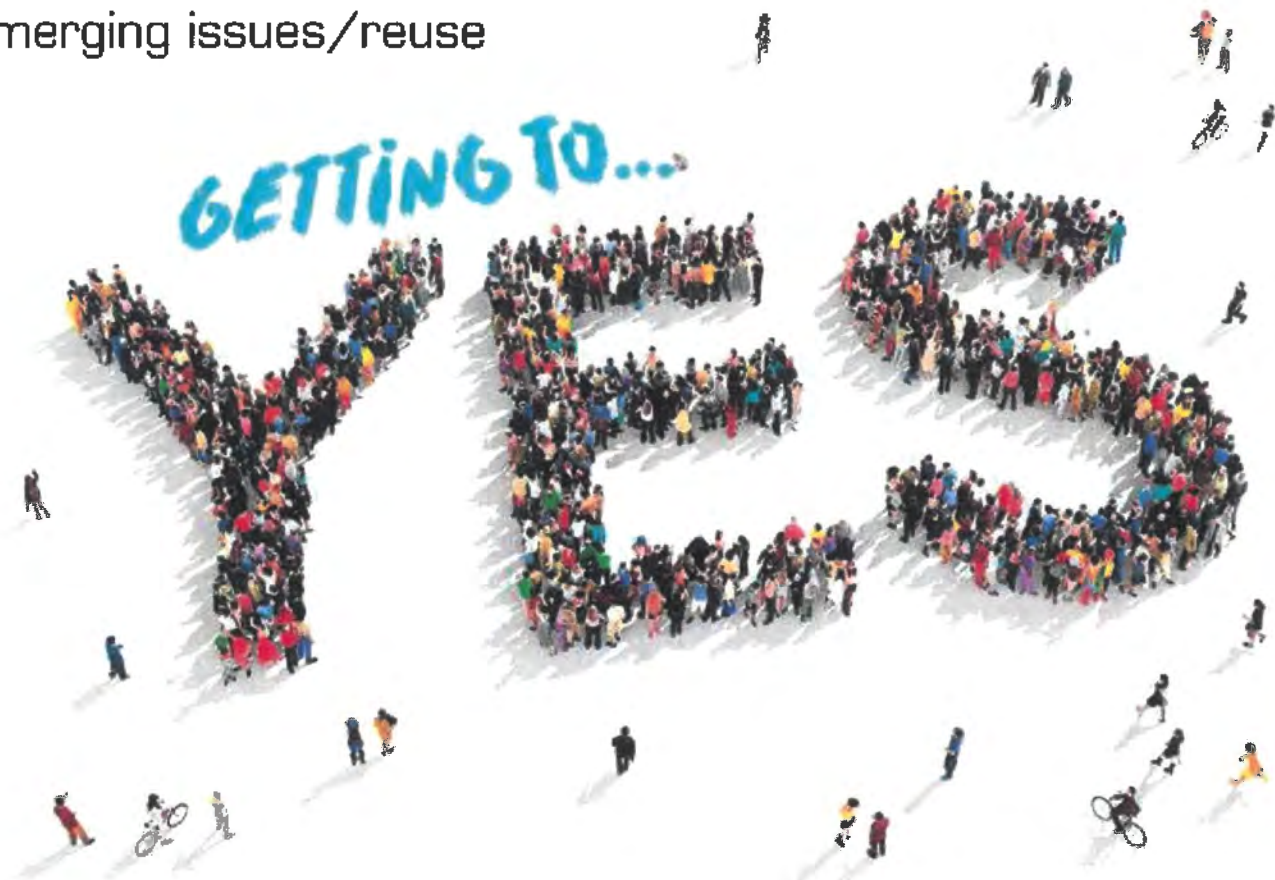
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SARA M. KATZ AND PATRICIA A. TENNYSON

Public Outreach for Potable Reuse: Bringing the Public to a New Level of Acceptance

PUBLIC OUTREACH FOR
POTABLE REUSE REQUIRES
A STRATEGIC APPROACH TO
ENSURE SUCCESS IN
HELPING THE PUBLIC
UNDERSTAND THAT
POTABLE REUSE WATER IS
SAFE FOR DRINKING.

Just a few years ago, potable reuse was defined by a four-letter word: yuck. It suffered under the clever but misleading label “toilet to tap,” even though the two are never directly connected. However, these few short years have proved to be something like a full generation’s worth of change in the water world. What has been taken for granted with the turn of the tap for decades is now front and center, rife with challenges to be solved. Water has become a linchpin in a community’s economic well-being and is recognized for its contribution to quality of life. Yet supply reliability in many parts of the continent, and certainly across the globe, has never been more tenuous.

As water supply challenges continue to emerge and become more serious, the conversations about alternate drinking water supplies necessarily shift to other sources—chief among them is direct and indirect potable reuse, a topic so far from public acceptance in the old days as to remain almost unmentionable. In a society that uses 24 gpd/person just to flush toilets (Lewis 2012), the potable-reuse discussion asks water customers to take seriously the growing national challenge to secure reliable water and abandon emotion and negative perceptions in favor of science and technology. The latter request represents pushing the public into a hard but critical switch in thinking that can help communities sensibly rebuild their water portfolios—and feel good about it.

Convincing people to jump onto a controversial and highly technical bandwagon is, many would agree, the ultimate “ask.” We are asking water drinkers to let go of a reasonable gut reaction and trust our vision, our technology, our professional expertise, and our fiscal prudence. We don’t usually have to do that with other water projects. In a time when trust of government agencies hovers right around the trust level of Congress, that’s a mighty big request. Added to that is this additional factor: we have for years told people not to drink recycled water. Now we are urging them to buy the concept (albeit with significantly more purification treatment) that purple pipes are a reasonable steppingstone to a “new and improved” product they can safely drink.

The truth: we can reliably purify water far beyond the level required for human consumption.

The puzzle: how do we convince our customers they can trust us?

Many proven approaches to public outreach have been used for decades on water projects and remain valuable in this discussion. However, there are aspects of communicating about potable reuse that are different and require significantly tailored approaches.

Here’s what we’ve learned through decades of communicating about a variety of water issues and projects, including potable reuse:

- Traditional outreach is critical.
- An increased focus on enhancing certain elements of traditional outreach can be a game changer.
- Research, careful attention to terminology, and strong alliances with third-party experts are key.
- Focusing on the technology, especially for potable reuse, is an essential part of the public message.

These statements are essential parts of the new, successful communication equation. All are contributors to a higher level of trust

than what has been demanded in the past.

WHAT REMAINS THE SAME? PROVEN COMMUNICATION METHODS

Most industry professionals finally agree that public outreach and education can no longer be an engineering afterthought. Board members, project managers, and other agency executives have, for the most part, accepted the need for solid public

The truth: We can reliably purify water far beyond the level required for human consumption.

The puzzle: How do we convince our customers they can trust us?

communication as part of the equation to ensure successful projects because they’ve seen results. That is progress. But with progress the bar moves higher into more challenging territory. Attempts to use only traditional communication approaches for potable reuse projects have proved ineffective, falling under the weight of misinformation and community opposition.

To begin, communication for potable reuse partly follows the same outline as any utility communication program.

- Produce solid message plans that clearly and concisely explain the reality of the situation and the partial solution that potable reuse guarantees.
- Identify target stakeholders and the information they need to hear.
- Prepare spokespersons to communicate their expertise and understanding in a way that resonates with and can be accepted by lay audiences.
- Create concise and memorable materials that are strongly supported by the kind of graphics to which modern audiences respond.

- Maintain a broad portfolio of outreach tactics to reach diverse audiences.

But these tried-and-true approaches are not enough. Technology will rarely, if ever, be the reason for a failed potable reuse project. Cost concerns may only slow the project down. But bad or even average public communication may kill it. Simply put, while we have the technology to safely and effectively deliver potable reuse results, and

while it has worked in outer space for decades, we have not yet turned the hearts and minds of the public to the belief that potable reuse—particularly direct potable reuse—is a necessary and viable new water supply. This requires a new way of thinking and communicating about the science and technology of purifying water with an emphasis on addressing the public’s squeamishness about water reuse. After all, reuse has occurred throughout history as a natural process.

WHAT IS DIFFERENT? INCORPORATING UNPRECEDENTED ATTENTION TO DETAIL

Start with context. Agencies and project managers can communicate using the premise that “water is water.” They can begin a more inclusive narrative about drinking water that focuses on the facts: all water has been naturally recycled since the beginning of time, and the source of that water—be it imported, recycled, treated wastewater, saved by community conservation, or drawn from the ground—becomes unimportant, as long as it is pure out of the tap. The mindset begins to shift to the finished,

high-quality product and not where it originated. Backing up that approach, however, is the other reality of talking about potable reuse: technology is going to be more important to customers than ever before if we are going to be successful in gaining credibility for potable reuse.

Technology matters. For decades, outreach specialists have advised our engineering and operations clients to focus less on the technology of our

know how the technology works and how *well* it works. Our research shows growing support when people are informed about the high-tech processes involved in potable reuse.

The public is primed. While it may prove challenging, the environment has never been more favorable for convincing the public of the positive reality of a technology that has proved and continues to prove itself in real-life applications. Communication

manager for the Wichita Falls Public Works Department, was quoted in *Environmental Health Perspectives* as saying that the “vast majority” of people thought the treated water tasted better than the normal supply (Dahl 2014). As part of their communication arsenal, agencies can now point to communities reusing water through advanced technologies such as those in Aurora, Colo.; Cloudcroft, N.M. (in construction); El Paso, Tex.; Fairfax County, Va.; Orange County, Calif.; Scottsdale, Ariz.; Wichita Falls; and in Australia, Namibia, and Singapore (Dahl 2014).

Focus groups and surveys (Millan & Metz 2015, Tennyson 2015 [also see the article by Tennyson et al. in this issue, “Getting Past the ‘Yuck Factor’” on page 58]) show a growing number of people who believe that potable reuse provides a safe water supply and, more important, is going to become more and more necessary in the future. However, studies also indicate that while there is growing acceptance of the technology, there is still a hearty resistance to actually drinking it. Thus, the need for potable reuse projects must be convincingly proved and the technical explanations bullet-proof.

Starting the public conversation. Different geographic regions, water supply portfolios, demographics, and community issues all inform the way in which utilities address strategic potable reuse communication. But there are challenges that appear to be consistent from project to project and must be overcome.

- There is confusion and a general lack of awareness about potable reuse, especially direct potable reuse.
- Within the industry we struggle with terminology, and that certainly carries over to the lay audience.
- Except perhaps in the western United States and in areas abroad, there is a lack of urgency to implement potable reuse as part of community water supply portfolios.

Technology is going to be more important to customers than ever before if we are going to be successful in gaining credibility for potable reuse.

projects and more on the purpose and need. People may not know much about what happens at a normal treatment facility, be it for drinking water or wastewater treatment, but the end product is so familiar that they aren't worried about it. Turn on the tap, water comes out—end of story and curiosity. Flush the toilet and the wastewater goes away, never to be thought about again. Despite the fact that all water is naturally recycled and a consumer's drinking water has been recycled from upstream users, the public has learned about and seen water and wastewater processes as distinct and separate, out of sight and out of mind. Thus, no “yuck factor” exists for our standard water supply and treatment methods. The technology, for the most part, has not been the focus of interested stakeholders.

But with reuse projects, it's different. If we progress to the point at which people believe and accept that “water is water,” always recycled throughout history, then the difference in what we talk about *is* in the technology. The endpoint in all water discussions must be the tap and the indisputable fact that the tap will yield safe, high-quality water regardless of where it originated.

As people consider their acceptance of potable reuse, they want to

optimism stems from successes already achieved. It can be done. In San Diego, Calif., where informing and educating about water reuse have been underway for years, surveys indicate growing acceptance of potable reuse. A 2009 survey demonstrated that 63% of respondents would either somewhat or strongly support using advanced treated recycled water as an addition to the supply of drinking water. That is in comparison to 26.6% of those surveyed in 2004 (San Diego Water Authority 2009). A full-scale potable reuse project is now in development to provide one-third of San Diego's drinking water by 2035.

In Wichita Falls, Tex., people looked at the dire condition of their reservoirs and decided that reclaimed water that came directly from a wastewater treatment plant tasted pretty good. That temporary project and how it was communicated can be a model for communities across North America. The City of Wichita Falls took great pains to make sure the public knew the facts surrounding the need for potable reuse as a temporary solution until the drought ended. Multiple public presentations and aggressive media relations were part of a conscious, proactive plan to get the word out and gain customer trust. Daniel Nix, utilities operations

- Diversity among stakeholders (including vocal ones) is growing, requiring more tailored and varied communication and outreach.
- The need for a long-term potable reuse commitment comes into question when circumstances, such as drought conditions, change. Tying potable reuse directly to drought will not be a successful, long-term narrative. Although potable reuse can help protect against drought, groundwater depletion, and water quality issues, the opportunity reaches beyond those common problems with the chance to cement a 21st-century idea into a commonplace, acceptable occurrence because it is a smart idea for cogent reasons.

How does this new reality affect agency activities, program management, and message platforms—the way we talk about what we do in the 21st century? Addressing this takes transformational hard work in the public trenches—not just good materials. Here are some public outreach informational starting points that have shown success when beginning the conversation with customers, although community-specific message planning is a must.

- Water supply shortages are narrowing supply options, traditional sources are shrinking, and costs are rising.
- Groundwater over-drafting is unsustainable in many communities.
- Diversifying water supplies requires looking at potable reuse as a new option.
- The technology behind potable reuse is proven and safe.
- Research shows consumers are becoming potable-reuse believers in growing

numbers and are willing to bear at least some of the cost (Millan & Metz 2015, Tennyson 2015).

- New solutions will likely not always be optional but instead necessary (or often the best choice) given population growth and other water supply realities.
- Customer expectations should not and will not change: reliable, high-quality, clean drinking water around the clock and at a reasonable cost remain priorities.
- Potable reuse is inevitable, especially because it solves thorny problems such as water supply reliability.
- North America generates an estimated 22 tril gal of wastewater annually. Only 3.8% of treated wastewater is intentionally and beneficially reused (Dahl 2014). That can and should change.
- Water is water, no matter where it comes from. It has been recycled throughout the earth's history. Potable reuse is the next

major advancement in safe water for communities.

OUTREACH STRATEGIES THAT WORK FOR POTABLE REUSE

Agencies need to conduct their own situation analysis to verify whether the factors and themes outlined here are accurate for their unique circumstances or if other factors are at play. The results will set the stage for positive project communication and will inform unique and targeted communication strategies that will be game changers if implemented well and transparently. Strategies and tactics that should be considered by any agency as part of its potable reuse communication should include the following elements.

Start with research. Just as water professionals rely on information and data to plan a capital project, we in the communication field rely on current, issue-specific data to guide our planning. Who are our audiences? What is the community thinking? What do people in the



community know about potable reuse? How do they want to hear from us? What historical issues might cloud the current discussion? What about age differences, and do they require different strategies? (See Eidson's article "Testing Potable Reuse Messages With a Utility-University Partnership" on page 54 in this issue.) What about ethnic audiences and those with limited English-speaking proficiency? Time and time again, research—through surveys, focus groups, and intercept interviews—provides unique community indicators that help craft the information you provide and the way in which you provide it (Millan & Metz 2015, Tennyson 2015).

Get the language right. The Water Reuse Association Public Education and Outreach Committee's draft of the report, *Water Reuse Description and Terminology*, keeps it simple: "Potable water is drinking water." Even then, you need to determine whether people know what "potable" means. They might not. Words are important and need to be tested.

What do we call the product of direct potable reuse? Some technical

experts question whether "purified water" is a good choice. But survey work indicates that "purified" serves as an identifier that people can understand. It makes them confident that the water is clean and safe—and made so by advanced technology. Some agencies are moving away from using the word "treatment" because the public equates it with curing a disease or sickness. Cleaning, filtering, or purifying the water may be more understandable to the public and convey what potable reuse really is.

"Direct" and "indirect" are additional sources of public confusion. Consider dropping the labels when possible. Ultimately what comes out of the tap—not where it came from or the specific process used—is the bottom line of discussion. What is an acre-foot? What is "mgd"? Define technical terms, explain the units of measure, and use them consistently.

The language bottom line: technical words are a challenge that makes some readers or listeners drop out. Give conscious thought to language simplification. Do not assume your audiences know anything about potable water or

how their water supply is maintained for their benefit.

Talk tech, but do it briefly and simply. The average attention span for a goldfish is nine seconds. But according to Microsoft Corp., people now generally lose concentration after eight seconds (Colgrass 2015), highlighting the effects on the brain of an increasingly digitized lifestyle. A successful communication program will incorporate technology because we know it is important, but it will have a language-simplified, concise technical description—not just about the project, but also about the technology to be used. Photographs, graphics, and simplified descriptions have been proved to aid communication success. For example, people are familiar with the water cycle they learned about in school. Use the urban water cycle—the one that depicts how water is used, cleaned, and then disposed of safely—as an education tool and explain that all water is recycled. Potable reuse provides just another reliable and sustainable water supply.

Build alliances. Sadly, most consumers and customers won't just take the utility's opinion as the final opinion. But people will pay attention when there is a critical mass of information that reflects views from diverse sources. This is truer and more important for potable reuse issues than for any water issue in recent history. Medical and scientific professionals carry significant credibility as spokespersons and third-party experts. A coalition of supporters can create a powerful bandwagon that can attract members of their own circles of influence. In San Diego, the Water Reliability Coalition—a broad-based affiliation of environmental, consumer, business, labor, ratepayer, and technical organizations—helped carry the banner for the city's Water Purification Demonstration Project, bringing diverse and strong perspectives to a



common issue. Meet with and recruit project supporters who add credibility and can broaden your reach. Seek written support.

Query your team's attitudes. Picture this: you organize a bus tour of your utility's potable reuse project, and one of your employee hosts says offhandedly, "I'll never drink that recycled stuff!" It has happened, and it could happen to you. When identifying stakeholders and audiences, internal stakeholders should be at the top of your list. Your customer service personnel, field crews, and other staff are—formally or informally—representatives of your organization. Conduct an internal screening to find out what people think or where their concerns lie regarding potable reuse, and then make sure you address their concerns to improve their comfort level.

Promote two-way communication but manage expectations. Stakeholders demand more transparency all the time, and transparency will be a key element in earning trust. Stakeholders also value the opportunity to influence decisions through their input. It is important to encourage two-way communication while also setting realistic expectations for what the stakeholder role will be during the project and decision-making process. Are you asking for informal input? Will there be a vote? Will there be an advisory group that will share in decision-making? Clarity on the role and length of input will be especially important as agencies strive to gain support for potable reuse efficacy.

Develop a message platform. Start with a message platform that informs all materials and presentations that will be developed. Talk about "informing" rather than "educating," which many people may resent. The ultimate message goal is for people to see potable reuse as an acceptable alternative because they have been well informed in a transparent way. Consistent, oft-repeated, printed, and published messages must be ingrained in this informational process.

Some messages will cover common, useful, and accurate themes: safe, reliable, sustainable, environmentally beneficial, energy efficient, and attuned to climate change concerns. For direct potable reuse, consider a message such as "Health risks

environmental documents and downloadable materials.

PowerPoint or Prezi presentations can mirror the message plan and be constructed in modular fashion for key issues, adding flexibility for spokespersons. These materials

The ultimate message goal is for people to see potable reuse as an acceptable alternative because they have been well informed in a transparent way.

are no different from those associated with indirect potable reuse." For safety messaging, consider something like "We recognize the need to be extremely vigilant and to employ the best possible monitoring systems to ensure public health."

Other message approaches will be tailored to individual issues or challenges. Use adjectives that express the excitement you have in working on the project with statements such as "It will be the cleanest, safest water in our entire system." Message workshops, even for experienced project managers and engineers, will be essential.

Provide usable materials. Usable materials are those that people actually read. Brevity works. It limits information to the key messages you want audiences to hear. Brevity is easier to deliver in various formats and enables people to retain the information. Examples of materials widely valued by stakeholders that form the staples of an information library include basic fact sheets, a list of frequently asked questions, project brochures, pocket cards for field personnel, and succinct presentations.

If possible, establish a website specifically for the project. This insulates an organization's regular website from the negativity that controversial projects rarely can avoid. On the website, keep the same simplicity as in your other information sources. Add depth in layers beyond the main navigation for those interested in more detail. This can include links to

make up an outreach toolkit for spokespersons, making their deliveries easier and more effective. To support that effort, a speakers bureau can target community groups, which are often neutral environments for controversial projects and can help spread the word to associates and families. Such materials can also be used to keep elected officials up to date on current developments. For long projects, a quarterly or semi-annual council or board presentation may be appropriate. Make it factual, complete, and concise but sufficient for easy understanding. As materials are established, build a materials library to house all finished documents for use by all team members.

Use graphics and videos. Given the complexity of reuse projects, clear graphics will be tremendously valuable in helping customers visualize a project and understand technical aspects. The current trend toward infographics—graphic elements tied together in a single illustration—has proved valuable in telling the story of a potable reuse project. Videos with multiple uses, including individual distribution, website inclusion, and as part of presentations, continue to be developed at a lower cost with technology that even allows for in-house production.

Establish a news bureau. Get ready for media relations. First, develop a rapid-response plan to help when project opposition gains attention. Crisis and issues planning is well

worth the investment of time and money. Include the involvement and potential concerns of all audiences in communication—employees, elected officials, and regulators—not just media. This can involve three major steps:

1. Take an inventory of every potential weakness or concern that might be exploited. This can take the format of a traditional SWOT analysis (strengths, weaknesses, opportunities, and threats).
2. Develop a message plan that covers all of those concerns in key messages and in a question-and-answer section. Every possible question (especially tough, oppositional ones) can be answered in advance to ensure that spokespersons and project personnel never hear a question they haven't heard and answered before.

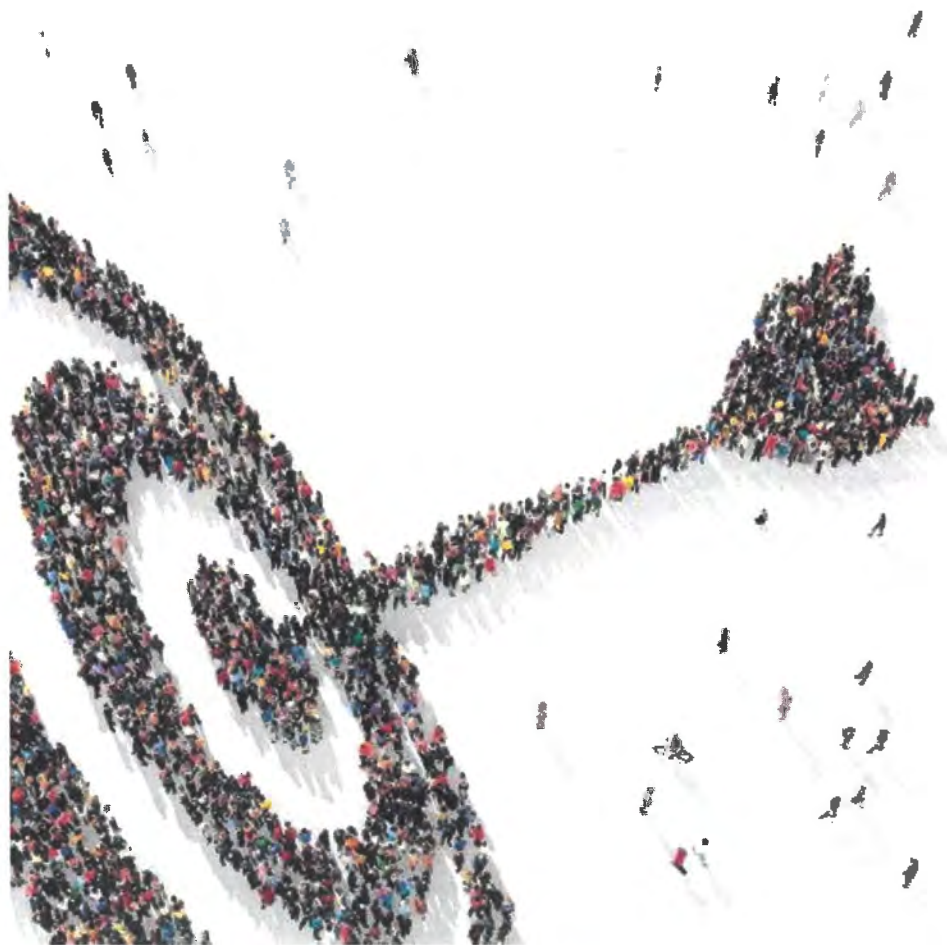
3. Sharpen spokesperson skills with message workshops that focus not so much on presentation technique as they do on delivering messages succinctly and well, and answering questions the same way. Countering misinformation is priceless and should always be done.

Traditional media relations should include the mission of getting editorial boards to accept portable reuse based on science and real-life experience. Share stories about major projects that have gained traction across the world, from Orange County to Australia to Singapore. Schedule an editorial board presentation of a project of major significance to a community. Write commentaries for editorial page placement and encourage third-party-expert partners and advocates to do the same.

Use social media judiciously.

Social media can be helpful, but it can also be dangerous. It is important to understand its power. Citizen journalists (anyone with a computer or camera) are not bound by any particular journalistic standards. Social media trending and “going viral” can happen before you can get a written statement out. On the other hand, social media can have value when the public views an agency or department as an integral and relatable member of the community. It builds equity and strengthens relationships with the public. These relationships are imperative to maintaining an environment of mutual trust and support. When using social media, remember these tips:

- *Interact as a real, personable, fellow community member.* Tone and approach to content should have a personal feel. One-on-one connection is key to developing a strong relationship. The agency's social media posts can include the use of personal pronouns as a simple grammar trick that yields personal engagement with customers.
- *Share dynamic and relatable content.* Most agencies have already begun creating and building relationships on social media through consistently posting content that relates to its customers, primarily on Facebook and Twitter. Continue to post dynamic and engaging images as well. We've found that posts with pictures receive 120% more engagement than those without.
- *Post an appropriate amount of content.* Most social media algorithms keep the most highly engaged content at the top, but there are rules. With Facebook, try not to post more than once a day. Information gathered over time by Katz & Associates and from 2012 Track Social research revealed



that when Facebook pages post twice a day, those posts receive only 57% of the likes and 78% of the comments per post. Twitter does not have the same rules. The shorter display life (the amount of time content is displayed near the top of the newsfeed) of a tweet means that it is effective to post multiple times per day if content is relevant and appropriate. Three tweets a day seems to be the most consistently successful when there is a special topic or message to get out.

Warning: social media consistency takes a lot of planning and work! Recurring deadlines are not for the faint of heart.

Touring is believing. While solid graphics and images address visual communication needs, tours can be the best way to give stakeholders an up-close or behind-the-scenes look at a project. Seeing is believing when it comes to building support for potable reuse. Tours put stakeholders close to a developing project, even if it is just where the pipeline will go or the plant will be built. The ability to interact with stakeholders over a solid block of time (two hours, for instance) not only delivers messages memorably, but also puts a human face on agency personnel and allows them to develop initial relationships with important customers or influencers.

A BOLD OPPORTUNITY

Agencies have a bold opportunity to get the offense position on the field for potable-reuse public outreach. With the support of science and technology, there are no apologies necessary for recommending and pursuing potable reuse projects. Stay proactive. Continue consistent message reinforcement at every opportunity. Quote independent sources with credibility. Finally, show enthusiasm when addressing stakeholders. The exciting concept of potable reuse deserves a few well-chosen adjectives!

ABOUT THE AUTHORS



Sara M. Katz is the founder and chief executive officer of Katz & Associates, a full-service public communication and outreach firm.

With her team of communication professionals, Katz manages community relations, public involvement, and public affairs strategies for clients throughout the United States. She has developed a specialty in creating communication programs for local, state, and federal public agencies. Her experience includes public outreach and community involvement programs for major public works projects and controversial public policy issues. She has spent the past three decades successfully working in the environment of public works programs representing over \$25 billion in capital improvement program investments. Her water experience has taken her to projects in Australia, Iraq, and throughout the United States. Katz's experience ranges from issues management, coalition building and facilitation to strategic planning, media strategy, and crisis management. Patricia A. Tennyson is executive vice-president at Katz & Associates and a water specialist with more than 25 years of experience in the industry. Correspondence may be addressed to Karen Snyder, director at Katz and Associates, 5440 Morehouse Drive, Ste. 1000, San Diego, CA 92121 USA; KSnyder@katzandassociates.com.

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Michael Romero

From: Loveland, Jonathan P <LovelandJP@bv.com>
Sent: Monday, August 20, 2018 4:47 PM
To: Pat Sinicropi
Cc: Jon Loveland
Subject: RE: Call for Nominations for WateReuse Association Board of Directors
Attachments: Jonathan Loveland Resume.docx; Jonathan Loveland Bios for WateReuse.docx

Good afternoon Pat,

I am interested in maintaining my role on the WRA Board. It goes without saying that I have enjoyed working with the current Board and the staff of WRA. I hope to continue and expand this work.

I have attached bios from B&V and a personal bio and statement. I have also attached a supporting resume.

Please let me know if the nominating committee is interested in any additional information.

Regards,

Jon

Jonathan P. Loveland, PE

Black & Veatch Corporation | 5 Peters Canyon Rd, Suite 300, Irvine, CA 92606
+1 949-788-4209 P | +1 949-753-1252 F | +1 949-400-1484 M | LovelandJP@BV.com

From: Pat Sinicropi <psinicropi@watereuse.org>
Sent: Thursday, August 02, 2018 1:08 PM
To: Loveland, Jonathan P <LovelandJP@bv.com>
Subject: Call for Nominations for WateReuse Association Board of Directors

Dear Jonathan:

The Nominating Committee of the WateReuse Association Board of Directors is issuing a call for nominations to fill two Board vacancies. Individuals interested in being nominated should submit an application to either [Patricia Sinicropi](#), Executive Director for the WateReuse Association, or to a member of the Nominating Committee by **COB Tuesday, August 21st**. The Nominating Committee will review nominations and select candidates for approval by the full Board at its 3rd Quarter meeting in Austin, Texas on September 9th. Directors are appointed for up to three two-year terms for a total of six years of service.

Selection Criteria for Board Appointment

WateReuse is committed to recruiting the best and brightest leaders in the water industry to serve on its Board of Directors. The criteria for determining qualified candidates are:

Leadership

- A belief that water reuse and desalination are essential components of the water supply portfolio of the future.
- Significant professional credentials in the water industry.
- Stature and recognition within the water community.
- Recognized change agent/thought leader/innovator in the area of administration, technology, management, communication and/or education.

Commitment

- Membership in good standing with the WaterReuse Association;
- A commitment to the success of WaterReuse's mission and vision with sufficient time and resources dedicated to their implementation;
- Ability to attend four quarterly board meetings, including one during our Annual Symposium in September, and one via conference call;
- Ability to participate in WaterReuse Association committees and initiatives, as necessary, in pursuit of the mission and vision;

Skills and Experience (one or more areas)

- Executive and managerial leadership of public, private, or not-for-profit organization;
- Stature in an international, national, regional, or state water agency;
- Experience in federal or state advocacy of laws, rules or funding for water and water reuse;
- Experience in science, education, outreach, or social research associated with water and water reuse;
- Experience with financial management or investment associated with water and water reuse infrastructure;
- Experience on professional association boards or committees;

Other Factors

WaterReuse is committed to creating a diverse board that reflects and represents the membership and population of members. To ensure both balance and diversity, the following factors should be considered as part of the nominating process:

- Geographic Location
- Industry Sector
- Public, Private, Not-for-Profit Sector

Application Requirements:

Statement of Interest along with a resume or bio via email by COB Tuesday, August 21st.

Nominating Committee for 2019 WaterReuse Association Board of Directors Nominations:

[Gilbert Trejo, El Paso Water](#), Chair and Vice President of WaterReuse Association

[Paul Jones, Eastern Municipal Water District](#), Vice Chair and President of WaterReuse Association

[Karen Pallansch, Alexandria ReNew](#), Member

[Jon Freedman, Suez North America](#), Member

[Halla Razak, Inland Empire Utilities Authority](#), Member

[Patricia Sinicropi, Staff Liaison and Executive Director of WaterReuse Association](#)

Jonathan Loveland Black & Veatch Bio from Cindy Wallis-Lage

I am pleased to announce that Jonathan Loveland, a leader in the development and design-build execution of alternative water supply projects, has joined Black & Veatch's Water business.

Black & Veatch is strongly positioned as a leader in alternative water supply (AWS) solutions, with a global portfolio of award-winning desalination and reuse projects. The company established AWS as a blue-chip initiative as communities around the world increasingly search for new resource solutions to address population growth, extended water shortages, water rights restrictions, regulatory pressures and other issues. Jon will guide Black & Veatch's activities to cement the perception of the Water business as a global leader in AWS and to win more work in this rapidly growing market.

Jon has more than 25 years of experience solving water process and treatment challenges for municipal water districts and public utilities, primarily in California but also internationally. His background includes program management, project management, resource management, permit compliance, and contract, cost and permit negotiation. His project work encompasses full-scale plant optimization studies, pilot testing, cost-estimating, conceptual and preliminary design, and treatment plant commissioning.

With particular expertise in advanced surface and colloid chemistry, Jon brings to Black & Veatch strong capabilities in seawater desalination, recycled water treatment, groundwater treatment, all types of low- and high-pressure filtration, and desalination membrane treatment.

A highlight of Jon's work is the Claude "Bud" Lewis Carlsbad Desalination Plant, recently named the Desalination Plant of the Year for 2016 by Global Water Intelligence. Working for Poseidon, Jon was responsible for managing all engineering consultants for the project's development phase (planning, permitting and preliminary design), and the execution of its EPC phase (drinking water permit, NPDES permit compliance, all technical elements). As part of a three-person lead team, his responsibilities also included scope and contract documents, financing agreements, procurement, and alternative intakes assessment. (Black & Veatch also worked on the Carlsbad project, helping to resolve funding, technical and permitting issues.) Several large pilot studies along with projects involving advanced treatment designs for projects highlight Jon's technical expertise.

Jon is recognized globally in the industry for his presentations on wide range of technical issues involving water supplies. He also writes extensively for peer-reviewed technical journals.

Jon is based in Irvine, California, as a global practice lead for alternative water solutions.

Jon Loveland Personal Bio

My career in recycled water and alternative water supply began with EPA and NWRI sponsored research beginning in 1993 into the fate of viruses in the environment at the University of Colorado. This work resulted in several published peer-reviewed papers which supported EPA rulemaking and CA DDW recycled water policy regarding the appropriate environmental barrier for pathogens.

Starting in 2000, I was then fortunate to work for both West Basin MWD and Orange County Water District on the occurrence, formation, treatment, and environmental fate of N-Nitrosodimethylamine while supporting the permitting of the West Basin Phase IV expansion and the initial planning for the GWRS. I was also working for OCWD when 1,4-dioxane was discovered in a water supply well near my house and began supporting the “Blue Ribbon Panel” for CA DDW that eventually led to the draft CA recycled water policy that was the genesis of UV-advanced oxidation as an important treatment barrier for both pathogens and contaminants. This work led to a peer-reviewed chapter in an early 2006 WaterReuse book on Nitrosamine precursors, formation, and treatment in wastewater. I then went on to support many recycled water and contaminated water studies and treatment plant design projects and am currently supporting similar Nitrosamine work on an alternative to FAT treatment for the City of Los Angeles.

In 2002, I began my work in seawater desalination, conducting work for both Poseidon Resources at their sites and for West Basin MWD in El Segundo. This work led to several laboratory studies in seawater desalination water quality, one of which was sponsored research from the Water Research Foundation, and to some of the industry’s seminal work in bromamine chemistry with the University of Colorado. I also conducted or advised several pilot studies of treatment and distribution system water quality, which ultimately led to peer-reviewed research in JAWWA and a peer-reviewed report for WRF. This work continues today with WRF.

In 2009, I transitioned to working in the nascent field of public-private partnerships, and while working with Poseidon Water, successfully jointly-led the final requirements setting, contract negotiations, contractor procurement, financing, and execution of the Carlsbad Desalination Facility. This project remains the industry’s pre-eminent example of alternative financing, risk transfer, and alternative project delivery for a water treatment facility.

While with Black & Veatch, I have continued to work on all phases of projects related to alternative water supply, whether they be the final expansion of the GWRS, projects related to non-potable recycled water, including water supplies for data centers or in states where potable recycled water regulation do not yet exist, or for South Florida’s seminal recycled water project for Miami-Dade and Florida Power and Light. I have also continued my work in seawater desalination while supporting our work in mining applications and for the Florida Keys.

I was fortunate to join the WaterReuse Board in 2016, and I have worked to make the newly composed WaterReuse Association stronger and more sustainable. I have worked to establish an investment policy that would more prudently manage our finances and investments so that the WRA retains a future ability to advocate policy, expand, and advance the interests of the water supply community. I have also worked to expand the WRA by assisting in identifying and recruiting additional industry members. If I were to continue my service to the WRA Board, I would be interested in joining the advocacy committee and leveraging my financing experience and Washington DC relationships into greater public

and financial support for the programs of the WRA and the recycled water supply community. I see this as the greatest limitation to local utilities in implementing projects.

Jonathan P. Loveland

Mr. Loveland has had broad experience in resolving a diverse range of water supply issues for municipal water districts as well as other entities. He is an expert in advanced surface and colloid chemistry, and uses this knowledge to solve challenging process and treatment problems. His experience includes program management, project management, resource management, permit compliance, and contract, cost, and permit negotiation. His expertise covers the areas of seawater desalination, recycled water treatment, groundwater treatment, all types of low and high pressure filtration and desalination membrane treatment, full-scale plant optimization studies, treatment plant commissioning, conceptual design, preliminary design, cost estimating, and pilot testing.

While at Poseidon, Mr. Loveland was responsible for managing all of Poseidon's engineering consultants for both development phase work (planning, permitting and preliminary design) nationwide for all of Poseidon's water and wastewater projects and for the execution of the EPC phase of the Carlsbad Desalination Facility, including obtaining the drinking water permit, NPDES permit compliance and all technical elements of the design/build construction, commissioning, and operational phases. In addition, Mr. Loveland was a member of the three-person Poseidon team responsible for developing scope and contract documents for the Carlsbad project and negotiating all legal agreements (purchaser and contractor) and financing agreements (non-recourse bond debt and multiple equity interests). Mr. Loveland led the final and successful procurement of an EPC contractor for the Carlsbad Project, and contributed to the successful execution and completion of the largest 3P desalination project in the US. Finally, Mr. Loveland was a key member in assembling and managing the expert panel that assessed alternative intakes for seawater desalination in collaboration with the California Coastal Commission to support policy decisions regarding technology selection.

Mr. Loveland has managed several large pilot studies, including MF/RO/Calcite/Chloraminated seawater desalination (SWRO) and corrosion testing (an AwwaRF sponsored project), ion exchange and NDMA formation, ozone and bromate formation, granular activated carbon for TCP removal, and chlorine dioxide application for nitrification control. Mr. Loveland has also managed multiple design projects in addition to the Carlsbad Desalination Facility, including two UV/chlorine/chloramine design projects for Stage 2 DBP Rule/LT2ESWTR compliance for Fallbrook Public Utility District (32 MGD) and Covina Irrigating Company (12.5 MGD), the design of an 11 MGD UV/peroxide



GLOBAL PRACTICE LEADER – ALTERNATIVE WATER SUPPLY

**Specialization: reuse
and desalination**

Office Location
Irvine, CA

Education

- PhD Candidate Environmental Engineering University of Colorado, Boulder
- University of Colorado, Boulder, MS Civil Engineering, 1995
- Worcester Polytechnic Institute, BS Civil Engineering, 1992

Professional Registration
Professional Engineer (CA)

Professional Associations

- **WaterReuse Association**
- American Chemical Society
- American Water Works Assoc.
- Water Env. Federation
- American Membrane Technology Assoc.
- American Water Works Assoc – Desalting Committee
- American Water Works Assoc., CA-NV Section Desalination Committee
- Assoc. of CA. Water Agencies (ACWA), Seawater Desalination Committee

Total Years Experience
25

Year Career Started
1993

Year Started with B&V
2016

treatment facility for the City of Pomona, and the design of a GAC project for MtBE removal for Chevron.

Poseidon Activities

- Negotiations with purchasers, contractors, and other public and permitting agencies,
- Primary interface with CA DDW, FL DEP, and TX TCEQ,
- Technical support for financing, real estate, power, utility, and legal interests,
- Development of scope, legal agreement, and procurement documents,
- Selection and management of scientific and engineering consultants,
- Scientific studies (I&E, toxicity, algae occurrence, emerging contaminants),
- Pilot Studies (low mortality pumping, algae treatment, integrated membrane treatment),
- Engineering studies (water quality monitoring, conceptual treatment process and cost, intake and outfall concepts),
- Planning studies (siting, market analysis)
- Oversight of design/build and commissioning teams.
- Technical assistance for construction management.

SELECT OTHER RELEVANT EXPERIENCE

- **Upper San Gabriel Valley MWD** – Indirect potable reuse project employing filtered 2nd wastewater from LA County Sanitation District. Evaluated water quality goals and identified treatment processes necessary to achieve public acceptance for the project.
- **Confidential Client** – For a large industrial facility in Southern California seeking to achieve zero discharge, evaluated the nature of the water quality matrix and identified treatment necessary to produce water suitable for reuse.
- **West Basin MWD** – Supported activities to gain approval for 100% recycled water injection for the West Coast Seawater Barrier project. Analysis included halogenated DBP and NDMA formation and removal, virus removal during membrane treatment and groundwater transport, groundwater transport of NDMA, use of intrinsic groundwater tracers, and a suitable monitoring program.
- **City of San Diego – 2005 Water Reuse Study** – Provided technical support to PBSJ regarding health based risks associated with recycled water, development and screening of treatment process options, and conceptual treatment costs for selected options to support development of the North City Project.

- **WaterReuse Foundation: NDMA Research Project. Research project: "Removal and/or Destruction of NDMA and NDMA Precursors in Wastewater Treatment Processes."** - Project involves development and validation of a water quality-based UV treatment model for recycled water for indirect potable reuse. Project used data from 5 UV pilot systems sited at WBMWD and OCWD. Model is also extended to estimate advanced oxidation processes for removal of compounds like 1,4-dioxane and PhAC's.
- **Orange County Water District: NDMA Formation & Treatment / Fountain Valley CA.** - Assistance with NDMA formation and treatment in advance of the GWR project and after discovery in local water supply wells adjacent to the Talbert Barrier.
- **Southern California Water Company: Process Evaluation & Conceptual Cost Estimate.** Litigation support, process evaluation, and conceptual cost estimate for the Clear Lake Water Treatment Plant in proceedings before the Public Utilities Commission.
- **St. Johns River Water Management District: St. Johns River Treatability Study.** – Provided third-party review for SJRWMD's pilot study for siting a new surface water treatment plant.
- **City of Los Angeles: Lime Stabilization Alternatives for the Advanced Water Treatment Facility / Los Angeles, CA.** - Conducted process review, data collection, and bench testing of RO permeate stabilization alternatives to the existing lime slurry system. Developed conceptual costs and pilot system design.
- **City of Los Angeles: On-Line WQ Monitoring / Los Angeles, CA.** - Conducted an analysis of needs and analytical capabilities for monitoring, data analysis, and reporting for radiological contaminants and other routine distribution system WQ parameters. Conducted in the context of event-monitoring and routine operation.
- **Main San Gabriel Watermaster: Comparison of UV Treatment Systems / Azusa CA.** - Project involved comparison of UV treatment systems for NDMA removal, including Calgon and Trojan UV systems.
- **Mesa Consolidated Water District: Bromate Formation Mitigation / Costa Mesa CA.** - Project manager for construction and operation of an ozone pilot facility for color removal designed to investigate advanced methods to mitigate bromate formation.
- **City of Oceanside: Assessment of Methods for 1,2,3-TCP Treatment and GAC Pilot Testing.** - Conducted a review of all feasible treatment methods for 1,2,3-TCP and helped design and conduct GAC pilot testing.

Project also included cost analysis and procurement specification for turn-key treatment system.

- **West Basin Municipal Water District: Large-Scale Application of Seawater Desalination / Carson CA** -. Project Manager for MF/RO pilot operations and water quality monitoring for AwwaRF project entitled "Water Quality Implications of Large-Scale Application of Seawater Desalination".
- **AwwaRF Seawater Desalination Pilot Study: "Research Needs for Producing New Potable Supplies from Seawater Desalination."** - Project manager for pilot study concerning corrosion, algal toxin occurrence, and pathogen challenge testing for integrated membrane (MF/RO) seawater desalination.
- **San Diego County Water Authority: Assessing Aesthetic Impacts of SWRO Integration.** - Developed a statistical sampling method involving blind taste tests by expert and consumer panels to evaluate aesthetics of stabilized, disinfected SWRO permeate. Operated a pilot-scale SWRO unit to produce representative permeate samples for tasting and blending.
- **Poseidon Resources Corporation: Desalinated Seawater & Corrosion / Carlsbad CA.** - Developed a pilot pipe-loop system to assess corrosion-related impacts for introducing desalinated seawater in Carlsbad, California.
- **University of California Santa Cruz: Desalination Technology and Financing Issues / Santa Cruz CA.** -Participated in workshop designed to elicit industry feedback regarding key technology and financial issues to consider in the development of a desalination project. Prepared a presentation regarding 316(b) impingement and entrainment issues for SWRO facilities.
- **California Avocado Commission: Agriculture Application of Reverse Osmosis (RO) / Valley Center CA.** - Prepared a state of California Prop 50 grant to examine the application of reverse osmosis (RO) membrane treatment in an agricultural watershed to desalinate saline runoff in avocado groves in an effort to both protect existing groundwater supplies and improve agricultural production.
- **Eastern Municipal Water District / Perris, CA. Wellhead Fluoridation Systems.** - Project manager for planning and design of fluoridation facilities for 8 independent locations totaling 40 MGD.
- **City of Pomona: UV/Advanced Oxidation Treatment System Design.** - Project manager for the design of an 11 MGD treatment system to remove NDMA and VOCs.

- **City of Pomona: Perchlorate Treatment Feasibility Study.** - Project manager for a feasibility study and pilot testing to size and locate a perchlorate treatment plant.
- **Fallbrook Public Utility District: Design of UV Facilities for LT2ESWTR Compliance for Red Mountain Reservoir / Fallbrook CA.** - Project manager for design of 32 MGD UV facility. Project also includes permitting and the design of bulk hypochlorite and aqua ammonia storage and feed facilities and the design of a new chlorine contactor.
- **Covina Irrigating Company: Temple WTP UV Upgrade for Stage 2 DBPR Compliance / Covina CA.** - Project manager for the design of 12.5 MGD UV facility. Retrofit will be located post-filtration and may be increased in size to accommodate MF retrofit of facility. Project also includes a permitting phase and construction of new chlorine and ammonia facilities.
- **Melbourne Water: Seawater Desalination Water Quality Analysis / Melbourne Australia.** - Addressed water quality, treatment, and integration issues associated with the planned Melbourne seawater desalination plant, including boron removal, corrosion control, bromide, aesthetic issues, algae/algal toxins, post-treatment stabilization, and other concerns. Various process options were also examined, including two-pass RO treatment, blending, the use of specialized RO elements, pretreatment (e.g., media vs. membrane filtration (MF/UF)), and temperature considerations for design.
- **Municipal Water District of Orange County (MWDOC): MWDOC Prop 50 Grant Application / Fountain Valley CA.** - Prepared state of California Prop 50 grant application for seawater desalination pilot system utilizing nanofiltration (NF) and reverse osmosis (RO) membranes, including innovative biofouling-resistant membranes developed at UCLA. Pretreatment to be tested included both media filtration and membrane filtration (i.e., microfiltration (MF) and ultrafiltration (UF)), as well as chlorine dioxide pretreatment. As a component of the work, also contributed to the development of a corrosion control study for a beach well to be used for seawater intake. This proposal was successful and funded for \$1.5 million.
- **West Basin Municipal Water District: Prop 50 Grant Applications.** - Prepared four proposals covering feasibility, water quality, research & design, and demonstration facilities for a SWRO treatment plant in the South Bay region of Los Angeles. Three of the proposals/projects were selected for funding, including the #1 ranked R&D proposal for 2007.

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- **Poseidon Resources Corporation: Desalination, Algal Toxin Removal, & DBP Formation & Corrosion / Carlsbad CA.** - Developed solutions to water quality issues relation to full-scale SWRO treatment and implementation, including algal toxin and emerging contaminant removal, distribution system disinfection byproduct formation and corrosion.
 - **Poseidon Resources Corporation: Assessing Water Quality Impacts of SWRO on Recycled Water Systems and Agriculture.** - Project manager for a project to develop a spreadsheet model to determine water quality impacts as blending and then treatment occurs in potable, sewer, and recycled water systems, and then assessed impacts on agricultural yields and soil structure upon irrigation.
 - **Poseidon Resources Corporation: Desalinated Seawater & Corrosion / Huntington Beach CA.** - Assessed a variety of SWRO integration issues for the 50 MGD SWRO desalter proposed for Huntington Beach, CA.
 - **City of Camarillo: Camarillo Prop 50 Application / Camarillo CA.** - Prepared application for State of California Prop 50 grant. Scope of proposed project included treatment of brackish groundwater using nanofiltration (NF) and reverse osmosis (RO) membranes. Pretreatment to be tested included both media filtration and membrane filtration (i.e., microfiltration (MF) and ultrafiltration (UF)), as well as chlorine dioxide for disinfection. This proposal was successful and funded for \$384,000.
 - **Three Valleys Municipal Water District: Full-Scale Treatment Plant Optimization for the Miramar Water Treatment Plant / Claremont CA.** - Project manager for full-scale treatment plant optimization for the Miramar Water Treatment Plant. Project involved a residuals management audit, high-flow filter re-rating studies, and enhanced coagulation optimization for a conventional water treatment plant on the state water project. Project was expanded to include detailed design and construction management of lagoon mixing system, decanting structure, transfer pump station, and belt press facilities.
 - **Cucamonga Valley Water District: Tracer Studies for the Lloyd Michael and Royer Nesbit WTPs / Rancho Cucamonga CA.** - Conducted tracer studies to determine new baffling coefficients for WTP unit processes, which could be used to optimize disinfection and DBP formation. New baffling factors were approved by state regulators.
 - **City of Pomona: NDMA Control / Pomona CA.** - Project manager for pilot testing to inhibit NDMA formation at the AEP. Project included testing of alternative IX resins, GAC, and chloramination SDS-DBP testing for NDMA formation on IX effluent.

- **City of Pomona: UV & GAC Treatment for NDMA Removal / Pomona CA.** Project manager for comparison of UV and GAC treatment for NDMA removal or precursor removal.
- **City of Carlsbad: Pilot Testing / Carlsbad CA.** - Project manager for pilot testing at Maerle Reservoir using chlorine dioxide for nitrification and DBP control. Project included SDS-DBP testing for nitrification control.

PEER-REVIEWED PUBLICATIONS

Loveland, J.P., Means, E.G., Amy, G.L., and Reiss, C.R., 2010. "Seawater Desalination Implications for Drinking Water Quality", Water Research Foundation.

D. Sedlak, M. Kavanaugh, Removal and Destruction of NDMA and NDMA Precursors during Wastewater Treatment, in, WaterReuse Foundation, Alexandria, VA, 2006.

Loveland, J.P. et al., "Occurrence and Removal of Marine Biotoxins for the SWRO Treatment Process", AMTA Water Quality Solutions, Spring 2007.

McGuire, M.J., Loveland, J.P., Means, E.G., and Garvey, J., 2007. "Use of Flavor Profile and Consumer Panels to Determine Differences between Local Water Supplies and Desalinated Seawater", Water Sci. Technol., 55: 275- 282.

Loveland, J.P., Bhattacharjee, S., Ryan, J.N., Elimelech, M., 2003. "Colloid Transport in a Geochemically Heterogeneous Porous Medium: Aquifer Tank Experiment and Modeling", *Journal of Contaminant Hydrology*, 65: 161 – 182.

Ryan J.N., Elimelech M., Harvey R.W., Aronheim J.S., Bhattacharjee S., Bogatsu Y., Loveland J.P., Metge D.W., Navigato T., and Pieper A.P., 2002. "Transport of Viruses in Porous Media". In *Colloids and Colloid-Facilitated Transport of Contaminants in Soils and Sediments*, de Jonge L.W., Moldrup P., and Jacobsen O.H., eds., Danish Institute of Agricultural Sciences Plant Production Report No. 80, Tjele, Denmark, 93 – 99.

Loveland J.P., Ryan J.N., Amy G.L., and Harvey R.W., 1996. "The Reversibility of Virus Attachment to Mineral Surfaces", *Colloids Surf. A: Physicochem. Eng. Aspects*, 107: 205 – 221.

PROFESSIONAL ACTIVITIES

Manuscript Reviews – *Langmuir*, *Journal of Contaminant Hydrology*, *Journal of the American Water Works Association*, *Environmental Science and Technology*

SELECTED PRESENTATIONS

Ghosh, A., Loveland, J.P., Nygaard, J., Sarullo, M., Lane, K., "Making High Quality Reclaimed Water: Challenges with RO Permeate Stabilization," *Proceedings*, 23rd Annual WaterReuse Symposium, Dallas TX, September 7-10, 2008.

Manoukian, R., Parekh, P., Means III, E.G., Trachtman, G.B., Loveland, P., Niu, E., "Value-Based Assessment: Real Time WQ Monitoring Technology at Los Angeles Department of Water & Power," *Proceedings*, Distribution System Symposium of the American Water Works Association (AWWA), Cleveland OH, September 23-26, 2007.

Hawley, E.L., Alspach, B.A., Deeb, R.A., Loveland, J.P., Babcock, J.W., "Efficacy of Membrane Technologies to Address Emerging Contaminants in Advanced Water Treatment and Water Reuse Applications," presented at the International Water Technology Conference, Fresno CA, April 2-4, 2007.

AWWA Water Quality Technology Conference, Denver, CO, "*When Even RO Doesn't Remove It, Just Add GAC! Bench- and Pilot-Scale Results for 1,2,3-TCP Control*", 2006

AWWA Water Sources Conference, Albuquerque, NM, "*Treatment of Marginal Supplies and Associated Costs*", 2006

Spring American Chemical Society Western Regional Conference, Anaheim, CA, "*Occurrence and Removal of Marine Biotoxins*", 2006

WaterReuse CA Section Spring Conference, San Francisco, CA, "*Evolution of Indirect Potable Reuse and Recycled Water Treatment at the West Basin Water Recycling Facility*", 2006

AWWA Annual Conference, San Antonio, TX, "*Marine Phytoplankton and Domoic Acid Occurrence and Removal for the Seawater Reverse Osmosis Treatment Process*", 2006.

Groundwater Resources Association 18th Groundwater Contaminant Symposium, Concord, CA, "*Pilot and Modal Results for NDMA Removal Using UV Treatment During Advanced Recycled Water Treatment*", 2006.

Urban Water Institute Spring Conference, Huntington Beach, CA, "*Novel Solutions and Associated Costs for Alternative Water Supplies in CA*", 2006.

AWWA CA/NV Annual Spring Conference, Industry, CA, "*Nitrification Control for Maerkle Reservoir using Chlorine Dioxide*", 2005.

AWWA Water Quality Technology Conference, Quebec City, Quebec, Canada, *"Implications of Bromamine Chemistry for Drinking Water Treatment: The Bromamine Breakpoint Curve in Solutions of Deionized Water and Several Treated Waters"*, 2005.

AWWA Water Quality Technology Conference, San Antonio, TX, *"Key Water Quality Parameters for Integration of Single-Pass Reverse Osmosis Desalinated Pacific Ocean Seawater"*, 2004.

AWWA Water Quality Technology Conference, San Antonio, TX, *"Advanced Techniques for Bromate Reduction: Pilot Testing Chlorine Dioxide, Chloramination, and MEX Treatment with Ozonation"*, 2004.

AWWA Annual Conference, Orlando, FL, *"The Stability of Chlorinated-Derived Oxidant Residuals in Desalinated Seawater"*, 2004.

AWWA CA-NV Annual Spring Conference, Las Vegas, NV, *"AwwaRF Project 2841 - Water Quality Implications for Large-Scale Applications of MF/RO Treatment for Seawater Desalination"*, 2004.

AWWA CA-NV Annual Spring Conference, Las Vegas, NV, *"Water Quality Impacts of the Filter Backwash Recycling Rule"*, 2004.

AWWA CA-NV Annual Fall Conference, San Diego, CA, *"Disinfection of Reverse Osmosis (RO) Desalinated Seawater Using Free Chlorine and Chloramines: Implications for Disinfection Byproduct Formation and Disinfectant Residual Stability"*, 2003.

Urban Water Institute Conference, San Diego, CA, *"Seawater Desalination – Water Quality and System Integration"*, 2003.

Poster – WaterReuse Association Annual Research Conference, San Francisco, CA, *"Development of a Water Quality Based Model for UV Treatment of NDMA and Other Trace Organics in Reclaimed Water"*, 2003.

Citrus College Water Awareness Days, Glendora, CA, *"N-Nitrosodimethylamine (NDMA) Formation at the City of Pomona's AEP"*, 2002.

AWWA Water Quality Technology Conference, Nashville, TN, *"Pilot Testing to Inhibit NDMA Formation at the Anion Exchange Plant, Pomona, CA"*, 2001.

AWWA National Conference, Washington, DC, *"Emerging Water Quality Issues in Distribution Systems"*, 2001.

WEFTEC, Atlanta, GA, *"UV Treatment for Indirect Potable Reuse: Simultaneous Disinfection and NDMA Destruction"*, 2001.

Loveland J.P., Ryan J.N. and Elimelech, M., 2000. *"Anionic Surfactant Adsorption and Silica Colloid Release from a Heterogeneous Porous Media"*, 74th American Chemical Society Colloid and Surface Chemistry Symposium, Lehigh, PA.

Loveland J.P. and Ryan J.N., 1999. *Surfactant-Induced Colloid Release from Mineral Surfaces; The Significance of Surfactant Type and Concentration on Release Behavior*, 217th National Meeting of the American Chemical Society, Anaheim, CA.



Hazen and Sawyer
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August 20, 2018

Ms. Patricia Sinicropi
Executive Director
WateReuse Association
1199 North Fairfax Street, Suite 900
Alexandria, VA 22314

Dear Nominating Committee:

It is with sincere pleasure and great enthusiasm that I write this letter in support of the nomination of Christine Owen to the WateReuse Association Board of Directors. As described in her enclosed statement of interest and resume, Chris has had a stellar career in the water industry. Her leadership, commitment, experience, and passion for water reuse make her an ideal board member.

Chris joined Hazen and Sawyer last year as our Director of Water and Reuse Innovations after almost 30 years working at the City of Tampa and at Tampa Bay Water. She is a nationally-respected water quality expert and has been instrumental in furthering the mission of the water supply industry. Throughout her career, Chris has distinguished herself in numerous ways including serving on the EPA Science Advisory Board's Drinking Water Committee, the EPA National Advisory Council for Environmental Policy and Technology Subcommittee, as an AWWA Water Quality Division Trustee, and several positions on various Water Research Foundation (and the predecessor Water Environment and Reuse Research Foundation) advisory councils and committees. Through these appointments, Chris has become a recognized spokesperson for the water industry. Having now started working with us to support utilities coast-to-coast further enriches Chris' rare and extremely valuable perspective on the industry.

In closing, Chris possesses the right combination of leadership skills, commitment, and experience to help you lead the advancement of water reuse. She is a true ambassador to the industry and would be an exemplary member of the WateReuse Association Board of Directors. I cannot think of anyone more qualified and I recommend her without hesitation.

Sincerely,

A handwritten signature in blue ink, appearing to read "CH Hocking", is written over a light blue circular background.

Charles S. Hocking, PE
President and CEO



Statement of Interest – Christine Owen

Water reuse is vital to the continued sustainable use of water resources. We need to develop a culture that embraces water reuse and leaders who will effectively advocate for and promote the acceptance of recycled water, while working to provide the necessary funding. My interest in joining the Board of Directors of the WaterReuse Association is to join you in providing this leadership and fostering this culture, helping to create a more sustainable water future.

Leadership

Among the greatest honors of my career was being named the 2017 Water Quality Person of the Year by AMTA and AWWA. Building to that moment, I have served on the planning committees for several major conferences including the Membrane Technology Conference, the Annual Conference and Exposition, the Water Quality Technology Conference, and the Biological Filtration Symposium. I have also served as the Chair of the AWWA Journal Editorial Advisory Board for five years and continue as a reviewer for industry journals. I am currently finishing up my second term on the AWWA Board of Trustees for the Water Science and Research Division as the Vice Chair and am also currently the first Vice President for AMTA.

Commitment

For more than 27 years, I have devoted myself to the sustainable use of water resources. In my first position at a utility, I ran an analytical laboratory and developed a research program. In time, I came to manage all regulatory compliance, source water assessment, and research for a large regional wholesale system.

Understanding the value of research and advocating for its place in the industry has been a passion for me, as reflected in my decades of volunteer work with the Water Research Foundation and WaterReuse. I have served on numerous Project Advisory Committees for both organizations, the Research Advisory Council and Focus Area Committees. I have consistently advocated strongly for science in developing regulatory paradigms, serving two terms on the USEPA Science Advisory Board for Drinking Water and five years on the National Advisory Council for Environmental Policy and Technology, as well as providing technical support for the 1999 Information Collection Rule, the Disinfection/ Disinfection Byproduct Rules, the Revisions to the Total Coliform Rule, and the Arsenic Rule.

I believe I am an excellent candidate for the Board of Directors, offering scientific expertise and advocacy skills and experience, as well as a deeply felt passion for "all things water." In addition to my energy, commitment, and enthusiasm, I also bring many valuable relationships that I have built over the years that can help strengthen strategic alliances for the advancement of water reuse and the Association.

Serving with you would be a great honor. Thank you for considering my application.

A handwritten signature in black ink, reading "Christine J. Owen". The signature is fluid and cursive, with the first name "Christine" and last name "Owen" clearly legible.

Christine A. Owen
Director of Water and Reuse Innovation
Hazen and Sawyer
10002 Princess Palm
Tampa FL 33619

Summary of Work Responsibilities

- Hazen and Sawyer Director of Water and Reuse Innovation
- Twenty-seven years professional experience in technical and policy aspects of water quality, research, treatment and regulatory compliance
- At Tampa Bay Water responsible for all regulatory compliance; quality and treatment technology research; the analytical laboratory; source water assessment and protection efforts; consecutive system water quality and distribution system issues, Operations and Engineering support for current and future water supply projects
- At City of Tampa responsible for regulatory compliance, reporting, the analytical laboratory, customer complaints and responses, cross connection control and water quality field staff; managed contract laboratory work performed by City Water Quality laboratory for outside agencies; designed and managed City of Tampa Water Quality laboratory expansion
- Active member of the American Water Works Association (AWWA), American Membrane Technology Association (AMTA), and the Water Research Foundation (WRF), Florida WaterReuse, and Water Environment and Reuse Foundation (WE&RF)

Employment History

- Director of Water and Reuse Innovation, Hazen and Sawyer, November 2017 to present
- Water Quality Senior Manager, Tampa Bay Water, 2001 to 2017
- Water Quality Supervisor, Tampa Water Department, 1991 to 2001
- Lecturer, University of California at Santa Cruz, 1989 to 1991

Professional Experience

- Water Quality Person of the Year, 2017, Joint American Water Works Association and American Membrane Technology Association Award
- Trustec, Water Science and Research Division, American Water Works Association, June 2014 to present; vice chair 2015 to present
- Member, American Water Works Association, Journal Editorial Board, 2015 to present
- Member, WE&RF Water Reuse & Desalination Issue Area Team, 2016 to 2017
- Member, Journal Editorial Advisory Board, American Water Works Association, 2009 to 2014, Chair 2012 to 2014
- Board of Directors, American Membrane Technology Association, 2008 to present
- First Vice President, American Membrane Technology Association, 2014 to present

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Director of Water and Reuse Innovation
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- Appointee, USEPA Science Advisory Board, Drinking Water Committee, 2003 to 2009
- Appointee, USEPA National Advisory Council for Environmental Policy and Technology Subcommittee, 2004 to 2008
- Member, AWWA Technical Advising Workgroup for Microbials and Disinfection Byproducts
- Member, AWWA Technical Work Group for LT2/Stage Two Disinfection/Disinfection By-Products Rule Negotiations
- Invited Speaker, USEPA Workshop, *Online Water Quality Monitoring for Regulatory Compliance*, Washington, D.C., 2015
- Member (current or previous), AWWA Standards Committee for Coagulants, Laboratory, Desalting (vice chair), Emerging Issues (chair and vice chair)
- Member, Water Research Foundation Biofiltration Focus Area Committee, 2012 to present
- Member, American Water Works Research Foundation Research Advisory Committee, 2005 to 2007

Select Presentations/Publications/Posters

- Perfluorinated Chemicals, SEDA 2018 Spring Symposium
- IPR, DPR and Potable Water: Source Water and Treatment Rules, FL WaterReuse Spring Workshop
- Preparing for Emerging Contaminants, SEDA 2017 Spring Symposium
- How to Become a Regulated Contaminant: The Long and Winding Road, FWRC, May 2017
- Invited Speaker, Leadership in Difficult Situations, AWWA National YP Summit, 2017
- The Tampa Bay Water Story: More than 8 Years Managing Large Scale Desalination, WaterReuse, 2016
- Compliance Sampling: What Does It Tell Us? FSAWWA, November 2015
- Chloramine Decay Challenges in a Regional Water System, FWRC, May 2015
- Tampa Bay Water Desalination Facility: Project History, Operation and Environmental Impact Monitoring, NAEP, 2014
- Challenges Associated with Implementing New Water Sources, FSAWWA August 2013
- The Tampa Bay Desalination Facility: Drivers and Results, Georgia Environmental Conference, 2013
- Regulations in the Pipeline, FSAWWA November 2012
- Desalination: Surface Water as a Source and Lessons Learned, FSAWWA, August 2012
- Biological Filters: What Have They Done for us Lately and Can They Do More? Texas Biofiltration Workshop, WRF 2011

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- Concentrate Management for the Tampa Bay Water Desalination Facility, AMTA Annual Conference 2008
- A Utility Perspective on the Total Coliform Rule, Virginia AWWA Annual Research Meeting, 2007
- A Regional Chloramine Conversion: How to Evaluate its Impacts, AWWA ACE 2007
- Tampa Bay Water's 25 MGD Seawater Desalination Facility, AWWA MTC 2007
- Ultrafiltration for Hydrogen Sulfide Removal, AWWA MTC 2007
- Correlation of Elector Noise to Iron, Copper and Lead Release in a Changing Distribution System Water Quality Environment With and Without Inhibitors, World Environmental and Water Resources Congress, 2007
- Effect of Inhibitors on Iron, Copper and Lead Release in a Changing Water Environment, World Environmental and Water Resources Congress, 2007
- What does Total Coliform Monitoring Tell Us and the Effects of Sample Volume on Analytical Sensitivity, AWWA WQTC 2006
- Zenon, Ozone, and Biological Filtration – Alternatives to Packed Tower Aeration for Hydrogen Sulfide Removal, AWWA WQTC 2006
- Control of MIB, Geosmin and TON by Membrane Systems, Journal of Water Supply: Research and Technology (AQUA), March 2006
- Computer Assisted Quality Control of Real Time Water Quality Data, AWWA WQTC 2006
- The Tampa Bay Water Case Study: Impacts of Blended Source Waters on the Distribution System, AWWA ACE 2004
- Nine Utilities Systems Successfully Convert to Chloramines in 48 Hours, Florida Water Resources Journal, July 2003
- The Effect of Mixed Seawater and Surface Waters Sources on Fouling and System Design, IDA 2003
- "How a Utility Can Use ICR Data to Improve Water Quality and Meet Future Regulations" in The Information Collection Rule Data Analysis, American Water Works Association, 2003
- An evaluation of MIEEX process impacts on treated water quality for a range of raw water supplies, AWWA ACE 2003
- Building A Water Quality Model for Source Water Operation, AWWA ACE Anaheim, 2003
- Required Treatment and Water Quality Criteria for Distribution System Blending of Treated Surface, Ground and Saline Sources, AWWA ACE, Anaheim, 2003
- Drought Induced Water Quality Changes and the Impact on Disinfection and Disinfection Byproduct Formation, AWWA WQTC 2002
- Assessment of Source Water Blends on Distribution System Water Quality, AWWA WQTC 2002

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- Required Treatment and Water Quality Criteria for Distribution System Blending of Treated Surface, Ground and Saline Sources, AwwaRF Technology Transfer Conference 2002
- Arsenic and Aquifer Storage Recovery, AWWA WQTC, 2001
- Achieving Multiple Water Quality Objectives Using Ozone, Peroxide and Biological Filtration, AWWA WQTC 2000
- Occurrence of Arsenic in a Florida Surface Water Supply and its Regulatory Implications, AWWA WQTC 2000
- Comparison of Two Concentration Methods for Protozoans, AWWA WQTC 1999
- A *Bacillus subtilis* Endospore Protocol for Challenge Studies, AWWA WQTC 1999
- Oocyst Movement as a Method of Determining Viability in *Cryptosporidium*, AWWA WQTC 1999
- Determination of Taste and Odor Compounds Using SPME and GCMS, AWWA WQTC 1999
- Microbial Challenges of Integrated Membrane Systems Treating Surface Water, AWWA WQTC 1999
- Diffusion Controlled Organic Solute Mass Transport in Nanofiltration Systems, WQTC 1999
- Removal of Microorganisms by Microfiltration Processes: Correlation Between Membrane Integrity Test Results and Microbial Removal Efficiency, AWWA MTC 1999



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August 21, 2018

Ms. Patricia Sinicropi, JD
Executive Director
WateReuse Association

Subject: WateReuse Association Board of Directors - Letter of Interest

Dear Ms. Sinicropi:

The WateReuse Association is a thought-leader on alternative water supply development with a focus on policy guidance and educational tools on water reuse as well as the principal influencer of public opinion, lawmakers and policymakers on policy and projects related to water reuse.

I am truly excited about the opportunity to be assessed for the WateReuse Association Board of Directors. I am writing this letter as an expression of my interest and a demonstration of how my skills, experience, leadership, and stature in the industry will be a great fit and an added value to the Association. My interest is to partner with you and the board members on advancing and supporting the Association's vision of: "A culture that embraces water reuse and recycled water".

I am a licensed Professional Engineer and a Board Certified Environmental Engineer (2018 by Eminence) with 30 years of diverse global engineering experience in Egypt, Sweden, Taiwan, Thailand the United States and Canada. I have led landmark projects for some of the largest utilities in the world. I currently hold leadership positions on several significant projects in the United States and Canada involving water use and reuse, with a focus on resource recovery and sustainability.

I am a Vice President and a Director for the West Pacific Region (Arizona through Western Canada) with CDM Smith, I am also the President for CDM Smith Canada Company and I report directly to the North America Unit president. I am responsible for all our clients in that region and have a strong network with thought leaders in the industry. Furthermore, I have been fortunate in my career to have the opportunity to work for leading engineering firms and live, and work on landmark projects, around the globe. This journey has provided me with a great sense of our industry and the critical need for reuse from a global perspective.

My belief in water reuse is exemplified in the projects and the industry sessions I have led as attached in my resume.

For instance; Echo Park Lake Project implemented an innovative solution to harvest and treat stormwater and use it to make up for evaporative losses and maintain the water elevation in the Lake in lieu of using potable water. The Charnock Well Field Restoration Project provided ground water treatment to eliminate contamination followed by installation of a Reverse Osmosis Membrane Softening System, at the Arcadia Treatment Plant. and as such offered a new





Ms. Patricia Sinicropi, JD
August 21, 2018
Page 2

source of potable water. That source reduced the City's need to purchase their potable water by 70%.

Throughout my career I have been an advocate for our industry and have sought various associations and organizations to engage in and promote our cause. For example; the California Water and Environment Association (CWEA) where I am currently a board member (until April 2019).

As an advocate for Water Reuse I have established leadership position in the industry with a focus on One Water issues through CWEA and US Water Alliance. As described in my resume; the industry sessions I led with CWEA were focused on advancing the cause for "One Water and how it Can Solve Our Water Challenges".

During the US Water Alliance in July 2018 I facilitated a panel discussion re "Innovations in Finance and Delivery of One Water Projects"

On Sep 20th I will be leading an industry session with AWWA and Bank of America; A Roundtable Dialogue with Leaders from the Water and Financial Communities. "A Meeting that Focuses on the Needs of the Western Region's Water Challenges Through Partnerships and Innovative Solutions".

In recognition and appreciation of the importance and level of intricacy of the opportunity, I would like to confirm my commitment to support the Association in promoting a culture that embraces water reuse and recycled water and advocate for policies and funding that increase water reuse.

I have included a few industry leaders as my references in the attached resume for their input at your discretion. Furthermore, Mr. Harlan Kelly, General Manager San Francisco Public Utility Commission (SFPUC) provided me with the attached letter of recommendation.

Thank you for the opportunity and please feel free to reach out to me if you have any further queries or need additional information.

Sincerely,

A handwritten signature in blue ink, reading "Hala Z. Titus". The signature is fluid and cursive, with the first name "Hala" being the most prominent.

Hala Z. Titus, P.E., BCEE, PMP
Vice President
CDM Smith Inc.
925 212 2228



Hala Z. Titus, PE, BCEE, PMP

Vice President, Regional Manager

Hala Titus is a Vice President with CDM Smith. She has over 30 years of diverse engineering experience in Egypt, Sweden, Taiwan, Thailand the United States and Canada with leading International Engineering firms.

A Board Certified Environmental Engineer (BCEE) and a certified Project Management Professional (PMP), Ms. Titus specializes in managing large scale public works projects, including resource recovery, water quality, water and wastewater treatment plants, and collection systems and outfalls. She has managed landmark projects for some of the largest utilities in the U.S. Over the past ten years she has managed 10 monumental projects, including the City of Los Angeles award-winning Echo Park Lake Rehabilitation Project and the City of Santa Monica's award-winning Charnock Wellfield Restoration Project.

Skill set includes: Global Business Knowledge, Client focus, Business Acumen and diverse portfolio of delivering successful projects through various delivery methods.

GLOBAL EXPERIENCE

1986 to 1993 Alexandria, Egypt

Maclean Grove – 1986 to 1991 Alexandria, Egypt – Field Engineer

Harbert Jones – 1991 to 1993 Alexandria, Egypt – Project Engineer

1994 to 1996 Taipei, Taiwan

Morrison Knudsen – 1994 to 1996 Taipei, Taiwan - Office Engineer

1996 to 2005 Bangkok, Thailand

Pate Engineers – 1996 to 2000 Bangkok, Thailand – Deputy Project Manager

M&E – 2000 to 2001 – Bangkok, Thailand - Resident Engineer

2001 to 2005 Black & Veatch (B&V), Water Asia, General Manager

Responsible for operations, successful execution of projects, management of technical resources & client services management. As the General Manager she was responsible for the financial performance of the B&V operations in Thailand; metrics included revenues from projects executed locally, office staff utilization, career development and mentoring. Responsibilities also included building alliances with the local supply chain and securing new business from the local municipalities. During that period the size of the office varied between 45 and 60 professionals. During this period, she worked on "The Unaccounted-for Water (UFW) Reduction Projects for the Metropolitan Water Authority (MWA) of Thailand.

B&V – 2001 to 2004 – Bangkok, Thailand – Contract Manager

A series of UFW Reduction projects for the MWA. Activities included system modeling, leak detection, lead repairs, pipe replacement and rehabilitation and comprehensive training for MWA staff. This four-year, \$68M program resulted in a savings of more than 130 million cubic meters of water. Each Branch was divided into a number of hydraulically discreet District Metering Areas. Performance payments were linked to reduction of UFW.



Specialization:

Executive Management Business Development & Leadership,

Resource Recovery and Water Quality Projects, Design Build and other Project Alternative Delivery Models

Education

- BSc, Civil Engineering, Alexandria University, Egypt, 1981-1986
- MSc, part 1-Civil Engineering, - Alexandria University, Egypt, 1987-1989
- Business Administration, American University, Egypt, 1991-1992
- Executive Business Acumen and Advanced Executive Business Acumen, Black & Veatch 2006 & 2011

Professional Registration

- New York USA, Year 1996 074444
- Certification: BCEE – 2018 Board Certified Environmental Engineer by the American Academy of Environmental Engineers (AAEE)
- PMP – 2007 Project Management Professional Certified by the Project Management Institute (PMI)

Professional Associations

- Past President – Los Angeles Basin Section (LABS) of California Water and Environment Association (CWEA) – 2009 to 2011
- Past Director – Arab American Association of Engineers and Architects (AAAAEA) 2010- 2011
- Board of Directors – CWEA – 2016 to present

Year Career Started
1986

2005 to 2011 Black & Veatch Los Angeles, California

B&V - 2005 to 2011 - Los Angeles, CA - Client Manager and Project Manager

Client Manager and Project Manager for City of Los Angeles, Bureau of Engineering and Bureau of Sanitation, the City of Santa Monica and the City of Beverly Hills.

B&V – 2006 to 2011 Los Angeles, CA – Office Leader

As the Office Leader Ms. Titus was responsible for the Los Angeles office staff (about 35 professionals) career development and mentoring. As a Project Director she was responsible of leading Projects and Project Managers to successful technical and financial execution of existing projects as well as securing new projects from Los Angeles clients including City of Los Angeles, Bureau of Engineering and Bureau of Sanitation. City of Santa Monica, City of Beverly Hills and Orange County Sanitation District.

B&V – 2007 to 2014 Associate Vice President (AVP)

In 2007 Ms. Titus became an officer of the firm (Associate Vice President) and as such had fiduciary responsibilities, metrics included successful technical and financial execution of existing projects as well as financial metrics for new projects won.

CWEA – 2006 to 2009 – Board of Directors for the Los Angeles Basin Section

CWEA – 2009 to 2011 – President of the Board of Directors for the Los Angeles Basin Section (LABS)

During the tenure of her leadership role with LABS, Ms. Titus organized and participated in several major specialty conferences that rallied the industry leaders, owners, regulators and academia. As an example; in 2012 she organized and participated in the CWEA full day conference in celebration of the 40th Anniversary of the Clean Water Act.

2011 to 2014 Black & Veatch Vancouver, British Columbia

B&V - 2011 to 2014 - Vancouver, British Columbia – Office leader and Client Director for BC clients. I retained my AVP title in Vancouver, BC.

Responsibilities included establishing a strong Client Center in Vancouver for B&V, developing and implementing plans for Profitable Growth, recruiting local professionals and securing projects as well as the financial performance of the operations in BC.

2014 to Present CDM Smith, Concord, CA – Vice President

CDM Smith – 2014 to Present – CA, Director for the West Pacific Region

Responsible for sales and profit and loss in AZ, NV, CA, WA, OR, AS, HI and British Columbia. Metrics include Sales, Profit, Staff Utilization and Operational Income.

RECENT PROJECT EXPERIENCE

San Jose/Santa Clara Regional Wastewater Facility Headworks Enhancement Project - City of San José, California – Principal-in-Charge.

Annacis Island Wastewater Treatment Plant, Transient Mitigation and Outfall, Metro Vancouver, British Columbia, Canada-Corporate Sponsor and Project Director.

Annacis Island Wastewater Treatment Plant - Cogeneration System Engineering Services, Metro Vancouver, British Columbia, Canada - Project Director.

Iona Island Wastewater Treatment Plant – Term Engineering Service Agreement, Metro Vancouver, British Columbia, Canada – Program Manager

Department of Public Works Bureau of Sanitation | Hyperion Water Reclamation Plant- Bioenergy Facility; Los Angeles, CA

Project Manager. Assisted the City in preparing a Request for Proposal (RFP) from interested parties and assisted the City in evaluation of the proposals and in negotiations with the highest ranked proposer to implement a project to make beneficial use of the Digester Gas produced at the Hyperion Treatment Plant.

Department of Public Works - Bureau of Engineering | Echo Park Lake Rehabilitation Project, Proposition O Implementation Program; Los Angeles, CA

Project Manager. For the design of water quality improvements for 13-acre urban park. The rehabilitation is viewed as a great opportunity to implement multipurpose solutions recreational enhancements within the community while achieving the City's objectives to enhance water supply, water quality, and downstream flood control. Primary goals of the project are: to improve water quality in the lake; enhance the Los Angeles River Watershed; and assist the City in meeting current and future requirements for Total Maximum Daily Load (TMDL) allocations set by the Regional Water Quality Control Board. Captured urban runoff will be treated and utilized to make up evaporative losses of up to 100,000 gpd in Lake thereby saving precious potable water. Treatment is achieved via screening, aeration and recirculation through constructed wetlands. This project will also significantly reduce exfiltration from the Lake that requires a considerable amount of potable water to keep the lake full during drier months.

City of Santa Monica | Charnock Well Field Restoration Project; Santa Monica, CA

Project Manager. This was a Design Build project and as the project manager was responsible for the overall project execution during design, construction and startup phases including contract management, team coordination, distribution of information, coordination of meetings with the City and various stakeholders, tracking project budget and schedule, as well as resolving the technical and regulatory issues. The project comprises installation of granular activated carbon (GAC) contactors at the Charnock Wellfield site to eliminate MTBE and TBA contamination that was detected in three of the City's five wells at the Charnock Wellfield in the mid 90s followed by installation of a Reverse Osmosis Membrane Softening System, a Fluoride chemical feed system, and disinfection by Chloramination at the Arcadia Treatment Plant. The project was on a fast track schedule and included major coordination efforts with Public Outreach Consultant, Environmental Consultant, and Peer Review Consultant. Permitting through Department of Public Health (DPH), Regional Water Quality Control Board (RWQCB), Air Quality Management District (SCAQMD) and City of LA, Bureau of Sanitation.

City of Santa Monica | Measure V Program; Santa Monica, CA

Project Manager. Measure V is a parcel tax that was approved by Santa Monica voters in November 2006 to fund projects that protect the Santa Monica Bay from the bacteria and other contaminants in storm water and runoff from urban areas. She assisted the City with the evaluation, prioritization and the development of an implementation schedule for up to \$30M in storm water quality improvements throughout Santa Monica. Conceptual designs and cost opinions were developed for key facilities. The emphasis of the Program was on Low Impact Development (LID) and Best Management Practices (BMPs) dispersed throughout the City, but other large-scale facilities were also considered.

Orange County Sanitation District–Newport Trunk Sewer and Force Mains, Fountain Valley, CA, 2008 – 2011 – Project Manager

Orange County Sanitation District—Outfall Land Section and OOBs Piping Rehabilitation (J-112), Fountain Valley, CA – 2010 to 2012 -Project Manger

City of Los Angeles | Department of Public Works – Bureau of Sanitation, Los Angeles, CA On-Call Contract Manager

Publications, Presentations and Facilitated Industry Sessions

- NACWA 2018 Utility Leadership Conference: July 2018 – “Practices and Business Models for an Economically Viable Future”
- US Water Alliance – July 2018 – I participated in and facilitated a panel discussion re “Innovations in Finance and Delivery of One Water Projects”
- P3 Water Summit: April 2018 – Hyperion Water Reclamation Facility – Bioenergy Facility”
- US Water Alliance – June 2017 – Facilitated a session re “The Maturation of Multi-Benefit Green Infrastructure Strategies” the session focused on citywide plans, creative financing, programmatic approaches, and the role of networks to accelerate the adoption of this effective One Water strategy.
- CWEA Roundtable: April 2017 – “What is One Water and Can It Solve Our Water Challenges?” **Video with Water Industry leaders**
- California Association of Sanitation Agencies (CASA): August 2017 - Public Private Partnership presentation with Traci Minamide LASAN and Ben Munoz (SKFCSD)
- CWEA – 2012 – Organized a one-day session re One Water with Industry leaders celebrating the 40th anniversary of the Clean Water Act.
- CASQA – Measure V Project Presentation with the City of Santa Monica
- AWWA-CDM Smith Roundtable Dialogue: Dec 2016 - “Strategies for Financing Large-Scale Programs in the Water Sector”
- WEF Magazine WE&T: Dec 2013 - Echo Park Lake revival- Rehabilitation gives Los Angeles lake fans reasons to rejoice
- DBIA – Design-Build DATEINE – Jan-February 2009 – TREAT IT RIGHT Design-Build Provides Sound Approach to MTBE Contamination in Brackish Groundwater Supply
- The Magazine of the American Society of Civil Engineering: Sep 2013 - Echo Park Lake Renovation Complete
- North American Society for Trenchless Technology - No Dig show – Newport Trunk Sewer and Force Mains Presentation with OCSD

Awards

- California Water Environment Association (CWEA) - Select Society of Sanitary Sludge Shovelers (5S) award – 13th April 2011

- CWEA - Los Angeles Basin Section (LABS) – 2009 Past President Leadership award
- CWEA - LABS - Outstanding Leadership 2010 and 2011
- Black & Veatch University – Certificate of Achievement in recognition of successful completion of all coursework and activities required in the “Advanced Executive Business Acumen Program” 6th October 2011
- Black & Veatch – Appreciation of Exceptional Collaboration Award 2010
- Black & Veatch – Best Practice Award 2013
- ENR 2013 Best Projects – Best Water/Environment Project “Echo Park Lake Rehabilitation” I was the Project Manager for the full duration of the project
- APWA 2012 Project of the Year – “Charnock Wellfield Restoration” I was the Project Manager for the full duration of the project

Mentoring

Throughout my career I mentored professionals, provided guidance and advice re their career development and helped them succeed with their direct supervisors.

- I worked with the City of Los Angeles, Bureau of Sanitation on their Outreach and Science project competition program for high school students as I served as a judge on the evaluation panel (2011 to 2014).
- As part of B&V outreach to students, I presented to Howard University students “Management vs. Leadership” 2006
- I am on the advisory board for the Engineers Alliance for the Arts (EAA), EAA's mission is to inspire and educate students about the interaction of art, architecture, engineering and construction

References

- **Dan W. McCarthy - Principal - Dan McCarthy Consulting LLC**
danmccarthywater@gmail.com
Mobile: 816-813-7051
- **Andrew Sawyers, EPA - Director Office of Wastewater Management (OWM)**
sawyers.andrew@epa.gov
Office 202 564 0748
- **Harlan Kelly, General Manager - San Francisco Public Utility Commission (SFPUC)**
HKelly@sfgwater.org
Office (415) 554-0740
- **Traci Minamide, COO - City of Los Angeles, LA Sanitation**
traci.minamide@lacity.org
Office 213 485 2210
- **Mark Ferguson, Director of Engineering - Metro Vancouver, BC**
Mark.Ferguson@metrovancover.org
Office 604 432 6341



**San Francisco
Water Power Sewer**

Services of the San Francisco Public Utilities Commission

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San Francisco Public Utilities Commission

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HKelly@sfgwater.org

August 20, 2018

Mr. Paul Jones II
President, Board of Directors, WaterReuse
1199 North Fairfax Street
Alexandria, VA 22314

Subject: Letter of Recommendation for Hala Z. Titus

Dear President Jones,

Congratulations on the great work that WaterReuse is doing to effectively promote recycled water and water reuse, thanks to your leadership and the commitment of your Board members, including Michael Carlin of our agency, the San Francisco Public Utilities Commission (SFPUC).

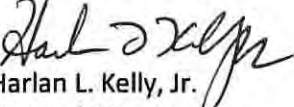
I am writing in support of Hala Z. Titus' strong interest in serving on the WaterReuse Board of Directors. Throughout her distinguished career, Ms. Titus has been a passionate advocate for our industry, on Water Reuse and One Water issues in particular. She presently serves on the Board of the California Water and Environment Association (CWEA), through Spring 2019, and is active with AWWA, CWEA, and the US Water Alliance.

Ms. Titus was formerly Project Director for Black and Veatch, and presently Vice President of CDM Smith, since 2014. Both firms have provided technical services on major SFPUC projects. Over the years I've had the pleasure of working with Ms. Titus in my capacity as SFPUC General Manager, and as a Board member of the National Association of Clean Water Agencies.

Ms. Titus would bring to the WaterReuse Board over thirty years of outstanding engineering experience in the U.S. and internationally, as a Board Certified Environmental Engineer and as a certified Project Manager. She has managed numerous large scale public works projects that include the award-winning Echo Park Lake Rehabilitation Project for the City of Los Angeles.

If you have questions or need additional information, please do not hesitate to contact me. Thank you for your consideration.

Sincerely,


Harlan L. Kelly, Jr.
General Manager

cc: Hala Z. Titus, Michael Carlin

London Breed
Mayor

Ike Kwon
President

Vinca Courtney
Vice President

Ann Moller Caen
Commissioner

Francesca Vietor
Commissioner

Anson Moran
Commissioner

Harlan L. Kelly, Jr.
General Manager

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