WateReuse

one glass at a time . . .

Helping people understand

Potable Reuse

A Flexible Communication Plan
for use by Public Information Professionals

Get It Done

As a public information professional, your job is to tell a story, tell it to the right people at the right time, and — truth be told (always) — pave the way for critically important, expensive, large, and potentially controversial projects to get done!

It may seem overwhelming at first, although it's not an impossible task. Why? Because much of the work has already been done and there is a framework you can use and adapt to your project in your own territory. Take a deep breath — and dig in.

Here's Your Roadmap

This get-going kit has been pulled from the larger document known as Model Communication Plans for Increasing Awareness and Fostering Acceptance of Direct Potable Reuse or WRRF-13-02. You can find the complete original Plans at www.watereuse.org/product/13-02-1.

Experience has shown that public acceptance of potable reuse is one of the primary challenges facing the use of this source of water supply. Just as processes leading to potable reuse involve the use of a proven and reliable technology to purify recycled water, there is a set of proven processes that can help you communicate — and deliver on — your project.

The Plan is flexible and is designed to be adapted to the specific needs and situations of an individual community, whether pursuing indirect potable reuse (IPR) or direct potable reuse (DPR) options.

Draft Your Message Plan

— ESSENTIAL —

Water Terminology for Potable Reuse

The messages here introduce new terminology for potable reuse — namely, "**advanced purified water**" or "**purified water**." This reflects the preferred terminology from the focus groups and telephone surveys conducted during the WRRF-13-02 project. **The research clearly demonstrates that "potable reuse" and "direct potable reuse" are not understood by the mainstream population and that, even when explained, they do not resonate well.**

We reference DPR and IPR as "potable reuse." This is fine when talking among those in your agency and industry, but the public neither recognizes nor understands the terms — we recommend using the term "purified water" in your communications with the public.

The WateReuse Research Foundation created a glossary "simple enough to understand, but technical enough to trust," which can be found at www.watereuse.org/information-resources/about-water-reuse/glossary-1.

The glossary helps explain water recycling. Although research recommends terms such as "treated wastewater" be avoided, it is important to show how we all put contaminants into water during use and how the "pollutants" can be taken out. No need to hide the fact that water has been used and reused—all water is used water. Maintain your perspective and don't simply talk about one slice of the water cycle—all aspects function together.

Get Ready for Public Engagement

Carefully craft your community's project story

At a minimum, answer the following questions about potable reuse:

1. What is potable reuse?
2. Where does it fit in our water supply portfolio?
3. Why is the potable reuse project needed?
4. What purpose will it serve?
5. How safe is the water?
6. How will it be monitored to ensure safety?
7. How much will it cost?
8. When will it be implemented?

Messaging Tips

Develop key messages in terms understandable to a non-technical audience and avoid using jargon.

Create a standard community presentation and train spokespeople to present and respond to general and specific questions.

Identify key community leaders and groups and build a mailing database for distribution of e-mail or direct mail updates.

Create easy-to-understand infographics that describe the treatment process, how the project fits into the larger water supply portfolio, and simplify complex attributes.

Effective Messaging to Aid Understanding of Potable Reuse

Public understanding of the critical role that potable reuse, engineering, and technology play in the community is of paramount importance. Effective messaging consistently applied in communications can help improve technological literacy.

Effective messaging is not enough. According to Dr. Paul Slovic in *The Feeling of Risk: New Perspectives on Risk Perception* (2010) information must also convey emotion or feeling to be meaningful.

Goals of Messaging

The goal is to provide coordinated, consistent, effective communication ideas about the role and importance of potable reuse that can be used with a variety of stakeholders, from children to parents and health professionals to business interests. There are three basic objectives:

- identify messages that help increase public understanding of water use, treatment, and potable reuse in a water cycle context;
- establish messages in the context of your water agency's mission;
- establish common terminology and approaches that resonate with the public and broaden acceptance for potable reuse projects.

Messages presented herein are not designed to convince a stakeholder to make a particular decision. Rather, these messages facilitate exploration of ideas and possibilities. This approach emphasizes the agency's concern:

- for the future,
- for health and the environment, and
- for its partnership with the community.

This approach changes the tone and context, instead emphasizing sharing facts to facilitate informed decision-making.

Goals of Messaging continued...

Although the messages offered may not reflect the priorities of every community, they can be used to start the conversation and be modified, as needed. Your own feedback and research may reveal that additional or different messaging priorities exist, such as construction issues, rate concerns, or social/environmental justice perceptions. For example, population/economic growth can be cited as a reason for turning to potable reuse. In many communities, growth is viewed negatively; in that case, the messaging should be modified to reflect that situation.

Basic Key Messages and Definitions

The following messages combine technical accuracy with benefits, creating a meaningful and comprehensive message.

The topics and tenor of these messages are based on findings from focus groups and telephone surveys conducted in two model communities.

Three Key Messages

Potable reuse provides a **safe, reliable, and sustainable** drinking water supply.

Using advanced purified water is **good for the environment.**

Potable reuse provides a **locally controlled, drought-proof water supply.**

Using the Messages Effectively

The following approaches are recommended:

- be sure all spokespeople are well trained and informed;
- review messages before presentations, interviews, or meetings;
- use the messages in crafting speeches;
- repeat, repeat, repeat—consistently state the messages in response to questions; bridge back to messages whenever you answer a question;
- end every written article or meeting with a message appropriate for the audience and subject matter.

Message Outcomes

The following are anticipated message outcomes:

- an appreciation for your goals and mission;
- an understanding that your agency treats and cleans the wastewater for a large population, and the clean water is a resource for a more sustainable future;
- purified water is purer than drinking water—it is nearly the quality of distilled water;
- your agency is partnering with the community to explore sustainable solutions and that decisions require an informed community;
- your agency provides information to assist the community in making appropriate infrastructure investment decisions and to instill confidence that the proposed system will provide sustainable and safe drinking water;
- an internal mindset that provides truthful and timely information, a key to enhancing trust.

Key Messages

Top Three Key Messages

Purified water provides a safe, reliable, and sustainable drinking water supply.

Using advanced purified water is good for the environment.

Purified water provides a locally controlled, drought-proof water supply.

Key Messages Explained

Potable reuse, or purified water, as described here, uses advanced, multistage treatment to provide a safe, reliable, and sustainable drinking water supply.

Here are some tested and useful message bullets:

- Proven engineered treatment processes are used to purify water to a level that is safe to drink.
- Purifying water is a "multibarrier process" designed to separate water from pollutants.
- There are various treatment processes to accomplish this objective.
- Purified water will be tested in real time with online sensors and will be strictly monitored by the Department of Health.
- Purified water will comply with or exceed strict state and federal drinking water standards.
- The purification process produces water that is purer than most bottled waters.
- Purified water is currently used to supplement drinking water in many communities in the United States and around the world. There have been no problems from using purified water to augment drinking water supplies.

At times it may be advantageous to include a more detailed description of the advanced technological processes used to purify recycled water. In such instances, the following language is an example of how to describe the microfiltration/reverse osmosis/ultraviolet light treatment train:

- The water first goes through microfiltration, a pretreatment process, where water is pumped through tubes filled with tiny membranes. Each membrane is made up of hollow fibers, perforated with holes 1/300th the width of a human hair! As the water moves through the tubes, solids and bacteria are caught in the fibers.
- The water then goes through reverse osmosis where it is forced through membranes that remove salt and microorganisms, including viruses, bacteria, and most chemicals of emerging concern.
- Now the water is very clean, but one more step ensures its safety: exposing the water to ultraviolet light breaks down any remaining organic particles.

Using advanced purified water is good for the environment.

The more recycled water we use for whatever purpose we use it, the less we have to take out of rivers, streams, and our scarce groundwater supplies. This is good for rivers and streams and the fish, plants, and wildlife that rely on them.

We all recycle as often as we can — glass, plastic, paper, and even yard waste, which is the right thing to do. For the same reason, we should recycle and reuse as much of our limited water supplies as we possibly can — water is too valuable to be used just once.

Purified water, provides a locally controlled, drought-proof water supply.

- Purified water is independent of climate or weather in other locations.
- Purified water enhances water supply reliability and helps protect us from droughts by diversifying supply sources — keeping us from relying too much on any one source of water that may run low in a drought.
- Purified water provides a community with a constant source of water.

Additional Messages

If additional information is needed regarding the potable reuse concept, the following points provide some good background information:

- Water reuse — including potable reuse — happens naturally all over the planet.
- Water reuse happens daily in rivers and other water bodies everywhere. If you live in a community that is downstream of another community, chances are you are reusing that community's water, and likewise, communities downstream of you are most likely reusing your water. This has been called "de facto" or unacknowledged/unplanned potable reuse.
- Planned potable reuse is publicly acknowledged as an intentional project to recycle water for drinking water. It can be either direct or indirect (see the following). It commonly involves a more formal public process and public consultation program than is observed with de facto or unacknowledged reuse.
- How potable reused water is delivered determines if it is called IPR or DPR.
- IPR means the water is delivered to you indirectly. After it is purified, the reused water blends with other supplies and/or sits awhile in storage, man-made or natural, before it is delivered to a pipeline that leads to a water treatment plant or distribution system. That storage could be a groundwater basin or a surface water reservoir.
- DPR means the reused water is put directly into pipelines that go to a water treatment plant or distribution system. DPR may occur with or without "engineered storage" such as underground or aboveground tanks.
- The amount of fresh water on the planet does not change, so through nature all water has been used and reused since the beginning of time. Using advanced technology to purify recycled water merely speeds up a natural process. In fact, potable reuse provides a needed water supply that is of higher quality than what occurs naturally.

Communication and Outreach Tools

Building Trust — Why Tools are Needed

Since public acceptance of potable reuse is one of the primary challenges facing this source of water supply, developing clear and informative tools will help gain acceptance and build trust within your community for your project.

Develop Informational Materials

The following are strategies for developing informational materials:

- Make available easy-to-understand materials highlighting key messages appropriate for target audiences and provide them in print and electronic formats; consider using QR codes (a type of bar code that links to additional information) and social media platform strategies.
- Develop materials tailored to the interests of specific audiences.
- Ensure all materials are geared to multicultural, multi-ethnic, and age-specific audiences; translate key items into other languages as needed.
- Consistently update all materials (both electronic and print) to make sure designated audiences, including agency employees, have timely and accurate materials.
- Provide links to other places that provide information about purified water projects.

Menu of Informational Materials and Tools

Collaterals

- Purified water fact sheet
- Purified water FAQ
- Pocket brochure
- Bill inserts
- Posters and banners
- Materials for children
- White papers
- Template articles

Web and Digital

- Website
- Presentations
- E-newsletter
- Program DVD
- Quarterly videos

Libraries and Databases

- Graphics "catalog"
- Quote/Cite bank
- Mailing list
- Centralized internal information station

Other

- Learning/visitor's center at the advanced water treatment facility
- Key messages card
- Supporter/comment cards

Speakers Bureau

- Detailed information on *Strategies & Activities for Creating Your Speakers Bureau* are available at www.watereuse.

For more detailed and helpful information on each of these bulleted items see section 5.10 of the WRRF 13-02 report.

Sample Timeline on reverse

Key Plan Element Prioritization and Timeline

An example of a timeline you can adapt for your own public outreach planning.

ACTIVITY	MONTH																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Review existing communication materials (internal and external)																		
Review the literature																		
Develop draft key messages for testing																		
Identify key stakeholders						*Ongoing*												
Build mailing list/contact database							*Ongoing*											
Conduct in-depth interviews								*Ongoing as needed*										
Conduct focus groups and baseline survey																		
Finalize key messages																		
Develop or modify Community-Level Communication Plan												*Ongoing as needed*						
Create communication tools																		
• info materials																		
• speakers bureau and training														*Ongoing*				
• media training														*Ongoing*				
• webpages and social media														*Ongoing*				
• IAP (Independent Advisory Panel)														*Ongoing*				
Create a Rapid Response Plan																		
• identify a core team			*Ongoing as needed*															
• conduct spokesperson training			*Initial*								*Key messages*			*Ongoing as needed*				
• create template articles for media			*Initial*								*Key messages*			*Ongoing as needed*				

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Creating Water Quality Confidence

Understanding the Treatment Process

Currently*, most advanced water purification processes involve a multistage process of microfiltration, reverse osmosis, and ultraviolet light with advanced oxidation:

- The water first goes through microfiltration, a pretreatment process, where water is either pushed or pulled through tiny tube-like membranes. Each membrane is like a straw with microscopic holes in the sides of the straws, 1/300th the width of a human hair! As the water moves through the tubes, protozoa, solids, and bacteria are removed from the water.
- The water then is treated through reverse osmosis where it's forced through the molecular structure of membranes. Things like fertilizers, pharmaceuticals, viruses and finally salts or minerals are removed. The result is near distilled quality water.
- Now the water is purified, but one more step provides a safety barrier: The water is exposed to ultraviolet light with advanced oxidation to cause any remaining organic molecules to break down into safe, simple elements, like oxygen, nitrogen, carbon, etc.

After this process the water is cleaner than most bottled water.

(*Alternative processes are being evaluated.)

Build Trust in Your Water Quality

Past and present market research shows that many people do not believe their tap water is safe to drink and therefore turn to bottled or filtered water. This finding points to the challenge of convincing the public that potable reuse is a good idea; therefore, it may prove effective to initiate public outreach with strong messaging about the quality of the current water supply and the superior quality of highly treated water intended for potable reuse, as compared with lower quality and loosely regulated bottled water.

Follow these steps to create water quality confidence in your community:

Step 1: Establish Your Water Quality Values

Make sure you articulate the utility's values or commitments related to water quality. Always connect your actions and decisions to your commitments when you communicate.

Commit to Water Quality Improvement
People are not inclined to support investment in projects that degrade quality of life or that maintain the status quo. Make it a core value to improve water quality as new technologies are discovered.

Commit to Increasing Knowledge
People know that science is not perfect and that things change. They will accept that population growth and the expanding use of chemicals impacts source water quality. Telling them there is nothing to worry about won't fly and is not generally true. Communicating treatment technoliges in ways that are easily understood is key.

Manage Emerging Contaminants
Articulate actions or plans that address emerging or new contaminants.

Connect Actions with Motivations
When describing treatment technologies or methods, always include the motivation for employing the method or process. Remind them that the motivations originate from meeting your commitments.

Step 2: Be the Trusted Source of Information

Don't let someone else communicate about important water quality issues before you do. Be meaningful by describing the benefits of your decisions, actions, and investments.

Communicate How and Why You Test
Communicate in simple and meaningful terms how much you test the water quality and why. Make sure that your audience knows that you are asking the tough questions and looking for answers.

Share Your Emergency Response Plans
Share your plan for responding to water quality problems. Be proactive in your response to the problem and communications. Working through problems with your community can create more trust than having no problems at all!

Articulate Water Quality Risks
Define the issues and risks that need to be addressed in simple and meaningful terms. Describe the different types of contaminants, where they come from, and why they are a problem. People who are paying attention won't buy that there are no risks.

Describe General Treatment Capabilities
First, let people know that we can make the water as pure as we want to. Describe in simple and meaningful terms the

operations of separation, destruction, and disinfection. Communicating simply, yet meaningfully, will increase trust. Technical information without explanation erodes trust. For example, relate treatment processes to familiar things — such as kidney dialysis or bottled water treatment.

Step 3: Be the Trusted Source of Quality

Regularly remind your audiences that it is your values, diligence, process management, and commitment to investment that create water quality, not the physical source of the water or regulations. Never refer to regulations as the driver for quality.

Commit to Water Quality Improvement By Putting Source Control in the Proper Context
Managing and improving the quality of source waters should be described as one of many things that the utility does to create high-quality water. Putting source control in the context of the entire process of water quality management keeps people from believing that the physical source determines final water quality.

Use MultiStep Purification Processes
Once people understand that the source water is unacceptable for drinking, they will want to see a process that puts some distance between the source and the final water product. Communicate how multiple and diverse steps address a broad spectrum of contaminants, create system redundancy, create safety factors, and establish long-term sustainable solutions. Categorize these steps as separation, disinfection, or destruction.

Employ Natural Treatment Processes When Possible
Design in or highlight natural treatment processes. Studies and experience show that natural processes increase people's confidence.

Use Track Record to Create Confidence
Scientific data alone is usually ineffective when trying to create confidence. Science and data are not foolproof. Share track record information about your utility and the industry. It helps to have specific examples where you have taken a stand and advocated for improved water quality.

Opinion Leader Outreach

Goals of Opinion Leader Outreach

- Establish or enhance the relationship between the opinion leader and the agency.
- Build awareness, trust, and confidence in purified water treatment technology processes.
- Inform leaders of water supply demands and shortages and how purified water can meet demands.
- Listen to these stakeholders and be responsive to concerns related to purified water project implementation.
- Secure written support of purified water projects from strategic community and opinion leaders.

Opinion leaders influence attitudes, beliefs, motivations, and behaviors of others. They influence opinions by raising awareness, persuading others, establishing or reinforcing norms, and leveraging resources. They usually have high visibility and a defined constituency. Opinion leader outreach builds strong relationships and garners third-party involvement in disseminating information to a broader network.

Identifying Opinion Leaders

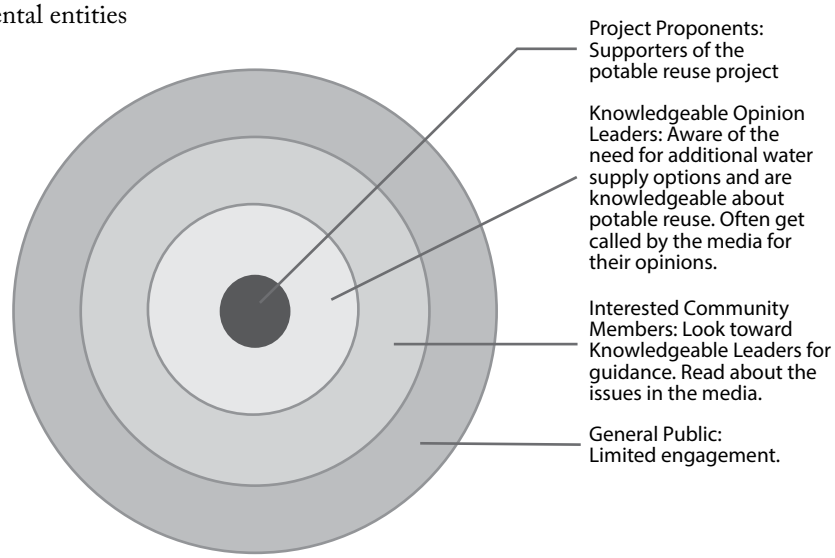
Each community will have its own unique set of influencers, who will likely change and grow as the project progresses. Keeping an accurate database of opinion leaders, contact information, preferred communication methods, and other pertinent notes is imperative to a successful outreach program.

It's important to identify the leaders and their staff. Characteristics include: appointed or elected position, values and traits, competence or expertise, and social position. Opinion leaders can include, but are not limited to, the following (in alphabetical order):

- academic/education leaders
- business organizations
- civic groups
- environmental entities
- media
- medical, public health, and water quality experts
- multicultural and faith-based leaders and groups (these leaders/groups may be found within the other audiences listed)
- state and local elected officials and their staff

Relationship of opinion leaders to other target audiences

The following graphic illustrates the opinion leaders in relation to other community members. As a core group, from which information spreads to other community members, opinion leaders must be made aware of the need to increase water supply sources and should be knowledgeable about purified water as an option.



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Menu of Opinion Leader Outreach Activities

These activities should not be confused with communications tools. However, the tools are key elements of most of these activities; as such, there is some overlap between the tools and activities.

Written Communication Activities

- Prepare and distribute briefing binders
- Send regular e-mail updates
- Send event invitations
- Distribute informational materials
- Submit newsletter articles and press releases
- Build mailing list

Face-to-Face Activities

- Conduct one-on-one briefings
- Hold small group/roundtable discussions
- Organize neighborhood meetings
- Deliver formal presentations
- Maintain an active speakers bureau
- Conduct facility tours

Web Activities

- Direct stakeholders to project-related web pages/website
- Communicate via social media
- Work with web reporters and bloggers

External Events

- Sponsor local events
- Participate and exhibit at community events
- Participate in civic groups

Activities for Garnering/ Demonstrating Support

- Encourage board member involvement
- Create beneficial partnerships
- Ask for letters of support

Possible Target Audiences

- Academic/Education Leaders
- Business Organizations
- Civic Groups
- Environmental Organizations
- Medical, Public Health, and Water Quality Experts
- Media
- Multicultural Leaders and Groups
- State and Local Elected Officials and their Staffs

For each audience, a detailed menu of strategies, activities, and measurable objectives can be found in section 5.8 of the WRRF 13-02 report.

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Rapid Response Plan

When unexpected events occur, the agency must be prepared to respond quickly. During emergency and unplanned events, it is the project team's responsibility to communicate promptly, effectively, and efficiently with affected internal and external stakeholder groups. If the team is prepared and executes the plan appropriately, consistently, and often, vital information will be provided and lasting effects on the organization's reputation and credibility will be positive.

This Rapid Response Plan is intended to be a living document that provides guidelines and recommendations for how the agency should work to provide a consistent and prompt communication response.

Strategy

The strategy behind the Rapid Response Plan is to:

- respond quickly to unexpected events by identifying the affected stakeholders, the messages that need to be conveyed, and the most effective and efficient methods to convey those messages
- respond quickly to misinformation in the news or circulating within the community

Rapid Response Plan Activities

Rapid Response Team
Identify a core team within the agency that is designated as the rapid response team. This team should include the board chair, the CEO, legal counsel, operations staff, communication staff, and customer service staff. This group should meet periodically to review potential scenarios and strategize responses. When a crisis occurs, convene the team immediately to develop a specific response.

Message Development
Develop three unique key messages in response to the situation or event and share those with staff and board members. These are the three messages that should be included in all written and verbal communication about the event.

Employee Communication
Employees are one of the most important stakeholders in a crisis or rapid response situation, and they are often forgotten because of other pressing issues, such as responding to media inquiries and ensuring the safety of the agency's customers. An all-employee e-mail should be developed and distributed with the details of the event and the agency's response. This communication should also include the contact information for a person at the agency who can answer employee questions. This needs to be the assigned responsibility of a member of the rapid response team.

Board or Council Communication
Another function of the rapid response team is to update the board on the activities that are occurring or have occurred and the agency's response. This communication should be done via telephone and with a follow-up e-mail. The board members should also be given the developed messages or talking points as they may be called by media or elected officials for a response or statement.

"Dark" web pages and Public Notices
Create Web Pages and public notices for potential crisis situations and keep them ready to upload/print in the event of an actual crisis.

Phone Lists
Keep up-to-date phone lists (both hard copy and electronic versions) with home and cell phone numbers of board members, agency management, elected officials, and top staff from other local agencies.

Op-eds and Letters to the Editor
Address inaccurate news coverage by writing letters to the editor and submitting op-ed articles stating the agency's position. Always include appropriate agency messages to leverage any opportunity for providing correct information about potable reuse.

Media Outreach
Identify one spokesperson or select spokespeople for the agency staff (the board members will likely be contacted and speak for themselves) and ensure that all employees know to direct any inquiries to that designated person or persons. The identified spokesperson/people should be aware of the key messages developed and should incorporate them as they respond to media questions.

Social Media
Develop short statements based on the developed messages that can be quickly disseminated through the agency's social media channels while more information is gathered and checked. Identify links to trusted and relevant sites that can be sent out where interested parties can find more information.

Examples

Examples of Informational Materials to be used
for communication with the public.

Potable Reuse Summary

Commonly Referred to as Purified Water

Multiple Benefits of Purified Water

Safe, reliable water supply
Potable reuse uses proven technology to purify recycled water to provide a safe water source. Multiple treatment methods separate pollutants, producing water that is cleaner than most bottled water.

Sustainable water supply option
Potable reuse provides a sustainable and cost-competitive water supply option using less energy than many other options.

Environmental benefits
Potable reuse allows us to leave more water in rivers, lakes, and streams for fish, plants, and wildlife, while reducing discharges to these water bodies and the ocean.

Drought proof
Potable reuse is a drought-proof water supply. It can help ensure safe, sustainable water now and into the future.

Responsive to weather variability
Potable reuse is part of a diversified water portfolio and is independent of climate or weather.

Understanding Potable Reuse —

A Key Part of Our Water Supply Solutions

Numerous regions of the world are experiencing drought and the resulting lack of water supplies. Although using purified water for drinking is not new, innovative projects in Australia, Texas, California, and elsewhere are living examples of advanced purification practices being used to increase scarce water supplies.

Water Reuse Happens Naturally

The term "potable" water means "suitable for drinking." Water reuse, including potable reuse, happens naturally all over our planet — on rivers and water bodies everywhere. If your community is downstream from another, chances are you are reusing its water and likewise communities downstream from you are most likely reusing your water.

Reused or recycled water is water used more than one time before it passes back into the natural water cycle. It is wastewater, including sewage, which has been treated or purified to a level that allows for reuse for beneficial purposes.

Potable Reuse — Direct and Indirect

Potable reuse refers to water that meets all federal and state drinking water standards and is safe for human consumption. Potable reuse may be created by indirect potable reuse (IPR) or direct potable reuse (DPR).

In IPR, highly purified wastewater is introduced into an environmental buffer before being reused. The buffer may be a groundwater aquifer or surface water reservoir used to provide an additional process for the protection of public health.

In DPR, highly purified recycled water is introduced, with or without a buffer, into the raw water supply that feeds a water treatment plant, or into the distribution system downstream of a water treatment plant.

Because the amount of water on the planet does not change, through nature all water has been used and reused since the beginning of time. Using advanced technology to purify recycled water merely speeds up a natural process. In fact, potable reuse provides a needed water supply that is of higher quality than what occurs naturally.

To Learn More

WateReuse is internationally-recognized as the foremost leader in research, education and policy on water reuse. Our singular focus is promoting water reuse as a proven tool to provide a safe, reliable, locally-controlled supply of water in every community. We are the voice for utilities, businesses, government agencies, environmental groups, and other entities engaged in water reuse..

To learn more, visit www.watereuse.org.

Water Reuse Solutions — Volume 1, 2015

WateReuse

Understanding Potable Reuse

A Key Part of Our Water Supply Solutions

Potable Reuse Education — Sharing Solutions to Water Supply Challenges

Numerous regions of the world are experiencing drought and resulting lack of water supplies. Although using purified water for drinking is not new, innovative projects in Australia, Texas, California, and elsewhere are currently providing advanced water purification to increase water supplies. These projects can serve as models for other states and municipalities.

WateReuse provides countries, states, municipalities, and water districts with information and tools that can lead to establishment of Direct Potable Reuse (DPR) or Indirect Potable Reuse (IPR) projects that are both sustainable and protective of public health. As a new water supply option, DPR projects treat wastewater, including sewer water, that has been cleaned for return to the environment and further cleans and purifies it to meet all drinking water standards. This purified water is regulated by water quality and health officials and implemented by water utilities in a safe, cost-effective and environmentally responsible manner. Uses may include purifying water to distilled quality for industrial processes, as well as for drinking. IPR projects add the step of passing the highly treated water through an environmental buffer, such as a groundwater aquifer or surface water reservoir.

Since 2012, Big Springs and Wichita Falls, Texas have been operating the nation's first DPR plants. Likewise, in 2012, California has embarked on an awareness effort to help establish DPR as a water supply option. The ongoing effort is to address the regulatory, scientific, technical, and attitudinal issues surrounding potable reuse projects. This is being accomplished through funding of rigorous, independent scientific research and communicating findings and data through public outreach and awareness programs.

WateReuse is sharing solutions and best practices from 26 independent research projects, made with investments of more than $11.5 million, to evaluate and demonstrate the feasibility of DPR. The research entails developing a redundant water purification system with robust monitoring. These projects will help inform other communities and governments moving forward when considering a range of potable reuse projects.

Wichita Falls' DPR Project went online July 9, 2014, following extensive testing by the City of Wichita Falls and the Texas Commission on Environmental Quality (TCEQ). Shown here is one of their clarifers.

What is Potable Reuse?

Potable reuse refers to purified water you can drink. It's highly treated to meet or exceed federal and state drinking water standards and is safe for human consumption. How potable reused water is delivered determines if it is called Indirect Potable Reuse (IPR) or Direct Potable Reuse (DPR).

Indirect Potable Reuse means the water is delivered to you indirectly. After it is purified, the reused water blends with other supplies and/or sits a while in some sort of man-made or natural storage before it gets delivered to a pipeline that leads to a drinking water plant or distribution system. That storage could be a groundwater basin or a surface water reservoir.

Direct Potable Reuse means the purified water is put directly into pipelines that go to a drinking water plant or distribution system. Direct potable reuse may occur with or without "engineered storage" such as underground or above ground tanks.

Multiple Benefits of Potable Reuse

Many states experiencing growing population and chronic water shortages continue to stretch the limits of their water supplies. But each community is different and has its own unique reason to develop new water supplies, including potable reuse. Here are just a few:

Safe, reliable water supply
Potable reuse uses proven technology to purify recycled water to provide a safe water source. Multiple treatment barriers separate pollutants from water. The purification process produces water that is cleaner than most bottled water.

Sustainable water supply option
Potable reuse provides a sustainable and cost-competitive water supply option that is less energy intensive than many alternative options.

Environmental benefits
Potable reuse allows us to leave more water in rivers, lakes, and streams for the fish, plants, and wildlife, while reducing discharges to these water bodies and the ocean.

Drought proof
Potable reuse is a drought-proof water supply. It can help ensure safe, sustainable water now and into the future.

Independent of weather variability
Potable reuse is part of a diversified water portfolio and is independent of climate or weather.

Water Reuse Happens Naturally

Recycled water is water that is used more than one time before it passes back into the natural water cycle. It is wastewater, including sewage, which has been treated or purified to a level that allows for reuse for beneficial purposes.

Potable Reuse — Direct and Indirect
Potable reuse refers to reused water that meets all federal and state drinking water standards and is safe for human consumption. Potable reuse, referred to as purified water, may be characterized as either indirect potable reuse (IPR) or direct potable reuse (DPR). In IPR, wastewater that has been highly purified is introduced into an environmental buffer for a specified period of time before being withdrawn for potable purposes. The environmental buffer may be a groundwater aquifer or a surface water reservoir. The purpose of the environmental buffer is to provide an additional barrier for the protection of public health.

In DPR, purified water is introduced with or without the use of an engineered buffer into the raw water supply feeding a water treatment plant, or into the distribution system downstream of a water treatment plant. To date, proposals have been made to introduce DPR water into a water treatment plant intake rather than into the distribution system.

The way in which potable reused water is delivered determines whether it is called indirect potable reuse or direct potable reuse.

Water reuse, including potable reuse, happens naturally all over the planet.

Water reuse happens daily on rivers and other water bodies everywhere. If you live in a community downstream of another, chances are you are reusing its water and likewise communities downstream of you are most likely reusing your water. This has been called "de facto" or unacknowledged/unplanned potable reuse.

The amount of water on the planet does not change, so through nature all water has been used and reused since the beginning of time. Using advanced technology to purify recycled water merely speeds up a natural process. In fact, potable reuse provides a needed water supply that is of higher quality than what occurs naturally.

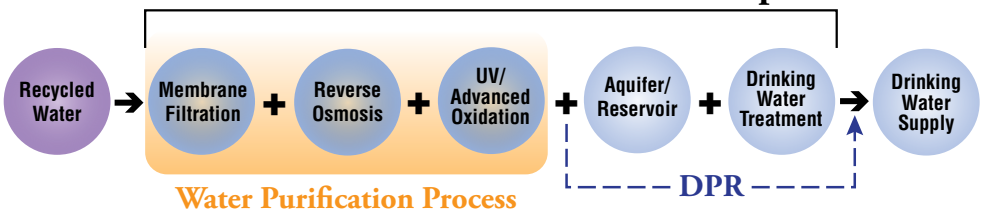
Building Trust is Key to Public Acceptance

Understanding and addressing community and stakeholder concerns can be a significant challenge toward fostering acceptance for potable reuse (purified water) projects in a community. Research activities have included gauging a general understanding of perceptions of recycled water use, identifying primary concerns, and developing educational and communication tools that can provide greater assurance, awareness, and education.

Research in this area includes various assessments including in-depth interviews, focus groups, surveys, and communication research (message testing and evaluation) with a focus on fostering awareness, education, and acceptance by:

- identifying and clarifying health and safety concerns
- identifying and addressing concerns about reliability and the ability to stop production, if necessary
- developing a public outreach framework and communication tools that address concerns in layperson terms and in ways that can be adapted by utilities for community audiences

Multi-Barrier Water Purification Steps



Advanced Purified Water is on the Rise: Lessons from the Pioneers

Numerous regions and states, such as Australia, Texas, Florida, and the Pacific Northwest, are experiencing drought and a lack of water supply. Using purified water for drinking is not new. Projects in Texas, Arizona, and California are currently providing advanced water purification. These projects can serve as models for other states and municipalities:

Colorado River Municipal Water District, Big Spring TX — Big Spring took more than a decade to research, test, and determine DPR as a feasible water supply. In 2013 they opened the first U.S. DPR plant, capable of treating up to 2 million gallons of wastewater effluent per day to drinking water standards. Also in Texas, the **City of Wichita Falls**, 230 miles away, opened their plant in June 2014, which can treat up to 10 million gallons of wastewater effluent per day.

City of Scottsdale's Water Campus, AZ — Scottsdale's potable reuse program purifies water for urban irrigation, preserving more water for drinking purposes. The city operates a recycled water treatment system with the ability to process more than 20 million gallons of wastewater a day, 365 days a year. Most recycled water is distributed to 23 golf courses with the remainder put through further treatment and pumped back into the groundwater aquifer and recharged.

Santa Clara Valley Water District, Silicon Valley Advanced Water Purification Center, CA — Began deliveries of advanced purified water for nonpotable uses in 2014. The District also began conducting a potable reuse demonstration and piloting effort in September 2014 showing how highly purified water that can be used for various purposes, including expanding future drinking water supplies.

City of San Diego, CA — The city began operating a 1 million gallon a day Advanced Water Purification Facility (AWPF) in 2011. The project successfully evaluated how purified water could be blended with imported and local water supplies in San Vicente Reservoir before traveling to a drinking water treatment plant. The AWPF is open for tours and is testing additional equipment for direct potable reuse research.

Advanced purified water has also been used since the early 2000s for the seawater barriers in Southern California (Dominguez Gap Barrier and the Los Alamitos Barrier).

Scottsdale's Advanced Water Treatment Facility uses reverse osmosis (pictured), ultrafilitration, UV, and ozone to treat the water to exceed drinking water standards.

Case Study:

California's Potable Reuse Awareness Effort

Sustainable, Cost-Effective Water Supplies

Consideration of a range of potable reuse projects is very timely given the decline in traditional water supply sources along with growing demand and the uncertainty of climate change.

California's efforts will provide information for regulators, utilities, and communities as they consider the implementation of potable reuse.

For communities that have limited or no groundwater basins or limited reservoir augmentation options, potable reuse may be an alternative approach to augment the water supply.

Potable reuse projects can be advantageous and feasible when:

- technologies to purify wastewater are well established and proven through existing potable reuse projects;
- they offer a cost-effective approach to diversifying a water portfolio;
- they require less energy than other alternatives; and
- they avoid potential water quality issues associated with groundwater and surface water sources.

Potable reuse provides communities with another feasible water supply alternative to increase water supply reliability, diversify water portfolios, and provide maximum flexibility in managing water supply choices.

Legislative Action

Another key driver for potable reuse success is legislative action. California's

continued on page 4...

People who tour the City of San Diego's demonstration project learn about the various stages of water purification.

How Does the Advanced Water Purification Process Work?

Currently*, most advanced water purification processes involve a multi-stage process of micro-filtration, reverse osmosis, and ultraviolet light with advanced oxidation:

- The water first goes through micro-filtration, a pretreatment process, where water is either pushed or pulled through tiny tube-like membranes. Each membrane is like a straw with microscopic holes in the sides of the straws, 1/300th the width of a human hair! As the water moves through the tubes, protozoa, solids and bacteria are removed from the water.
- The water then is treated through reverse osmosis where it's forced through the molecular structure of membranes. Things like fertilizers, pharmaceutical, viruses and finally salts or minerals are removed. The result is near distilled quality water.
- Now the water is purified, but one more step provides a safety barrier: The water is exposed to ultraviolet light with advanced oxidation to cause any remaining organic molecules to break down into safe simple elements, like oxygen, nitrogen, carbon, etc.

After this process the water is cleaner than most bottled water.

(*New alternative processes are being evaluated.)

West Basin's Water Reliability 2020 program is designed to shift their future water supplies to more locally controlled and reliable sources of water. Their Edward C. Little Water Recycling Facility produces five different qualities of "designer" or custom-made recycled water that meet the unique needs of West Basin's municipal, commercial, and industrial customers.

"Case Study" continued from page 3...

Recycled Water Policy established aggressive goals to increase recycled water production in order to help meet the State's overall water supply goal (by 2020, increase recycled water use by 1 million acre-feet per year over 2002 levels). Although recycled water for agriculture, landscape, industrial and other purposes will always be needed in California, they will probably not be able to meet their recycled water goals without fully expanding potable reuse options.

Significant legislation promoting potable reuse in California has been SB 918 (Pavley 2010), which requires the State to evaluate the feasibility of direct potable reuse by the end of 2016.

California's potable reuse effort will provide independent, peer-reviewed research for regulators, utilities, and communities as they consider the implementation of potable reuse in various communities in the state of California and beyond. Subsequent legislation, SB 322 (Hueso, 2013), directed the Department of Public Health, in consultation with the State Water Resources Control Board, to develop a public review of the potable reuse draft report by September 2016 and established a public advisory group representative to provide a forum for public discussion and to assist the expert panel in its deliberations.

In his SB 322 signing message, California Governor Jerry Brown wrote "This information is past due … California needs more high quality water and recycling is key to getting there."

WATEREUSE

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Proven treatment technology (and successful projects) exist that will allow communities to utilize potable reuse as a reliable source of water. Experience has shown, however, that public acceptance is one of the primary challenges facing potable reuse. Therefore, developing and implementing a Community Outreach Plan is a critical step toward building public awareness of the needs, benefits, and opportunities of potable reuse and the high-quality water it offers, to achieving acceptance of this technology, and to successfully implement potable reuse projects.

— WateReuse Foundation

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Our vision is a world where the right water is used for the right purpose, all the time, everywhere.

The mission of the WateReuse Association is to educate the public on the importance of reusing water and to advocate for policy, laws, and funding to increase water reuse in communities across the United States.

The mission of the WateReuse Research Foundation is to build support for water reuse through research and education.