

Creating Water Quality Confidence

Sample Communication and Guidance - Natural Treatment

Introduction

This document is intended to provide guidance for water utility managers related to creating water quality confidence, specifically related to implementing Water Supply Replenishment projects.

The sample communications are provided as an example of messages that will create confidence. They are not a final work product and do not address the different ways that the ideas in the sample communications can be delivered. Videos, PowerPoint presentations and many other forms can be used, including communications that are much more visual. The key to success is the messages that are conveyed, and the perceptions that stick with audience.

Terminology Guidelines

How we use words is extremely important when describing something that is unfamiliar to someone. We can use the same word in a variety of ways, which can be confusing if this is done within the same document or context. This is why it is best to follow a set of conventions or rules, some of which are included below.

- **Results** - What we want the water to be, which is pure, or clean.
- **Water Purification** - The term water purification is used to refer to the set of actions that we take to make the water pure, or clean. This was chosen over the term “water treatment” because treatment can be perceived as “doctoring” the water.
- **Program** - Used to describe all the specific actions that a utility takes to manage water quality including implementing a purification process, testing, and increasing knowledge.
- **Process** - Used to describe the multiple steps employed to make the water pure, or the overall water purification process.

- **Multiple Steps Versus Multiple Barriers** - Multiple steps is used instead of multiple barriers because the word barrier implies a specific structure or technique. In reality, all the steps are not “barriers.” Using the term barrier can be confusing, especially since we have defined the different operations of separation, disinfection, and destruction.
- **Techniques, Methods** - These terms are used to describe the specific purification steps because each step describes specific technologies or ways of performing an operation.
- **Process Water** - The water that emerges from the purification process
- **Separation, Disinfection, and Destruction** - The sample communications categorize these important ideas as “operations” that we perform on the water to purify it, as opposed to categorizing them as processes, results, methods or techniques.

General Communication Guidelines

Emphasize the Utility Role - Another key aspect of the sample communications is that the steps are always described as an action of a utility, or that the utility made the decision to employ a certain approach. This is important for reminding the audience that the utility’s competency, decision making, and diligence are the keys to ensuring high quality water. Anyone can buy technology, but quality comes from organizational competencies and diligence.

Connecting Actions with Motivations - Another important concept integrated into the samples is that we always want to connect an action, decision, or technique with a motivation. This is why each step is connected with the value it adds to the water purification process or overall process.

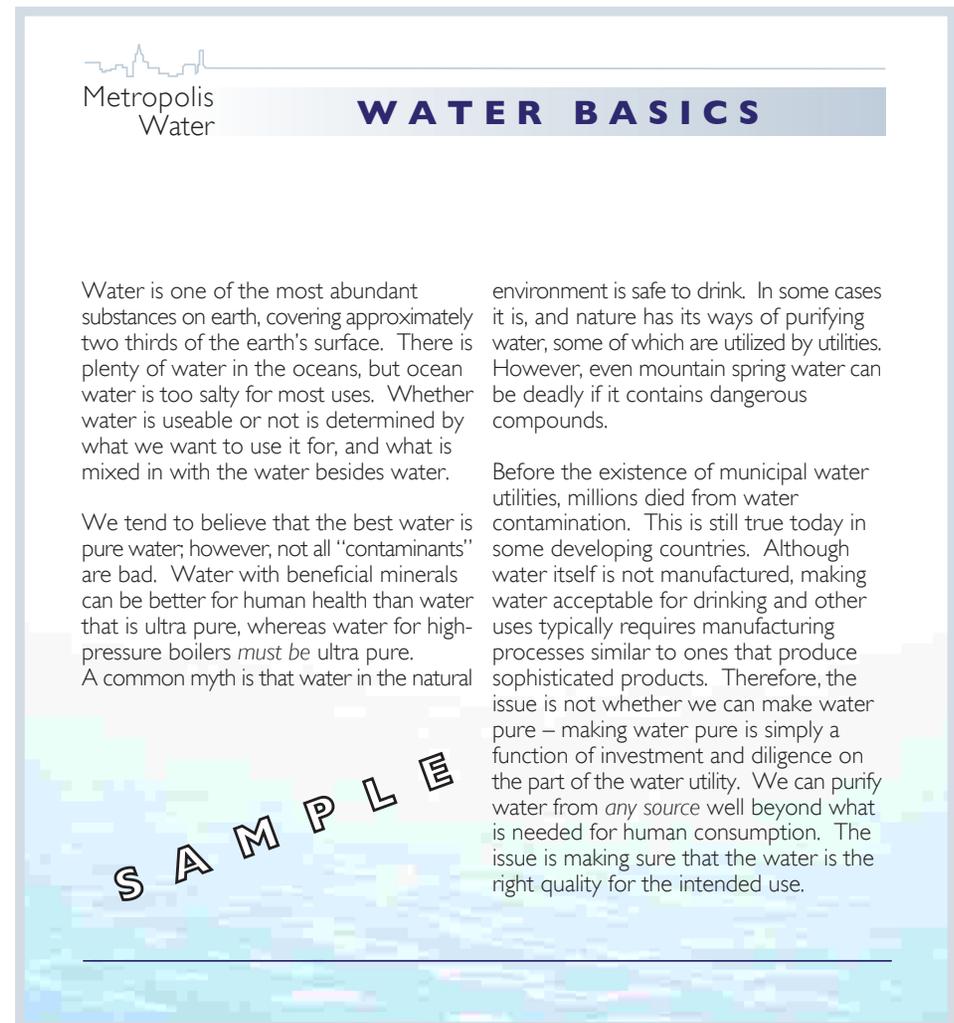
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Step I: Communicate the Basics

These paragraphs give the audience some meaningful background, or context, for understanding the basics of water; the natural environment, and the importance of the utility's diligence and investment in determining final water quality and safety. These paragraphs set the stage for developing the perception that the utility is the "trusted source of quality," which is important when dealing with an impaired source such as wastewater.

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Metropolis Water

WATER BASICS

Water is one of the most abundant substances on earth, covering approximately two thirds of the earth's surface. There is plenty of water in the oceans, but ocean water is too salty for most uses. Whether water is useable or not is determined by what we want to use it for, and what is mixed in with the water besides water.

We tend to believe that the best water is pure water; however, not all "contaminants" are bad. Water with beneficial minerals can be better for human health than water that is ultra pure, whereas water for high-pressure boilers *must be* ultra pure. A common myth is that water in the natural environment is safe to drink. In some cases it is, and nature has its ways of purifying water, some of which are utilized by utilities. However, even mountain spring water can be deadly if it contains dangerous compounds.

Before the existence of municipal water utilities, millions died from water contamination. This is still true today in some developing countries. Although water itself is not manufactured, making water acceptable for drinking and other uses typically requires manufacturing processes similar to ones that produce sophisticated products. Therefore, the issue is not whether we can make water pure – making water pure is simply a function of investment and diligence on the part of the water utility. We can purify water from *any source* well beyond what is needed for human consumption. The issue is making sure that the water is the right quality for the intended use.

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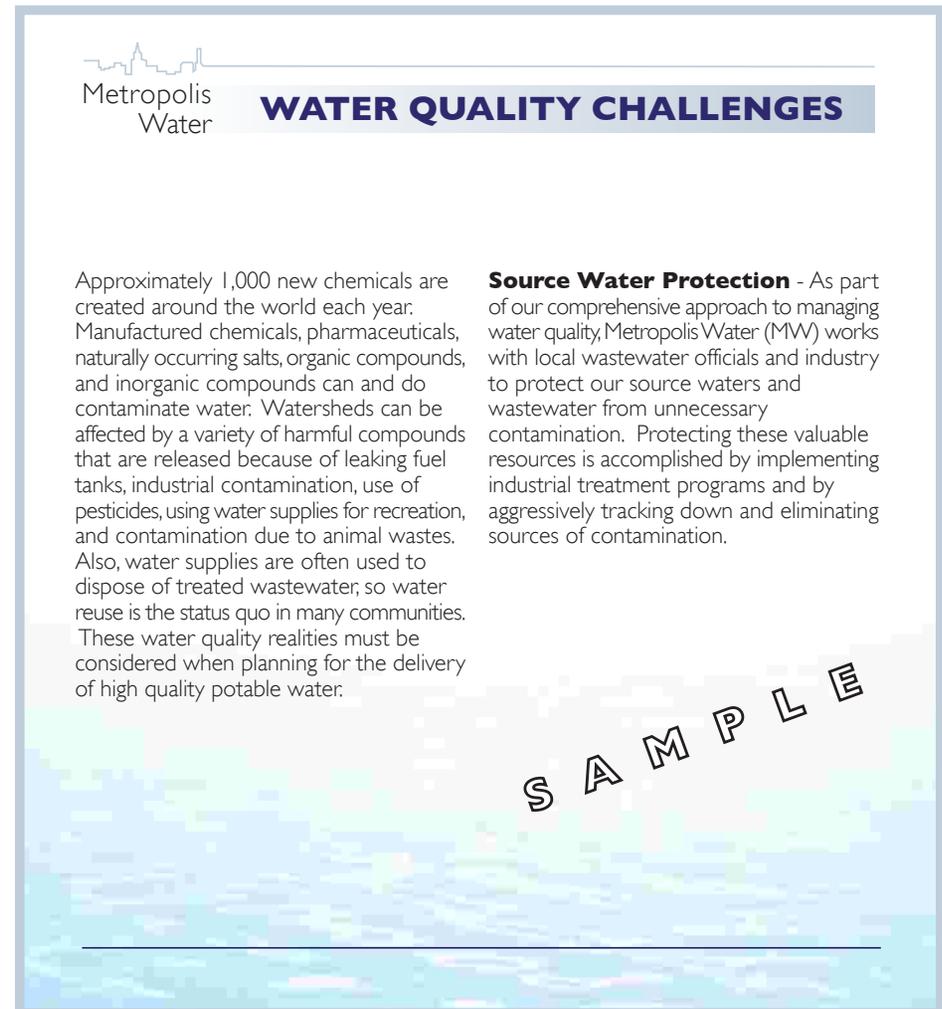
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Step 2: Communicate the Challenges

Utilities get in trouble when they gloss over or downplay water quality realities and risks. People understand that there is risk in every part of life, so telling them that there is “nothing to worry about” does not go over well. In fact, people want to see that *the utility* is concerned about managing the risks. This is why outlining the water quality challenges establishes an important context for talking about the values and actions of the utility.

Source Water Protection - In many cases, water quality risks result from contamination of source water, whether it is a potable water resource or a wastewater resource. Not all water, or wastewater, has the same chemical makeup. The other important issue is the context in which source water protection is presented. Sometimes utility managers think that if we talk about source water protection, we are back to emphasizing the physical source as the key to final water quality, and continuing to confuse our audience. This confusion will not occur if source water protection is presented in the context of a comprehensive water quality program that is *planned and implemented by the utility*. Also, there are economic or other benefits of source protection that can be emphasized that are not directly related to final water quality.

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Metropolis Water

WATER QUALITY CHALLENGES

Approximately 1,000 new chemicals are created around the world each year. Manufactured chemicals, pharmaceuticals, naturally occurring salts, organic compounds, and inorganic compounds can and do contaminate water. Watersheds can be affected by a variety of harmful compounds that are released because of leaking fuel tanks, industrial contamination, use of pesticides, using water supplies for recreation, and contamination due to animal wastes. Also, water supplies are often used to dispose of treated wastewater, so water reuse is the status quo in many communities. These water quality realities must be considered when planning for the delivery of high quality potable water.

Source Water Protection - As part of our comprehensive approach to managing water quality, Metropolis Water (MW) works with local wastewater officials and industry to protect our source waters and wastewater from unnecessary contamination. Protecting these valuable resources is accomplished by implementing industrial treatment programs and by aggressively tracking down and eliminating sources of contamination.

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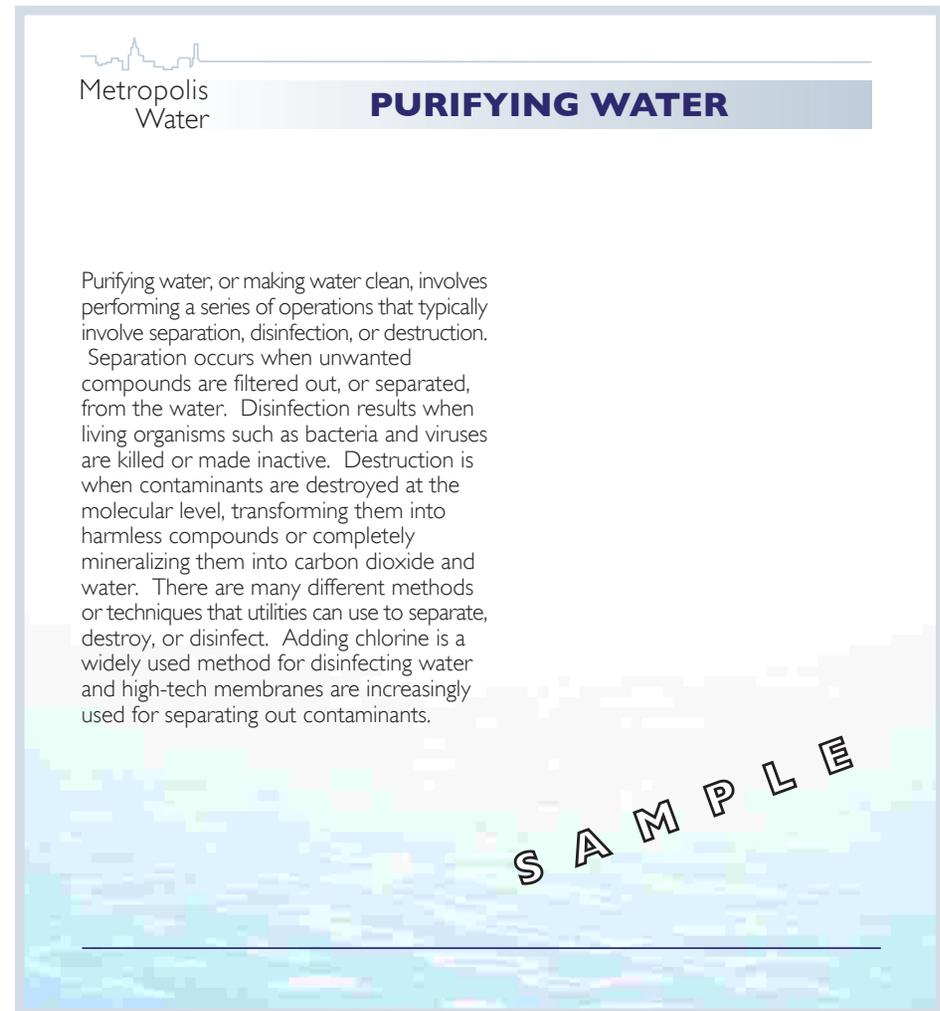
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Step 3: Define Water Purification

This is an extremely important message in the sample communication because it again addresses the issue of context. It gives a layperson a basis for understanding water purification. In many cases utilities talk about technical issues or technology without the proper context. This is confusing to the audience, and a confused audience will be suspicious. However, if we begin by describing the basic operations that we can perform to purify water, we have created an important context for helping audiences understand the specific techniques that the utility is implementing. People can understand the ideas of separation, disinfection, and destruction. Once they understand these basic operations, they will have the ability to appreciate the different purification techniques, and how they combine to create safety factors and redundancy.

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Metropolis Water

PURIFYING WATER

Purifying water, or making water clean, involves performing a series of operations that typically involve separation, disinfection, or destruction. Separation occurs when unwanted compounds are filtered out, or separated, from the water. Disinfection results when living organisms such as bacteria and viruses are killed or made inactive. Destruction is when contaminants are destroyed at the molecular level, transforming them into harmless compounds or completely mineralizing them into carbon dioxide and water. There are many different methods or techniques that utilities can use to separate, destroy, or disinfect. Adding chlorine is a widely used method for disinfecting water and high-tech membranes are increasingly used for separating out contaminants.

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Step 4: Communicate Your Values

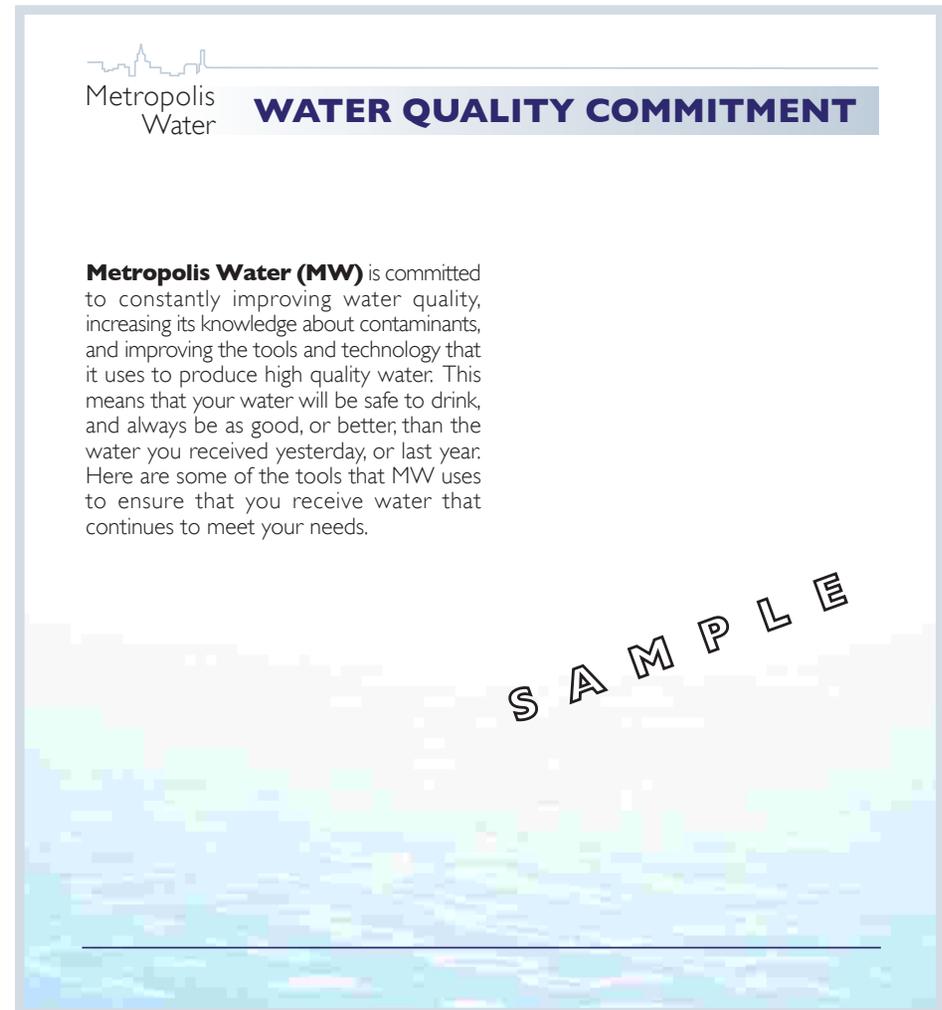
If the utility is to become the “trusted source of quality,” then it follows that the utility must be able to capture the audience’s trust. Trust comes from knowing what to expect from someone, or knowing what you can count on them to do. This usually comes from developing a history, and seeing over time that a utility’s actions are consistent with their words. Trust departs quickly if promises are not kept. One way to create trust in an organization is to articulate a set of organizational values or commitments (promises), and then show that your actions are consistent with these commitments. In order to do this you must start by clearly stating the values of the organization. The sample communications do this by making a series of statements that define the commitments of Metropolis Water (MW) related to water quality.

MW’s Promise to Improve - The primary water quality commitment of MW is improvement. Often, utility personnel feel uncomfortable with committing to improvement. They feel that stating a constant need to improve suggests that there is something wrong with the water today. Private sector companies that do not have a commitment to improvement typically do not stay in business very long, even if they enjoyed initial success. Water quality improvement is an important idea because it allows the audience to factor their past experience into their thinking about future risk. If the water is going to be as good, or better, than it has been in the past, then the person’s past personal experience is relevant. Once the person feels that the water is being allowed to degrade in any way, then their personal experience is not longer valid.

Increasing Knowledge - One of the ways to get comfortable with the improvement promise is to link it to increasing knowledge. Everyone understands that good organizations are constantly learning. This is why the second idea in MW’s commitment statement relates to increasing knowledge. It would be arrogant for a utility to assume it has nothing new to learn. Opponents to indirect potable reuse projects have brought up this arrogance as a reason for not trusting the utility, and being concerned about water quality.

Commitment to Improving Technology - People expect technology to improve, and at a brisk pace. Given people’s exposure to recent advances in computers, communications, and advancing procedures such as laser eye surgery, this is an idea that utilities must embrace.

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Metropolis Water

WATER QUALITY COMMITMENT

Metropolis Water (MW) is committed to constantly improving water quality, increasing its knowledge about contaminants, and improving the tools and technology that it uses to produce high quality water. This means that your water will be safe to drink, and always be as good, or better, than the water you received yesterday, or last year. Here are some of the tools that MW uses to ensure that you receive water that continues to meet your needs.

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Step 5: Articulate Your Water Quality Program

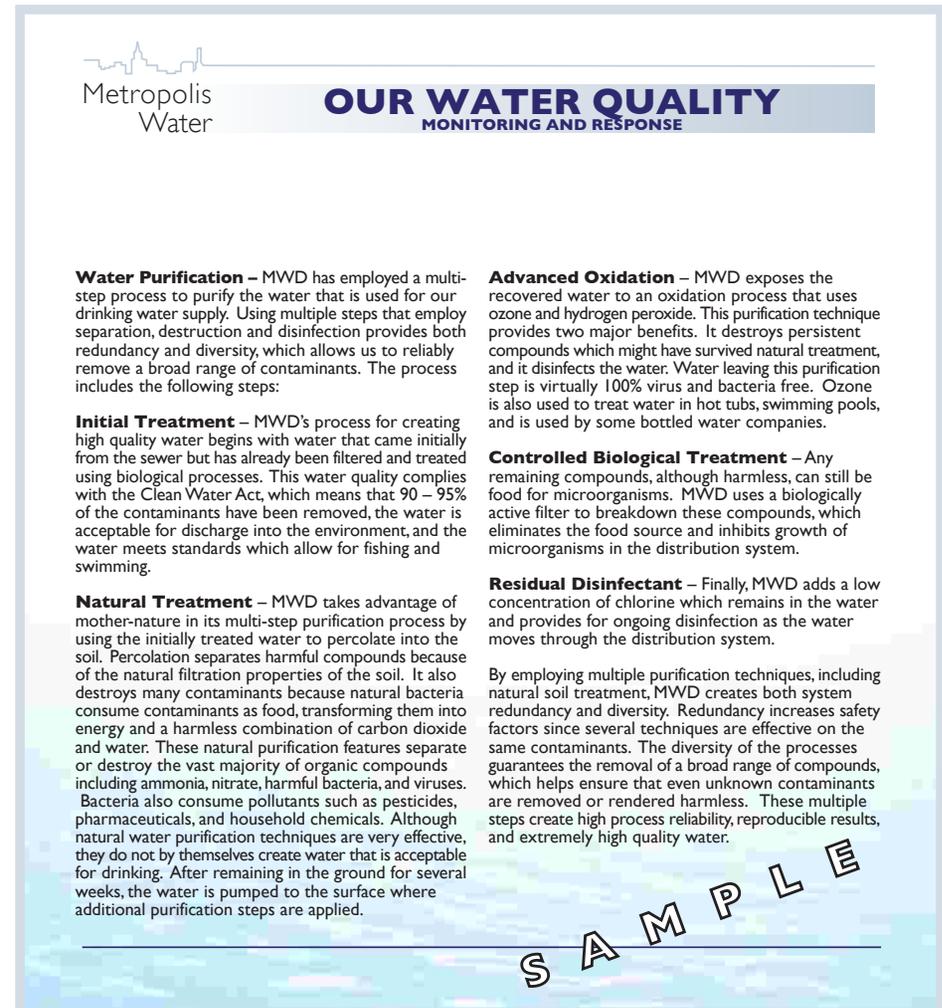
It is important that the water quality program incorporate the ideas of multiple steps, diverse methods, rigorous testing, redundancy, and safety factors. The ideas of redundancy and safety factors are fairly universal and resonate with most people. Multiple steps are intuitively more reliable and certainly more redundant than a single purification step. As mentioned in the general communication guidelines, the sample repeatedly mentions Metropolis Water's water role in deciding to "use" a specific technique, which reminds the audience that the decisions and diligence of the water utility are what create high quality water.

Separation, Disinfection, Destruction - Throughout the description of the specific purification steps we refer back to the ideas of separation, disinfection and destruction. This gives the audience a basic context for understanding what is happening and helps them see more clearly the diverse nature of the purification process. The sample communication also carefully conforms to the terminology guidelines outlined on the first page of this tool.

Natural Water Purification - People respond positively to the idea of water being purified by nature, so having natural purification in the process is a good thing. However, we need to be a little careful with this idea because the utility's decisions and diligence must still be recognized as the source of water quality. The natural treatment step should be positioned as one of many methods that the utility employs to ensure that their customers receive high quality water. Also, the sample communication clearly states that natural purification alone does not produce water that is acceptable for the drinking water supply.

Specific Purification Methods - The purpose of this sample is not to recommend specific purification methods for implementing Water Supply Replenishment. There are many different approaches that address regulations and public health. The purpose of the sample is to highlight confidence-building concepts that can be applied to different water purification strategies.

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Metropolis Water **OUR WATER QUALITY**
MONITORING AND RESPONSE

Water Purification - MWD has employed a multi-step process to purify the water that is used for our drinking water supply. Using multiple steps that employ separation, destruction and disinfection provides both redundancy and diversity, which allows us to reliably remove a broad range of contaminants. The process includes the following steps:

Initial Treatment - MWD's process for creating high quality water begins with water that came initially from the sewer but has already been filtered and treated using biological processes. This water quality complies with the Clean Water Act, which means that 90 - 95% of the contaminants have been removed, the water is acceptable for discharge into the environment, and the water meets standards which allow for fishing and swimming.

Natural Treatment - MWD takes advantage of mother-nature in its multi-step purification process by using the initially treated water to percolate into the soil. Percolation separates harmful compounds because of the natural filtration properties of the soil. It also destroys many contaminants because natural bacteria consume contaminants as food, transforming them into energy and a harmless combination of carbon dioxide and water. These natural purification features separate or destroy the vast majority of organic compounds including ammonia, nitrate, harmful bacteria, and viruses. Bacteria also consume pollutants such as pesticides, pharmaceuticals, and household chemicals. Although natural water purification techniques are very effective, they do not by themselves create water that is acceptable for drinking. After remaining in the ground for several weeks, the water is pumped to the surface where additional purification steps are applied.

Advanced Oxidation - MWD exposes the recovered water to an oxidation process that uses ozone and hydrogen peroxide. This purification technique provides two major benefits. It destroys persistent compounds which might have survived natural treatment, and it disinfects the water. Water leaving this purification step is virtually 100% virus and bacteria free. Ozone is also used to treat water in hot tubs, swimming pools, and is used by some bottled water companies.

Controlled Biological Treatment - Any remaining compounds, although harmless, can still be food for microorganisms. MWD uses a biologically active filter to breakdown these compounds, which eliminates the food source and inhibits growth of microorganisms in the distribution system.

Residual Disinfectant - Finally, MWD adds a low concentration of chlorine which remains in the water and provides for ongoing disinfection as the water moves through the distribution system.

By employing multiple purification techniques, including natural soil treatment, MWD creates both system redundancy and diversity. Redundancy increases safety factors since several techniques are effective on the same contaminants. The diversity of the processes guarantees the removal of a broad range of compounds, which helps ensure that even unknown contaminants are removed or rendered harmless. These multiple steps create high process reliability, reproducible results, and extremely high quality water.

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