Best Practices for Developing Indirect Potable Reuse Projects

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WateReuse Foundation

Best Practices for Developing Indirect Potable Reuse Projects: Phase 1 Report

The mission of the WateReuse Foundation is to conduct and promote applied research on reclamation and reuse of impaired waters. The Foundation's research advances the science of water reuse and supports communities across the United States and abroad in their efforts to create new sources of high quality water through the reclamation and reuse of impaired waters while protecting public health and the environment.

The Foundation sponsors research on all aspects of water reuse including emerging chemical contaminants, microbiological agents, treatment technologies, salinity management, public perception, economics, and marketing. The Foundation's research informs the public of the safety of reclaimed water and provides water professionals with the tools and knowledge to meet their commitment of increasing reliability and quality.

The Foundation's funding partners include the U.S. Bureau of Reclamation, the California State Water Resources Control Board, and the Southwest Florida Water Management District. Funding is also provided by the Foundation's Subscribers, water and wastewater agencies, and other interested organizations. The Foundation also conducts research in cooperation with two water research coalitions – the Global Water Research Coalition and the Joint Water Reuse Task Force.

Best Practices for Developing Indirect Potable Reuse Projects: Phase 1 Report

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Disclaimer

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FOREWORD

The WateReuse Foundation, a nonprofit corporation, sponsors research that advances the science of water reuse and reclamation. The Foundation funds projects that meet the water reuse research needs of water and wastewater agencies and the public. The goal of the Foundation's research is to ensure that water reuse projects provide high-quality water, protect public health, and improve the environment.

The Foundation's research program is guided by a Research Plan. Under the plan, a research agenda of high-priority topics is maintained. The agenda is developed in cooperation with the water reuse community including water professionals, academics, and Foundation Subscribers. The Foundation's research focuses on a broad range of water reuse research topics including the following:

- Defining and addressing emerging contaminants;
- Public perceptions of the benefits and risks of water reuse;
- Management practices related to indirect potable reuse;
- Groundwater recharge and Aquifer Storage and Recovery;
- Evaluating methods for managing salinity; and
- Economics and marketing of water reuse.

The Research Plan outlines the role of the Foundation's Research Advisory Committee (RAC), Project Advisory Committees (PACs), and Foundation staff. The RAC is tasked with prioritizing and recommending projects for funding in addition to providing advice and recommendations on the Foundation's research agenda and other related efforts. PACs are convened for each project and provide technical review and oversight. The Foundation's RAC and PACs consists of experts in their fields and provide the Foundation with an independent review, which ensures the credibility of the Foundation's research results. The Foundation's Project Managers facilitate the efforts of the RAC and PACs and provide overall management of projects.

The Foundation's primary funding partner is the U.S. Bureau of Reclamation. Other funding partners include the California State Water Resources Control Board, the Southwest Florida Water Management District, Foundation Subscribers, water and wastewater agencies, and other interested organizations. The Foundation leverages its financial and intellectual capital through these partnerships and funding relationships. The Foundation is also a member of two water research coalitions – the Global Water Research Coalition and the Joint Water Reuse Task Force.

This publication is the result of a study sponsored by the Foundation and is intended to communicate the results of this research project. The goal of this study was to identify best practices to ensure that well planned indirect potable reuse receive fair consideration in water supply decisions. Across the United States and the world, communities are facing water supply challenges due to increasing demand, drought, depletion and contamination of groundwater, and dependence on single sources of supply. These challenges can be addressed by implementing reuse projects that solve water supply challenges and create value for communities across the nation. Achieving acceptance of water reuse is needed for ensuring future water supply reliability, quality, and safety.

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This project was funded by the WateReuse Foundation in cooperation with the U.S. Bureau of Reclamation (USBR), Awwa Research Foundation (AwwaRF), Phoenix Area Sub-Regional Operating Group (SROG), and County Sanitation Districts of Los Angeles County. Support was also provided by the City of Phoenix Water Services Department and Orange County Water District.

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CHAPTER 1

INTRODUCTION

Over the past ten years, water agencies have considered indirect potable reuse projects including groundwater recharge and reservoir augmentation through water reclamation. Although there are several successful indirect potable reuse projects in operation today, the public has opposed projects by negative *branding*. This branding of the projects creates negative perceptions and fear. As a result, some water agencies have abandoned indirect potable reuse projects, even after significant investment, in favor of more traditional nonpotable water reuse or other alternatives such as water transfers and desalination. Unsuccessful projects can be costly and can tarnish the reputation of water agencies. This affects trust and investment in critical water and environmental projects.

Support for indirect potable reuse projects varies despite the fact that many communities experience "unplanned" indirect potable reuse. Upstream communities discharge treated wastewater that contributes to the potable water supplies of downstream communities. So why are there problems with specific projects and not others? The primary reason relates to *differences in value*. Although two projects may be technically similar, people may perceive *value* differently depending on the problem that the community needs to solve, alternatives for solving the problem, and how this information is communicated to important audiences. Indirect potable reuse is typically a new product or idea for communities. Its value must be compelling and described in simple and meaningful terms. In addition, some indirect potable reuse projects date back 40 years and have stayed "below the radar screen." This was possible prior to the era of environmental activism and the free flow of information that occurs today. These long running projects also have a long track record of success.

This report outlines practices to ensure that well planned indirect potable reuse projects receive *fair consideration* in water supply decisions. The sponsoring utility must become confident about managing public perception issues. The best practices are also intended to maintain the reputation of the sponsoring agency and the industry, even if indirect potable reuse is not adopted in a given community.

This report addresses *planned* indirect potable reuse, which includes groundwater recharge, reservoir augmentation, and soil aquifer treatment reuse projects. This document does not address *direct* potable reuse or pipe-to-pipe reuse, where the water is put directly in the drinking water distribution system, since the public has not shown any support for this approach.

This report is the primary work product of Phase 1 of a three-phase project. The three phases are:

- **Phase 1: Primary Research** – Develop a better understanding of public perceptions related to indirect potable reuse projects;
- **Phase 2: Develop Toolkit** – Develop tools to help water utility managers implement indirect potable reuse projects; and
- **Phase 3: Develop Guidance Document and Website** – Develop guidance document and a website that can be used by the water industry to implement the results of this research.

The purpose of this Best Practices report, the product of Phase 1, is to shed light on how people perceive the value of indirect potable reuse and how the messages and management practices of the sponsoring utility affect these perceptions. Bringing together a set of marketing, communication, and technical professionals and applying their experience to the problem accomplished this insight. Initially, a hypothesis of best practices for managing perceptions of indirect potable reuse was developed. Looking at several cases studies of past indirect potable reuse projects tested this hypothesis. The purpose of the research into these case studies, whether direct interviews or secondary research, was not to understand people's opinions of why a project did or did not go forward. It was to understand the key ideas of value related to the project, how communication of the project was managed, and how key people involved in the project perceived the benefits and risks. Consequently, the case studies are not always a direct

reflection of what specific individuals said, but they are a comparison of the important aspects of the project against the best practices hypotheses.

1.1 Organization of this Best Practices Document

1.1.1 Best Practices

The best practices are introduced in *Chapter 2 - Best Practices of Managing Indirect Potable Reuse Projects*. It is instructive to understand why the term "best practices" was chosen. These practical ideas could be categorized as principles, strategies, and tactics. In fact, these terms might be a more accurate description. However, there are important reasons why they are called best practices. Mainly, this simple and practical language can be a catalyst for bringing about change. The term "best practices" suggests that we should endeavor to follow them and the best way to learn is by doing, that is, by practicing. In addition, the best practices are categorized and organized to contribute to an understanding of how they relate to value and the fundamental principles of how people come to conclusions about the value of things.

These best practices are organized into two major categories that address what we communicate and how we communicate. These categories are:

- Value-Based Strategy Best Practices; and
- Communication Process Best Practices.

Value-Based Strategy Best Practices – Consumers and communities are alike in that they look for value in any person, product, or endeavor. This is an important idea, since private sector marketing practices demonstrate, and the results of the research on this project confirm, that the public will support or reject projects based on whether they perceive the projects have value or meet their interests. Describing the value of a project *must* be the content and message. The first set of indirect potable reuse best practices addresses the value of the project. To understand these best practices, a working definition of value is needed. A discussion of value is provided in Chapter 1.2.

Communication Process Best Practices – Attaining public support for indirect potable reuse projects is a communication challenge. These best practices address communication and collaboration with the public. Competent communication processes, however, cannot make up for a flawed or unclear message about value. There are examples of projects where professional communication programs were implemented only to result in failure of the project.

1.1.2 Case Studies

The *best practices* provide the context for viewing the specific indirect potable reuse projects. In the course of this study, the best practices became a powerful clarifying force in understanding public concerns with these projects. Most of the best practices were developed as hypotheses before conducting the case study research. They were refined and new ones added during the research. The case studies were developed with both secondary research (i.e., literature searches) and primary research (i.e., interviews). The project's research methods are outlined in more detail in Appendix B. It is informative to examine the case studies in detail, especially the conclusions. In the case studies, the projects are tabulated by how well they followed the best practices. The results are encouraging since projects that followed the critical best practices were successful and those that did not encountered opposition and were not completed as proposed. The best practices were not available when these projects were underway and it is not possible to say that project sponsors ignored or did not follow the best practices.

It is appropriate to mention the cooperation received from water professionals and others involved in the case study projects. Their openness and willingness to unravel the issues was critical to the development

of the insights and conclusions contained in this document. A list of interviewees is provided in Appendix D.

1.2 Working Definition of Value

A definition of *value* is needed to understand how to create a *value-based strategy*. Ultimately, value is something that a single person perceives. Different people will perceive different things about the same product, project, or issue. However, based on documented marketing principles and direct experience in interviewing people for this project, value can be assessed by evaluating the following four basic elements:

- Problem being Solved;
- Alternatives for Solving the Problem;
- Risks; and
- Identity or Brand.

Often differences about the value of something occur because of a lack of clarity on one or more of these four elements. It is important to realize that all of these elements are perceived together and are related to each other. Perceptions of the risk of getting into a car or plane are significantly affected by the benefits of being able to travel quickly from one place to another. Who would get into a car if it were not faster than walking?

Another way people refer to value is to talk about interests. People and groups have interests. Interests are people's feelings about what is desirable. Interests are people and groups' articulations of their reasons for acting. For example, people have an interest in safe and plentiful water.

Problem Being Solved – It can be argued that not all value is based on solving a problem, especially in consumer products. However, it is an effective way of viewing value in the water and wastewater industries because water utilities solve important problems. Significant problem solving areas in the water and wastewater communities are as follows:

- **Water Supply Reliability** – such as providing an adequate or abundant supply of water;
- **Water Quality Safety** – including water, healthy water, or good tasting/non-odorous water;
- **Environmental Quality of Life** – such as condition of surface waters, beaches, and water habitats;
- **Customer Service** – including ease of contact with the utility, response to problems; and
- **High Value per Dollar.**

Poor performance in any of these categories of value creates problems such as water cutbacks, illnesses, wastewater overflows, lakes and beaches unfit for recreation, customer frustration in dealing with bills or service calls, and higher rates because of low efficiency or poor planning. Most issues in water and wastewater map into these basic categories of value or problem solving.

Alternatives for Solving the Problem – It is difficult to overstate how important alternatives (or comparisons) are in assessing value. Once one has decided that buying a car solves a problem, the other cars one could choose heavily influence the perception of the value of any specific car. This value element of alternatives is where the cost or price of something is considered. Water supply problems can be solved with indirect potable reuse, nonpotable reuse, desalination, increased water storage, water transfers, or increased conservation. People cannot honestly assess the value of a specific proposal unless they also consider viable alternatives. This means that any time a project (a solution) is discussed, the alternatives must be part of the dialogue. Otherwise, the audience will not be able to establish its own sense of the project's value.

Risks – There is nothing in our lives that does not involve risk. However, we perceive the risk of any activity relative to the benefits of taking part in the activity. This applies to everything we do including driving, flying, running, eating, and investing in the stock market. In these cases, we make a choice to participate in the activity because we perceive that the benefits outweigh the risks. Risk will seem higher if we feel we are being forced into something. In the water and wastewater industries, risk has been allowed to take center stage because of a lack of understanding of the elements of value and the absence of value-based strategies.

In looking *specifically at risk* it is important to realize that people perceive risk based on intuition. People do not make decisions about risk based on understanding the reliability of the parts of an automobile or on an average person's ability to competently drive a car. They decide based on how their family and friends have been killed or injured in automobiles, or possibly knowledge of national statistics on auto injuries and deaths. In other words, they look at the track record of the negative effects of participating in a certain activity.

Identity or Brand – For value, the identity of something is a simple association between a proper name (or entity) and an idea of value. Some strong identities from the business world are:

- Volvo = safe cars;
- Crest = cavity fighting toothpaste;
- Southwest = low cost, on-time airline; and
- BMW = ultimate driving machine.

The first three communicate value based on solving problems: people are injured in cars, people get cavities, and airplanes often get delayed. It can be argued that the BMW buyer reached a point when not having the "Ultimate Driving Machine" became a problem in his or her mind. What is the difference between an identity and a brand? An identity becomes a brand when it is perceived by one or more people to be true. Branding is the process of getting more and more people to accept the identity or idea of value as true. All the identities above are, or have been, strong brands.

Indirect potable reuse projects have to address negative brands. For example: Indirect Potable Reuse = "toilet-to-tap" is not a fact. This is, however, the brand it has been given by some factions.

Conflict with the media often occurs because of an argument over headlines. An article may be well balanced, but if the headline suggests a negative value or identity, a negative brand may emerge. Key audiences will brand projects. As a result, a project must be described in very simple and meaningful terms.

With this working definition of value, the best practices for managing indirect potable reuse can be introduced. The value-based strategy best practices are organized under the headings of the *Problem Being Solved, Alternatives to Indirect Potable Reuse, Risks of Indirect Potable Reuse and Alternatives*, and the *Identity of the Water Agency*. This organization will help the reader develop a better understanding of how each of the best practices is related to these basic elements of value.

CHAPTER 2

BEST PRACTICES FOR MANAGING INDIRECT POTABLE REUSE PROJECTS

The best practices for managing indirect potable reuse projects serve as a hypothesis or basis for planning and implementing a project. The best practices are a hypothesis since no single project researched in this study followed all of the best practices. These best practices were evaluated against six representative case study projects.

The best practices are grouped into two categories: *value-based strategy* best practices and *communication process* best practices. The value-based strategy practices address the *content* or the message of the project. The communication process best practices address *methods* to deliver the message and collaborate with key audiences.

2.1 Value-Based Strategy Best Practices

The value-based strategy best practices are organized into the four elements of value described in Chapter 1.2 (i.e., the problem being solved, alternatives for solving the problem, risks, and identity or brand). In this approach, the content of an indirect potable reuse project (or any water supply project) can be effectively managed with a clear sense of how people assess value.

2.1.1 Problem Being Solved

Value is based on problem solving, improving a situation, or improving someone's life. The following best practices address this element of value.

Best Practice #1: Create a Perception of Improvement

Water planners should design projects that improve supply reliability and water quality. Degradation of reliability and quality is not acceptable. In developing a strategy of value, however, the concept that "perception is reality" must be adopted. Although compelling value may be created with products or services, the customer or audience must *perceive* that value. For many water and environmental issues perception is an assessment of whether a proposed project is *enhancing* or *degrading* the environment and quality of life in the community. This idea of improvement or degradation can be the key factor in determining the success of a project.

No-growth sentiment stems from the perception that growth degrades quality of life for current residents, which may be debatable. Transportation gridlock, loss of wetlands and habitats, and degrading air quality, however, help fuel this perception. As a result, questions should be asked related to perception for the community and the project. Will the public perceive implementing indirect potable reuse to solve a wastewater treatment issue as improving or degrading quality of life? Will the public perceive recharging an aquifer with reclaimed water as improving or degrading the condition of the aquifer? Will they see implementing a seawater intrusion barrier as an improvement of the water quality and availability of water?

When developing any strategy of value, and the associated communication plans, it has to pass this simple test of perception. People do not support lower standards and lower quality of life. Best Practice #1 is the "master" best practice because the other best practices are geared towards developing projects that actually improve the quality of life and create the perception and experience that the quality of life of a community is enhanced.

When a meaningful problem is solved, the perception will likely be that the state of affairs has improved. This goal is why clearly stating the problem is so important.

Best Practice #2: Clearly Articulate the Problem

Communities should develop an executive summary and a set of core messages that explain the problem that is being solved. The problem can be a water supply reliability issue or a combination of problems. Often a solution is proposed before the audience clearly understands the problem. This clear statement of the problem is critical because it positions the value of *any* solution.

Indirect potable water reuse solves two basic types of problems:

- Provides a source of new water supply when demand threatens to exceed supply, or when improved supply planning dictates the need for new supply; and
- Provides a vehicle for disposing of treated wastewater.

Although indirect potable reuse may resolve a wastewater disposal problem, it is recommended that a project *should not be proposed unless there is a compelling need for new supply in the future or unless there is a significant problem related to preservation of supply such as seawater intrusion into a groundwater basin.* Indirect potable reuse projects bring to the forefront the decision to supplement drinking water supplies with water that ultimately came from treated wastewater effluent. This is not a wastewater issue but a water supply and water quality issue. People will intuitively understand this and will also perceive that wastewater has been disposed of for years.

In establishing the need for new supplies, water agency managers need to create an executive summary and a set of simple core messages that describe the problem and why the community cannot continue with the status quo. The executive summary may need to address one or more of the following issues:

- Changes in demand
  - Population growth due to births and immigration (residential development)
  - New industry – increase in number and types
  - Environmental needs – newly defined needs that preserve or restore the natural environment and habitats
  - Correction of past unsustainable practices related to groundwater management
- Meeting groundwater neutral policies or preventing salt water intrusion by replenishing groundwater with reclaimed water
- Changes in supply
  - *Adjustments in planning* related to droughts or climate variability
  - Resolution of water rights disputes
  - Changes in the availability of storage

Water agency leaders must make a clear and compelling case to develop a new supply to key audiences. Water agency management must provide the leadership because it is likely that no one else in the community will do so. Also, the water agency will ultimately be the one that the public must trust to implement the project. If there is no continuing dialogue with the community about water supply and drought resistance, the project sponsor must start one before proposing an indirect potable reuse project as a solution.

Best Practice #3: Have a Meaningful Supply Planning Criterion

Many water supply projects are conceived during droughts and water supply issues are much less interesting during times when water is plentiful. This uncovers a fundamental problem with the communication between water agencies and their communities.

Water agencies do not plan water supply needs based on what is happening today. Agencies plan based on growth projections and on worst-case water shortage scenarios. It is problematic that this criterion (the level of service during a worst-case shortage scenario or drought of record) is not communicated in terms

that are meaningful to water laypersons. Water laypersons are most of the people, including the public officials who make decisions related to investing in new supply. Decision makers are not told about the basic criteria that drive water supply planning decisions.

It is difficult to effectively establish the value of a water supply asset or a proposal to invest in new supply without a meaningful water supply criterion as a basis for discussion. The water supply planning criterion is the statement of the value that needs to be achieved. Without this standard, the dialogue related to resolving supply/demand problems can be confusing and more politically charged, thus lengthening the time to achieve a consensus.

The dialogue about water supply and demand issues will be more efficient if meaningful criteria that drive water supply planning are shared with the public. For instance, state a worst-case scenario, or drought of record, and the level of service planned during that scenario. Show how the water reuse project is critical to achieving the desired standard of service. For example, a hypothetical supply-planning criterion could be as follows:

> *"During a typical drought that occurs every 10-12 years and lasts 3 years, our customers will not be asked to cut back, even if the drought extends to 4 years."*

This statement is meaningful on many levels. It states the condition that the utility plans for, the level of service needed, and the need for a safety factor. All of these *inform* the audience in a meaningful way. Having a clear water supply planning criterion has another significant benefit. Since the utility is *committed* to meeting the standard, no matter what changes, it increases confidence and can defuse conflict related to growth.

2.1.2 Alternatives to Indirect Potable Reuse

Once the problem has been defined, all alternatives need to be reviewed. The public and key audiences will do this quickly using experience and basic reasoning. If this is not done, the public may not see the water agency as a competent solver of the problem.

Best Practice #4: Evaluate Alternatives to Indirect Potable Reuse

The community and decision makers will choose the method for creating new supply by their support or opposition to a stated project and the alternatives. This process of deciding on the best alternative begins with the premise that developing a new water supply is important. Given that key audiences accept this premise, the sponsoring agency should demonstrate leadership by offering a range of new water supply options with no preferred option. If the sponsoring agency thinks that indirect potable reuse is the best approach, the agency should state this, share their thinking, and share information about the alternatives. They should also make it clear that they have not made a final decision but will define the decision process. They should also be open to more information on alternatives, and open to the idea that someone who is not a water professional might come up with useful advice. The project sponsors should emphasize that their primary commitment is to solving the water supply problem independent of the approach.

Possible alternatives to indirect potable reuse include the following:

- Conservation or increased water productivity programs;
- Importing water or reallocation of regional supplies;
- Implementing nonpotable reuse;
- Ocean water or brackish water desalination;
- Finding and tapping new groundwater sources;
- Developing new storage assets; and
- Limiting future growth.

Not all communities will be able to consider all of these alternatives and some communities may be able to pursue multiple options. In many cases, however, solving the water supply problem will come down to importing water, nonpotable reuse, or indirect potable reuse. Also, many agencies are advocating that a diversified supply is the best approach to manage risk, much like a diversified investment portfolio. This diversity may mean that more than one new water supply option will be chosen. A key issue in this dialogue about options will be how clearly the benefits of indirect potable reuse are articulated and how the perceived risks are managed.

Even after the decision has been made to proceed with the project, the alternatives must be shared with new audiences. Opposition can occur at any time, even after the project has been finished. It is important to remember the ultimate goal is to *solve the water supply problem and not to make sure that your project gets approved.* It is not a coincidence that proper evaluation of alternatives will help ensure that the ultimate goal is achieved.

Best Practice #5: Communicate All the Benefits of Indirect Potable Reuse Projects

A community must understand why they would support or consent to indirect potable reuse as the best approach for creating a new water supply. In many cases all the benefits of indirect potable reuse are not understood and communicated. Community leaders will support indirect potable reuse and those involved in the decision process if they believe that the benefits greatly outweigh the risk. Support from Federal or State regulatory agencies only addresses risk.

In marketing, the term "positioning" is used to define the process of clearly describing the value of a product or service relative to competitors' products. In this same way, indirect potable reuse will need to be *accurately positioned* against other alternatives in order for it to get *fair* consideration. What are the benefits of indirect potable reuse relative to other alternatives? The benefits can be stated in terms of the problems that indirect potable reuse projects solve. These problems include:

- **Underutilization of Water –** Many coastal cities routinely use water once, treat wastewater to fairly high standards, and discharge it into the ocean. In California, water is transported hundreds of miles before being used once. It should be noted that many communities use water from the Colorado River, and other rivers, and discharge treated wastewater back into the river downstream for other communities to use later. Viewed in this simple manner, this single-pass use seems wasteful. Once the water is in the local system it should be used to its maximum potential. Both nonpotable and indirect potable water reuse projects allow communities to maximize their investment in storage and the transport of water over long distances.

- **Climate Dependency of Water Supplies** – Most potable supplies of water are directly affected by drought. Statistics show that the generation of wastewater is not significantly lower during droughts. This means that reclaimed water is virtually a drought proof supply. This benefit is true whether an indirect potable or nonpotable water reuse project is planned. Properly planned, this drought proof supply can be used to increase the reliability of the overall supply.

- **Need for Investment in Separate Infrastructure** – Nonpotable reuse projects need investment in separate infrastructure that can be costly. Implementing indirect potable reuse projects allows investment of more money in the water product, not a separate set of pipes, resulting in more investment in *higher water quality*. Indirect potable reuse treatment plants produce water that is generally of higher quality than the water in the reservoir or aquifer. This difference can be important in comparing indirect potable with nonpotable reuse projects. Indirect potable reuse allows for investment in higher quality water.

- **Underutilization of "Potable" Storage Assets** – Availability of water storage is a key asset for weathering droughts. Most storage assets contain water that is used for the potable supply. A

half-full reservoir is an underutilized asset when viewed from the standpoint of its ability to counteract drought. One of the most compelling aspects of indirect potable reuse is that the water can be stored using existing storage assets, including groundwater basins and reservoirs. Use of reclaimed water allows the community to maximize the ability of the storage asset to get the community through a drought with minimal hardship. In some cases reclaimed water has been injected into coastal aquifers to protect the groundwater storage asset by preventing ocean water intrusion from occurring. *This full utilization of storage assets is an important benefit of indirect potable reuse projects.* This is important because there is typically no place to store nonpotable reclaimed water (or separate storage must be constructed, adding to the costs).

- **"Unplanned" Indirect Potable Reuse is Already Happening** – Indirect potable reuse is already occurring in many communities that have not adopted projects specifically designated as indirect potable reuse projects. This is the case in Virginia with the Occoquan reservoir. Upstream communities discharge treated wastewater into rivers that are used by downstream communities for their water supply. Developing nonpotable, purple-pipe projects may continue this denial, at least from a public perception standpoint, that "unplanned" indirect potable reuse is already occurring. One of the advantages of indirect potable reuse projects is that it forces communities to address the fact that much of our water has been used before, and that water quality is dependent more on treatment and monitoring and less on the physical source of the water. Indirect potable reuse projects typically (and should) lead to higher water quality.

- **Increases Surface Water Quality** – In the case studies reviewed as part of this project, the advanced treated reclaimed water meets or exceeds drinking water standards and is of higher quality than the surface water to which it was being discharged. While most water professionals realize this – and it is clear in the Occoquan Watershed case study – this water quality improvement is not obvious to the average person. This fact goes to the heart of the water quality issue. The emerging issue of trace contaminants in the wastewater (i.e., endocrine disruptors, disinfection byproducts, pharmaceuticals, etc.) highlights the larger question of contaminants in all water sources, not just treated wastewater effluent. Indirect potable reuse forces communities to address these issues in a public forum, which should lead to better overall water quality.

Best Practice #6: Express Costs in Meaningful Terms

From the perspective of the general public, rates are a meaningful expression of costs. Discussions about alternatives should include comparisons of the impact on rates or fees. Costs in dollars are not meaningful to the average person, and therefore discussing dollars will only create confusion and erode trust. The recommended solution must be the best *investment* for the community, not necessarily the most advanced project or the lowest cost in dollars. Rates will be looked at in comparison to other communities. Water agencies must be prepared to explain rates in comparison to those in other communities.

2.1.3 Risks for Indirect Potable Reuse and Alternatives

The risks associated with indirect potable reuse and alternatives include the following:

- The financial, business, or social risks to the project that could include the competency of the utility to perform the project, social justices issues, technology risks, and the cost of capital; and
- The actual and perceived health risks and track record of other projects.

Best Practice #7: Understand and Avoid Environmental Justice Issues

The term "environmental justice" can be used to capture several concerns within communities. Regarding water reuse, a specific group cannot feel like they are "guinea pigs" because they are the first group in the area to be asked to use reclaimed water for their potable supply. This is especially true if the

first users of reclaimed water are an economically disadvantaged group or a minority group. This rule may seem out of place given that water quality improves with the implementation of indirect potable reuse. However, the bottom line is that indirect potable reuse will be a new idea, and new ideas are perceived as more risky, even without the "yuck factor." The best scenario from a public perception standpoint is to ensure that the leaders proposing the project also live in the community that will be one of the first users. Water agencies should be careful of offering benefits such as lower rates to first users. This type of incentive can be perceived as a payoff to encourage people to take increased risks. Offering other benefits such as increased quality or reliability is a better strategy.

Best Practice #8: Understand and Use Track Records

Water agencies should be prepared to respond to questions about past indirect potable reuse projects that were not implemented due to conflict and other reasons. The sponsors of these proposed projects should not be characterized as victims of circumstances (e.g., the drought ended) or unscrupulous or irrational opponents. People need to understand that discontinued projects were the result of poor implementation strategies related to value and not only because of negative perceptions of the water quality. On the positive side, the health track record of the water industry and the safety record of current reuse projects should be cited.

Best Practice #9: Break the Source-Quality Connection

History shows that indirect potable reuse projects are an easy target for negative publicity due to the connection with wastewater. "Toilet-to-tap" and other humorous but negative slogans suggest a close connection between the source of the water and the final product that is returned to the water supply. This close connection is far from reality. Managing the perceived risks (e.g., the "yuck factor") will require that this idea of a close connection be countered with a different and simple idea that the general public can easily understand. This simple idea is that the *utility has been the source of quality for years* and the current project is improving water quality. This idea is embodied in Best Practice #11.

For a local community to make an informed decision about indirect potable reuse, the issue of water quality has to be addressed. Stakeholders must be informed in ways that will allow them to make good decisions. How can a group of local stakeholders and decision makers (laypersons) be *informed* about the water quality and its connection to the wastewater source? Here are some guidelines:

- *Health Risk Agents* – Develop simple and intuitive explanations of the risk agents in the source water including:
  - Microorganisms and pathogens;
  - Dissolved solids (salts);
  - Organic and inorganic compounds; and
  - Emerging contaminants such as endocrine disruptors.
- *Multiple Barriers* – Describe in simple terms that there are multiple treatment barriers that the water must pass through before being sent back into the potable water supply. This breaks the *direct connection idea* of negative slogans.
- *Redundancy of Barriers* – Show that each risk agent is addressed by more than one treatment process or barrier. Redundancy is a simple and well-known risk management tool.
- *Natural Treatment Barrier* – Studies have shown that people respond well to the idea of natural processes. Describe how soil aquifer treatment or direct injection into the aquifer is employed as one of the barriers, which can be defined as a "natural treatment process."
- *Higher Quality than Existing Water Supply* – Demonstrate how the water being returned to the potable supply is of higher quality than that which comes from existing or traditional sources. Relate the quality to something with which the public is familiar, such as bottled water. Also, compare the water from the treatment process to existing sources that feed into the potable water supply.

The idea that needs to be emphasized is that the water has been through many barriers and is not directly connected to the source water and that diligence, treatment, and investment on the part of the water utility are the true sources of quality.

Best Practice #10: Articulate an Ongoing Water Quality Plan

People understand that water quality is an evolving science and that unknowns exist. They will not understand if they are only told by the water utility that the water is safe and that there is nothing to be concerned about. This implies that there is nothing left to do or learn, which the informed opposition will not accept because they know about emerging contaminants. The public will be more confident if they are shown a plan for increasing knowledge about risks and improving quality over time. The public will also be more trusting if there is an emergency response plan. These measures will show the public that risks exist, but that there are plans to continuously address and decrease the risk. A water quality plan is an opportunity to show that the diligence of the water utility is what ensures quality and safety, not the physical source of the water.

The need for a water quality plan is the reason why it is a risk for a wastewater utility to be the *sole leader* on indirect potable reuse. On their own, the wastewater utility will not be viewed as credible in managing evolving water quality issues. The wastewater utility can resolve this dilemma by partnering with a credible third party, such as the local water agency. This third party cannot be a temporary entity such as a blue-ribbon committee.

2.1.4 Identity of the Water Agency

The best practices in this section support the notion that people will reduce issues into simple ideas of value or identities. Establishing the water utility as the trusted source of quality is an identity that becomes a brand when people perceive it to be true. Is the identity or brand of the water considered to be high quality or substandard?

Best Practice #11: Establish the Water Agency and Investment as the Sources of Water Quality

People tend to associate water quality with its physical source. Yet for years, water quality has depended more on the level of investment in treatment and monitoring than the source. Surface water has not generally been "fit to drink" for over a century. The water utility has been protecting the public health and creating safe, potable water from low quality sources throughout this history. Bottled water companies, who emphasize that the source of the water is important to quality, reinforce this perception that source is important. They create the impression that bottled water is somehow "natural" (i.e., mountain springs, crystal geyser, glacier, etc.) although many bottled water companies obtain their source water from municipal water utilities.

This best practice is simple but extremely important. The water industry should consider addressing this misleading perception on a national level. The ramifications of not addressing the link between source and perceived water quality are straightforward:

- Acceptance of reclaimed water and indirect potable reuse is more difficult;
- Opportunities to strengthen trust in the utility are missed (Where is the value - the water source or the utility?); and
- Investment in water quality and the environment is underfunded.

Establishing the water utility as the trusted source of water quality is an opportunity to enhance the reputation of the water utility and increase support for water and environmental projects. As stated in Best Practice #10, it is a risk for a wastewater utility to establish itself (without a partner who can generate a credible water-quality plan) as a trusted source of quality for drinking water.

Best Practice #12: Rename the Water Quality

The terms "recycled water" or "reclaimed water" do not have to be used to describe a project. These terms emphasize the source of the water. "Recycled" implies "reused." How many people buy reused clothes or reused tires? Reused, recycled, and reclaimed imply second class, not best of class. Choose another term such as "purified," "highly purified," or simply drinking water to convey the higher quality of the water. The term purified will be more easily accepted if processes such as reverse osmosis are being proposed and installed. Reclaimed water can be perceived as purple pipe water that is not to be ingested. Disapproving slogans can create a negative idea of value. Agencies should consider creating a new idea of value to associate with the new name. In the Scottsdale case study, the water department effectively branded the wastewater effluent as a "valuable resource."

2.2 Communication Process Best Practices

The remaining 13 best practices address collaborating and communicating with key audiences in the community.

Best Practice #13: Communicate and Collaborate About Value

Why do we need to communicate proactively? We communicate for the following reasons:

- To make better decisions – communicating and collaborating allow us to learn;
- To develop a foundation of support or consent for the project; and
- To *find* and address conflicts that can cause good projects to fail.

Better decisions emerge when diverse interests, knowledge, and expertise are used to frame, analyze, create, and implement solutions for complex problems such as water reuse. Disputes, particularly over complex technical, social, and environmental issues, can only be solved when all the important information is available. Much of this information comes from project planners and various technical experts. However, significant information about community values such as water taste, quality, and use comes from the public. These sources of information are why public participation is valuable. Since the issues are complex, it is important to include the input of many experts (e.g. scientific, technical and economic) in analyzing and problem solving.

The best answer will not be developed if consultants or other water experts are the only ones involved. The public has good instincts about value. *This point cannot be overemphasized.* As information is shared about the problems and alternative solutions, it is important to listen to everyone who wants to be heard. Usually non-experts will have a good sense of value *because* they are trying to understand things at a basic level. The more collaboration that occurs early in the process, the better the result will be. Properly done, this collaboration may change the overall strategy. Conflict can and has come from those who feel that they are not being heard.

Best Practice #14: Inform, Don't Educate

Many of the best practices in this document address the need to collaborate and communicate with members of the community in order to make a good decision about indirect potable reuse. Often public sector project managers use the term "education" to describe their communication with key audiences. Based on information received from people involved in past projects, it is important to distinguish between *educating* someone and *informing* them.

Believing someone needs to be educated assumes that they are *uneducated* and need a program of schooling to prepare him or her to make a "good" decision. Thinking that audiences need to be educated can come across as arrogant or condescending and ultimately will not yield the desired result, which is creating and communicating value. This misunderstanding occurs because the term education implies a

formal process of *changing* the state of mind or abilities of a person. If a company needed to send their customers back to school to understand the value of their products no one would recommend investing in that company. Focusing on *informing* challenges us to create messages that are meaningful and address the interests of the general public and important constituents. These messages should communicate, in simple intuitive terms, the value of an indirect potable water reuse project. The average person, or even the important decision maker, does not need to know the technical details of how it will happen, they simply must come to understand *and trust* that the water utility will deliver the value (see Best Practice #11). Informing suggests that you must *give form* to the value of the project without having to send your audiences (i.e., investors) back to school. The first 12 best practices describe methods for creating content that informs people in this way.

Examples from the other best practices that support the idea of informing the public include the following:

- Stating a meaningful supply reliability criterion is an example of informing and not educating. (Best Practice #3)
- Expressing project costs by their impact or rates is informing. Talking about project costs in dollars is education and not meaningful to most audiences. (Best Practice #6)
- Emphasizing multiple treatment barriers and redundancy is informing. Explaining the specific details or technology of a treatment process is education. (Best Practice #9)
- Relating health risks to industry track record and explaining *your process* of managing water quality is informing. Communicating the list of contaminants that are in the water is education. (Best Practices #8 and #10)

The examples above show that value can be expressed without having to educate. Education is difficult to carry out and much too expensive. People can be informed by addressing their interests.

Best Practice #15: Practice Good Leadership

In general, gaining support or investment of the public requires that the following two fundamental conditions be met:

- A clear and compelling case for investing in the project or business endeavor has been made by addressing the elements of value (i.e., problem solving, alternatives, and risk); and
- The leadership is trusted by the investors to implement and deliver the value or return on investment (In the case of a water utility, the key audiences and decision makers – i.e., investors – must trust the sponsoring management team to manage the important issues).

A key component of the second condition is that there needs to be a leader or champion for the investment or project. A lack of clarity can occur when it is unclear who is leading a project. In the case of water supply projects, and specifically indirect potable reuse projects, the leadership must address the following:

- Ensure that key audiences and decision makers understand and agree that there is an important water supply problem that needs to be solved;
- Evaluate and understand as early as possible how alternatives for solving the problem will be perceived compared to indirect potable reuse; and
- Ensure that there is a credible water quality authority that can be trusted to implement indirect potable reuse (or create/partner with a credible water quality authority).

It is the responsibility of the leadership to ensure that key best practices related to the elements of value are understood and are being followed. Leadership characteristics include the following:

- Visibly and clearly commit to solving the stated problem;
- Portray stated values, words, and actions that are consistent;
- Enlist positive (strong) relationships with decision makers and the media;
- Advocate for solving the problem, do not advocate for a specific solution;
- Collaborate, be willing to change direction based on input from key audiences, and do not use *design, announce, defend (DAD)* tactics;
- Credibly manage the financial and technical aspects of the project; and
- Willingly accept as valid the concerns of all opponents.

Simply stated, if the messenger is not trusted, any plea for investment will not likely be met. The reputation of the agency and its leadership needs to be considered and it is important that the agency measure its reputation with key audiences and the public. If there are problems with this reputation, the issues must be addressed prior to communicating about an indirect potable reuse project. Effectively managing a community dialogue about the need to invest in new water supply (i.e., solving an important problem) can improve this reputation.

Best Practice #16: Start Early

Communication must begin well before the project is online and before the project is designed. This communication is especially important because projects typically take many years to conduct environmental assessments and to apply for and receive approvals for permits to design and build. Other reasons to start early include the following:

- *Collaborating and communicating* face-to-face with the many leaders in the community takes time;
- Identifying potential opposition and addressing their concerns takes time; and
- Early learning will require improvements and refinements to your message and many individuals will have to be met with multiple times.

There should be a simple and ongoing dialogue, in advance of when the project is needed, about the problems to be solved and alternatives.

Best Practice #17: Identify and Collaborate with Key Audiences

When informing the public, the purpose of communication is to learn and to avoid conflict that can result in the failure of a good project. The previous best practices addressed the content and some of the process issues with respect to communications related to indirect potable reuse. This best practice addresses the kinds of people and organizations that should be part of the communication and collaboration process.

"Reaching" all segments of the public is not possible and not affordable. Communication processes develop support or consent for the water supply message among individuals who are "key audiences." These key audiences have the following characteristics or are in the following groups:

- *Elected/City Officials* – These individuals are listened to, represent a large group of people, and may have a political agenda that encourage them to take positions on controversial subjects. City management, city council members, elected water board officials, county boards, members of state legislatures, and Congressional representatives *all* fall into this group. Having a positive and interactive working relationship with these decision makers is *critical* to success.
- *Active Community Members* – This group includes individuals who are regularly involved in key community issues. They may be elected officials or members of the community who are active and listened to by the community or by the elected officials.
- *Business Leaders* – Business leaders are interested in a reliable water supply since it is needed for economic growth. In many cases business leaders are also community leaders.

- *Ethnic and Social Group Leaders* – These leaders are important if they represent a larger group. Ethnic, social and environmental justice issues can generate conflict surrounding indirect potable reuse projects.
- *Environmental Leaders* – Water is an environmental issue, and environmental groups are a relevant and important audience.
- *Local Regulators* – This category includes local heath department representatives.
- *The Media* – The media may be difficult to collaborate with because many view themselves as independent watchdogs. However, they still must be approached.
- *Trusted Technical or Medical Community Leaders* – These groups can be important in developing local water quality standards or consent related to perceptions of risk.
- *Other Active Groups* – It is important to realize that there are a variety of groups that are part of the community voice. The Mothers of Tampa Bay might be one. In another community it may be a grandmother's group or a group similar to MADD.
- *Well-Networked People* – Community leaders have a strong network within the community, which means community leaders can tell you who else to talk to and where potential opposition may arise.

These individuals and groups will form the foundation of support or be the nucleus of opposition. An ideal collaborator in a public process is a decision maker or someone who represents a larger portion of the community, thereby providing an opportunity for the dissemination of information. This collaboration is even more important if an individual has a strong political agenda that relates to established conflict within the community. Project sponsors should identify current conflicts before developing the communication plan. The individuals who comprise these key audiences will change with time and communication efforts must be constantly updated.

Best Practice #18: Embrace Potential Conflict and Opposition

Project sponsors should identify strong political agendas within the community. Individuals and groups should be contacted who are involved in these issues or conflicts, or who are likely to oppose the project. These efforts are especially important if these individuals are decision makers or regulators. These individuals and groups should be identified as key audiences as outlined in Best Practice #17. Project sponsors must be plugged into the political issues in the community and embrace conflict early.

Involvement by key audiences will allow collaboration and, if necessary, the use of conflict resolution techniques outlined in Best Practice #24 prior to making major investments in project design and construction. If conflict arises, assume the problem is the message (i.e., the basic discussion about the value or values of the project) and how the dialogue about the project is managed. Approach and collaborate with opponents with this idea in mind and typically key audiences will feel as if they have been heard. The research on this project reinforces the idea that most opponents have valid concerns and arguments.

Best Practice #19: Constantly Communicate

A project can easily take five to ten years to implement and the people identified as being influential early on may not be engaged later in the project. The list of key audiences must be constantly updated and time gaps should not occur in the communication process. Support developed at the beginning does not ensure that conflicts will not occur if the communication process stops. The communication process must continue up to and beyond the point that the project goes online.

The process of constantly communicating is also useful with respect to identifying the opposition. A water utility cannot collaborate with groups who oppose a project if they cannot be identified. Constantly communicating with leaders and groups will help identify groups that may oppose the project and better understand the strength of community support.

Some general guidelines for communication processes, some of which were introduced elsewhere in this document, are as follows:

- Obtain agreement that there is a water supply problem to be addressed;
- Choose the option that best addresses the problem;
- Consider alternatives to the indirect potable reuse option;
- Explain the alternatives as well as the proposed option;
- Develop trust;
- Seek for geographic and demographic fairness;
- Guarantee that stringent safety standards will be met;
- Make the users of water reuse better off;
- Seek consensus on the proposed project through a broad-based dialogue; and
- Develop lists of supporters as you brief and collaborate with community leaders.

Following these elements ensures that: 1) consideration of a water reuse project is conducted in a fair manner; 2) available time and other resources are used efficiently; 3) decisions are technically wise; and 4) decisions are socially, financially, and politically feasible.

Best Practice #20: Keep Communicating after the Project is Completed

Once the project is operational, the indirect potable reuse facility becomes a valuable asset for ensuring water supply reliability. The process of communicating the message to a changing group of key audiences should never end. The value of the project will always be viewed relative to alternatives even after it has been approved, built, and operating for years. Also, addressing emerging water quality issues or concerns demonstrates leadership. Quick and effective resolution of problems is a proven method for building trust with customers and communities.

Best Practice #21: Develop Ongoing Relationships with the Media

The media have in the past branded indirect potable reuse projects with negative and factually incorrect slogans such as "toilet-to-tap." First, the general characteristics of the media need to be covered.

The Nature of Today's Media – The culture in the media has changed significantly over the last 30 years. Most of what is seen or heard on local television and radio is "infotainment." A perfect example is the summer of 2002's focus on child abductions. From the news reports, child kidnappings had significantly increased from previous years, when in fact, the FBI reported that they were down. While radio talk shows constantly address important issues, they exercise little regard for balanced reporting and *often ignore facts*. Many of these radio shows admit that they are not "news," but a "show."

So what are the major conclusions? Three simple ones are as follows:

- *It is difficult, but important, to collaborate with the media.* Their job is not to collaborate but to find interesting or inflammatory topics to increase ratings. They may also view collaboration as not being objective. Media people see themselves as independent watchdogs.
- *Do not count on balanced reporting*. This is especially true if it is an interesting or juicy topic, and if there is a news lull. Using treated wastewater as a new source for replenishing drinking water supplies is an easy target.
- *There is significant turnover in the media*. People you work with today may not be there tomorrow.

Best Practices – Although the job is difficult, it is not acceptable to *give up* on working with the media. Best practices for working with the media include:

- *Develop an ongoing relationship with the reporters and editors.* Do not just approach them when their support is needed.
- *Make sure the idea, brand, or positioning of the project is clear.* Negative ideas can be used to fill a gap. Make sure there is no ambiguity in the positive value and brand of the project. Be open and honest with the media.
- *Understand Headlines.* Although the full text of a news story may be balanced and even positive, the headline related to indirect potable reuse may create negative impressions or branding. Consider the headline project managers would like when developing the key idea or identity of the project.
- *Develop comprehensive media packets.* These packets should highlight that the community is endeavoring to solve a real problem. Do not rely solely on news "releases." Use fact sheets, backgrounders, and one-on-one media briefings to get points across.
- *Get media packets out early.* Fill the information gap with well thought out positioning of the value of the project.
- *Include the media in discussions with key audiences.* Invite members of the media to collaboration sessions with stakeholders.
- *Ensure that the interaction with the media is constant.* This interaction will address the high turnover rate in media personnel and on-air talent.
- *Ask known supporters of the project to attend media events.* It is much better to have community supporters in front of the media than the sponsoring agency.

It is possible to avoid negative slogans when these best practices are employed.

Best Practice #22: Use General Information/Advertising Campaigns Appropriately

There are requirements to hold public meetings, and water agencies do not want to be perceived as hiding information. However, general communications (e.g., press releases, newspaper/magazine articles, and public hearings) that cover a specific project have little impact on whether a project is successful. *General communications may not reach the people that are likely to influence the decision to continue or to create conflict.*

General or non-specific communication is more effective if the intent is to improve the reputation or *brand* of the sponsoring agency. In this case, the content should be oriented toward brand development (i.e., expressing the values and commitments of the organization) and not advocacy for a specific project. Even if it is brand development, the articles or public relation efforts should be targeted towards media to which important audiences pay attention (e.g., newspapers, specific magazines, and specific radio or news programs). Reputation or brand development helps if it is started well before a controversial project is introduced.

General communications are also useful in finding opposition. Identifying potential opposition early in the planning stages allows collaboration that can address conflict early.

Best Practice #23: Don't be Defensive

"Perception is reality" is a frustrating fact. "Toilet-to-tap" and "drink the stink" *are* funny, albeit inaccurate, slogans. Indirect potable reuse proposes a closer connection, even if only geographically, between wastewater effluent and drinking water. Address people's perceptions with compassion and understanding. Also, understand that negative perceptions are often caused by the way the project sponsor positions and demonstrates the value of the project. Being defensive is a sign of weakness and makes people think that the sponsoring agency has something to hide.

Best Practice #24: Practice Conflict Resolution

Overall Advice. Conflict will occur. Do not ignore conflict because you think it will go away. Embrace opponents and assume they have valid concerns. Do not assume opponents are bad people or people with hidden agendas. They have interests and feelings about what is desirable. Although they may not voice them to you, they have reasons for their actions.

What is Conflict? Conflicts are interactions between interdependent people who see their goals as incompatible and who believe the "other" people are interfering with their efforts to satisfy their interests. Conflict is not necessarily a problem. Conflict can promote interest and curiosity about an issue, provides a way to learn about problems, and improves decisions and their implementation. Conflict provides the creative impetus to change relationships, organizations, and institutions. By ignoring or suppressing conflict, organizations remove valuable responses and learning mechanisms. Choosing to view conflict as an opportunity to improve the project and the surrounding relationships will by itself go a long way to resolve it. Often conflict becomes destructive because of the inefficient and ineffective ways people and organizations handle it. Successful organizations develop strategies, processes, and forums for resolving disputes.

Fundamental Issues that Cause and Affect Conflict. When internal community issues cause conflict they usually follow previously developed *lines of conflict*. These lines of conflict usually involve three important issues: 1) economic - most American communities are deeply divided by economic issues; 2) power and authority - many people perceive that government is non-responsive; and 3) values - conflict occurs because of differing values and beliefs over how decisions should be made regarding risk, health and safety, and aesthetics. Conflicts can follow previous social divisions. Community members may respond to community issues and controversies along the lines of race, class, or other social issues. Each dispute over a community issue or decision mirrors previous debates and conflicts and represents a continuing battle between the different groups.

How Different Groups Pursue Their Interests. Previous social divisions and conflicts affect the strategy and tactics people choose when pursuing their interests. For example, people who historically have had a lesser voice or people from foreign countries may be alienated, apathetic, or passive about issues that affect them. In this research, problems with traditional public hearings and forums were raised. Since these groups have little experience with being heard or considered, they may not participate or voice their interests because they have no experience or expectation that it will be meaningful.

Groups who have had little voice or input into decisions may quickly intensify the tactics they use to seek a hearing or to become involved. Since they have little experience on being heard, they may resort to extreme demands or forceful tactics faster than would a group which is used to being included and heard. Because water agencies do not understand the reason for these tactics, it is easy for them to dismiss these groups as being unreasonable or "irrational."

Finally, individuals and groups with little voice or input may be led or influenced by individuals and groups from outside their group. Since they have less experience with democratic participation and decision making, they may lack internal spokespersons or leaders.

Plan for Conflict Resolution. Develop mechanisms at the outset of the project to manage conflicts and have a proactive conflict management plan. Begin projects with a liaison team, a representative working group, a steering committee, or other such broad representative, collaborative group. This group can help identify any potential conflicts. This group will already be in place if a conflict does emerge. The group can define, discuss, and propose solutions to problems with the proposed project. Through a series of facilitated meetings, the representative or stakeholder group can find ways to meet the needs of all the parties affected by the project or who are in a position to block its implementation.

Make use of joint fact-finding, which involves discussions and consensus building between technical experts, decision makers, and other essential stakeholders. If conflicts do intensify beyond the ability of a representative group, the organization can hire a mediator. Mediation is assisted-negotiation by an acceptable impartial third-party that has no authority to make or enforce a decision.

Outcomes. In the end, the result of this process will be that the community chooses a solution to the established problem. Even with the best conflict management process, the outcomes of each community difference, dispute, or struggle will not transform deep-rooted community understandings, conditions, or structures. Sometimes, the best public participation process and conflict resolution strategies cannot overcome public opposition to water reuse. Maybe the public was already hostile before the utility employed good public participation and conflict resolution. Maybe the water agency's efforts were overcome by politics or unanticipated events. If this is the case, *it is important to realize the outcome of this conflict will set up the conditions for the next community engagements and struggles.* The outcomes will shape how community members sense and engage in new differences, problems and disputes. Even if the utility designs good and fair public participation and conflict resolution process, the outcome may not result in developing a water reuse project.

Best Practice #25: Maintain Credibility

A good process that solves the water supply problem, but does not necessarily result in an indirect potable reuse, is still a good result. The result is that the community makes a decision to invest appropriately in resolving the pertinent problem and the agency maintains its credibility and reputation. This outcome positions the sponsoring agency as an advocate for solving water supply problems. As long as the utility and public decision makers participated in good faith and with the overall goal of providing safe and reliable water supply, credibility in water utility decisions and decision makers will be maintained. If Best Practices #1 to 24 are followed, the chances are very good that the water utility will come out of the process with their credibility intact, or better yet, an improved reputation and brand.

CHAPTER 3

CASE STUDY SUMMARIES

Background research and interviews were conducted on ten projects using a technical approach designed to achieve the goals and objectives of this project. The approach is detailed in Appendix B. The study focused on three successful and three projects that were not implemented in order to test the hypotheses of the *25 Best Practices of Indirect Potable Reuse*. The major criteria for selecting projects for research were the following:

- Successful indirect potable reuse projects that have been ongoing for years and have stayed under the "radar screen" of the public were not selected. In these cases, little or no communication has been conducted. The research team decided that further research would not be useful given the current dynamics of communities.
- Projects that were not implemented in which there was little understanding of the potential conflict and projects that did not follow most of the best practices about establishing the value of the project and communicating were not selected.
- To ensure geographic diversity, projects that were in regional proximity with other chosen projects were not selected.

"Successful" projects are indirect potable reuse projects that have been implemented (Upper Occoquan, Virginia and Scottsdale, Arizona) or moving forward and nearing completion (Orange County, California). "Projects not implemented" are projects where there was planning and investment, but which were discontinued to pursue other alternatives for achieving water supply reliability.

A table of each of the best practices that were followed for each case study is presented in Chapter 4 of this report. In this section, each of the case studies is briefly summarized to provide an overview of how each project fared relative to the best practices, and how this influenced the outcomes. Detailed summaries and discussion of the case study projects are provided in Appendix A.

3.1 Successful Project Summaries

The three indirect potable water reuse projects investigated as part of this report are in operation or are nearing completion and implementation are: 1) the groundwater recharge project in Scottsdale, Arizona; 2) the groundwater recharge project in Orange County, California; and 3) the reservoir augmentation in the Upper Occoquan watershed of Fairfax County, Virginia.

3.1.1 Case Study #1: Scottsdale, Arizona

Overview

The Scottsdale Water Campus is a 12 mgd water reclamation plant with a co-located 10 mgd advanced treatment facility, groundwater recharge wells, and water quality laboratory. The Water Campus has been in operation since 1999 and is in northern Scottsdale, Arizona.

A portion of the water is treated to nonpotable reuse standards and used for irrigation (mainly golf courses during summers). The other portion is treated to exceed Federal drinking water standards and injected via dry wells into the drinking water aquifer. This dry well process involves soil aquifer treatment as the water passes through several hundred feet of soil on its way to being stored in the aquifer.

Conclusions

The Scottsdale project was successfully completed in 1999 and has been in operation since then. Of all the case studies reviewed, the Scottsdale project followed most of the best practices. It followed 21 of the

25 completely, three somewhat, and one (Best Practice #24- *Practice Conflict Resolution*) was not applicable since little conflict occurred.

The best practices that appeared critical for project success were:

- *Best Practice #1 – Creating a perception of improvement.* The quality of the water injected into the aquifer was "bottled water quality."
- *Best Practice #2 – Clearly articulating the problem.* Scottsdale needed to meet the Arizona Groundwater Management Code, which addresses maintenance of aquifers. They were also faced with spending money to increase their capacity to send wastewater to the regional treatment plant.
- *Best Practice #4 – Evaluate alternatives.* They looked at the option of increasing wastewater delivery infrastructure. However, they successfully made the case to the community that it did not make sense to invest in wastewater infrastructure to give a "valuable resource" away by sending it to the regional wastewater treatment plant. They would still have to buy more imported water to replenish the aquifer.
- *Best Practice #7 – Understand and avoid environmental justice issues.* Scottsdale wastewater producers and indirect potable users were the same, generally affluent community. No disadvantaged or minority groups were isolated.
- *Best Practices #10 – Articulate an ongoing water quality plan and Best Practice #11– Establish the utility as the trusted source of quality.* The presence and positive branding of the "Water Campus," which includes a water quality lab, and ongoing information about water quality and testing, inspired public confidence in the utility and their processes.

3.1.2 Case Study #2: Upper Occoquan, Virginia

Overview

In the late 1960s and early 1970s, secondary treated wastewater from 11 plants discharged into the Occoquan Reservoir and its tributaries. This effluent was creating water quality problems, including the following:

- Active viruses detected in the reservoir and tributary streams;
- Frequent and intense algae blooms;
- Frequent taste and odor problems in the water treatment plant;
- Oxygen depletion and fish kills in the reservoir; and
- Sulfides in lower reservoir depths.

After a comprehensive study was completed in 1970, several alternatives were considered to address the water quality problems. Since 1978, the Upper Occoquan Sewage Authority (UOSA), operating a new consolidated "advanced wastewater treatment" (AWT) plant has been providing "the highest treatment technologically achievable and discharging the reclaimed water to the Occoquan Reservoir." In addition to the treatment plant, an independent "watch dog" laboratory organization was established called the Occoquan Watershed Monitoring Laboratory (OWML). The mission of OWML is to oversee water quality in the treatment plant, the treatment technology, and the environmental health of the reservoir.

Conclusions

This project was the oldest reviewed under this study and it followed only ten best practices fully. However, this case study highlights the importance of *Best Practice #1 – Create a Perception of Improvement*. It was clear to all involved (especially the water districts that were taking water from the Occoquan Reservoir) that water quality had greatly improved as a result of the AWT plant. Because this project was conceived and intended as a surface water quality improvement program, rather than a supply enhancement program, it had a unique context compared to the other projects reviewed.

A unique feature of this project was the formation of the water quality laboratory, OWML, which provided the public an actual independent audit of the facility and its impact on the environment. For example, OWML has recently shown that pollution from urban runoff far exceeds any discharge pollution from the AWT facility. Because of its unique context, features, and ongoing public involvement programs, the Upper Occoquan project stands as a positive example of indirect potable reuse.

The best practices that appeared critical for project success were as follows:

- *Best Practice #1 – Creating a perception of improvement.* The Upper Occoquan situation was unique in that it was designed specifically to *improve* surface water quality. No other project studied had this objective, although successful reuse project improve, and not degrade, water quality.
- *Best Practice #2 – Clearly articulating the problem.* The water quality problem was easy to see and easy to articulate in this project.
- *Best Practice #7 – Understand and avoid environmental justice issues.* The Fairfax County area was both the producer and consumer of the water and no specific groups were isolated.
- *Best Practice #10 – Articulate an ongoing water quality plan and Best Practice #11 – Establish the utility as the trusted source of water quality.* Creating the independent OWML was critical to articulating a plan and establishing water quality credibility.

3.1.3 Case Study #3: Orange County, California

Overview

The Orange County Water District (OCWD) received approval from their board of directors for the Ground Water Replenishment (GWR) System project in 2003. The main project elements are to expand and upgrade reclaimed water production capacity for Water Factory 21, expand existing seawater barrier capacity, and build a pipeline to the forebay to allow the highly purified recycled water to percolate into the aquifer.

Conclusions

While this project is still in development, it is approved and moving forward as of the publication of this report. The research on this case study revealed that OCWD has followed 14 of the best practices completely, eight best practices somewhat, and one not at all (i.e., Best Practice #3 – there is no supply planning criteria). Two best practices (#20 and #23) were not applicable to this project.

The best practices that appeared critical for project success were as follows:

- *Best Practice #1 – Creating a perception of improvement.* OCWD has created a perception of improvement in both supply and quality as the backbone of their project communication.
- *Best Practice #2 – Clearly articulating the problem.* Seawater intrusion into the aquifer, beach closures, and enhancing supply reliability are recognized problems in the minds of leaders and key audiences.
- *Best Practice #7 – Understand and avoid environmental justice issues.* Orange County is a relatively dense geographic area and the water from OCWD goes to over 20 communities. It would be difficult for one community to feel singled out. Also, barrier wells tend to be near the coast, which are typically more affluent communities.
- *Best Practice #11 – Agency as source of water quality.* The building and operation of Water Factory 21 has given OCWD over 20 years of experience with injecting reclaimed water into the aquifer. With its track record of increasing water quality knowledge, and proactive response to emerging water quality issues such as N-nitrosodimethylamine (NDMA), OCWD has established itself as a trusted source of water quality. There is virtually no opposition to the GWR System based on water quality concerns.

- *Best Practice #19 – Constantly communicate.* OCWD is very diligent and consistent with its communications.

All of these factors have fostered feelings of trust and credibility and are the basis for the success of the project so far. Objections to the GWR System project are related to financial and timing issues. These issues probably represent the largest current risk to project success. The only apparent water quality issue that is still open as of the date of this report is the desire to get the California Department of Health Services officially involved in the pre-treatment standards that govern the wastewater treatment plant. This would address industrial contaminants such as 1,4-dioxane. Overall, the GWR System is an example of a project that has followed many of the best practices of indirect potable reuse with positive results.

3.2 Summaries for Projects not Implemented

The three indirect potable water reuse projects investigated as part of this report that were planned but not implemented were: 1) San Diego's indirect potable reuse project, 2) Dublin San Ramon's indirect potable reuse project, and 3) City of Tampa's Tampa Water Resources Recovery Project.

3.2.1 Case Study #4: San Diego, California

Overview

For a five-year period (1993 to 1998), the San Diego County Water Authority and City of San Diego worked jointly to develop an indirect potable reuse project in the City of San Diego. This project was lead by the Wastewater Department of the City. Although the City's Water Department was present at all meetings and hearings, their voice was not strongly heard in public records or in public memory. The project was converted to a nonpotable reclaimed water project in 1998, which was supported by the public.

Conclusions

The San Diego experience represents an interesting case study because a significant amount of communication and outreach was conducted during the project and the outreach was persistent throughout the project. However, the project had several flaws. The case study research revealed that San Diego followed two best practices (#12 – it renamed the water "Repurified Water," and #16 – it started communication early, five years prior to potentially going on line), it followed nine best practices somewhat, and the balance (13 best practices) not at all.

As detailed in the case study summary in Appendix A, the main problem with this project, as with the others not implemented, is that a clear perception of improvement (i.e., supply, environment or quality) was not clearly made. In fact, the opposite was perceived. The community that was to use the water felt *singled out* and there was a perception that African Americans were being used for an experimental project (see Best Practice #7). Thus, the project had a politically unacceptable design. Repurifying wastewater and the negative branding became the focus of community leaders, which eventually caused a change in the project to a nonpotable alternative.

The best practices that appeared critical for project success were as follows:

- *Best Practice #1 – Creating a perception of improvement.* There was no clear and specific idea of the quantity or quality improvement that this project was going to deliver. This perception was mainly due to the fact that the problem being solved was not established with key audiences and decision makers.
- *Best Practice #2 – Clearly articulating the problem.* The major motivation behind the project related to approval of the "Ocean Waiver" for continuing to discharge primary effluent into the

ocean. As part of the agreement to approve the waiver, San Diego was required to meet certain water recycling goals. The water repurification project was offered as the most cost effective way to achieve these goals. There were no commonly agreed upon water supply or quality problems among key audiences and decision makers. Ultimately, some perceived the project as the cheapest way for the City of San Diego to dispose of wastewater.

- *Best Practice #7 – Understand and avoid environmental justice issues.* The perception that the wastewater was coming from wealthy communities and would be treated and used by economically disadvantaged communities was a major stumbling block in this project. Residents of one district of the City and the African American community clearly felt singled out and felt that they were being used for an experiment.
- *Best Practice #11 – Agency as the trusted source of water quality.* This and the Dublin/San Ramon project were led by wastewater agencies, which are not given the job or the responsibility to produce drinking water in the normal course of their work. This is an important branding problem. The negative result of these projects argues strongly to not have wastewater leadership sponsoring an indirect potable reuse project without very visible drinking water partners.
- *Best Practice #15 – Practice good leadership.* The wastewater professionals were the only consistent champions for the project. Having the San Diego County Water Authority or the City of San Diego as very visible leaders throughout the project might have added credibility that there was a water supply problem to be solved and may have created additional water quality credibility. Neither of the two entities were champions of the project at the point of the city council vote that resulted in canceling the project.
- *Best Practice #17 – Identify and collaborate with key audiences.* If the problem is not well stated, it is difficult to communicate with influential audiences. At least one member of the city council, who was influential with others, was not clear on basic attributes of the project.

3.2.2 Case Study #5: Dublin San Ramon, California

Overview

The Dublin San Ramon Services District (DSRSD) proposed an indirect potable reuse project to solve a wastewater disposal problem created predominantly by the rapid growth in Dublin. The neighboring communities of Pleasanton and Livermore, co-owners of the wastewater disposal ocean outfall under a Joint Powers Authority, refused to approve expanding the outfall to provide more disposal capacity. DSRSD decided that the best alternative, independent of Pleasanton and Livermore, was to propose an indirect potable reuse project.

The South Bay Regional Water Board issued a permit for indirect potable reuse to DSRSD in 1993. An Environmental Impact Report (EIR) was approved in 1996 with no legal challenges, and in early 1999 a membrane water purification plant was completed and tested. By 1998, however, the expansion of the ocean outfall pipeline was approved by Livermore and Pleasanton, eliminating the economic need for the project. In early 2000, the Regional Board Executive Officer authorized the project to be placed into operation under the authority of the 1993 permit. Pleasanton, Zone 7 (the local water agency), and a local special interest group filed suit to stop the operation of the project. The key basis of the suit was that significant factors had changed since the 1993 permit was issued and the Regional Board should have considered those factors. Because of the changes, the Executive Officer no longer had the authority to authorize operation. The court determined that several factors were different, the most significant being public opinion, and directed the Regional Board to consider the merits of the project before authorizing operation. DSRSD dropped the project since it was no longer required to provide wastewater service although a survey of all residents indicated that a majority, almost 80 percent, accepted the project.

Conclusions

The problem with this project was that indirect potable reuse was not the solution of first choice. During the project development, the primary need for the project was superseded by another project (i.e., ocean

outfall). As with the unsuccessful San Diego indirect potable project, this project was perceived as a wastewater effluent disposal option and not as an enhanced water supply or purity option. This project followed two best practices completely (#2 – clearly articulating the problem, and #16 – starting communication early, although communication stopped for a while after approval of the EIR). Six best practices were followed somewhat, and 16 best practices were not followed.

The best practices that appeared critical for project success were as follows:

- *Best Practice #1 – Creating a perception of improvement.* Because there was no clear water supply or water quality problem, this project was perceived as degrading water quality and reducing quality of life.
- *Best Practice #2 – Clearly articulating the problem.* While the problem of not being able to discharge to the ocean *was* clearly defined, this project showed that this might not be a good enough reason to institute indirect potable reuse. There was no accepted water supply issue. The termination of this project and the success of the three implemented projects reviewed in this study suggest that the two problems strong enough to warrant indirect potable reuse are improving supply reliability and/or increasing watershed quality. Using indirect potable reuse as an *alternative disposal option* appears risky.
- *Best Practice #7 – Understand and avoid environmental justice issues.* Pleasanton, not Dublin or San Ramon, became the primary recipient of the water from the recharge well field. In this sense, Pleasanton was singled out by being asked to supplement its drinking water supply with reclaimed wastewater because of rapid growth in Dublin. Pleasanton also held approval of the wastewater effluent pipe ocean outfall. In time, the outfall was approved and eliminated the *problem (*see Best Practice #2).
- *Best Practice #10 – Articulate an ongoing water quality plan.* Key opponents stated outright that there was no visible plan to address concerns related to emerging or unknown contaminants. DSRSD would have had to partner with Zone 7, the local water agency, to create a very proactive water quality monitoring and management process to address this issue. The water agency was never a clear champion for the project and eventually pulled their support when a new general manager was hired.
- *Best Practice #11 – Agency as source of water quality.* As with the San Diego example, the Dublin San Ramon project was led by a wastewater agency, falling into the very real branding problem that wastewater agencies are not entrusted with ensuring drinking water quality.

This case study also uncovered an interesting opposition insight that may help in designing more effective communication programs. Opponents felt that DSRSD was trying to "indoctrinate school children" through school information programs. This emphasizes the notion that if the value of a project cannot be communicated to the adult public, then the value of the project should be questioned. It is in the best interest of communities to inform children of the benefits of indirect potable reuse independent of the problem that needs to be solved.

3.2.3 Case Study #6: City of Tampa, Florida

Overview

Over a period of 15 years (from 1983 to 1998) the City of Tampa evaluated the Tampa Water Resources Recovery Project (TWRRP), an indirect potable water reuse project, as a potential water supply source. Federal, State, and local health officials acknowledged that the project could produce water supply that was well within Safe Drinking Water Act standards. Others, especially Pinellas County officials, believed that the water quality treatment was not sufficient and opposed development of the project. At the time of the vote deciding which projects would be adopted, there were two other major alternative projects (i.e., a surface water storage project and a seawater desalination project), which could provide enough water to meet regional supply goals. In November 2000, Tampa Bay Water, the regional water

supply authority, voted to eliminate TWRRP from its list of projects, opting in favor of the two alternatives.

Conclusions

TWRRP appears complex because of the multiple water agencies involved. However, the reasons that the decision was made not to move forward with the project are straightforward. In the final analysis, Pinellas County officials, who had significant positional power and influence over the project, were not content with the water quality management within the region, especially with respect to surface waters. They were not satisfied that a water quality plan was in place that would address the issue of emerging or unknown contaminants. They felt so strongly about this that they are currently considering a water polishing process to improve water quality and consistency even without the indirect potable reuse project. These perceptions about water quality created the foundation for concerns that TWRRP would face conflict from regional water professionals and might face public opposition. This opposition, combined with the fact that the region had developed at least two other supply alternatives (i.e., surface water reservoir and seawater desalination), led to the final decision by the Tampa Bay Water board of directors to remove TWRRP from the list of projects. Any two of the three projects were enough to meet the water supply enhancement goal of 85 mgd.

The key best practices that were not followed that combined to defeat this project were Best Practices #1, #4 and #11. This project followed the most Communication Process Best Practices (#13 to #25) of any of the uncompleted projects (9 of 13 communication best practices were either completely or somewhat followed). Only nine of the 25 best practices were not followed. These results illustrate that some best practices are much more important than others, as discussed in Chapter 2 of this report.

The best practices that appeared critical for this project were as follows:

- *Best Practice #1 – Creating a perception of improvement.* It was the perception of at least one influential agency in the region (i.e., Pinellas County) that water quality was already marginal. Putting treated wastewater into the source water supply might further degrade water quality.
- *Best Practice #4 – Evaluate alternatives to indirect potable reuse.* For years, the Tampa Bay region had been looking at several water supply options, including seawater desalination. In the end, desalination and a major surface water supply project emerged as the alternatives that would address the near term regional water supply issues. Choosing all three alternatives was not necessary to meet the regional goals. Without an aggressive plan for addressing the unique water quality concerns and perceptions associated with indirect potable reuse, it was unlikely that indirect potable reuse could compare favorably against alternatives with similar cost per gallon specifications.
- *Best Practice #11 – Agency as the trusted source of quality.* The City of Tampa's wastewater department was the project proponent and Tampa Bay Water had the ultimate jurisdiction related to water quality. Although Tampa Bay Water has clear water quality standards, they were not sufficient to create the confidence to counteract the unique concerns such as emerging contaminants that arise when evaluating indirect potable reuse projects.

CHAPTER 4

SUMMARY AND CONCLUSIONS

Phase 1 of this project has resulted in the *Best Practices of Indirect Potable Reuse*. These best practices were developed through collaboration with water reuse professionals, interviews with water agency sponsors, and knowledge gained from the case study research. Table 4-1 summarizes the overall assessment of the projects with respect to each of the best practices.

The assessment of whether a specific project followed the best practices is somewhat subjective. The assessment, however, has enough information to be useful. Based on this matrix and the more detailed case study discussion in Appendix A, it is clear that successful projects followed many more of the best practices than the projects that were not implemented.

4.1 The Number and Importance of the Best Practices

Each of the best practices conveys useful information. The assessment of the projects within the context of the 25 best practices provides a framework for both interpreting past projects as well as planning new ones. However, based on the research and an understanding of the critical issues in each of the projects, some of the best practices are more important than others. The conclusion sections for each of the case studies show that the success or failure typically hinged on three to five issues (i.e., best practices).

For instance, the keys to success in the Scottsdale case study included the following: 1) perceptions of the value of water in the desert; 2) the water campus and the associated water-quality credibility; and 3) the relationships that the water resources leadership had with the city council and the media. For the Tampa project, water quality credibility was a problem with key decision makers, as well as two acceptable alternatives that would allow the region to meets its goals. Other best practices were major factors in the other projects.

The best practices considered to be the most critical in the acceptance, approval, and implementation of indirect potable reuse projects are as follows:

Best Practice #1 – Create a Perception of Improvement. It is extremely difficult, if not impossible, to get support for a project if key audiences perceive that the project is somehow degrading quality of life or making things worse. All of the successful projects in this study were perceived as an improvement or moving in the right direction. Dublin San Ramon was perceived as degradation due to growth and influential players in the Tampa project viewed indirect potable reuse projects as moving in the wrong direction with respect to water quality.

Best Practice #2 – Clearly Articulate the Problem. It is difficult to follow Best Practice #1 if there is not an important problem to solve. What is the unacceptable condition that water agencies are resolving or avoiding? The case study research shows that San Diego was a project without a clearly defined problem. At least one influential city council member was not aware that the project resolved a water supply issue. He thought the project was being sold on the "goodness of recycling." Since 2003, the Metropolitan Water District of Southern California and its member agencies, including San Diego, began to address how they could send a unified message on the need for water supply investment in southern California.

Dublin San Ramon had a defined wastewater problem. However, they did not succeed in implementing Best Practice #1 because people perceived that rapid growth was forcing them to consider augmenting their drinking water supply with reclaimed water. Occoquan did not have to follow *best practices* because they were clearly improving an *existing and significant water quality problem.* They backed this up with an independent and perpetual water quality authority.

Table 4-1: Assessment of Best Practices by Case Study Project

Best Practices of Indirect Potable Reuse	Case Study					
	#1 Scotts Dale	#2 Upper Occoquan	#3 OCWD	#4 San Diego	#5 Dublin/San Ramon	#6 City of Tampa
Value-Based Strategy Practices						
1. Create a Perception of Improvement	●	●	●	○	○	○
2. Clearly Articulate the Problem	●	●	●	○	●	◒
3. Supply - Planning Criteria	◒	N/A	○	○	○	○
4. Evaluate Alternatives to Indirect Potable Reuse	●	◒	●	◒	◒	◒
5. Communicate the Benefits of Indirect Potable Reuse	●	●	●	◒	○	◒
6. Express Costs in Meaningful Terms	●	◒	●	○	○	●
7. Avoid Environmental Justice Issues	●	●	●	○	○	●
8. Understand, Use Track Record	●	N/A	●	◒	◒	●
9. Break the Source-Quality Connection	●	◒	●	○	○	○
10. Articulate an Ongoing Water Quality Plan	●	●	●	○	○	○
11. Agency as Source of Water Quality	●	●	◒	○	○	○
12. Rename Water Quality	◒	○	◒	●	○	○
Communication Process Practices						
13. Communication and Collaboration	●	●	◒	◒	◒	◒
14. Inform, Don't Educate	●	N/A	●	◒	○	○
15. Practice Good Leadership	●	◒	◒	○	◒	◒
16. Start Early	●	○	●	●	●	◒
17. Identify and Collaborate with Key Audiences	●	◒	●	◒	○	◒
18. Embrace Potential Conflict and Opposition	◒	●	◒	○	○	○
19. Constantly Communicate	●	◒	●	◒	○	○
20. Keep Communicating after the Project is Completed	●	◒	N/A	N/A	N/A	N/A
21. Relationships with the Media	●	○	◒	○	◒	●
22. General Information/Advertising Campaigns	●	◒	●	◒	◒	●
23. Don't be Defensive	●	●	N/A	◒	○	●
24. Practice Conflict Resolution	N/A	N/A	◒	○	○	◒
25. Maintain Credibility	●	●	◒	○	○	●
Was the Project implemented or approved?	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**

Legend: ○ – best practice **not** followed ◒ – best practice **somewhat** followed

● – best practice **was** followed N/A – not applicable

Best Practice #4 - Evaluate Alternatives to Indirect Potable Reuse. Once a compelling problem is articulated, the value of any solution can be assessed relative to alternatives. If there is no value-based collaboration about alternatives, the public may feel that they are not being heard or that the "project" is being "forced on them," resulting in conflict (Dublin San Ramon and San Diego). At least one city council member in San Diego did not understand why he should choose indirect potable reuse given that desalination was an emerging alternative. Alternatives clearly factored into the Tampa decision. San Diego is now pursuing seawater desalination in addition to the transfer of water from Imperial County. Most of the conflict remaining in the OCWD Groundwater Replenishment System project relates to water banking options and financial alternatives. If this best practice is not followed, the utility risks being perceived as advocates for the project and not advocates for solving the meaningful problem. Utility leaders should look at alternatives very early in the process and assess how indirect potable reuse will compare against the available options.

Best Practice #7 – Understand and Avoid Environmental Justice Issues. Until communities are fighting over reclaimed water to inject into the ground, it is prudent to adhere to this best practice. There is potential for conflict if the utility chooses not to address environmental justice concerns.

Best Practice #11 – Establish the Utility as the Source of Water Quality. Ultimately the community has to find someone to trust on issues related to managing water quality. The public has preconceived notions that water quality is related to its physical source. That is, consumers incorrectly believe that mountain spring water is "pure and healthy" and reclaimed water is "not fit to drink." In fact, mountain spring water can be lethal and advanced treated reclaimed water can be very safe. Water quality, as delivered to users, is determined by the diligence of the utility and how much they invest in testing and treatment. To follow this best practice, utility managers must understand the importance of the utility as the source of water quality. Water managers must make it a high priority to be perceived as the source of quality. By following this best practice, at least two other best practices are also followed: 1) Best Practice #*10 – Articulate an Ongoing Water-Quality Plan,* and 2) Best Practice #9 – *Breaking the Source-Quality Connection*. The water quality plan must employ and communicate processes for managing emerging contaminants. Communities will understand that there is risk, and that it can be managed, if the process is presented in simple and meaningful ways (i.e., multiple barriers, redundancy, proactive and ongoing quality testing diligence, and emergency response). Scottsdale, Orange County, and Occoquan followed this best practice.

Best Practice #11, in conjunction with Best Practices #9 and #10, underscores the fundamental reason why a wastewater utility should not be the sole sponsor of an indirect potable reuse project. Occoquan resolved this issue by setting up an independent and ongoing water quality authority (OWML), which became the trusted source of quality. In general, the wastewater utility, by itself, will not have water quality credibility. They will need to meet this best practice through third parties and partnerships.

Best Practice #13 – Communicate and Collaborate About Value. This is the master best practice for all of the communication processes. The value-based strategy best practices help us define the value of the project. The communication process best practices help develop support for the project through communicating and collaborating with key audiences. Collaboration will reduce the likelihood of conflict. Water laypersons, which are most people and include the decision makers, are capable of helping utilities define higher-value projects.

Best Practice #15 – Practice Good Leadership. This best practice is critical since it factored heavily into the outcome of several of the projects evaluated in this study. Project leadership must be trusted and credible in the eyes of key audiences. A leader must develop good relationships with these audiences. It will not be sufficient for the hired public relations firm to fill this role. Good relationships with city council and the media factored into the success of the Scottsdale project. Although the wastewater leaders in San Diego were good at their jobs (i.e., received "high marks" from everyone interviewed), they did not have the necessary relationships and credibility with the city council, local and state

legislators, or the media. The leaders should also have a good sense of how people perceive value and how to communicate in a meaningful way about value.

Best Practice # 17 – Identify and Collaborate with Key Audiences. The most important audiences are elected officials, people who influence them such as community activists, the media, and any official decision makers. Collaboration with these key audiences was an important factor in several of the projects. Water staff and leadership had good relationships with city council members and the media in the Scottsdale case. Dublin San Ramon board members were eventually in conflict with the media. Despite the professional outreach and communications in San Diego, the communication between council members and project leadership was not effective. The local paper was not supportive of the project.

Best Practice #18 – Embrace Potential Conflict and Opposition. In the majority of cases, opponents of projects have valid points and conflict arises because of a failure to effectively follow Best Practice #13 – *Communicate and Collaborate about Value*. Embracing conflict (i.e., viewing it as valuable and legitimate) helps the sponsoring utility to see project flaws, helps opponents to believe that they are being heard, and increases the credibility of the utility. If conflict arises, it is advisable to practice conflict resolution (see Best Practice #24).

Best Practice #21 – Develop Ongoing Relationships with the Media. The media can create negative perceptions about a project that will cause elected officials and decision makers to be concerned. It is important to note that *headlines brand projects*. One of the most impressive events that happened in Scottsdale was that the editor of the newspaper and the general manager of the water resources department visited Water Factory 21 in Orange County *together*. This set the stage for a positive relationship that continued throughout the project. Feeling victimized by the media, or becoming antagonistic toward them, is a recipe for problems.

4.2 Structure for Presenting the Best Practices

To add meaning and improve usability, the best practices can be structured or categorized in several ways. For example, most of the remaining best practices are related to the ten most important best practices listed above. In addition, some of the best practices could be considered subsets of others. The purpose of Best Practices #2-25 is to meet the requirement of Best Practice #1, which is to create a perception of improvement. In this sense there is a hierarchy within the best practices. The best practices could be arranged in a structure that reflects the best order for implementing them (i.e., reflecting the chronology of a typical project). They could also be categorized as to whether they are principles, strategies, or tactics.

This section of the report is intended to provide a better understanding of perceptions related to indirect potable reuse projects. For instance, this study demonstrates that people will view projects positively or negatively based on their perceptions of the value of the project. Given the importance of value, it is reasonable to structure the best practices with respect to the key elements of value as has been done throughout this document. As discussed in Section 1.2, these elements are as follows:

- Problem being Solved;
- Alternatives for Solving the Problem;
- Risks; and
- Identity or Brand.

Separating the best practices between content (value-based strategy best practices) and process (communication process best practices) simply emphasizes that the best communications processes cannot overcome a flawed value strategy, and great value may not matter if no one knows about it.

In the next phases of this project, the best practices will be used in different structures and contexts to develop a series of tools for water managers. These tools for managing indirect potable reuse projects will be prioritized to address the most critical best practices.

4.3 Importance and Impact of Project

Why is it important that indirect potable reuse projects get fair consideration? First, unplanned indirect potable reuse is already occurring in many communities. Upstream communities discharge treated wastewater into what ultimately becomes the water supply of downstream communities. If water agencies do not become proficient at managing perceptions of indirect potable reuse, communities will not sufficiently address the need to manage emerging and unknown contaminants in our water sources, not just in the water that is perceived to be reused. Second, it is possible that communities will choose not to produce the higher-quality water that indirect potable reuse can deliver because they are afraid that they cannot manage the public perception issues. Communities deserve and will pay for high quality and value if they are informed about the benefits.

4.4 Next Steps

As specific tools are developed for utility managers in the next phase of this project, the best practices will become clearer and can be refined. Given the ten most critical best practices above, there is a manageable checklist to work with, and a clear context for viewing potential projects. It is also clear that these case studies, viewed within the context of the best practices, demonstrate that the public perception issues surrounding indirect potable reuse projects can be managed by water and wastewater agencies. Projects that are valuable and perceived as valuable by key audiences can be implemented.

Many of the best practices in this document could be applied to any project or proposal in the water industry. This parallels other work with water and wastewater utilities related to implementing value-based strategies and decision-making.

REFERENCES

National Research Council (1998), *Issues in Potable Reuse: The Viability of Augmenting Drinking Water Supplies with Reclaimed Water*, www.nap.edu/books/0309064163/html/index.

Occoquan Policy, http://leg1.state.va.us/lis.htm, Go to: 1) The Virginia Administrative Code, 2) Table of Contents, 3) Title 9 – Environment, 4) Agency 25-State Water Control Board, 5) Chapter 410 - Occoquan Policy.

Repurified Water Information Book (1998), unpublished (copy of the City of San Diego, Project Leader's personal project history and notes).

Resource Trends, Inc. (2002), *Bridging the Marketing Gap in Water*, written and published by Resource Trends, Inc., www.ResourceTrends.com.

Robbins, Jr., M.H., (1993) *Supplementing a Surface Water Supply with Reclaimed Water*, AWWA Annual Conference and Exposition, San Antonio, TX.

Robbins, Jr., M.H., and Gunn, G.A. (1979) Water Reclamation for Reuse in Northern Virginia, *Proc. Water Reuse Symposium*, American Water Works Association, Denver, CO, 2, 1311.

WEF and AWWA (1998) *Using Reclaimed Water to Augment Potable Water Resources*, Special Publication, Water Environment Federation and American Water Works Association.

APPENDIX A

CASE STUDY DISCUSSION

A.1 Introduction

The individual case studies for the six projects investigated as part of this project are provided in this appendix. The case studies are examined in greater detail in this appendix, including an assessment of each project within the context of the 25 best practices. The best practices served as a hypothesis and framework for analyzing why some projects were successful, while others were not. As a result, each best practice is viewed within the context of six real world situations. The case studies should provide a context for using the best practices in evaluating future indirect potable water reuse projects.

A.2 Case Studies of Successful Projects

The definitions of "success" and "failure" can depend on context. In this study "success" is defined as ongoing implementation of a specific planned indirect potable reuse project. A "failed" project is one where an indirect potable project was proposed and invested in, but did not continue due to opposition.

The successful projects reviewed under this study were as follows:

- Scottsdale, Arizona – Case Study #1;
- Upper Occoquan Sewage Authority, Virginia – Case Study #2; and
- Orange County California GWR System – Case Study #3.

A.2.1 Scottsdale, Arizona – Case Study #1

About the Project

The Scottsdale Water Campus is a 12 mgd water reclamation plant with a co-located 10 mgd advanced treatment facility, groundwater recharge wells, and water quality laboratory. The Water Campus, located in northern Scottsdale, Arizona, has been in operation since 1999.

The City of Scottsdale lies along the eastern border of Phoenix, the nation's sixth largest city. Indian reservation land borders Scottsdale to the east. Scottsdale's 184.5 square miles form a long tall rectangular shape, with rather distinctive character and geographic separation between its older, less affluent southern sections and its newer, more affluent northern sections. As of 2002, Scottsdale had a population of over 215,000. Scottsdale's potable water sources include groundwater and surface water delivered by the Central Arizona Project and Salt River Project canal systems.

The water reclamation plant produces two effluent streams. One stream is tertiary treated effluent, which is safe for body contact and is used for nonpotable applications. A majority of this water is transferred to area golf courses for irrigation, particularly during the hot summer months. Parks and medians also use this effluent for irrigation. After the needs of irrigation customers are met, the remaining effluent undergoes advanced treatment, creating the second stream. The advanced treatment includes microfiltration and reverse osmosis to treat water that exceeds Federal drinking water standards before it is injected via dry wells into the aquifer. The groundwater recharge helps Scottsdale meet the requirements of the State of Arizona's 1980 Groundwater Management Code (described later under Best Practice #2).

Design and construction of the Water Campus occurred during the mid- to late-1990s, a period of major growth in north Scottsdale. Prior to construction of the Water Campus, Scottsdale's wastewater was delivered via underground infrastructure to a regional wastewater treatment facility, the 91st Avenue Wastewater Treatment Plant (WWTP), located in Phoenix 40 miles southwest of the Water Campus. Because of booming growth in north Scottsdale, the City was exceeding its maximum allocated capacity at the 91st Avenue WWTP and faced the cost to purchase additional capacity from the regional facility as well as the cost to design, build, and maintain the infrastructure to transport the increasing quantity of wastewater. Rather than expanding its allocated capacity at the 91st Avenue WWTP, Scottsdale decided to build the Water Campus to address current and future water needs.

The Water Campus facility was approved by more than 70 percent of Scottsdale's voters in a 1989 citywide bond election. In 1991, the City purchased 100 acres in north Scottsdale near a future freeway interchange and other existing utilities (including a high-voltage power line corridor) from the State Land Department.

The Water Resources Department underwent a Master Planning process in 1992 to analyze alternatives to determine the optimum solution to address the City's future water requirements. The proposed treatment processes successfully underwent pilot testing at a reclamation plant located in an upscale Scottsdale neighborhood. Design of the facility and associated collection system began in 1995, construction began in 1996, and the system went online in 1999.

The Scottsdale Water Campus is an example of a successful indirect potable reuse project that is a centerpiece of community pride. Based on both the secondary research and primary interviews with City staff and engineering consultants, the following is an assessment of how this project used the best practices of indirect potable reuse.

Value-Based Strategy Best Practices

Problem Being Solved

1. ***Create a Perception of Improvement –*** Yes. The project enabled compliance with Arizona's Groundwater Management Act of 1980 and stopped the practice of giving away a valuable resource (i.e., its wastewater) to the 91st Avenue WWTP. These improvements, combined with the state-of-the-art treatment processes and water quality laboratory, created a perception of enhancement.

2. ***Clearly Articulate the Problem –*** Yes. The project was proposed by the City Water Resources Department as a solution to two problems: a need to treat the wastewater of the growing City and need for a source for aquifer recharge to comply with the State's Groundwater Management Act. Irrigation customers, particularly area golf courses, also created a demand for reclaimed water. It is interesting to note that in articulating the problem, the City positioned the wastewater as a "valuable resource" that was being "lost" to the 91st Avenue WWTP when it could be retained for use within the City.

3. ***Have a Meaningful Supply Planning Criterion –*** Some. The Water Resources Department underwent a Master Planning process in 1992 to analyze alternatives to determine the optimum solution to address the City's future water requirements. In addition, Arizona's Groundwater Management Code restricts desert cities' reliance on groundwater by requiring that water agencies account for use of groundwater resources and recharge groundwater aquifers to replenish whatever is withdrawn. It should be noted that because of the desert climate, the need for additional sources of water supply was intuitive to the community.

Alternatives to Indirect Potable Reuse

4. ***Evaluate Alternatives to Indirect Potable Reuse –*** Yes. Alternatives were thoroughly researched and discussed by the City, its engineering consultants, and a Technical Advisory Committee (TAC) that consisted of academic, regulatory, public health, and technological representatives. The TAC met three times: first for a brainstorming session, second just prior to commencement of the pilot test, and third at the conclusion of the pilot test. Alternatives that were considered included building the infrastructure and buying the additional capacity that would be necessary to send the wastewater from the new areas at the north end of the City to the 91st Avenue WWTP. This alternative would have also required buying additional surface water rights (Central Arizona Project or Salt River Project water) to recharge the aquifer. The comparison against alternatives was a consistent theme in project communications, with simple, straightforward text and graphics that explained why the project had "won out" over the other alternatives.

5. ***Communicate All the Benefits of Indirect Potable Reuse Projects –*** Yes. The benefits of this project were communicated clearly, and they were communicated using comparisons of the alternatives. Wastewater was described throughout communications as a "valuable resource." In fact, the capital costs favored the 91st Avenue WWTP alternative if the value of the reclaimed water resource for irrigation and recharge was not taken into consideration.

6. ***Express Costs in Meaningful Terms –*** Yes. The $150 million project was funded by revenue bonds approved in 1989 as well as water and wastewater development fees. The Water Campus project enjoyed the benefit of being able to say "you voted for it." In addition, the project was paid for by developer fees in the growing north Scottsdale area, so there was no impact on rates.

Risks of Indirect Potable Reuse and Alternatives

7. ***Producer and User Must be the Same –*** Yes. The wastewater collection, treatment, groundwater recharge, and eventual withdrawal all occur within north Scottsdale, where the facility is also located. Additionally, the City positioned the wastewater as a "valuable resource" that was being "lost" to the 91st Avenue WWTP when it could be retained for beneficial use within the City.

8. ***Understand and Use the Concept of Track Record –*** Yes. The project was "inspired" by the successful Orange County Water District project called Water Factory 21. In fact, the Director of the Water Resources Department traveled to tour Water Factory 21 with local media. Project planning, approval, and design spanned the tenure of two different Water Resources Department Directors, both of whom had outstanding track records and reputations within the industry, and both had positive relationships with city management, mayor, and city council.

9. ***Break the Source-Quality Connection –*** Yes. Project communications clearly identified and explained the various stages of treatment using text and graphics. The wastewater undergoes a five-step treatment process at the reclamation plant before undergoing an additional two steps of advanced treatment, microfiltration, and then ultimately reverse osmosis, a technology that is relatively familiar to the average citizen and is associated with water purity. Communications also identify the natural "polishing" process that happens as the recharged water filters through 500 feet of soil before reaching the water table.

10. ***Articulate an Ongoing Water Quality Plan –*** Yes. In project communications, the Water Campus facility was identified as the City's proactive solution to meeting future regulatory requirements by touting the state-of-the-art treatment technology and co-located water quality laboratory. The water quality laboratory, located within the main building at the Water Campus, analyzes multiple samples collected regularly from points throughout the City to comply with the Safe Drinking Water Act, Arizona's Aquifer Protection Program, and the Clean Water Act.

Identity of the Water and the Agency

11. ***Establish Water Agency and Investment as Source Water Quality –*** Yes. The Water Resources Department enjoyed a positive relationship with city management, city council, and other key audiences. The many treatment barriers including the "natural" soil percolation meant that people intuitively trusted the water quality (i.e., injecting "bottled water quality" into the aquifer). Other factors that afforded the project credibility include the water quality laboratory described above and the "academic" Water Campus brand.

12. ***Rename the Water Quality –*** Some. Informational materials routinely referred to "recycling" of water and emphasized the purity of the recharge water by indicating that it would "meet or exceed all Federal water quality standards." "High quality reclaimed water" and "water purified to drinking standards" were phrases that were used frequently.

Communication Process Best Practices

13. ***Collaborate and Communicate About Value –*** Yes. There were two collaborative forums during project planning. A Technical Advisory Committee consisting of regulators, academics, and public health and technology experts helped the Water Resources Department make better decisions by participating in a brainstorming session with the City and its consultants. A strong foundation of support was developed, particularly with the decision makers (i.e., county, state, and Federal regulators, city management, mayor and city council). Also, the Department sought out and communicated with potential opposition, particularly the media.

14. ***Inform, Don't Educate –*** Yes. Discussions about the project and alternatives were meaningful and did not require "education." People understood that investing in new infrastructure to send a valuable resource to the 91st Avenue WWTP would mean tearing up streets and having to buy imported water to recharge the groundwater. The choices were either: 1) to pay money to give the resource away and pay more money to buy water to recharge the aquifer, or 2) keep the resource and recharge the aquifer. From a water quality perspective, people understood that reverse osmosis created pure water.

15. ***Practice Good Leadership –*** Yes. The project proponent was the Water Resources Department Director. The Director "marketed the project one on one" and in particular developed a rapport with a reporter at the Scottsdale Progress Tribune. The reporter was invited to visit the Water Factory 21 facility in Orange County. Instead, the paper decided to fly their editor to Orange County to accompany the Director. The Water Resources Director established a very positive relationship with the newspaper. The paper ran a positive story and established a solid foundation for the remainder of the project. Several sources said that the Water Resources Director and staff had developed positive relationships with the city manager and the city council. This relationship with the city management and city council was a key factor in the success of the project.

16. ***Start Early –*** Yes. Marketing for the project actually started in the late 1980s. The City procured the 100-acre parcel in 1991, and signage identifying it as the "Future Home of the Water Campus" was in place throughout the planning and design process.

17. ***Identify and Collaborate with Key Audiences –*** Yes. The relationships with the media and the decision makers (i.e., management and city council) were the critical element of the project's ultimate success. The Technical Advisory Committee was formed to create a collaborative process with key audiences including regulators, the U.S. EPA, county environmental officials, academics, and technology experts. They considered the problem and alternatives to solving problem including shipping the water to the 91st Avenue WWTP.

18. ***Embrace Potential Conflict and Opposition –*** Some. There is evidence that the City and consultants anticipated opposition and issues, but no evidence that conflict or opposition ever surfaced. One-on-one proactive communication occurred with the media, mayor and city council, city management, the Technical Advisory Committee (i.e., regulators, academics, and technology experts) and the Water Resources Advisory Group (i.e., developers directly impacted with development fees). The team also anticipated a potential no-growth faction that could have surfaced in opposition to irrigating golf courses located in north Scottsdale. They emphasized the environmental benefit of retention of a valuable water resource and groundwater recharge (i.e., intuitively beneficial activities to residents of the desert) in project communications.

19. ***Constantly Communicate –*** Yes. Communication occurred at least semi-annually throughout design and construction. This communication included newsletters distributed to citywide citizen service centers and upon request, as well as a video that ran on the City's local cable station several times per week for several months.

20. ***Keep Communicating After the Project is Completed –*** Yes. The Water Resources Department held an open house for the grand opening, which was heavily attended and a huge success. The facility offers tours (although more limited since the terrorist attacks of September 11, 2001) to a wide variety of local, national, and international audiences. Brochures produced by the City continue to promote the benefits of the Water Campus.

21. ***Develop Ongoing Relationships with the Media –*** Yes. Early in the planning process, the Water Resources Department Director developed close relationships with local media. The Water Resources Department Director and the local newspaper editor flew together to Orange County, California to tour Water Factory 21. As a result, newspaper coverage was factual and positive

and television coverage of the facility's grand opening in 1999 included "man on the street" interviews enthusiastically in support of the facility and the Department.

22. ***Use General Information/Advertising Campaigns Appropriately –*** Yes. Newsletters, video, and brochures were produced and distributed.

23. ***Don't Be Defensive –*** Yes. The Water Resources Department enjoyed a position of confidence in its solution because of the clear articulation of the problem and alternative solutions.

24. ***Conflict Resolution –*** Not Applicable. Traditional lines of conflict were addressed by geography. Potential growth opposition did not become a conflict because the direct impacts of the facility fell within the growth area (not in the backyards of the anti-growth population). Also, it was difficult for opposition to take hold given the sensitivity to water needs in the desert and the positive relationships between the project and the city officials.

25. ***Maintain Credibility –*** Yes. Follow the other best practices and this will follow naturally.

Conclusions

The Scottsdale project was successfully completed in 1999 and has been in operation ever since. Of all the case studies reviewed, the Scottsdale project followed most of the best practices. It followed 21 of the 25 completely, three somewhat, and one (Best Practice #24- Practice Conflict Resolution) was not applicable since little conflict occurred.

The best practices that appeared critical for project success were:

- *Best Practice #1 – Creating a perception of improvement*. The quality of the water injected into the aquifer was "bottled water quality."
- *Best Practice #2 – Clearly articulating the problem.* Scottsdale needed to meet the Arizona Groundwater Management Code, which addresses maintenance of aquifers. They were also faced with spending money to increase their capacity to send wastewater to the regional treatment plant.
- *Best Practice #4 – Evaluate alternatives.* They looked at the option of increasing wastewater delivery infrastructure. However, they successfully made the case to the community that it did not make sense to invest in wastewater infrastructure to give a "valuable resource" away by sending it to the regional treatment plant. They would still have to buy more imported water to replenish the aquifer.
- *Best Practice #7 – Understand and avoid environmental justice issues.* Scottsdale wastewater producers and indirect potable user were the same, generally affluent community. No disadvantaged or minority groups were isolated.
- *Best Practices #10 – Articulate an ongoing water quality plan and Best Practice #11 – Establish the utility as the trusted source of quality*. The presence and positive branding of the "Water Campus," which includes a water quality lab, and ongoing information about water quality and testing, inspired public confidence in the utility and its processes.

A.2.2 Upper Occoquan Sewage Authority, Virginia – Case Study #2

About the Project

The Occoquan Reservoir serves as a principal water supply source for more than one million people in Fairfax County, Virginia. The 570 square mile Occoquan Watershed, with Dulles International Airport on its northern boundary and Washington, D.C., 15 miles to the east, remained largely rural until the 1960s when the opening of Interstate 66 made a rural/suburban area convenient to people working in the nation's capital. The resulting rapid development led to water quality problems in the reservoir (Robbins and Gunn, 1979). Documented water quality problems included:

- Active viruses detected in the reservoir and tributary streams;
- Frequent and intense algae blooms;
- Frequent taste and odor problems in the water treatment plant;
- Oxygen depletion and fish kills in the reservoir; and
- Sulfides in lower reservoir depths.

Based on a comprehensive study from 1969 to 1970, the source of the problem was 11 primary and several secondary wastewater treatment plants discharging into the reservoir and its tributaries. Two alternatives were recommended (WEF and AWWA, 1998):

- Providing upgrades to secondary treatment, combining the effluent, and exporting the effluent out of the Occoquan Watershed; or
- Providing the highest treatment technologically achievable and discharging the reclaimed water to the Occoquan Reservoir.

Since 1978, the Upper Occoquan Sewage Authority (UOSA), an agency created by Virginia, has been treating wastewater for discharge to this reservoir for indirect potable reuse (Robbins, Jr., M.H., 1993; and Occoquan Policy). In addition, an independent agency known as Occoquan Watershed Monitoring Laboratory (OWML) was established to monitor water quality of the watershed and advise State regulatory agencies on a continuing basis of the measures necessary to preserve and protect the reservoir as a water supply.

Based on both the secondary research and the interviews, the following is an assessment of how this project followed the best practices of indirect potable reuse.

Value-Based Strategy Best Practices

Since the motivation for this project was to clean up the water source, not a water shortage problem, it has a number of unique elements related to the best practices.

Problem Being Solved

1. ***Create a Perception of Improvement –*** Yes. The project was perceived as improving the water quality in the Occoquan Reservoir.

2. ***Clearly Articulate the Problem –*** Yes. The Occoquan Reservoir had a poor water quality problem due to runoff and low-quality secondary treatment. The formation of UOSA and the oversight by OWML greatly enhanced the water quality and has consistently maintained a supply of high water quality for the Fairfax County Water Authority.

3. ***Have a Meaningful Supply-Planning Criterion –*** Not Applicable. The supply-planning criterion was not the issue on this project. The area has sufficient supply from other sources including the Potomac River and other reservoirs upstream. However, the Occoquan Reservoir has been in use

for many years for both recreation and water supply and is considered an important resource for the region. Improving its quality was the primary planning criterion, while maintaining a sufficient quantity of water in the reservoir.

Alternatives to Indirect Potable Reuse

4. ***Evaluate Alternatives to Indirect Potable Reuse –*** Some. One other alternative was considered: to export the water from the watershed. Since lower quality water was already going into the reservoir, the choice was made to keep it there. The increased purity of the discharge water showed immediate benefits to the water users. This *increase* in water quality was an immediate, obvious, and tangible benefit to the public and to the water agency that treats and distributes the drinking water (see Best Practice #10).

5. ***Highlight the Benefits of Indirect Potable Reuse Projects –*** Yes. The benefit was simply improving the existing poor quality water while keeping the hydraulic flow in the Occoquan River and Reservoir. No other benefits were communicated to the community. The treated wastewater has consistently been demonstrated to be of higher quality (especially salts and organic concentration) when compared to the average runoff water in the watershed.

6. ***Express Costs in Meaningful Terms –*** Some. The new wastewater treatment project was not handled any differently than typical capital improvement projects. This upgrade occurred at a time when the Clean Water Act was just being implemented (1970s), and State and Federal funding were used on this project. Rates were not impacted more than was common at the time for other wastewater treatment improvement projects.

Risks of Indirect Potable Reuse and Alternatives

7. ***Producer and User Must Be the Same –*** Yes. Producers and users of the Occoquan Reservoir are the same. Fairfax County Water Authority and Prince William County Water are both the generators and users of the reclaimed water.

8. ***Understand and Use the Concept of Track Record –*** Not Applicable. This idea was not used in this project since prior to this project there was no track record available.

9. ***Break the Source-Quality Connection –*** Some. As stated above, the increased purity of the discharge water demonstrated immediate benefits to water users. UOSA added two more "barriers" to improve water quality (i.e., carbon adsorption and ion exchange). However, the actual and observable increase in water quality from reclaimed water over the original and/or natural runoff provided an immediate tangible benefit. This improvement helped to "distance" the quality of treated wastewater from the quality of the community tap water. By improving, rather than degrading, the quality of the reservoir water, the source-quality connection never became an issue.

10. ***Articulate an Ongoing Water Quality Plan –*** Yes. OWML, and the watershed in general, are charged with maintaining a continuous water quality improvement plan. This approach is a major focus of the ongoing watershed management system.

Identity of the Water and the Agency

11. ***Establish Water Agency as Trusted Source of Water Quality –*** Yes. UOSA and OWML (the independent water quality laboratory) have shown over a 20-year history that water quality has improved. Initially the source water was very poor and there were algae blooms and significant taste and odor problems. By improving the source-water quality through improving the quality of the discharge water, the source-water quality improved.

12. ***Rename the Water Quality –*** No. Occoquan is unique compared to practically any watershed in the U.S. in that it has a separate water quality monitoring laboratory and a program specifically established to monitor and make recommendations on water quality (i.e., OWML). However, there is no evidence that water quality is specifically branded, except that it is perceived to be better than what it was.

Communication Process Best Practices

Other than the websites and the various stakeholder committees and citizen watershed monitoring plans, no evidence was found that there is a concerted communication process that positions UOSA as an "indirect potable reuse project." Not only is this not emphasized, UOSA basically operates as any typical wastewater treatment plant in any other watershed (i.e., compliance, citizen involvement and public education programs).

13. ***Communicate and Collaborate About Value –*** Yes. The compliance and regulatory function of UOSA participates regularly in task forces and citizen action groups within the Occoquan watershed. In this way they communicate by their actions and their words that they are a leader of water quality for the community

14. ***Inform, Don't Educate –*** Not Applicable. Since this project is ongoing with more than a 20-year history, there is little or no advocacy that is promoted. For this reason, elements of a communication program are not that detailed.

15. ***Practice Good Leadership –*** Some. This project was implemented by the Commonwealth of Virginia. It was not a locally generated project due to the multi-jurisdictional nature of the watershed (i.e., multiple cities and counties). In addition, the creation of the independent oversight and monitoring program (OWML) instituted a layer of independent accountability. It is perceived by all involved that this provides assurance (i.e., trust) to both the local communities and the regulators.

16. ***Start Early –*** No. While this project was conceived 30 years ago, there is no evidence that formal communication processes were "started early."

17. ***Identify and Collaborate with Key Audiences –*** Some. The public is included constantly in all major decisions through the key boards that run the various agencies in this watershed (i.e., UOSA and OWML) and Fairfax County Water Authority. UOSA and OWML were mandated as part of the Virginia "policy" for the Occoquan watershed. However, there are two ongoing processes where communication is regularly occurring:

    - **Technical Advisory Groups:** Periodically various agencies form technical advisory groups composed of a combination of experts, citizens, politicians, and other stakeholders in the Occoquan watershed . For example, in 2002 a technical advisory group formed to focus on downzoning of certain land tracks so as to protect the integrity of the watershed. Much of the discussion has been about urban/suburban runoff and not the discharges to Bull Run by the UOSA facility. Also, as pointed out by the President of the Occoquan Watershed Coalition, the main water quality problem is storm water runoff, not the discharges from the wastewater treatment plant. There are ongoing programs within the Coalition (e.g., citizen volunteers are helping to monitor the watershed's streams and are participating in stream clean-ups). The focus is on land practices management, not the UOSA discharge.

    - **Response to Call-In Inquiry:** Periodically, "once or twice a week," there are inquiries from citizens who come to realize that 100 percent of the local wastewater treatment

plant's discharge goes into the local Occoquan Reservoir, which is a major source of drinking water. These callers typically have concerns, but staff of the agency (typically one of the water agencies that uses the water, not UOSA), informs them about the independent monitoring agency (OWML) and that this has been going on for over 25 years (over 50 years when the other wastewater plants are included). It typically makes people feel more comfortable that this is not something new and that it is generally accepted by both the local population as well as the State health officials. UOSA had no "opposition" that anyone can point to. This effort is more of an ongoing and somewhat standard community involvement process, rather than a proactive communication campaign.

18. ***Embrace Potential Conflict and Opposition –*** Yes. The water agencies that use the water (e.g., Fairfax County Water Authority) and UOSA respond to inquiries. But there has never been major conflict that anyone can remember or point to on this project. As a result of the above processes, the various agencies responsible for water quality address potential conflict. The fact that agency leadership addresses concerns directly and does involve people, this implies responsiveness rather than ignorance or avoidance.

19. ***Constantly Communicate –*** Some. While communication occurs, and although there is not an ongoing or special communication program, the agencies are responsive.

20. ***Keep Communicating After the Project is Completed –*** Some. As stated above, this is occurring in much that same way the communication occurs in other districts and agencies around the country.

21. ***Develop Ongoing Relationships with the Media –*** No. No specific relationship with the media has ever been developed for this project. In general, the media will gravitate toward controversial projects. It has been the implicit goal of members of this project to stay out of the media's attention.

22. ***Use General Information/Advertising Campaigns Appropriately –*** No. No information or advertising campaign was implemented on this project.

23. ***Don't Be Defensive –*** Yes. During interviews people were very open about the fact that wastewater effluent was being reused through the unique hydrology of the Occoquan Reservoir. There was no defensiveness observed with the participants in the various facilities.

24. ***Conflict Resolution –*** Not Applicable. Conflict resolution has not been a factor in this case study.

25. ***Maintain Credibility –*** Yes. Credibility is maintained due to the 25-year history of the water quality monitoring laboratory and the consistently positive performance of the facilities. As a result, the water quality of the reclaimed water is higher than the natural runoff.

Conclusions

This project was the oldest reviewed under this study and it followed only ten best practices fully. However, this case study highlights the importance of *Best Practice #1 – Create a Perception of Improvement*. It was clear to all involved (especially the water districts that were taking water from the Occoquan Reservoir) that water quality had greatly improved as a result of the AWT plant. Because this project was conceived and intended as a surface water quality improvement program, rather than a supply enhancement program, it had a unique context compared to the other projects reviewed.

A unique feature of this project was the formation of the water quality laboratory, OWML, which provided the public an actual independent audit of the facility and its impact on the environment. For example, OWML has recently shown that pollution from urban runoff far exceeds any discharge pollution from the AWT facility. Because of its unique context, features, and ongoing public involvement programs, the Upper Occoquan project stands as a positive example of indirect potable reuse.

The best practices that appeared critical for project success were:

- *Best Practice #1 – Creating a perception of improvement.* The Upper Occoquan situation was unique in that it was designed specifically to *improve* surface water quality. No other project studied had this objective, though the successful ones are improving, and not degrading, groundwater quality.
- *Best Practice #2 – Clearly articulating the problem.* The water quality problem was easy to identify and easy to articulate in this project.
- *Best Practice #7 – Understand and avoid environmental justice issues.* The Fairfax County area was both the producer and consumer of the water and no specific groups were isolated.
- *Best Practice #10 – Articulate an ongoing water quality plan and Best Practice #11 – Establish the utility as the trusted source of water quality.* Creating the independent OWML was critical to articulating a plan and establishing water quality credibility.

A.2.3 Orange County California GWR System – Case Study #3

About the Project

The Orange County Water District (OCWD) has proposed and received approval from their board of directors for the Ground Water Replenishment (GWR) System project. This project consists of the following:

- **Expansion/Upgrade of Water Factory 21** – OCWD implemented Water Factory 21 in the 1970s to produce recycled water for creating a seawater intrusion barrier. OCWD is proposing expanding and upgrading the facility with modern treatment technology.
- **Expand the Existing Barrier Capacity** – Expand the number of seawater intrusion injection wells.
- **Pipeline to Forebay** – OCWD proposes to build a pipeline upstream to the forebay to transport recycled water for percolation into the aquifer.

The specific reasons for the project are discussed below within the context of the best practices. Based on interviews with the OCWD personnel, OCWD board members, city council members, local environmentalists, and opponents of the project, the following is an assessment of the GWR System project.

Value-Based Strategy Best Practices

Problem Being Solved

1. ***Create a Perception of Improvement –*** Yes. A combination of items contributed to a positive perception. The proposed GWR System technology and OCWD's water quality focus, and track record with Water Factory 21 have addressed concerns related to recycled water. Also, the project is perceived to improve groundwater quality, protect the beaches, and protect the groundwater from seawater intrusion. Even opponents feel that the proposed investments are *moving in the right direction* and will eventually be needed.

2. ***Clearly Articulate the Problem –*** Yes. OCWD has a long history of managing the significant groundwater basin fed by the Santa Ana River. Since the 1970s, Water Factory 21 has injected recycled water into the ground at key points in order to prevent the intrusion of seawater into the aquifer. Due to consistent communications from OCWD, professionals and laypersons have come to realize the tremendous value of the aquifer. Consequently, keeping seawater out is recognized as solving a major problem. The GWR System project is an upgrade of the Water Factory 21 technology, the addition of more seawater barrier injection wells, and construction of a pipeline to transport additional water upstream for percolation into the aquifer. OCWD communicates that this project provides the following benefits:

    - **Seawater Barrier –** The project increases the seawater barrier, which is necessary due to increased pumping by user communities. The barrier cannot be neglected, so the fact that recycled water is an extremely reliable source is very important. Coastal communities understand that if they do not properly address seawater intrusion, they could lose the ability to pump from the aquifer.
    - **Drought Resistance –** Better drought resistance due to the ability to inject more water into the basin, keeping it at optimum levels. The basin is currently overdrawn due to a multi-year drought. Also, the Metropolitan Water District supplies are climate dependent and are impacted by water rights issues. The project will decrease dependence on imported, climate-dependent supplies of water.
    - **Ocean Discharge Reduction/Beach Closures –** Reduction of wastewater discharged into the ocean is a goal of the project. Beach closures in Orange County have been a

major issue. Communities have come to understand the staggering economic value of open and pristine beaches. Orange County led the nation in beach closures in the summer of 1999. This issue continues to gather significant media attention, which has stimulated support for the GWR System project from key environmental groups and business leaders.

- **Avoidance of New Ocean Outfall –** Use of the recycled water allows the sanitation district to avoid construction of a new ocean-discharge outfall. Although the numbers vary depending on who is asked, but the cost savings has been reported to be as high as $170 million.

The need to maintain and expand the barrier and keep aquifer levels from falling dangerously low are clear and important water supply issues.

3. ***Have a Meaningful Supply-Planning Criterion –*** No. OCWD wholesales water that is used by over 20 communities in the area. Each of these communities receives a portion of their supply from groundwater. It is difficult for OCWD to create a simple statement of supply reliability for each of the communities because OCWD does not manage all their water.

   The ongoing agreement between OCWD and the "producer" cities is that these cities are allowed to pump a given percentage of their total needs from the aquifer. Due to over-pumping and drought, it has been necessary for this percentage to be reduced from 75 to 66 percent, forcing the cities to purchase more expensive water from the Metropolitan Water District. This additional cost has caused some conflict related to whether OCWD has been properly managing investment in replenishing the aquifer over the past several years. In 7 out of the last 11 years, more water has been pumped out than replenished. In any case, the percentage agreement between OCWD and the cities does not directly address water supply reliability and the associated costs for each City. It also does not address the issue that faster growing communities are allowed to draw more water. This situation creates lower confidence with respect to whether groundwater will be there in the future. In fact, lawsuits have been brought against OCWD by "producer" communities because they are concerned about the ability to pump needed quantities in the future.

   This issue represents a challenge to the agency as being credible to manage the project. This perception is the only significant remaining potential conflict on the project. This issue has not been sufficient to threaten project completion.

<u>Alternatives to Indirect Potable Reuse</u>

4. ***Evaluate Alternatives to Indirect Potable Reuse –*** Yes. Although OCWD is viewed by some of their critics as advocates for the "project," they consistently present alternatives to the GWR System project. The alternatives include:

   - **Continued and Increased Conservation** – However, conservation has been shown to be insufficient to meet demand.
   - **Desalination** – Desalination is recognized as a clear part of the region's water future. However, it is still viewed as expensive and there are significant environmental issues. The GWR System water will cost approximately $500/acre-foot while seawater desalination is approximately $900/acre-foot. To date, this difference in cost prevents significant investment is desalination.
   - **Satellite Treatment Plants** – This option is estimated to cost at much as $3,000/acre-foot.
   - **Increased Use of Imported Water** – This option was considered as less drought resistant due to the climate dependency of the supply.

In a recent meeting, the board of directors was presented with these alternatives and voted 9-1 in favor of the GWR System project. Some opponents still feel that OCWD has not been taking full advantage of imported water options.

5. ***Communicate All the Benefits of Indirect Potable Reuse Projects –*** Yes. Protection of the aquifer from seawater intrusion and recharge of the aquifer to optimum levels are clear benefits to the community. Others benefits include the following:

    - Improved drought resistance;
    - Less ocean discharge;
    - Improved water quality – injected water is lower in salt than water currently in the ground; and
    - Reduced dependence on imported water from the Metropolitan Water District, which may create more leverage in the future for Orange County with the Metropolitan Water District related to pricing and other marketing issues.

6. ***Express Costs in Meaningful Terms –*** Yes. The total cost of the project is estimated to be about $450 million. Taking into account the outside funding, the project cost to ratepayers in the communities that OCWD serves is about $0.75 per month on the average bill. Even with this apparently low rate change there is still controversy over the costs. Some of the issues are:

    - **Changes In Project Costs** – Some water professionals in the region feel that future costs are not reliable because the project costs have changed (i.e., increased) "at least a half a dozen times."
    - **Lower Cost Alternatives** – Some opponents (including water professionals) of certain aspects of the project and the proposed timing feel that in the past OCWD was remiss in negotiating deals for low cost water from the Metropolitan Water District to replenish the aquifer. These measures could have kept the aquifer at optimum levels and averted the need to lower the pumping percentage agreements with the cities (which effectively increases the costs to the cities). The argument is that the Metropolitan Water District would have been open to selling water for less because they had access to more than was needed for the given year. In other words, negotiate for cheap water and bank it. Also, opponents say that there will still be enough Metropolitan Water District water in the near future and it will be less expensive than GWR System water. This point is debated because of uncertainty in climate conditions and future costs of water from the Metropolitan Water District.
    - **Funding or Price/Value Disconnects** – Arguments were also made that there are lower-cost alternatives to the $170 million that was used as a cost for building a new ocean outfall. Some feel that this has resulted in Orange County Sanitation District (OCSD) paying too much of the capital costs of the project (OCSD's share was quoted at $200 million). Others feel that there were clear alternatives to building the outfall (including a 20 million gallon peak storm flow storage tank for $10 million).
    - **Impact to Lower Income Families** – Lower income families are significantly impacted by the rate increase even if it is only $1 to $2 dollars per month.

    It is interesting to note that most of the opposition to the project has not been related to health or water quality risks, but issues with the cost and financial decisions and alternatives. The issues noted above emphasize the importance of collaboration and free information flow about financial and other options that go beyond the engineering issues. Some opponents believe that the decision to go forward with all aspects of the project is not financially sound and is based on "feelings and not the numbers."

7. ***Understand and Avoid Environmental Justice Issues –*** Yes. OCWD supplies water to over 20 utility customers so it is unlikely that any one group could feel singled out. The only caveat to this is that the communities closest to the ocean (the more affluent ones) are the ones who are most likely to use the recycled water first since the seawater barrier injection wells are close to the ocean.

8. ***Understand and Use the Concept of Track Record –*** Yes. There are several track record issues that contribute to people's perceptions of the project and their support. These include the following:

    - **Industry Track Record on Potable Use** – Some water professionals in the area who are not completely supportive of the project point out that past failed projects create a business risk to this project. This has not been a major issue but it is a relevant argument since the project still could be derailed at considerable expense to the community.
    - **OCWD Track Record –** OCWD has created a positive water quality track record with the management of the Water Factory 21 for over 20 years. They have been proactive in informing the community about emerging water quality issues such as NDMA and 1,4-dioxane. This record is significant because "failed" projects were typically derailed due to negative perceptions of water quality. The track record on financial issues is not as positive. However, financial issues have not historically energized the media and the public.

9. ***Break the Source-Quality Connection –*** Yes. OCWD has been successful in breaking the source-quality connection. They have related the technology to familiar processes such as:

    - Microfiltration is used for dialysis, baby food production, and fruit juice manufacturing; and
    - Reverse osmosis is used for bottled water.

    OCWD is using a multi-barrier treatment approach that includes the following:

    - Reverse osmosis and microfiltration;
    - Ultraviolet (UV) disinfection, hydrogen peroxide treatment;
    - Redundancy of barriers;
    - Groundwater filtration; and
    - Addressing emerging contaminants.

    OCWD has also emphasized that the water goes through a suite of treatments prior to reaching the GWR System project. All of this effectively demonstrates that there is *not* a connection between the quality of the water and the source of the water.

10. ***Articulate an Ongoing Water Quality Plan –*** Yes. Most people seem to understand that there are very few things in life that do not have some risk. Trust is eroded when someone tries to tell them there is no reason for concern or there is no risk. In the case of OCWD, the community has been exposed to the fact that there are risks, and OCWD has demonstrated its ability to address the evolving issues related to water quality and health, including the following:

    - **NDMA** – Due to an aggressive water quality monitoring program for groundwater and Water Factory 21, OCWD discovered contaminants, including NDMA. OCWD has followed up with action that included shutting down wells although contaminant levels were below the State's action level of 10 parts per trillion.

- **Testing Facilities** – OCWD has State-certified testing facilities and was involved in creating the methods for testing for MTBE.
- **Water Quality Studies** – OCWD is involved in the Santa Ana River Water Quality and Health Study. Over $8 million has been spent over the last six years addressing water quality issues with the Santa Ana River. A dozen or so third party experts oversee this study.
- **Emerging Contaminants –** OCWD discovered that 1,4-dioxane, a cancer-causing agent, could get through the reverse osmosis process. OCWD is addressing this by adding UV and hydrogen peroxide to the treatment process. OCWD also monitors for endocrine disruptors and pharmaceuticals.
- **Pre-Treatment of Source Water –** OCWD supports the idea that the California Department of Health Services be the responsible party for setting standards and permitting treatment processes at the sanitation districts. Usually discharge regulations for sanitation districts are geared toward protecting aquatic health rather than human health risks. Since this water is now becoming a source for drinking water, the argument is that human health risks need to be considered in the permitting process.
- **Response to Water Quality Issues –** OCWD has brought water quality issues to the attention of the public. They have also shut down wells when contaminant levels were below action levels. These steps help to foster trust that they have a water quality improvement plan and are conservative when it comes to public health protection.

These efforts indicate that OCWD has a plan for addressing the evolving problem of ensuring high water quality. OCWD responds aggressively when water quality issues surface. The above efforts have been important contributing factors in having virtually no opposition to the project that relates to water quality, although other projects in the area have been derailed due to negative branding.

<u>Identity of the Water and the Agency</u>

11. ***Establish the Utility and Investment as the Source of Water Quality –*** Some. This best practice recognizes that people have the tendency to equate water quality with the source (i.e., where it physically comes from). This tendency is demonstrated in the public's thinking that water from mountain springs or streams is high quality or healthy water. OCWD has not made it a focus to address the source quality connection, as is the case with most utilities. However, with their diligence, track record, and testing facilities, they are building a reputation as the source of quality. They could probably do better at enhancing and clarifying this message. This issue is important because it relates to negative labels and the reputation or credibility of the utility.

12. ***Rename the Water Quality –*** Some. OCWD has not renamed the water quality officially, but uses the terms "near distilled" or "purified" water.

Communication Process Best Practices

13. ***Communicate and Collaborate About Value –*** Some. Collaboration occurring prior to choosing or recommending a specific course of action is often lacking in many projects. OCWD's GWR System project appears to be no exception. The most noticeable opposition to the project relates to financial, investment, and timing options. Comments such as, "We should have been buying cheap water from the Metropolitan Water District and banking it over the last few years…" are typical. The seeds of this conflict appear to be due to inadequate collaboration with area water professionals and selected stakeholders. This conflict could continue as the project is designed and constructed.

14. ***Inform, Don't Educate –*** Yes. OCWD has been active in trying to inform the public by describing the project in simple, easy to understand terms. Here are some examples:

- Comparing the water treatment to processes that people are familiar with (see Best Practice #10 above); and
- Expressing the financial impact in rates/fees makes it meaningful.

15. ***Practice Good Leadership –*** Some. There are several aspects of leadership that should be addressed with respect to the GWR System project. Specific examples include the following:

    - **Reputation** – Overall OCWD has created a positive reputation related to operations of Water Factory 21 and its diligence about water quality. Within the water industry, Water Factory 21 has been an example of leadership for many years.
    - **Collaboration –** Good leaders propose, collaborate, and modify their plans as necessary to build consensus and to meet the needs of their constituents. Although OCWD did start communicating about the project very early, they still have been perceived as advocates for the project (i.e., had made their minds made up), and not advocates for solving the water supply problems. Interviewees said that the alternatives to the project and alternatives for the sanitation district were not adequately addressed. Some have commented that general managers can get too focused on the project because they see it as part of their legacy. This perception of management bias has led to certain opponents feeling that even when the water district knows better, they continue to misrepresent facts about financial alternatives and water quality issues.
    - **Diligence in Communicating and Belief in the Project –** OCWD's public relations group has been very diligent in their communications and demonstrated a strong belief in the project. These are both positive leadership qualities and have made a big difference in securing public acceptance and avoiding conflict.

16. ***Start Early –*** Yes. OCWD started communicating about the project over five years ago. Approval to go ahead with the project was received in 2003. The projected date for project completion is 2007, which means OCWD started communicating almost ten years prior to the eventual on-line date. This definitely qualifies as starting early.

17. ***Identify and Collaborate with Key Audiences –*** Yes. OCWD has been fairly diligent in knowing who the key audiences are in the process. Their list of key audiences includes the following:

    - Water board members and elected officials;
    - Local medial including the LA Times and Orange County Register;
    - Business leaders;
    - Environmentalists – Orange County Coast keeper, Newport Beach Coast Water Quality Committee, and Santiago Oaks Regional Park;
    - University science departments;
    - Heath Professionals – Jack Skinner, retired MD, California DHS, Orange County Environmental Health Department;
    - Grandmothers and other community groups; and
    - Known opponents.

    OCWD started to build their contact list in 1998, and it has grown to over five thousand names, email addresses, and phone numbers. Any time they have an event or get responses from surveys, they add names to the database. They also update the database when elected officials change.

18. ***Embrace Potential Conflict and Opposition –*** Some. Although OCWD does use general communications to identify the opposition, there is no strong evidence that they seek them out for more in-depth collaboration. OCWD responds to conflict but the District should try to better

understand the nature of the conflicts and how to better resolve the conflicts. See Best Practice #24**.**

OCWD has a set of strategies that relate to conflict avoidance. A key strategy is to *anticipate conflict and initiate proactive communications.* OCWD releases potentially sensitive issues, which increases trust. OCWD has done this with NDMA and other water quality issues. Controlling the message is important. In this case, the best defense is a good offense.

19. ***Constantly Communicate*** – Yes. Because of their extensive database, OCWD can and does communicate regularly with key constituents. They publish a district newsletter and they have created a "Fast Fax" list of 250 people that they use for reaching key people quickly. This list is critical when a quick response to negative press or misinformation is required. OCWD constantly conducts VIP tours and water classes and has not had a major hiatus in communications since the project started. Since the mission of OCSD is focused on groundwater, it is much easier for them to be consistent and focused with communications, which is more difficult in larger municipalities where a wide variety of issues are being managed.

20. ***Keep Communicating After the Project is Completed –*** Not Applicable. This best practice is not applicable for the GWR System project. However, OCWD does have a track record of proactively responding to water quality issues that have surfaced in conjunction with Water Factory 21, which appears to have helped their reputation with key audiences.

21. ***Develop Ongoing Relationships with the Media –*** Some. Media relationships have tended to start with some form of negative press. Once a media person is on OCWD's list they will get future press releases. OCWD also tries to establish itself with the media as a trusted source of information about water issues. It appears that OCWD could be more proactive with the media; however, they seem to have a positive relationship. There have been no major issues to date.

22. ***Use General Information/Advertising Campaigns Appropriately –*** Yes. General communication is used by OCWD to meet requirements to inform the public and to find opposition and other key audiences. OCWD uses articles and print ads and multiple channels and methods to communicate, including the following:

    - Face-to-face meetings;
    - Cable television;
    - Brochures;
    - Tours;
    - Water classes;
    - Advertisements and bill stuffers; and
    - Newspaper articles.

23. ***Don't Be Defensive –*** Not applicable.

24. ***Conflict Resolution –*** Some. For the most part OCWD believes that the current conflicts are manageable, and no formal conflict resolution techniques have been employed. However, there are opponents to the project that do not agree with the financial approach and timing of the project. Some of these opponents perceive that they are not being heard or ignored despite the fact that Orange County perceives that they have "responded" to the concerns. The opponents believe that OCWD has just repeated their initial position. These circumstances suggest that a facilitated dialogue about values, and a process of conflict resolution would be worthwhile. The GWR System gets a grade of "Some" for attempting to address the concerns and continuing to communicate.

25. ***Maintain Credibility –*** Some. OCWD helped their case by reviewing the alternatives to the project in the board meeting that resulted in approval of the project. However, they are still viewed by some opponents as advocates for the project and not advocates for solving the problem. This best practice cannot be fully evaluated until the project has been implemented.

Conclusions

While this project is still in development, it is approved and moving forward as of the publication of this report. The research on this case study revealed that OCWD has followed 14 of the best practices completely, eight best practices somewhat, and one not at all (i.e., Best Practice #3 – there is no supply planning criteria). Two best practices (#20 and #23) were not applicable to this project.

The best practices that appeared critical for project success were:

- *Best Practice #1 – Creating a perception of improvement.* OCWD has created a perception of improvement in both supply and quality as the backbone of their project communication.
- *Best Practice #2 – Clearly articulating the problem.* Seawater intrusion into the aquifer, beach closures, and enhancing supply reliability are recognized problems in the minds of leaders and key audiences.
- *Best Practice #7 – Understand and avoid environmental justice issues.* Orange County is a relatively dense geographic area and the water from OCWD goes to over 20 communities. It would be difficult for one community to feel singled out. Also, barrier wells tend to be near the coast, which are typically more affluent communities.
- *Best Practice #11 – Agency as source of water quality.* The building and operation of Water Factory 21 has given OCWD over 20 years of experience with injecting recycled water into the groundwater. With its track record of increasing water quality knowledge, and proactive response to emerging water quality issues such as NDMA, OCWD has established itself as a trusted source of water quality. There is virtually no opposition to the GWR System based on water quality concerns.
- *Best Practice #19 – Constantly communicate.* OCWD is very diligent and consistent with its communications.

All of these factors have fostered feelings of trust and credibility and are the basis for the success of the project to date. Objections to the GWR System project are related to financial and timing issues. These issues probably represent the largest current risk to project success. The only apparent water quality issue that is still open as of the date of this report is the desire to involve the California Department of Health Services in the pre-treatment standards that govern the wastewater treatment plant. This would address industrial contaminants such as 1,4-dioxane. Overall, the GWR System is an example of a project that has followed many of the best practices of indirect potable reuse with positive results.

A.3 Case Studies of Projects not Implemented

Definitions of "success" and "failure" can depend on context. In this study "success" is defined as ongoing implementation of a specific planned indirect potable reuse project. A "failed" project is one where an indirect potable project was proposed and invested in, but did not continue due to opposition.

In all the cases where the projects were not implemented, alternatives to the indirect potable reuse project have been or are being pursued. None of the communities are going without water or experiencing catastrophic wastewater effluent discharge issues. It is beyond the scope of this project to determine if they made the "right choice." However, by applying the best practices of indirect potable reuse it becomes apparent why the "failed" projects were not implemented.

The projects reviewed under this study that were not implemented were as follows:

- San Diego, California – Case Study #4;
- Clean Water Revival Project, Dublin/San Ramon, California – Case Study #5; and
- City of Tampa, Florida – Case Study #6.

A.3.1 San Diego, California – Case Study #4

About the Project

The County of San Diego is served by 23 water and wastewater agencies, whose members are all represented on the San Diego County Water Authority (Water Authority). The Water Authority is responsible for purchasing and allocating imported water to the member districts, about 90 percent of the total water serving the 2.5 million residents of the County. The largest member agency is the City of San Diego, which manages the largest wastewater treatment plant in the County, located on the western bank of Point Loma facing the Pacific Ocean.

In June 1993, the Water Authority began a feasibility study that identified a potential water repurification project using tertiary-treated water produced at the City of San Diego's North City Water Reclamation Plant and storing the water for subsequent indirect potable use at San Vicente Reservoir. In August of 1993, the Water Authority and the City of San Diego presented the study to an audience of regulatory agencies, which included the California Department of Health Services (DHS), U.S. EPA, Regional Water Quality Control Board, and County of San Diego health officials. DHS indicated it was cautiously optimistic that a project such as this could be approved.

DHS requested that a detailed feasibility study be prepared and submitted for its review. In September 1993, the Water Authority and the City of San Diego agreed to work jointly to develop a water repurification project. As the regional water agency, the Water Authority was designated as the lead agency to conduct the necessary studies and work with DHS. The following month, to assess community attitudes toward the concept of repurified water, project planners implemented a three-pronged research program that included telephone surveys, focus groups, and community leader interviews. Public education efforts were implemented and continued for the next five years including a media education campaign, developing information materials, forming a Repurified Water Review Committee (RWRC), and making educational presentations.

In 1994, an Independent Advisory Panel (IAP) was formed, consisting of nationally recognized experts in the fields of water treatment and public health, to provide technical oversight of the proposal and to act as an objective advisor to DHS in its review of the project. The members of the IAP were individually selected by DHS.

In August 1994, DHS granted conditional approval to the Water Authority to proceed with the proposed repurified water project. The RWRC committee, consisting of local leaders, citizens and environmental advocates, met five times from July through November 1994 and submitted a report that was supportive and favorable to the Repurification Project. The public research also returned favorable public perception results.

Meanwhile, the construction of the North City Water Reclamation Plant (primary and secondary treatment) proceeded and the plant was ready to go online by 1998. The development of the tertiary treatment system and the pipelines intended to deliver the repurified water to the San Vicente reservoir were not completed, pending final approval and funding by the City of San Diego. The amount of recycled water, as a percentage of total water recycled, was designed to meet the requirement tied to U.S. EPA and U.S. Bureau of Reclamation funding as part of a continuance of an ocean discharge waiver from the U.S. EPA. This waiver permitted the discharge of "advanced primary" treated wastewater into the Pacific Ocean. Along with Orange County Sanitation District, they were the only two agencies on the entire Pacific Coast that did not have secondary treatment.

According to sources directly involved in the project, the public support eroded rapidly in 1998 due to at least six converging factors. These factors were as follows:

- **Drought Forgotten –** When the project was initiated in 1993, San Diego had been experiencing its worst drought in recent memory, which included water rationing. The drought was a distant memory by 1998 after the heavy rains caused by El Nino in 1997.
- **"Option of Last Resort" –** The National Research Council report on indirect potable reuse was published in 1998 and although very favorable, the press picked up on one phrase that indirect potable reuse should be used as the "option of last resort" due to lingering contamination uncertainties (National Research Council, 1998). This provided fuel for the emerging opposition.
- **Alternative Sources –** In 1998, the Water Authority was seeking approval of a major water transfer deal from the neighboring Imperial Irrigation District. The focus and efforts of the Water Authority had shifted to this water transfer, desalination, and a major capital improvement program addressing delivery infrastructure. There was limited time in 1998 for the Water Authority to focus on the Repurification Project.
- **Union Tribune Writer Dislikes Project –** According to the people interviewed as part of this project, one journalist for the *Union Tribune*, San Diego's major daily newspaper, never liked the project. This reporter's ongoing opposition blocked any positive coverage of the project by the *Union Tribune.*
- **Political "Football" –** A local State politician, Steven Peace, chose to make the project a campaign issue in 1998. One of the local council members was also running for a State office and Peace positioned himself as "protecting San Diegans" from a "bad project" that would use San Diegans as "guinea pigs" for an "experimental" water repurification project.
- **Environmental Justice –** The North City wastewater comes from some of the more affluent San Diegan property owners and businesses in La Jolla and a rapidly growing commercial area known as "The Golden Triangle." The San Vicente Reservoir water, projected to receive the reclaimed water, is treated at a plant that serves predominantly west central San Diego lower-middle class neighborhoods, including Asian, Hispanic and African American communities (as well as Mission Valley, including Hotel Circle, an important tourist destination). The city council representative from the 4th District strongly and vocally opposed the project, feeling that an ethnic community had been *singled* out for an "experimental project."

The following is the assessment of the project with respect to its adherence to the best practices of indirect potable reuse projects.

Value-Based Strategy Best Practices

Problem Being Solved

1. **Create a Perception of Improvement –** No. The project was branded as degrading quality of life by negative branding. Although efforts were made to communicate the positive aspects of the project, a perception of enhancement was not achieved for the following reasons:

    - Many of the communications emphasized that the project was an enhancement to the region because recycling is the "right thing to do" and recycling is a responsible use of natural resources. In fact, the majority of people, San Diegan's or otherwise, have no independent agenda to see recycling implemented. Recycling by itself is not a benefit.
    - Project communications emphasized that San Diego was 90 percent dependent on imported supplies, yet there were no clear communications that stated why this was a problem. Nowhere was it clearly stated that it was critical that supply reliability be enhanced because imported supplies were not reliable. The Metropolitan Water District continues to say that supplies are secure for the next 20 years, suggesting that there is still not a clearly articulated water supply problem. It is difficult to show improvement if there is no consensus that a problem needs to be solved.
    - Although statements were made that the recycled water was of higher quality than Colorado River water, it was also made clear that the U.S. EPA was requiring that the recycled water have 1-2 year residence time in the reservoir before it would reach the

taps of consumers. The Colorado River does not have a residence time requirement. As a result, how could the recycled water be perceived as higher quality? There was a credibility problem with this message.

- The fact that the project was branded with negative slogans such as "toilet-to-tap" suggests that there was a perception that water quality was degrading, not getting better.

2. ***Clearly Articulate the Problem –*** No. While the need for water, and the desire for independence from imported supplies, was generally presented in public communication documents, there was no meaningful supply or drought resistance problem that needed to be solved. For example, 30 mgd, the intended project size, is about 90 AF per day or about 33,000 AF per year. This amount would effectively increase local supply by 40 percent. How this would have impacted drought resistance or what problem was being solving was never presented. As stated in Best Practice #1, there was not a clearly articulated problem. A city council member who was an opponent of the project said he was not aware that the project was supposed to solve a supply problem. His perception was that the reasoning was recycling is the "right thing to do."

   There was another problem that was actually being solved. The North City Water Reclamation Plant would not have been approved had the U.S. EPA not provided significant co-funding for the project. This funding was connected to an agreement between the City of San Diego and the U.S. EPA that required the City to increase the amount of treated wastewater recycled to 10 percent by 1998, 25 percent by 2003, and 50 percent by 2010. This agreement was a result of the U.S. EPA's approval of the extension of San Diego's ocean waiver allowing them to continue to discharge primary treated wastewater into the ocean. This "need" for the ocean discharge waiver was also the reason why the City of San Diego's wastewater department was the only local water authority that stayed engaged in the project until the city council vote in 1998.

3. ***Have a Meaningful Supply-Planning Criterion –*** No. There is no doubt that the San Diego County Water Authority uses planning criteria to make decisions about investment in new supplies. The pertinent issue in the San Diego case is whether a *criterion meaningful to a layperson* was presented to the community and key audiences. Since the City of San Diego's wastewater department was the only consistent supporter for the project, there was no credible source for planning criteria, and one was not communicated.

<u>Alternatives to Indirect Potable Reuse</u>

4. ***Evaluate Alternatives to Indirect Potable Reuse –*** Some. This best practice could have been given a "No" because the process did not start with a water supply or water quality problem to be solved, followed by collaboration on alternatives. The root problem of the ocean waiver and the project messages related to independence from imported supplies made this difficult. Not pursuing the ocean waiver (i.e., upgrading the wastewater treatment plant to secondary standards) was never considered as an important alternative to this project.

   It appears that the RWRC did consider alternatives such as nonpotable reuse and agreed that dependence on imported supplies had a number of disadvantages. However, clear, succinct, and quantitatively stated alternatives were not part of the ongoing communications. In addition, a major motivation for this project (i.e., U.S. EPA funding) was contingent on offsetting the ocean discharge by building the repurification plant and discharging into the reservoir. This appeared to the public like the City of San Diego was solving a wastewater discharge problem, not solving a water supply or water quality problem like Scottsdale or Occoquan, respectively.

   Ultimately the project was impacted by alternatives. In this case, the major alternative was an imported source of water. By the time the project was up for final approval in 1998, the San Diego County Water Authority was focused on pursuing the transfer of Colorado River water from the Imperial Irrigation District as a major capital improvement program. This distraction

could have created perceptions that the Water Authority was not serious when they said that increased reliance on imported supplies was not acceptable. After the political and community-based opposition, it is easy to see how alternatives such as the Imperial Irrigation District transfer, desalination, and nonpotable reuse would look more attractive.

5. ***Communicate All the Benefits of Indirect Potable Reuse Projects –*** Some. The project gets a grade of "Some" because it communicated some of the benefits while leaving others out. A summary of the communication activities for this project is as follows:

    - *Utilization of water* – The project did convey that recycling was a practical use of valuable resources.
    - *Climate dependency of imported supplies* – This issue was communicated but there was no context of an accepted water supply problem.
    - *Comparison to nonpotable and the costs of separate infrastructure* – This idea was communicated although one of the opposing council members said that he was not informed of the costs and complications of the separate infrastructure required by nonpotable alternatives.
    - *Utilization of storage assets* – This issue was not communicated well because it is not yet fully appreciated in the industry. Drought resistance comes from one thing: the ability to store water. Indirect potable reuse allows for maximum use of current storage assets.
    - *Unplanned indirect potable reuse is already happening* – No evidence was found that this idea was effectively communicated. In fact, when water supply professionals were asked, they typically said, "we don't want to tell the public this." This response reinforces the source-quality/finish-quality connection that is still a major part of the water industry in general.
    - *Better water quality* – Communications were not effective. Although better water quality was claimed, it was undermined by the lack of a credible water quality leader and the requirement that the recycled water have a 1-2 year residence time and dilution in the reservoir.

6. ***Express Costs in Meaningful Terms –*** No. No evidence was found that the cost of the project was ever expressed in terms of rates. The costs were a main issue for the local newspaper, and the costs were well understood by the project team. There was confusion regarding how the total cost should be split between the wastewater utility and the water utility. If all the wastewater treatment costs were included in the water treatment costs, then repurification appeared prohibitively expensive. Also, as "safeguards" were added, the price kept increasing, and eliminating the safeguards to "save costs" would contribute to the perception of lower quality. Both "pro" and "con" stakeholders perceived this as a "Catch 22" for the indirect potable reuse option. This is a standard problem for these projects and must be proactively presented and managed with the media. No evidence was found that this was done on this project.

<u>Risks of Indirect Potable Reuse and Alternatives</u>

7. ***Understand and Avoid Environmental Justice Issues –*** No. As stated above, the producers of the wastewater were not the same as the users. Environmental justice became an "Achilles heel" for the project. Although the water was generated and to be used within the City limits, they represented two different demographic communities. Residents of District 4, and particularly the African American community, felt that they had been singled out for an "experimental project." People were told from church pulpits that tap water could threaten the health of their children. None of the project leaders, experts, or visible proponents could say that the water would be going to their home. In addition, there were no benefits or reason for the targeted community to accept this plan. This created a perception of increased risk with no benefits.

8. ***Understand and Use the Concept of Track Record –*** Some. While decision makers were flown to the Occoquan watershed in Virginia to see the success of that project, there seemed to be a heavy reliance on experts and the California DHS to provide a blessing that this project would be alright, as if it was "something new." The impression was given that the project was "experimental" and that there was no track record. It was also difficult for the San Diego County Water Authority or the City of San Diego's wastewater department to have a credible track record with respect to drinking water quality. Neither had managed drinking water quality before. As a result, public trust about quality was an important issue since neither of the lead agencies had ever managed drinking water quality.

9. ***Break the Source-Quality Connection –*** No. The project team was caught unprepared with the label of "toilet-to-tap." This term was coined on a San Gabriel Valley project proposal when a brewery was worried that recharge of its groundwater with recycled water would degrade its water quality. The phrase was picked up by Steve Peace and used by the press to help brand the San Diego project negatively. Also, the RWRC (the review committee) referred occasionally to the project as the "toilet-to-tap" project in internal documentation and communication (throughout 1994). There was little counter information presented to the media to help break this intuitive source/quality connection.

10. ***Articulate an Ongoing Water Quality Plan –*** No. The City of San Diego Sanitation Department was responsible for the water quality. Neither the City of San Diego Water Department nor the San Diego County Water Authority accepted the leadership role in defining and ensuring water quality. Given that the Water Authority had never managed treatment or drinking water quality (prior to 2003 they have only managed wholesale supply) they would not have been a credible and trusted leader with respect to this issue. The City of San Diego's water department may have been credible but they did not take the *leadership role*. This was a major issue with this project, and contributed to *eroding public trust*.

<u>The Identity of the Water and the Agency</u>

11. ***Establish the Water Agency and Investment as the Source of Water Quality –*** No. The City of San Diego's wastewater department was responsible for the water quality associated with the project. This created a water quality credibility issue and left a vacuum with respect to an agency being responsible for drinking water quality. Customers base their perceptions of quality on taste and odor of water provided by the water department. San Diego water is very hard. The water does not taste light or smooth and constantly calcifies fixtures and requires the use of softeners. As a result, most residents already perceive that the San Diego region has a water quality problem.

12. ***Rename the Water Quality –*** Yes. The term "repurified" was used. This case study suggests that renaming the water may have little effect if it is not accompanied with the public having trust in a credible water quality authority. Also the prefix "re" may still create a connection with the source or the idea that it is *used* water. For example, Singapore is using the name "NEWater" in their indirect potable reuse project.

Communication Process Best Practices

13. ***Communicate and Collaborate About Value –*** Some. There was no record of collaboration over choosing alternative sources of water supply. Some collaboration occurred in 1994 when the Repurified Water Review Committee was formed and endorsed the project. However, this project spanned a 5-year period before it was discontinued, and comparisons of the benefits of alternatives were not made as an ongoing part of project communications.

The Environmental Impact Report (EIR) process for various aspects of the project, especially the public involvement for the environmental impact of the pipeline, became tangled in the issues of whether the project should even exist in the first place. Because there was not an ongoing and collaborative communication process, the people presenting the pipeline had no basis for positioning the benefits of the overall project against other alternatives. They could not respond to challenges about the value of the project. As a result, EIR hearings may have been confusing to the public because they did not know what they were supposed to be giving input on and what impact their testimony would have. This confusion is reflected in the written testimony.

14. ***Inform, Don't Educate –*** Some. While there were simple, two-page "fact sheets" generated for the project, there was not a clear "problem" that was intuitively perceived as important compared to the alternatives. Both pro and con interviewees stated that San Diego still has no clear supply reliability strategy. Therefore, the problems, alternatives, risks, and lack of a water quality "identity" make all the "elements of value" very unclear for this region. Left with this lack of clarity, as one former State Assemblyman said, "[t]his looked like a project that was being driven by the wastewater engineers so that they could get their ocean waiver."

15. ***Practice Good Leadership –*** No. Although the wastewater managers were very competent, they could not be accepted as a credible authority on water quality or the need for new supply. The San Diego County Water Authority, which was an early leader and *clearly supportive of the project throughout the process*, was not the champion for the project in the later stages and when the project went to the final vote of the city council. Key council members were not even aware that the City of San Diego's water department or the San Diego County Water Authority was involved in the project by the time it came to a vote. The Water Authority was focused on pursuing more imported water from Imperial Irrigation District and a major capital improvement program. The only champions for the project were managers from the City of San Diego's wastewater department. There is no evidence that the managers from San Diego's wastewater department had strong relationships with any of the council or the media, and it was clear that key council members (and especially the State Assemblyman) were never clearly briefed on the project.

16. ***Start Early –*** Yes. The communication process was organized and initiated at the outset and carried through until the project was terminated in 1998. However, it seems clear that not enough collaboration with the community targeted to receive the water was done in the early stages. Given the environmental justice issue, this may have had a significant impact on the outcome.

17. ***Identify and Collaborate with Key Audiences –*** Some. This process was initiated with a Repurified Water Review Committee. This committee included the following participants:

    - San Diego Council of Bass Fishing Clubs;
    - University of California, San Diego School of Medicine;
    - San Diego Restaurant Association;
    - San Diego County Black Chamber of Commerce;
    - Greater San Diego Chamber of Commerce; and
    - San Diego Taxpayers Association.

    However, effective collaboration did not happen between the leadership and key audiences such as the city council and the media.

18. ***Embrace Potential Conflict and Opposition –*** No. To the extent that conflict resolution occurred, it was too little, too late. The opposition seemed to "flare up" during 1998. However, records in the public hearings of 1996 during the EIR process showed the beginning of public discontent. This early discontent was not perceived as being serious because until that point there had been support from leading stakeholders.

Understanding the nature of the conflict on this project is not trivial. The project eventually lost the support of the city council and mayor. The water professionals on the project supported the project to the end. However, no credible authority was willing to step up and own the water quality issue. San Diego's wastewater department could not play this role, since they are not a credible authority with respect to drinking water quality. As a result, there was no quality leader that could be trusted to be the fulcrum for conflict resolution. As a result, the project devolved into political maneuvering, social justice conflict, and low confidence related to water quality.

19. ***Constantly Communicate* –** Some. There was an ongoing communication process. As the project progressed, however, the RWRC (review committee) was not kept together.

20. ***Keep Communicating After the Project is Completed* –** Not Applicable. The project was not completed.

21. ***Develop Ongoing Relationships with the Media* –** No. As stated above, the main newspaper took exception to the project, and there was no rebuttal. An effective relationship did not exist between project leadership and the media.

22. ***Use General Information/Advertising Campaigns Appropriately* –** Some. Press releases and advertisements were placed in the media on a regular basis. However, this information was intermittent and was overwhelmed by the negative response in 1998 when the project was eventually stopped.

23. ***Don't Be Defensive* –** Some. While most of the public meetings did not display defensiveness on the part of the project leaders, there were varying degrees of support by some of the players.

24. ***Conflict Resolution* –** No. Conflict resolution occurred too late. The project was never allowed to go into a collaborative, conflict resolution phase.

25. ***Maintain Credibility* –** No. The project was confused and unclear as to what problem it was solving. This meant there was no credibility.

Conclusions

The San Diego experience represents an interesting case study because a significant amount of communication and outreach was conducted during the project and the outreach was persistent throughout the project. However, the project had serious flaws. The case study research revealed that San Diego followed two best practices (#12 – it renamed the water "Repurified Water," and #16 – it started communication early, five years prior to potentially going on line), it followed nine best practices somewhat, and the balance (13 best practices) not at all.

The main issue with this project, as with the others not implemented, is that a clear perception of improvement (i.e., supply, environment, or quality) was not clearly made. In fact, the opposite was perceived. The community that was to use the water felt *singled out* and there was a perception that African Americans were being used for an experimental project (see Best Practice #7). Thus, the project had a politically unacceptable design. Repurifying treated wastewater and negative branding became the focus of community leaders, which eventually caused a change in the project to a nonpotable alternative.

The best practices that appeared critical for project success were as follows:

- *Best Practice #1 – Creating a perception of improvement.* There was no clear and specific idea of the quantity or quality improvement that this project was going to deliver. This perception was

mainly due to the fact that the problem being solved was not established with key audiences and decision makers in mind.

- *Best Practice #2 – Clearly articulating the problem.* The major motivation behind the project related to approval of the "Ocean Waiver" for continuing to discharge primary effluent into the ocean. As part of the agreement to approve the waiver, San Diego was required to meet certain water recycling goals. The water repurification project was offered as the most cost-effective way to achieve these goals. There were no commonly agreed to water supply or quality problems among key audiences and decision makers. Ultimately, some perceived the project as the cheapest way for the City of San Diego to dispose of wastewater.
- *Best Practice #7 – Understand and avoid environmental justice issues.* The perception that the wastewater was coming from wealthy communities and would be treated and used by economically disadvantaged communities was a major stumbling block in this project. Residents of one district of the City and the African American community clearly felt singled out and felt that they were being used for an experiment.
- *Best Practice #11 – Agency as the trusted source of water quality.* This project and the Dublin San Ramon project were led by wastewater agencies, which are not typically responsible for producing drinking water. This is an important branding problem. The negative result of these projects argues strongly to not have wastewater leadership sponsoring an indirect potable reuse project without very visible drinking water partners.
- *Best Practice #15 – Practice good leadership.* The wastewater professionals were the only consistent champions for the project. Having the San Diego County Water Authority or the City of San Diego as visible leaders throughout the project might have added credibility that there was a water supply problem to be solved. Neither of the two entities strongly defended the project at the point of the city council vote that resulted in cancellation of the project.
- *Best Practice #17 – Identify and collaborate with key audiences.* If the problem is not well stated then it is difficult to communicate with influential audiences. At least one member of the city council, who was influential with others, was not clear on the basic attributes of the project.

A.3.2 Clean Water Revival Project, Dublin/San Ramon, California – Case Study #5

About the Project

The Dublin San Ramon Services District (DSRSD) is a special district that provides wastewater collection and treatment services for more than 108,000 people in the cities of Dublin and San Ramon, California, located approximately 35 miles east of San Francisco. Wastewater collected by DSRSD is treated and pumped through pipelines operated by the Livermore Amador Valley Water Management Agency (LAVWMA) and the East Bay Dischargers Authority. DSRSD also treats wastewater from Pleasanton by contract. The treated wastewater is discharged into the San Francisco Bay.

The communities of Pleasanton and Livermore lie south and east, respectively, of Dublin. The entire area (known locally as the "Tri-Valley") has experienced notable growth during the past two decades. The population of San Ramon more than doubled between the 1980 census (20,246) and the 2000 census (45,704), and based on figures released by the California Department of Finance for the period from January 1999 to January 2000, Dublin was the fastest growing City in Alameda County with a 12.8 percent population growth. The City grew from 28,800 (January 1999) to 32,500 (January 2000), or an increase of 3,700 residents. The City's growth spurt was nearly 11 times the Alameda County average (1.1 percent), and nearly eight times the 1.7 percent growth average for California. In fact, Dublin was the fourth fastest growing city in California for 1999.

DSRSD proposed an indirect potable reuse project to solve a wastewater disposal problem created predominantly by the rapid growth in Dublin. The neighboring communities of Pleasanton and Livermore, co-owners per a Joint Powers Authority of the wastewater disposal ocean outfall, refused to approve more disposal capacity via the shared outfall. DSRSD decided that the best alternative was to propose an indirect potable reuse project. The proposed project included advanced treatment of secondary effluent using microfiltration, reverse osmosis and ultraviolet light, and conveyance of the effluent via a five mile pipeline to a proposed groundwater recharge well field located in Livermore.

An Environmental Impact Report (EIR) was approved in 1996 with no legal challenges. The EIR process included an extensive public involvement program and an analysis of alternatives including local stream discharge and a seasonal storage reservoir. The DSRSD Board of Directors subsequently approved the project and moved ahead with design and construction prior to final regulatory approval from the California Department of Health Services (DHS), the South Bay Regional Water Board (the regional water agency), and Zone 7 (the local water supply agency).

During the project's nine month design process, public information and involvement stopped. Parallel to design and construction, approval from DHS and the local water agency were obtained. However, Zone 7 hired a new General Manager who held a public meeting on the project that was very well attended. The night before the Regional Board Meeting at which the Executive Officer was to inform the Board of his intent to authorize operation under the terms of a 1993 permit, Zone 7 removed its support because of the public meeting. The experience indicated to them that the project had lost public support.

When Zone 7 retracted its approval, DSRSD delayed the Regional Board meeting and started a six to nine month "education" process, including restarting a speakers bureau and conducting public opinion polls. During the new public information campaign, the DSRSD Board Members met directly with Zone 7 representatives in an attempt to regain Zone 7 support. At a Regional Board Meeting one year after the canceled meeting, the Board heard public testimony under an information item and endorsed the Executive Officer's intent to authorize operation of the project. In the meantime, Livermore and Pleasanton had approved an increase in wastewater disposal capacity (40-mile outfall/discharge to the ocean). As a result, there was no need to implement the indirect potable reuse project. Pleasanton, Zone 7, and a local special interest group filed suit to stop the project. The key basis of the litigation was that significant factors had changed since the 1993 permit was issued and the Regional Board should have considered those factors. Because of the changes, the Executive Officer no longer had the authority to

authorize operation. The court determined that several factors were different, the most significant being public opinion, and directed the Regional Board to consider the merits of the project before authorizing operation. DSRSD then dropped the project, despite a public opinion poll that showed 55-60 percent of residents supported the project, 30 percent were not supportive, and the rest had no opinion. A separate postcard survey sent to all Tri-Valley residences and businesses, with an 8 percent return rate, showed an 80 percent acceptance of the project.

Based on both the secondary research and primary interviews with project participants, what follows is an assessment of how this project adhered to the best practices of indirect potable reuse.

Value-Based Strategy Best Practices

Problem Being Solved

1. ***Create a Perception of Improvement –*** No. This project clearly faced negative perceptions related to the rapid growth in Dublin. Since there was not an established problem related to the need for new water supply, or a problem with the water quality in the aquifer, it was next to impossible to position this project as improving the current conditions. Putting recycled water in the ground to solve a wastewater treatment capacity problem (caused by rapid growth in Dublin) was viewed as moving in the wrong direction and was an example of degrading quality of life in the region.

2. ***Clearly Articulate the Problem –*** Yes. Recycled water, however, was perceived as a solution to a wastewater disposal problem and viewed by the public as, "Livermore and Pleasanton won't let us pipe it to the ocean so we'll make them drink it." The project was intuitively seen as a degradation of quality of life, not as an enhancement. The fundamental opposition was that the problem being solved was a direct need to "build out" Dublin, whose growth was already viewed as excessive and negatively impacting the surrounding communities. The opposition did not perceive a water supply problem.

3. ***Have a Meaningful Supply-Planning Criterion –*** No. Water supply was not the issue, or was not supported as a valuable water supply project by the local water supply agency, Zone 7.

Alternatives to Indirect Potable Reuse

4. ***Evaluate Alternatives to Indirect Potable Reuse –*** Some. There is some evidence that alternatives were considered related to disposal of the wastewater including expanding the ocean outfall, local stream discharge, and seasonal storage in a reservoir. The proposal was expanding the ocean outfall, which the Joint Powers Authority did not approve. Livermore and Pleasanton viewed this alternative as paying for Dublin's growth. However, opponents that surfaced later in the process would argue that alternatives to indirect potable reuse were not presented. Ultimately, the ocean outfall was approved.

5. ***Highlight the Benefits of Indirect Potable Reuse Projects –*** No. The project was primarily designed to solve a wastewater disposal problem and was seen as a degradation of quality of life to accommodate growth.

6. ***Express Costs in Meaningful Terms –*** No. There was a perception that existing residents would be carrying the financial burden of future growth. There was also a perception that wastewater costs were already high.

Risks of Indirect Potable Reuse and Alternatives

7. ***Understand and Avoid Environmental Justice Issues –*** No. The recharge well field was actually located in Livermore, with most of the water going to Pleasanton, not Dublin or San Ramon. This means that Pleasanton was isolated and residents perceived that they were being asked to "drink wastewater" because of rapid growth in Dublin. Pleasanton ultimately approved the new ocean outfall, which effectively eliminated the need for the indirect potable reuse project.

8. ***Understand and Use the Concept of Track Record –*** Some. Outreach efforts included "VIP tours" of Water Factory 21. However, it was not possible for DSRSD to have their own track record related to water supply and drinking water quality because they were a wastewater authority. Opponents perceived that DSRSD did not have a clear water quality plan.

9. ***Break the Source-Quality Connection –*** No. Multiple barriers were planned, but the connection was not broken in the project. Community distrust and awareness regarding emerging contaminants (e.g., hormones and pharmaceuticals) arose.

10. ***Articulate an Ongoing Water Quality Plan –*** No. Key opponents stated outright that there was no visible plan to address concerns related to emerging or unknown contaminants. DSRSD would have had to partner with the Zone 7 water agency to create a proactive water quality monitoring and management process to address this issue. Zone 7 was never a clear champion for the project and eventually pulled their support when the new General Manager was hired.

Identity of the Water and the Agency

11. ***Establish Water Agency as Trusted Guardian of Water Quality –*** No. The wastewater district was the project sponsor, creating immediate negative water quality perceptions.

12. ***Rename the Water Quality –*** No. This best practice was not attempted in this region.

Communication Process Best Practices

13. ***Understand that Communication Means Collaboration –*** Some. The DSRSD Board communicated with other elected officials.

14. ***Inform, Don't Educate*** – No. The opposition perceived project representatives as "tremendously arrogant." The opposition felt that they were being treated as if they were "uninformed." An interesting note is that outreach in the schools was viewed by opposing public as indoctrinating the children; that is, DSRSD was "selling their side of the story." As outlined in this best practice, water agencies should strive to inform the average adult about value without having to "educate" them as if they were children. In fact, indirect potable reuse is not always acceptable depending on the local situation. School children do not need to go through a course in aircraft safety to feel safe when riding in a commercial airliner. If water agencies cannot effectively inform adults about value, then the water agencies *may not be trusted* to implement or manage important projects.

15. ***Practice Good Leadership –*** Some. The General Manager of DSRSD was only partially involved. The visible communicators included technical people and staff and Board members that participated in the early speakers bureau. DSRSD lacked credibility with the public.

16. ***Start Early –*** Yes. Project communication started early but stopped too soon. The project underwent numerous approval processes but it appears that community communication stopped after the EIR. Outreach and media relations *at the beginning of the project* included VIP tours to

Water Factory 21, speakers bureaus, communication with news editors and the city council, flyers, and five public workshops at which attendance was low. Public meetings were also held as part of the EIR process.

17. ***Identify and Collaborate with Key Audiences –*** No. Public opposition felt completely unengaged and uninformed. This feeling was mainly due to the fact that communication occurred early in the project, but was discontinued prior to design and final regulatory approval, and then restarted once opposition surfaced.

18. ***Embrace Potential Conflict and Opposition –*** No. The opposition felt that they were not being heard and that management was condescending. There was little opportunity to embrace opposition because community awareness occurred too late in the project when it would have been difficult for the agency to collaborate about alternatives. Opponents included a small group with a strong scientific base that produced a report on why the project was unacceptable and should not be supported. DSRSD did not respond to the report for six months.

19. ***Constantly Communicate –*** No. Outreach and media relations occurred at the beginning of the project but ended too soon. Communication was not persistent throughout the development of the project.

20. ***Keep Communicating After the Project is Completed –*** Not Applicable. Although communication continued after the plant was constructed, the water was never delivered to the aquifer so the indirect potable reuse portion of the project was never implemented.

21. ***Develop Ongoing Relationships with the Media –*** Some. There were ongoing relationships with the media early in the process with editorial support in the three local newspapers. However, there was no ongoing relationship during and after construction. A key factor in the failure of the project was negative media coverage. There was a conflict between the DSRSD Board and newspaper editors over headlines. In general, articles were good but headlines created negative perceptions. This conflict progressed and was one of the reasons for editorials that questioned the ability of the wastewater agency to manage and operate the project.

22. ***Use General Information/Advertising Campaigns Appropriately –*** Some. Professional communications firms were hired to conduct community outreach. However, it appears that this was not done to positively brand the agency ahead of proposing the project, or to identify the opposition.

23. ***Don't Be Defensive –*** No. The opposition felt "labeled" by DSRSD as "no growthers, uninformed, and NIMBY [not in my back yard]."

24. ***Conflict Resolution –*** No. The conflict over the project fell within an established anti-growth conflict. Conflict was not anticipated and was not resolved.

25. ***Maintain Credibility –*** No. The final outcome was the original proposal, which was the ocean outfall. However, DSRSD lost some credibility since outcome was reached through an adversarial process and not a collaborative one.

Conclusions

The issue with this project was that indirect potable reuse was not the solution of first choice. During the project development, the primary need for the project was superseded by another project (i.e., the ocean outfall). As with the unsuccessful San Diego indirect potable project, this project was seen as a wastewater effluent disposal option, not an enhanced water supply or purity option. This project followed two best practices completely (#2 – clearly articulating the problem, and #16 – starting communication

early, although communication stopped for a while after approval of the EIR). Six best practices were followed somewhat and 16 best practices were not followed.

The best practices that appeared critical for project success were as follows:

- *Best Practice #1 – Creating a perception of improvement.* Because there was no clear water supply or water quality problem, this project was perceived to be degrading water quality and reducing quality of life.
- *Best Practice #2 – Clearly articulating the problem.* While the problem of not being able to discharge to the ocean *was* clearly defined, this project showed that this might not be a good enough reason to institute indirect potable reuse. There was no accepted water supply issue. The termination of this project and the success of the three implemented projects reviewed in this study suggest that the two problems strong enough to warrant indirect potable reuse are improving supply reliability and/or increasing watershed quality. Using indirect potable reuse as an *alternative disposal option* appears risky.
- *Best Practice #7 – Understand and avoid environmental justice issues.* Pleasanton, not Dublin or San Ramon, became the primary recipient of the water from the recharge well field. In this sense, Pleasanton was singled out by being asked to supplement its drinking water supply with reclaimed wastewater effluent because of rapid growth in Dublin. Pleasanton also held approval of the wastewater effluent ocean outfall. In time, the outfall was approved and eliminated the *problem (*see Best Practice #2).
- *Best Practice #10 – Articulate an ongoing water quality plan.* Key opponents stated outright that there was no visible plan to address concerns related to emerging or unknown contaminants. DSRSD would have had to partner with Zone 7, the local water agency, to create a proactive water quality monitoring and management process to address this issue. The water agency was never a clear champion for the project and eventually pulled their support when a new Zone 7 General Manager was hired.
- *Best Practice #11 – Agency as source of water quality.* As with the San Diego example, the Dublin San Ramon project was led by a wastewater agency, falling into the very real branding problem that wastewater agencies are not entrusted with drinking water quality.

This case study also uncovered an interesting opposition insight that may help in designing more effective communication programs. Opponents felt that DSRSD was trying to "indoctrinate school children" through school information programs. This emphasizes the notion that if the value of a project cannot be communicated to the adult public, then the value of the project should be questioned. It is in the best interest of communities to inform children of the benefits of indirect potable reuse, independent of the problem that needs to be solved.

A.3.3 City of Tampa, Florida – Case Study #6

About the Project

The City of Tampa has long recognized that the high-quality effluent from the Howard F. Curren Advanced Wastewater Treatment (AWT) Plant is a valuable water resource. The plant produces 40-60 mgd of secondary treated water. Projected population growth and impacts on aquifer, lakes, and wetlands (depletion of local aquifers, which is the primary source of water in the region) resulted in the implementation of a number of studies by the City beginning in 1983.

A 1984 water reuse study identified seven water resource recovery alternatives with potential merit. The seven alternatives were evaluated using the following screening alternatives:

- Ability of the proposed project to supply sufficient water to satisfy future water supply needs;
- Life-cycle cost of the proposed project;
- Anticipated water quality, including surface water bodies and potential effects on public health;
- Environmental impacts, including changes to the natural flora and fauna; and
- Use of existing facilities, including equipment, supplies, and plants already constructed.

As a result of the evaluation process, augmenting the Tampa Bypass Canal with treated wastewater and utilizing the Bypass Canal water as a source of potable water supply was identified as a water supply project that could be developed to meet future demands. This alternative became known as the Tampa Water Resource Recovery Project (TWRRP).

The highlights of TWRRP included the following:

- **Pilot Plant** – A 72,000 gal/day pilot plant was constructed and completed in June 1989 in order to evaluate the optimum treatment for the project. The treatment technologies evaluated included:
  - Carbon adsorption;
  - Reverse osmosis (packaged system);
  - Ultrafiltration (packaged system); and
  - No further treatment.

  All treatment trains evaluated were subjected to ozone disinfection prior to sample discharge and testing.

- **Health Effects (Toxicological) Testing** – A summary report was completed in August 1992. The overall goal of the testing program was to assess the safety of augmenting the conventional raw water supply with water recovered from the AWT Plant. The testing was designed to satisfy three objectives:
  - Test toxic agent reduction by various parts of the treatment train to aid in final technology selection;
  - Use full-scale toxicological testing to evaluate potential health effects and health risks of the recovered water produced by the selected process train; and
  - Compare the results of the analytical monitoring and toxicological testing program for both the selected product stream and the conventional raw water supply that now exists.

  A "Health Effects Group" was composed of six internationally recognized water quality and health effects experts. This group oversaw the testing and analysis of a broad array of physical, chemical, and biological contaminants including total toxicity analysis of the various treated waters. As a result of the extensive testing and positive results, the Florida Department of Environmental Protection (DEP) supported development of the project (David York interview and WEF and AWWA, 1998).

- **Implementation Program:** The City of Tampa, in cooperation with the Southwest Florida Water Management District (SWFWMD) and Tampa Bay Water, initiated a two-year feasibility development program. Key issues addressed in the feasibility program included:
  - Public acceptance;
  - Permitting;
  - Financial, legal, and administrative issues;
  - Implementation methods; and
  - Consideration of other water supply options.

Seven different reuse alternatives were analyzed during early project consideration, which led to choosing the TWRRP option. However, during the feasibility phase of TWRRP, there were a number of water supply alternatives that were continually analyzed by the Tampa Bay Water Board. The first three of these projects were as follows:

- **Seawater Desalination** – This 25-mgd plant in southern Hillsborough County is now the region's first seawater desalination facility and the largest in North America.
- **Brandon Urban Dispersed Wells** – This redevelopment of an existing groundwater source is now able to provide 6 mgd of drinking water.
- **Enhanced Surface Water System –** This 66-mgd system includes the following:
  - Tampa Bypass Canal/Hillsborough River high water;
  - Alafia River;
  - Tampa Bay Regional Reservoir; and
  - Tampa Bay Regional Water treatment facilities.

Ultimately, the Tampa Bay Water Board voted to remove TWRRP from the project list due to water quality concerns voiced primarily by Pinellas County, and the fact that there were other well-developed alternatives for solving the regional water supply problems. Given the wastewater capacity of 40-60 mgd, it is clear that all of the alternatives were not required to meet the 85-mgd goal. Implementing all of the alternatives would have delivered about 140 mgd.

Value-Based Strategy Best Practices

Problem Being Solved

1. **Create a Perception of Improvement –** No. A project will be at risk if key or influential audiences have a perception of degradation. In this case, Pinellas County officials did not feel that an indirect potable reuse project would enhance water quality or quality of life given alternatives such as desalination. It was perceived that the technology and water quality plan were not adequate to address increasing concentrations of unknown contaminants. Pinellas County officials were already concerned by the varying water quality supplied by Tampa Bay Water, especially quality issues with surface water. In fact, they are considering developing a polishing facility to improve quality and consistency.

2. ***Clearly Articulate the Problem –*** Some. The development of new water supplies to meet future demands was the clear issue in the Tampa Bay region. SWFWMD mandated that Tampa Bay Water reduce groundwater usage from regional groundwater facilities. To reduce groundwater production would require the development of new and alternative water supplies.

3. ***Have a Meaningful Supply-Planning Criterion –*** No. This best practice would require the City of Tampa and Tampa Bay Water to express a supply-planning criterion that was meaningful to the average ratepayer. There was no evidence that a meaningful supply criterion was shared with the public or key stakeholders; however, given the focus on finding new supplies, it *was* clear that there was consensus that new supplies were required to maintain future reliability.

Alternatives to Indirect Potable Reuse

4. ***Evaluate Alternatives to Indirect Potable Reuse –*** Some. Ultimately TWRRP was compared to desalination and a surface water project that boasted similar costs per gallon of water. All three projects were not required to meet the goal of increasing water supply by 85 mgd. Desalination and the surface water project remained on Tampa Bay Water's list, and indirect potable reuse was removed. These circumstances illustrate the point that if all other attributes are perceived as equal, then indirect potable reuse will probably lose out to other alternatives because of the "yuck factor" and water quality concerns. Indirect potable reuse can be successful if the project design and communications emphasize water quality improvement, like Occoquan and to some degree the Orange County GWR System. Proper management with respect to this best practice demands that project proponents understand early in the process how indirect potable reuse will compare with other alternatives. An effective dialogue early in the process about alternatives is essential, including a discussion on how they will be perceived with respect to each other.

5. ***Highlight the Benefits of Indirect Potable Reuse Projects –*** Some. The benefits of the project were marginally highlighted. The benefits identified included the following:

    - Solve the underutilization of the Curren AWT plant water in the region. The wastewater would add a much needed 60 mgd to the regional water supply;
    - Provide a climate-independent supply;
    - No need for investment in a separate nonpotable delivery infrastructure;
    - Maximize the use of storage assets, as indicated by groundwater recharge programs; and
    - Improve water quality (as compared to what existed in the "bypass canal" and the Hillsborough River, from which the City of Tampa currently withdraws surface water).

    It is clear that the idea of improved water quality was not convincing to Pinellas County officials, especially with respect to emerging contaminants such as pharmaceuticals and endocrine disruptors.

6. ***Express Costs in Meaningful Terms –*** Yes. As far as the information indicates, the costs were presented in terms that the Boards could understand.

Risks of Indirect Potable Reuse and Alternatives

7. ***Understand and Avoid Environmental Justice Issues –*** Yes. Evidence suggests that there were no real environmental justice issues. Tampa Bay Water is a regional supplier and there is little connection between source and user, especially from a public perception standpoint. However, in the time frame that TWRRP was being considered, Pinellas County was switched from a groundwater to a surface water supply. Although the City of Tampa had been using surface water for years, the other counties were still on groundwater. Some of Pinellas County's water quality concerns were related to surface water. In this sense, Pinellas County could have felt singled out. There is no strong evidence, however, that this was a major factor in the decision related to TWRRP.

8. ***Understand and Use the Concept of Track Record –*** Yes. This project attempted to use the track record of Occoquan (as did San Diego). However, in both cases the perception was that "emerging contaminants" (i.e., endocrine disruptors, disinfection byproducts, pharmaceuticals, etc.) or awareness of them represents a unique and new situation.

9. ***Break the Source-Quality Connection –*** No. This connection was not broken in this project. A number of professionals, especially from Pinellas County and St. Petersburg, believed that there were still unknown risks that the public should not be exposed to (despite the extensive health effects studies that proved acceptable to the group of six internationally recognized water quality

and health effects experts and the Florida DEP). As one interviewee stated, "there seems to be a difference between the wastewater and water professionals. The wastewater professionals seem to be comfortable with the water quality, while the water professionals seem to balk at it."

10. ***Articulate an Ongoing Water Quality Plan –*** No. A concerted potable water quality improvement plan did not appear to exist in this region. In fact, at least one water retailer (Pinellas County) stated that there were "serious concerns" about the variable water quality (especially taste and odor) being provided to them by Tampa Bay Water. To control the water quality, Pinellas County is considering building a polishing facility to ensure a consistent quality of the finished water. Given this underlying issue, it is not surprising that Pinellas County would be concerned about allowing indirect potable reuse to move forward. In this case, the City of Tampa's wastewater department was the organization that would ultimately deliver the water to Tampa Bay Water. The fact that the water would meet Tampa Bay's water quality standards was likely not the issue.

Identity of the Water and the Agency

11. ***Establish Water Agency and Investment as the Source of Water Quality –*** No. Water quality was an issue with Pinellas County. Neither the City of Tampa nor Tampa Bay Water established themselves as the trusted source of quality. As a result, it was unclear who was actually going to ensure that the water quality was acceptable. Tampa Bay Water had quality standards, but this alone was not considered adequate to address the special water quality concerns associated with indirect potable reuse.

12. ***Rename the Water Quality –*** No. The water quality for the project was not renamed. This issue remains an open option. However, the current nonpotable reclaimed water project will likely have the effect of "branding" reclaimed water as "nonpotable."

Communication Process Best Practices

In general, the evidence suggests that the communication process was extensive and ongoing. Water in the City of Tampa has been in the spotlight not only for the local public, but also in the water industry due to the fact that TWRRP, the desalination project, and the nonpotable projects have been extensively publicized.

13. ***Communicate and Collaborate About Value –*** Some. As with the other projects, the type of collaboration that should occur for this best practice is called "value-based collaboration." While the communication process and the "citizen involvement" process were extensive and ongoing in the Tampa Bay project, it was not based on this proposed communication around the key value categories outlined in the *Value-Based Strategy Best Practices*. For that reason, some communication and collaboration occurred, but more value-based collaboration and communication would have been an improvement.

14. ***Inform, Don't Educate –*** No. Both information and education programs were part of the water planning and implementation process in the Tampa Bay area. However, the review of TWRRP relied on the report by the "Health Effects Group." This group, by its composition and process, seemed to emphasize that the water was high quality, which satisfied the experts, but not the citizens. When industry insiders (e.g., Pinellas County) did not agree with the experts, the process was brought to a level of confusion and complexity that the public could not cope with.

15. ***Practice Good Leadership –*** Some. The region was exercising good leadership in that they had identified a problem and were pursuing multiple alternatives to resolve the problem. SWFWMD led with their financial resources by offering $183 million in funding for alternative water supplies. However, because of the "yuck factor," fair consideration of indirect potable reuse

requires that people have high confidence that the water quality issues and public perception issues are being addressed. In this project, indirect potable reuse seemed to have no champion and the water quality credibility was unclear.

16. ***Start Early –*** Some. This project was considered for over 15 years.

17. ***Identify and Collaborate with Key Audiences –*** Some. According to the public relations firm engaged to strategize the communication process, Katz & Associates, collaboration was planned as a natural part of the Tampa Bay Water management process. The key audiences were as follows:

    - **Tampa Bay Water:** The oversight agency that wanted to use the water from TWRRP to make up the deficit as mandated by the State.
    - **City of Tampa:** They were going to produce and manage the 40-60 mgd of "fresh water" that TWRRP would put back into the system.
    - **Other Tampa Bay Water Members:** They would become users of the water in addition to the City of Tampa and the other board seats. They included the following:
      – Pinellas County;
      – Pasco County;
      – Hillsborough County;
      – City of New Port Richey; and
      – City of St. Petersburg.
    - **Southwest Florida Water Management District:** The regulatory agency with responsibilities of water supply, water quality, natural systems, and flood control.

    Generally there was good support for the project among key regulators, stakeholders, and elements of the public who were aware of the project. Tampa Bay Water member utilities were keenly aware of this project since they were Board members. But the key opponent, Pinellas County Utilities, created enough concern such that other alternatives (i.e., the seawater desalination and enhanced surface water system) were selected over indirect potable reuse. As mentioned earlier, only two projects were required to meet the water supply goals.

18. ***Embrace Potential Conflict and Opposition –*** No. There is no evidence that the sponsoring agencies embraced and collaborated with Pinellas County officials about the water quality concerns. The leadership structure within the region related to how the alternatives were being considered was not conducive to collaboration.

19. ***Constantly Communicate –*** No. Constant communication assumes that there was ongoing communication between key stakeholders. While there were attempts to have some private meetings, the lack of a clear supply and quality process meant that people ended up reverting to "impressions" rather than standards. The opposition from Pinellas County was sufficient to defeat the project, which required adoption by Tampa Bay Water in order to be accepted.

20. ***Keep Communicating After the Project is Completed –*** Not applicable. Although the feasibility project was completed, full-scale implementation never occurred.

21. ***Develop Ongoing Relationships with the Media –*** Yes. The relationships were developed. However, this particular opposition was internal and not in the public. The issue was managing the internal opposition rather than the external public opposition.

22. ***Use General Information/Advertising Campaigns Appropriately –*** Yes. Information and advertising campaigns were conducted with the information that was available. Again, it appears the content was the problem**.**

23. ***Don't Be Defensive –*** Yes. From accounts of the participants on both sides, defensiveness did not occur.

24. ***Conflict Resolution –*** Some. Key players noted that attempts at conciliation were made. However, there is no evidence that a more formal conflict resolution process was employed, possibly because there were other alternatives to solving the water supply problem.

25. ***Maintain Credibility –*** Yes. In the end, Tampa Bay Water and its member agencies have maintained credibility by going through the process of developing alternatives and selecting solutions from that list of alternatives.

Conclusions

The TWRRP project appears complex because of the multiple water agencies involved. However, the reasons that the decision was made not to move forward with the project are straightforward. In the final analysis, Pinellas County officials, who had significant positional power and influence over the project, were not content with the water quality management within the region, especially with respect to surface waters. They were not satisfied that a water quality plan was in place that would address the issue of emerging or unknown contaminants. They felt so strongly about this that they are considering a water polishing process to improve water quality and consistency even without the indirect potable reuse project. These perceptions about water quality created the foundation for concerns that TWRRP would face conflict from regional water professionals and might face public opposition. This conflict combined with the fact that the region had developed at least two other supply alternatives (i.e., surface water reservoir and seawater desalination) led to the final decision by the Tampa Bay Water board of directors to remove TWRRP from the list of projects. Any two of the three projects were enough to meet the water supply enhancement goal of 85 mgd.

The key best practices that were not followed that combined to defeat this project were Best Practices #1, #4 and #11. This project followed the most Communication Process Best Practices (#13 to #25) of any of the uncompleted projects (9 of 13 communication best practices were either completely or somewhat followed). Only nine of the 25 best practices were not followed. These results illustrate that some best practices are much more important than others, as discussed in Chapter 2 of this report.

The best practices that appeared critical for this project were as follows:

- *Best Practice #1 – Creating a perception of improvement.* It was the perception of at least one influential agency in the region (i.e., Pinellas County) that water quality was already marginal. Putting treated wastewater into the source water supply might further degrade water quality.
- *Best Practice #4 – Evaluate alternatives to indirect potable reuse.* For years, the Tampa Bay region had been investigating at several water supply options, including seawater desalination. In the end, desalination and a major surface water supply project emerged as the alternatives that would address the near term regional water supply issues. Choosing all three alternatives was not necessary to meet regional goals. Without an aggressive plan for addressing the unique water quality concerns and perceptions associated with indirect potable reuse, it was unlikely that it could compare favorably against alternatives with similar cost per gallon specifications.
- *Best Practice #11 – Agency as the trusted source of quality.* Although Tampa Bay Water, one of the project proponents, has clear water quality responsibilities, in the end they were not sufficient to create the confidence to counteract the unique concerns such as emerging contaminants that arise when evaluating indirect potable reuse projects.

APPENDIX B

METHODS

The technical approach or methods of this study were designed to achieve the goals and objectives of the project. A strong foundation was set for the research to develop a better understanding of the indirect potable reuse problem. Team members were used to perform the necessary research. In addition, during this process, the team has used its extensive contacts at water agencies to gain a better understanding of the issues surrounding indirect potable water reuse.

B.1 Project Phases

This report, combined with a collaborative team meeting in January 2003 to review this report, represents the completion of Phase 1 of the three phases of this project as follows:

- **Phase 1 – Developing a Better Understanding,** which included the following steps:
  - **Collaboration of Experts**: Developing a context for evaluating past research and projects
  - **Primary Research:** Analysis of successful and failed indirect potable reuse projects
  - **Secondary Research:** Collection and review of published reports, papers and data
  - **Integration of Research Findings:** Individual documentation of interviews, summary case studies and report documentation
  - **Phase 1 Deliverables:**
    - Preliminary Best Practices Document from the Kickoff Workshop
    - Research Recommendations – Primary and Secondary
    - Interview Guides
    - Summary of Research Findings for Each Project – Case Studies
    - Research Validated Best Practices Document
- **Phase 2 – Development of the Toolkit**
- **Phase 3 – Development of a Guidance Document and Website**

The steps and deliverables for Phase 1, including the work leading up to and following this report, are described in more detail in the following section.

B.2 Steps and Deliverables of Phase 1

This section provides a more detailed description of the methods, steps, and deliverables of Phase I.

Collaboration of Experts

A workshop of water reuse experts was held on August 1, 2002. The workshop participants brainstormed sufficiently to create a "working hypothesis" for a best practices document. The work product of the workshop was as follows:

- **A documented set of best practices for indirect potable reuse –** This set of best practices was developed over the ensuing months into a set of "Best Practices for Indirect Potable Reuse" that became the basis for the follow-on research;
- **Refined research recommendations –** Recommendations were made on which projects to focus on and possible interviewees who were familiar with the project areas; and
- **Recommendations –** Specific sources and methods for secondary research were offered by the team members.

The best practices document defined in the proposal became organized into the *Best Practices of Indirect Potable Reuse*. These best practices became the backbone of this report, as well as the framework hypothesis for the primary research.

Primary Research

Analysis of successful and failed indirect potable reuse projects began with the parallel activities of choosing which water recycling projects to investigate in depth, as well as drafting an interview guide to use in conducting interviews with key stakeholders**.** The team reviewed nine potential indirect potable project case studies for potential in-depth analysis against the *Best Practices of Indirect Potable Reuse* (i.e., the hypothesis of best practices). The potential case studies that were reviewed were:

- City of San Diego – North City Water Reclamation Plant;
- Dublin San Ramon Services District;
- Orange County Water District – Ground Water Replenishment System;
- Virginia – Upper Occoquan Sewage Authority;
- City of Tampa;
- County Sanitation Districts of Los Angeles County - Montebello Forebay Spreading Grounds and East Valley Water Recycling Project;
- City of Phoenix – Agua Fria Linear Recharge Project;
- City of Scottsdale – Water Campus; and
- El Paso.

A subgroup within the project team, experienced with market and case study research, was formed to conduct the research. This primary research team consisted of Dan Noble, John Ruetten, and Kristin Darr. Based on a set of preliminary interviews, the team decided to focus on six projects (three failed projects and three successful projects). Projects were assigned to individual researchers to provide continuity to each case study research and write-up. The projects, research, and number of completed and documented interviews for each case study are listed in the following table. As shown in the table below, some projects were interviewed and considered, but not included in the more in-depth case study analysis.

Project	Researcher	Number of Completed Interviews
Case Study Projects		
Scottsdale	Kristin Darr	4
Virginia – Upper Occoquan Sewage Authority	Dan Noble	4
Orange County CA GWR System	John Ruetten	7
San Diego	Dan Noble	6
Dublin San Ramon	Kristin Darr and John Ruetten	6
Tampa Bay	Dan Noble	5
Other Projects Considered		
Montebello Forebay	John Ruetten	1
San Gabriel Valley	John Ruetten	1
East Valley Project	John Ruetten	2
El Paso	Kristin Darr	2
	Total Interviews:	38

The interview guide is included in Appendix C. The individual documented interviews are also included in this appendix.

Secondary Research

Prior to and during the process of conducting the primary interviews, the collection and review of published reports, papers and data proceeded as a part of the work. The references that became relevant and useful for explaining the important points of each case study were cited and listed in the References section of this report.

Integration of Research Findings

Through documentation of the interviews, drafting of individual case studies, and the development of this report, the research findings were integrated.

Phase 1 Deliverables

The specific Phase I deliverables include the following:

- Preliminary Best Practices Document from the Kickoff Workshop;
- Research Recommendations – Primary and Secondary;
- Interview Guides;
- Summary of Research Findings for Each Project – Case Studies; and
- Research Validated Best Practices Document.

APPENDIX C

INTERVIEW GUIDE

Setting up the Interview

My name is_____. I am working on a project for the WateReuse Foundation to find out why indirect potable water reuse projects succeed or fail. The WateReuse Foundation is an educational, nonprofit public benefit corporation that serves to increase public awareness and understanding of recycled water and to facilitate the development of technology to improve water recycling. We are interviewing water utility staff, managers, and other stakeholders in water recycling to gain deeper insights into the causes of successes and failures of water recycling projects across the country. Anything we learn from our interviews will be strictly confidential; we will only report information in the aggregate and without any identifying details.

Can I schedule 45 minutes of your time to discuss (city/name/project) with you? What time would be good for me to call you? Fine, I will call you at _____(time). Do you need to know anything else before the interview?

The Interview

My name is _____. Is this still a good time for the interview?
Thank you for giving me some time to talk about the (name) water reuse project.
The goal of these interviews is to find out from people who were involved in different ways with water reuse projects what worked and did not work, what actions or communication worked or didn't work to help the public learn about water reuse and this project.
The interview should take about 45 minutes.
Anything you tell me will be held in complete confidence.
I will only report what I learn in general themes or percentages or without any way of identifying who said it.
Do you have any questions about the interview or the goals of the project before I begin?

First, I would like to ask you some questions about how you came to pick a water reuse project.

Defining the Problem to Be Solved – Positioning the Value of the Project

1. What was the primary reason (sponsoring agency) decided to develop a potable water reuse project?
    a. Prompt – Did (leaders, staff, engineers) discuss the project as a solution to water supply problems?
    b. Prompt – Or as a solution to a wastewater treatment problem?

2. What did you (or the sponsoring agency) do to communicate clearly the need for new supply or groundwater management?

3. Did you perceive that the public, city leaders, etc. understood the need for new supply or groundwater management?
    a. Did some groups or individuals seem to have a better grasp of this issue?
    b. Who/what groups seemed to understand it? Who/what groups did not?
    c. What did they say/do that gave you that impression?

4. Did it seem to you that most community leaders believed that new supply was needed?
   Prompt – What kinds of things did they say/do that led you to that belief?

5. Did it seem to you that they believed it was an important problem?

Prompt – What kinds of things did they say/do that led you to that belief?

6. What kind of written communications (messages) did you use to describe the supply and demand issue?
    a. What other kinds of communications did you use to describe the supply and demand issue?
    b. Prompt – Can you give me some details of the length, tone, etc?

Now, let's turn to a discussion of how you presented water reuse compared to other water alternatives.

Indirect Potable Reuse Positioning and Alternatives

7. When indirect potable reuse was first presented to the public, were other alternatives to indirect potable reuse presented?

8. What were the alternatives that were presented?
   Prompt – Were any presented as alternative ways to develop new supply?

9. Can you tell me what the benefits of indirect potable reuse were compared to the other options that (sponsoring agency) considered?

10. Which of these benefits were most important? Why?

11. Were these benefits communicated to the public?

12. Did presentations or communications about alternatives include any information on impacts on rates?

13. Were any other considerations discussed? If so, what were they?

Thank you so much for your patience and care answering these questions. Let me ask you some questions about water quality next.

Water Quality

14. What is/was the general perception of "tap water" in the community?
    a. Was the water quality named?
    b. What was the name?

15. For your proposed project, what was the proposed treatment process?

16. What was the proposed water quality?
   (Not sure if they will understand this question--check with a water utility person when you test the protocol)

17. How were decisions about treatment and water quality made?
   Prompt – Who, how…

18. What mechanisms, formats, etc. did (sponsoring agency) or you use to communicate the water quality and treatment process?

19. What did you (sponsoring agency) do to address the public's perceptions linking wastewater and what we would eventually drink?
    a. Was the water quality named?
    b. What was the name?

Communication

20. Did (sponsoring agency) communicate with the public about the project?
    a. Was the communication ongoing and consistent throughout the project?
    b. Did (sponsoring agency) have a plan to develop support for the project?

21. What kind of communication activities did you conduct?
    Prompt--Written materials, media activities, face-to-face meetings, public hearings
    a. Why were the types of communication selected?
    b. How were the types of communication selected?

22. Was the communication started before or after activities started on design and construction?

23. What kinds of activities occurred to develop support for the project?

24. If any face-to-face meetings occurred, who conducted them?

25. Were face-to-face meetings invitational or generally open to the public?

26. If invitational, how were people chosen?

27. Did sponsoring agency focus on those who would oppose or who had major political agendas?

28. How did you find potential opposition? Was this easy or hard?

We want to ask you some questions now about the public, city or regional leadership responses to the project.

Opposition and Conflict

29. Who were the visible opponents and what was the basis for opposition?

30. Were the elements of this conflict present prior to the indirect potable reuse project?
    Prompt -- if over growth, have there been other growth management conflicts, if over race, have there been other racial conflicts, etc.

31. Did you (or the sponsoring agency) focus on opponents (or potential opponents) of the project?

32. Did you (or the sponsoring agency) focus on individuals or organizations with political goals that might be inconsistent with the project or that might interfere with consideration of the project?

33. Was their any negative media coverage?
    If yes, how did negative media coverage influence official or unofficial decision makers?

34. Was there any positive media coverage?
    a. If yes, who originated it? (media, or public relations)
    b. If no, why do you think there was none?

35. What was the planned and actual response to negative media?

36. Did any conflict activities occur over the project?
    Prompt – Angry exchanges in public meetings, negative letters to the sponsoring agency or editor, legislative or legal challenges, demonstrations, physical disruption of the construction?

37. At the beginning of the discussions, did you (or the sponsoring agency) think the opposition was important? Why/why not?
    If the answer to this question is no:
    a. Did you (or the sponsoring agency) think the opposition was important at some later point?
    b. If yes, when?
    c. If yes, what had changed?

38. Was there a plan to manage the conflict?

39. What was the sponsoring agency's response to conflict?

40. What was the official or unofficial decision that finally killed the project?

Leadership and Agency Credibility/Legitimacy

41. Who were the visible leaders of the project?

42. What was their leadership style?
    (Prompts – autocratic/controlling, promoter/sales, analyzer/technical, supporter/participatory)

43. Prior to the proposal of an indirect potable reuse project, what were the strengths and weaknesses of the sponsoring agency?

44. Did the public consider the agency's leadership to be credible and legitimate?
    If no, why not?

45. Was the credibility and legitimacy of the sponsoring agency or its leadership considered prior to proposing an indirect potable reuse project?
    Why/why not?

46. Did the agency or its leadership conduct any activities to strengthen the public perception of credibility and legitimacy before proposing the project?

47. What types of activities did it conduct?

48. If these activities were successful, why do you think they were?

49. If they were not, why do you think they were not?
    Prompt – were water officials trusted?

The Media

50. Was there a plan to work with the media?

51. What was the plan to work with the media?

52. Were trusted supporters present at media events?

53. Who was the media's attention focused on?

Thank you so much for your time and patience. I know this interview has taken a long time. If there is anything else we should know about the project to help us develop best practices for other proposed projects please e-mail…..or call……

APPENDIX D

LIST OF INTERVIEWEES

San Diego

David Schlesinger
Former Director of the City of San Diego's Metropolitan Wastewater Department (Project Lead on the Repurified Water Project)

Robert Simmons
Sierra Club

Cesar Lopez
Former Project Engineer, City of San Diego

Patricia Tennyson
Katz & Associates

Howard Glazer
MWH, Consulting Engineer

George Stevens
Former City of San Diego Councilman, District #4

Howard Wayne
Former State Assemblyman

George Ream
Unit Manager, San Diego County Public Works

City of Tampa

Doug Fredericks
Officer-In-Charge, CDM – Tampa Bay Water

Bobby Lue
Senior Engineer – Southwest Florida Water Management District

David York
Water Reuse Manager, Florida DEP

Mike Bennett
Water Department, City of Tampa

Pick Talley
Director of Utilities, Pinellas County

Todd Tanberg
Director of Alternate Water Sources, Pinellas County

Upper Occoquan

Albert B. Akers
President, Occoquan Watershed Coalition

Thomas Bonacquisti
Director of Water Quality and Production, Fairfax County Water Authority

Dr. Evelyn Torres
Regulatory Affairs Coordinator, Upper Occoquan Sewage Authority

Scottsdale

Jim Clune
City of Scottsdale – Water Quality Division Leader

Leonard Dueker
City of Scottsdale – Former Water Resources Manager

Joe Gross
City of Scottsdale – Project Manager

Brad Hemken
Design Engineering Consultant

Dublin San Ramon

Dave Requa
Dublin San Ramon Services District – Assistant General Manager

Peggy Purnell
Community Member

Dale Myers
Zone 7 Water District – General Manager

Orange County GWR System

Ron Wildermuth
Orange County Water District

Brian Brady
Board Member, Irvine Ranch Water District

Gary Brown
Orange County Coast Keepers

Jan Debay
Board Member, Orange County Water District

Jenny Glaser and
Orange County Water District

Cindy Ferch
Orange County Water District

Peer Swan
Board Member Irvine Ranch Water District

Jack Skinner
Retired Medical Doctor

Dennis Baker
Local Environmentalist

Other Projects

Earle Hartling
County Sanitation Districts of Los Angeles County – San Gabriel Valley Project

Don Avila
County Sanitation Districts of Los Angeles County – Montebello Forebay Project

Victoria Cross
Los Angeles Department of Water and Power – East Valley Project

Bill VanWagoner
Los Angeles Department of Water and Power – East Valley Project

Advancing the Science of Water Reuse and Desalination

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