2016 SYMPOSIUM PLANNING COMMITTEE

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- **Marlo Wanielista-Berg**, Texas Commission on Environmental Quality
- **Rick Warner**, Washoe County Department of Water Resources
- **Paul Westerhoff**, Arizona State University
- **Gordon Williams**, East Bay Municipal Utility District

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- **Rick Warner**, Washoe County Department of Water Resources
- **Paul Westerhoff**, Arizona State University
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LETTER FROM PLANNING COMMITTEE CO-CHAIRS

The origin of the 2016 AWWA International Symposium on Potable Reuse (ISPR) begins with you. With rapidly burgeoning interest in potable reuse as a drought-resistant, environmentally friendly means of long-term water supply portfolio diversification, the membership voiced its strong sentiment for the AWWA to play a prominent role in this important emerging topic, albeit not in isolation. Thus, from the outset, the ISPR was envisioned as an opportunity to conduct a collaborative event with partners from across the landscape of water organizations. The Planning Committee, comprised of representatives from many different AWWA constituencies, was well aware that there are many reuse-themed conferences, and the intent was to neither to duplicate those nor emulate the format of many other AWWA events. Instead, the ISPR vision was to create a forum for discussion and enable the industry to “advance the discourse,” as was the Planning Committee mantra. Accordingly, we eschewed the notion of having speakers talking at attendees, in favor of one all-encompassing group of “participants” whose contributions were all equally important. In order to facilitate this vision, the program was limited to just two parallel tracks with sessions that were designed to be provocative, thereby encouraging questions and comments. Podium presentations were shorter, and each session ended with an extended period for moderator-facilitated group discussion, not only with the speakers, but also among the audience. The spaces were smaller, the breaks were more numerous, and the refreshments were outstanding (thanks to the generous support of our sponsors), all in the interest of continuing the conversation of potable reuse well beyond the confines of the sessions themselves and serving to incubate new ideas.

We were surprised not that this experiment worked well, but rather by just how well it worked. Months later, people we have never met continue to approach us and pay unsolicited compliments on the ISPR, noting how much they enjoyed the event. But the credit goes not to any two specific people, nor the Planning Committee, nor AWWA’s partner organizations, nor sponsors, but to everyone who participated. You embraced our format; you asked questions; you engaged in the conversation; and you pushed the envelope of potable reuse, all in a collegial atmosphere. It is precisely this same mentality that is, even now, ushering in the era of potable reuse, leveraging what has historically been considered wastewater to produce a safe and reliable new source of highly purified drinking water. The Planning Committee started with you in mind, and it was you who made the ISPR so successful. What follows herein is a concise synopsis of the event; although no short summary piece could truly do it justice, it is hoped that this captures some of the key content and spirit of the ISPR, particularly for those who were unable to be there in person. For this latter group, and indeed for everyone, we hope to see you at the next ISPR, when we can gather to collectively and collaboratively “advance the discourse” on potable reuse yet again. Enjoy!

Sincerely,
Brent Alspach, Principal Environmental Engineer, Arcadis, ISPR Co-Chair
Paul Swain, Vice President, CH2M, ISPR Co-Chair
INTRODUCTION

With interest in potable reuse rapidly expanding, the need for industry discussion and collaboration in this burgeoning field is more pressing than ever before. In serving these needs, the AWWA International Symposium on Potable Reuse (ISPR), was a unique and timely event designed to advance the global discourse on both direct and indirect potable reuse. Structured with a combination of presentations and facilitated discussion sessions among conference participants, the Symposium captured international perspectives and cultivated the exchange of ideas on the hottest potable reuse topics, including source water assessment, treatment technology, facility operations, on-line monitoring, regulations, public engagement, public health protection, and more. Throughout the Symposium, the most significant points of discussion were captured by the AWWA staff, ISPR Planning Committee members, and session moderators. A summary of these points is presented in the two following sections, grouped in accordance with the Symposium’s two parallel session tracks: Planning and Implementation; and Treatment and Monitoring. A brief synopsis of the Groundwater Replenishment System facility tour is also provided.

PLANNING AND IMPLEMENTATION

Speakers from across the globe shared their experiences, both successes and setbacks, in implementing potable reuse projects. Specifically, there were new updates regarding El Paso Water Utilities (EPWU) direct potable reuse (DPR) facility, for which pilot testing had just been completed, with preliminary design pending. EPWU’s Advanced Water Purification Facility (AWPF) will be the country’s first direct-to-distribution potable reuse plant and only the second such facility worldwide. The Colorado River Water Management District’s Raw Water Production Facility in Big Spring, TX remains the country’s only full-scale DPR facility currently operating, and data were shown to demonstrate that deionized water can have more adenosine triphosphate (ATP) than the plant’s RO permeate, underscoring the robustness of advanced treatment processes.

The need to invest in operator training and certification was continually emphasized by ISPR participants, who discussed alternatives for expanding drinking water and/or wastewater certifications to accommodate potable reuse plant operators and the specific responsibilities commensurate with an advance treatment facility? The importance of coordination between the potable reuse treatment plant and the upstream wastewater treatment plant(s), both at the management and operator levels, was also a common discussion thread. Ultimately, participants affirmed that operators will play an essential role in not only the successful implementation of potable reuse projects, but in their design, as well.

Public acceptance remains a critical element of any potable reuse project. Strong stakeholder engagement from the outset of any such project was strongly encouraged based on the experience of effective educational campaigns. Representatives from benchmark projects in California, Texas, and Australia discussed the evolution of, and challenges with, public engagement and acceptance of potable reuse. It is necessary to provide transparent communication and ade-
quately address the public’s concerns, allowing sufficient time to build rapport, develop a reputation for trustworthiness and credibility, and establish effective communication channels. The Water Corporation of Western Australia cited its prominent Visitor’s Center and ongoing demonstration facility as key components of its highly effective public education and outreach initiative. The inclusion of formal stakeholder groups in the development of potable reuse projects can also have a profound positive impact, cultivating constructive community relationships focused on shared goals. In one of the ISPR’s most dynamic sessions, representatives from influential nongovernmental organizations discussed the beneficial role of such stakeholder groups with Symposium participants.

Potable reuse necessitates the advancement of alternative water supplies with the rigorous protection of public health. In many cases, current policy frameworks lag behind the need to achieve these simultaneous goals, resulting in project implementation challenges. Local, state, and federal officials discussed their perspectives on potable reuse policy development at the ISPR, and public health experts emphasized the need to remain vigilant about providing safe, high quality water to consumers independent of the source. The role of the United States Environmental Protection Agency (USEPA) in regulating (or not) potable reuse was a recurring point of lively discussion, with many diverse perspectives on the issue. However, whether in form of guidance, regulatory oversight, research, and/or funding, there was general consensus that form of USEPA engagement is essential for the long-term implementation of potable reuse.

**Costs are important, but the protection of public health is a priority.**

**TREATMENT AND MONITORING**

Once potable reuse is selected as new water resource, it must be implemented with confidence. The road to building that confidence is paved with complex questions: What is acceptable microbial risk? Is real-time pathogen monitoring technology feasible? What factors should determine treatment process decisions? How can we achieve similar water quality objectives in widely disparate wastewaters? These questions and many other issues were considered and discussed by ISPR participants over the two-day symposium.

In terms of pathogen treatment, California has established its standard 12-10-10 criteria for potable reuse projects, referring to the total respective log removal requirements for enteric virus, Cryptosporidium, and Giardia from the raw wastewater source to the advanced treated potable quality distributed water. Texas employs a similar underlying risk rationale for determining its potable reuse pathogen reduction requirements, although the manifestation of this regulatory framework differs from California’s in two key ways: first, it establishes facility-specific log removal requirements; and second, the requirements are determined based on an assessment of the feed water (i.e., treated wastewater) to the advanced potable reuse treatment plant. Thus, the facility-specific Texas approach could be either more or less conservative than the standard California approach as applied to any given potable reuse project, depending on the quality of the wastewater. Some research has been done to characterize raw, primary, and secondary wastewater effluent pathogen concentrations, but more data are required from various types and sizes of wastewater treatment plants to obtain a more accurate picture of microbial occurrence and treatment needs for potable reuse projects.

For potable reuse treatment facilities, the concept of “critical control points” (CCPs) has become integral to ensuring that treatment goals for pathogens and other contaminants are achieved; accordingly, CCPs were an important topic of discussion at the ISPR. In a treatment process train, CCPs are specifically designed to add robustness by reducing, preventing, or eliminating a human health
hazard. Examples of CCPs include: advanced on-line water quality monitoring; treatment process redundancy; and treated water storage with sufficient detention time to allow for mitigation of any water quality upsets prior to distribution. The need for CCPs and multiple barrier treatment was underscored by work conducted at the Padre Dam Municipal Water District’s Advanced Water Purification Demonstration Facility, which showed the potential for bacterial regrowth.

Real-time monitoring for treatment process control holds promise, but there was consensus of ISPR participants that significant advancements are necessary to increase sensitivity, reduce response time, and improve accuracy at very low contaminant levels. Even with such enhancements, the detection of very small numbers of discrete pathogens in large flows is expected to remain a significant technical and statistical challenge. Thus, improving the validation of treatment process pathogen reduction is garnering considerable research and development. In particular, techniques to verify the integrity of reverse osmosis (RO) and nanofiltration (NF) systems and more precisely quantify their pathogen rejection on an ongoing basis during operation have commanded considerable attention.

The application of potable reuse also heightens the significance of automated data collection and process control. SCADA systems integrate sensor information, water and operational data, standard operating procedures, and alarm functions. However, the use of a poorer quality wastewater source necessitates more robust, conservative, and thoughtfully designed systems than ever before.

Potable reuse treatment selection poses new and unique challenges, as well. Key factors include not just affordability, functionality, and regulatory compliance but also redundancy and stakeholder acceptance. ISPR participants discussed the benefits and drawbacks of ozone, various methods of ultraviolet (UV) disinfection with advanced oxidation, and biological treatment in different locations within an advanced treatment train. The City of San Diego’s Pure Water demonstration scale plant has employed all three of these processes, helping to set the contemporary spirit of innovative treatment evaluation for potable reuse applications.

GROUNDWATER REPLENISHMENT SYSTEM TOUR

The Symposium concluded with a tour of the Ground Water Replenishment System (GWRS) in Orange County, CA. The GWRS is one of the world’s largest advanced water purification systems for potable reuse. This joint collaboration between the Orange County Water District and the Orange County Sanitation District has created a local and reliable water supply since 2008. In a state-of-the-art facility, 100 MGD of treated wastewater that otherwise would be lost to the Pacific Ocean is purified using a three-step advanced process, including microfiltration, reverse osmosis, and ultraviolet light with hydrogen peroxide. The highly purified water produced by these treatment processes exceeds all state and federal drinking water standards before being pumped to injection wells, where it serves as a seawater intrusion barrier and recharges the local groundwater to augment the local drinking water supply. The tour concluded with attendees imbuing in samples of the clean and fresh-tasting purified water.

“It tastes like water... because it is water!”
CONCLUSION

The AWWA’s International Symposium on Potable Reuse provided a unique environment for professionals in the water community to collaborate, exchange ideas, and advance the discourse on potable reuse. Participants conferred on wide range of topics, including improvements in treatment and monitoring, key components necessary for the successful project implementation, regulatory strategies, public policy implications, research needs, and much more. Overall, there was strong consensus that potable reuse is a viable and essential long-term strategy for bolstering water supply reliability that will undoubtedly become a prominent part of the water resource portfolios of municipal utilities throughout the country and around the world.

Water should be judged not by its history, but by its quality.
THANK YOU TO OUR PARTNERS!

- Water Environment Federation
- WateReuse
- Association of Metropolitan Water Agencies
- Water Research Foundation
- AWWA California-Nevada Section
- International Ultraviolet Association
- National Water Research Institute
- National Association of Clean Water Agencies

THANK YOU TO OUR SPONSORS!

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