FINAL DRAFT

Southern California Water Recycling Projects Initiative

Successful Public Information and Education Strategies Technical Memorandum

Cooperative Effort Funded and Managed by:

The United States Bureau of Reclamation

IN PARTNERSHIP WITH:

BIG BEAR AREA REGIONAL WASTEWATER AGENCY
CALIFORNIA DEPARTMENT OF WATER RESOURCES
CENTRAL BASIN MUNICIPAL WATER DISTRICTS
CITY OF LOS ANGELES
CITY OF SAN DIEGO
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
ORANGE COUNTY SANITATION DISTRICT
SAN DIEGO COUNTY WATER AUTHORITY
SANITATION DISTRICTS OF LOS ANGELES COUNTY
SANTA ANA WATERSHED PROJECT AUTHORITY
SOUTH ORANGE COUNTY WASTEWATER AUTHORITY
WEST BASIN MUNICIPAL WATER DISTRICT
YUCAIPA VALLEY WATER DISTRICT

AUGUST 2004

PREPARED BY:

CH2MHILL
3 HUTTON CENTRE DRIVE, SUITE 200
SANTA ANA, CA 92707

Contents

Section Page

CONTENTS ..... **III**

ABBREVIATIONS AND ACRONYMS ..... **VI**

1 INTRODUCTION **1**

1.1 CONTENTS OF THIS SECTION 1
1.2 PROJECT BACKGROUND 1
1.3 THE IMPORTANCE OF RECYCLED WATER IN SOUTHERN CALIFORNIA 2
1.4 KEY TERMS 3
1.5 PURPOSE OF A PUBLIC INFORMATION AND EDUCATION PROGRAM 3
1.6 LEARNING FROM EXPERIENCE 4

2 KEY ISSUES FOR PUBLIC INFORMATION AND EDUCATION PROGRAMS **7**

2.1 CONTENTS OF THIS SECTION 7
2.2 INTRODUCTION 7
2.3 PUBLIC PERCEPTION AND ACCEPTANCE ISSUES 7
2.3.1 Water Quality and Public Health and Safety Concerns *8*
2.3.2 Economic Concerns *12*
2.3.3 Water Supply Availability and Population Growth Concerns *13*
2.3.4 Environmental Justice and Equity Issues *16*
2.3.5 General Opposition *18*
2.4 ADDRESSING PUBLIC PERCEPTION AND ACCEPTANCE ISSUES 20
2.4.1 Defining and Understanding the Community and Stakeholders *21*
2.4.2 Determine the Appropriate Level of Public Involvement *22*
2.4.3 Select Processes and Techniques for Public Involvement *22*
2.4.4 Questions to Address *24*
2.5 RECOMMENDATIONS OF THE 2002 DWR RECYCLED WATER TASK FORCE 26

3 PUBLIC INVOLVEMENT PROGRAMS **29**

3.1 CONTENTS OF THIS SECTION 29
3.2 INTRODUCTION 29
3.3 WHAT IS PUBLIC INVOLVEMENT? 29
3.4 10-STEP PUBLIC INVOLVEMENT PROGRAM 30
3.4.1 Frame the Project *31*
3.4.2 Identify Constraints *34*
3.4.3 Identify and Describe Decision Steps and Project Milestones *38*
3.4.4 Identify and Understand Potentially Affected Stakeholders *40*
3.4.5 Determine Vulnerability and Must-Resolve Issues *45*
3.4.6 Determine the Appropriate Level of Public Involvement *48*
3.4.7 Select Processes and Techniques *51*
3.4.8 Develop a Public Involvement Work Plan *56*
3.4.9 Implement and Monitor the Work Plan *60*
3.4.10 Manage Change *62*
3.5 PUBLIC INFORMATION AND EDUCATION PROGRAMS 64

4 INNOVATIVE IDEAS FOR PI&E PROGRAMS **69**

4.1 CONTENTS OF THIS SECTION 69

4.2 INTRODUCTION 69
4.3 COMMUNITY RELATIONSHIP MANAGEMENT (CRM) 70
4.4 SOCIAL MARKETING – CHANGING PUBLIC BEHAVIOR 72
4.5 BRANDING OF PRODUCT OR AGENCY 74
4.6 SOCIAL PSYCHOLOGY OF HUMAN REACTION TO WATER RECYCLING 76
4.7 PROACTIVE VERSUS REACTIVE APPROACHES 78
4.8 SPOTLIGHTING OF INNOVATIVE OR ADVANCED TECHNOLOGY 79

5 PI&E PROGRAMS: SUCCESSES AND DIFFICULTIES 85

5.1 CONTENTS OF THIS SECTION 85
5.2 INTRODUCTION 85
5.3 EXAMPLES OF SUCCESSES 85
5.4 EXAMPLES OF CHALLENGES 86

6 RECOMMENDATIONS AND CONCLUSIONS 91

6.1 RECOMMENDATIONS FOR PUBLIC INFORMATION AND EDUCATION PROGRAM STRATEGIC GOALS 92
6.2 RECOMMENDATIONS ON PUBLIC/MEDIA OPPOSITION 93

Tables

TABLE 1.1 LIST OF IEMT MEMBERS 2
TABLE 1.2 LIST OF CONTACTS AND INFORMATION SOURCES 5
TABLE 2.1 SUMMARY OF PI&E RECOMMENDATIONS FROM THE CALIFORNIA DWR 2002 RECYCLED WATER TASK FORCE 28
TABLE 3.1 SUMMARY OF PUBLIC INVOLVEMENT TECHNIQUES 53
TABLE 4.1 RECYCLED WATER USES ALLOWED IN CALIFORNIA 81
TABLE 5.1 EXAMPLES OF RECYCLED WATER PROJECTS THAT EXPERIENCED SUCCESSES AND DIFFICULTIES 87

Figures

FIGURE 2.1 ACCEPTANCE LEVEL OF RECYCLED WATER FOR VARIOUS USES 9
FIGURE 3.1 10-STEP PUBLIC INVOLVEMENT PROCESS 32
FIGURE 3.2 STAKEHOLDER INVOLVEMENT LEVELS 49

Appendices

APPENDIX A GLOSSARY OF TERMS
APPENDIX B SAMPLE STAKEHOLDER SURVEY
APPENDIX C AWWARF PUBLIC INVOLVEMENT STRATEGIES: A MANAGER'S HANDBOOK TOOLS THAT ASSIST DECISION-MAKING
APPENDIX D CITY OF SAN DIEGO RECYCLED WATER PROJECT – SAMPLE RECYCLED WATER BROCHURE
APPENDIX E AWWARF PUBLIC INVOLVEMENT STRATEGIES: A MANAGER'S HANDBOOK COMMUNICATION TOOLS
APPENDIX F CD CONTAINING PDF VERSIONS OF THE INITIATIVE PI&E TM AND THE SWFWMD'S RECLAIMED WATER GUIDE
APPENDIX G THE PUBLIC UTILITIES BOARD OF SINGAPORE NEWATER PROJECT PUBLIC INFORMATION FLYER
APPENDIX H SAMPLE PUBLIC INVOLVEMENT WORK PLAN QUESTIONNAIRE
APPENDIX I WATEREUSE FOUNDATION SUMMARY OF RESEARCH NEEDS ASSESSMENT WORKSHOP: HUMAN REACTIONS TO WATER REUSE
APPENDIX J BIBLIOGRAPHY

Abbreviations and Acronyms

ac-ft	Acre-feet
afy	Acre-feet per year
AwwaRF	American Water Works Association Research Foundation
AwwaRF Handbook	AwwaRF Public Involvement Strategies: A Manager's Handbook
CAC	Citizen Public Advisory Committee
CALFED	CALFED Bay Delta Program
CBMWD	Central Basin Municipal Water District
CEQA	California Environmental Quality Act
CRM	Community (or Customer) Relationship Management
C/WBMWD	Central and West Basin Municipal Water Districts
DHS	California Department of Health Services
DRIP	Desalination Research Innovation Partnership
DSRSD	Dublin-San Ramon Services District
DWR	California Department of Water Resources
EDCs	Endocrine Disrupting Compounds
EIR	Environmental Impact Report
EVWRP	East Valley Water Recycling Project
FY	Federal Fiscal Year
GWRS	Groundwater Replenishment System
IEMT	Initiative Executive Management Team

Initiative	Southern California Water Recycling Projects Initiative
IPR	Indirect Potable Reuse
IRWD	Irvine Ranch Water District
LADPW	City of Los Angles Department of Public Works
LADWP	Los Angeles Department of Water and Power
LMW	Low Molecular Weight
MF	Microfiltration
mgd	Million gallons per day
MRWPCA	Monterey Regional Water Pollution Control Agency
MVR	Multivariate Regression
MWDOC	Metropolitan Water District of Orange County
NEPA	National Environmental Policy Act of 1969
NDMA	N-Nitrosodimethylamine
NPDES	National Pollution Discharge Elimination System
OCWD	Orange County Water District
OCSD	Orange County Sanitation District
PAC	Public Advisory Committee
PIC	Public Information Committee
PPCPs	Pharmaceuticals and Personal Care Products
PI&E	Public Information and Education
QSAR	Quantitative Structure Activity Relationship
Reclamation	United States Bureau of Reclamation

RO	Reverse Osmosis
RWQCB	Regional Water Quality Control Board
SDCWA	San Diego County Water Authority
SWFWMD	Southwest Florida Water Management District
SWRCB	State Water Resources Control Board
TDS	Total dissolved solids
Task Force	2002 DWR Recycled Water Task Force
TM	Technical Memorandum
U.S.	United States
USEPA	United States Environmental Protection Agency
WateReuse	WateReuse Association
WBMWD	West Basin Municipal Water District
WET	Water Education for Teachers

1 Introduction

1.1 Contents of this Section

Project Background
The Importance of Recycled Water in Southern California
Key Terms
Purpose of Public Information and Education Program
Learning from Experience

1.2 Project Background

The Southern California Water Recycling Projects Initiative (Initiative) is a multiyear planning study that commenced in Federal fiscal year (FY) 2000. The project is funded as part of the Southern California Investigations Program and is managed out of the United States (U.S.) Bureau of Reclamation's (Reclamation) Southern California Area Office. The Initiative is funded on a 50/50 percent cost-sharing basis between Reclamation and 12 local agencies and the State of California Department of Water Resources (DWR), who together, form the Initiative's Executive Management Team (IEMT). Table 1.1 lists the 14 members of the IEMT. The purpose of the IEMT is to formulate, guide, and manage the technical activities of the project. The IEMT's goal is to assist local agencies with successful implementation of water recycling projects.

The Initiative is comprised of two major components; a project-specific work component and a regional component. The project-specific work component consists of identifying and funding recycled water planning projects. The regional component consists of performing work in the following categories: public information and education (PI&E); financial support opportunities; and evaluation of regional concerns, including water quality. This technical memorandum's (TM) purpose is to discuss strategies to successfully inform and educate the public about recycled water projects.

TABLE 1.1
LIST OF IEMT MEMBERS

Big Bear Area Regional Wastewater Agency	San Diego County Water Authority
California Department of Water Resources	Sanitation Districts of Los Angeles County
Central Basin Municipal Water District	Santa Ana Watershed Project Authority
City of Los Angeles	South Orange County Wastewater Authority
City of San Diego	U.S. Bureau of Reclamation
Metropolitan Water District of Southern California	West Basin Municipal Water District
Orange County Sanitation District	Yucaipa Valley Water District

1.3 The Importance of Recycled Water in Southern California

Southern California is dependent on imported sources of water due to the region's geographic location, growing population, and limited local water supplies. In addition, southern California is faced with reductions in the amount of water supply it obtains from the Colorado River aqueduct and northern California sources imported through the State Water Project aqueduct. The allocation of Colorado River water to southern California is being reduced to meet increased demands for water in Arizona and Nevada, which are now requiring their share of water that southern California has been using for many years. Also, southern California's allocation of State Water Project water is being reduced to meet environmental needs in the San Francisco Bay/ Sacramento- San Joaquin Delta and the tributaries to the Delta. This reduction in imported supplies, coupled with population growth in the region, make identifying new water sources, as well as reducing water use through water conservation measures, imperative to the southern California region.

Water recycling is one of many effective ways to conserve water. Water recycling reuses water that would be discharged, as treated wastewater, to inland or coastal water bodies. The development of water recycling projects in California assists in augmenting water supplies by replacing the need of potable water for non-potable uses. For this reason, recycled water has been recognized by the California legislature as an important resource to assist in meeting the state's water supply needs. In the Porter-Cologne Water Quality Control Act, recycled water is defined as a "valuable resource" for water supply in California. This characterization of recycled water as a "valuable resource" has also been reiterated by community leaders in

California, including Dr. Joseph Mason of the Santa Clara County Medical Association. Dr. Mason stated, "*Chronic water shortages are projected to occur in the foreseeable future, and water recycling will be a significant drought-proof source of water to make up for these shortages*."[1] Recycled water is an important mechanism to augment potable water supplies, thus ensuring that adequate quantities of water continue to exist to meet southern California water needs.

1.4 Key Terms

There are a number of key terms that will be used in this document. These include:

- **Stakeholders** – A person or entity with an interest in the problem or project and its results. In addition to the term stakeholders, the terms "the public" and "community groups" are also used to represent groups with an interest in the problem or project and its results.

- **Public Involvement—** A process that encourages the public to participate in project development. A successful public involvement program facilitates the exchange of information among project sponsors, stakeholders and the general public, and includes such techniques as meetings, surveys, committees, presentations, websites, and informational materials.

- **Public Information and Education (PI&E)–** A process that informs and educates the public about a particular problem, project, or program. PI&E efforts can be developed to deal with one segment of the public (i.e. school children or homeowners) or the entire public.

In addition to these terms, a number of other helpful definitions are provided in Appendix A.

1.5 Purpose of a Public Information and Education Program

When implementing water recycling projects, it is important to inform and educate the public about this "valuable resource." Implementing a successful PI&E Program is an effective mechanism to accomplish this goal. The purpose of a PI&E program is to draw "interested members of the public (i.e. stakeholders) into the decision-making process as a project or an issue evolves, in order to develop solutions"[2]. A PI&E Program should be developed to

[1] Jack Gillum. *Water Works: Santa Clara to Join Other Colleges in Reusable Water Project*. The Santa Clara. February 20, 2003.

[2] CH2M HILL. *AwwaRF Public Involvement Strategies: A Manager's Handbook*. 1995. p. X.

provide a framework that will guide work with stakeholders to promote a mutually acceptable project.

One key focus of a PI&E program for a recycled water project is to determine the public's perception of recycled water. Understanding local public perception will assist an agency in determining the level of complexity and type of program needed. For example, if an analysis indicates public apprehension regarding recycled water, then a cautious and very detailed PI&E approach would be necessary. On the other hand, the analysis could indicate public support for recycled water use; therefore, a more streamlined PI&E approach could be used. The level of effort required for a PI&E program is dependent upon the level of community activism, stakeholder concerns in the area, and the basic knowledge and level of acceptance that the community has regarding water recycling. It is important to have a good understanding of the community and stakeholder group's perception when defining a PI&E program. In addition, the PI&E program should have an ability to deal with unexpected issues or changes in perception that occur during the program. Having the flexibility to address emerging issues and concerns is important to a successful program.

1.6 Learning from Experience

This TM discusses methodologies that can be used to address public concerns. The TM also identifies key issues for PI&E programs and examines innovative approaches that can be used to assist in the formulation of a successful PI&E program. Throughout the TM, case studies and exhibits are used to provide information about successful PI&E programs, as well as lessons learned regarding previous PI&E efforts. Information and research from the 2002 DWR Recycled Water Task Force (Task Force) and the American Water Works Association Research Foundation (AwwaRF) *Public Involvement Strategies: A Manager's Handbook* (AwwaRF Handbook) were used as a basis for the information in this TM. In addition to these two sources, information contained in the TM is from additional research and interviews with educators, recycled water agency staff members, and public outreach experts. The research and interviews of relevant recycled water examples and project experience were undertaken to provide a comprehensive resource for agencies to use when developing recycled water projects. Table 1.2 provides a list of the agencies and experts interviewed as part of this effort.

TABLE 1.2
LIST OF CONTACTS AND INFORMATION SOURCES

JURISDICTION/AGENCY	PROJECT	SOURCE
California Department of Health Services (DHS)	All	Mr. Jeff Stone, DHS www.dhs.ca.gov/ps/ddwem/publications/waterrecycling
California State Water Resources Control Board (SWRCB)	Social Marketing and Influencing Public Perception	Mr. Tom Mays, SWRCB Mr. Rich Mills, SWRCB www.swrcb.ca.gov
City of Los Angeles Department of Water and Power (LADWP)	East Valley Water Recycling Project (EVWRP)	Mr. Bill VanWagoner, LADWP www.ladwp.com
City of Redwood City	Redwood Shores Area Recycling Project	Ms. Valerie Young, CH2M HILL www.redwoodcity.org
City of San Diego	City of San Diego Water Repurification Project	Mr. Cesar Lopez, San Diego County Water Authority (SDCWA) www.sdcwa.org www.ci.san-diego.ca.us
Irvine Ranch Water District (IRWD)	Various	Mr. Ken Thompson, CH2M HILL (formerly of IRWD) www.irwd.com
Los Angeles County Department of Public Works (LADPW)	Public Education and School Programs	Ms. Melinda Barret, LADPW www.ladpw.org
Orange County Water District (OCWD)	Groundwater Replenishment System (GWRS)	Ms. Cindy Ferch, OCWD www.gwrsystem.com
West Basin Municipal Water District (WBMWD)	West Basin Water Recycling Project	Mr. Joe Walters, WBMWD Mr. Marc Serna, WBMWD www.westbasin.com

2 Key Issues for Public Information and Education Programs

2.1 Contents of this Section

Introduction
Public Perception and Acceptance Issues
Addressing Public Perception and Acceptance Issues
Recommendations of the 2002 DWR Recycled Water Task Force

2.2 Introduction

This section of the TM focuses on describing issues that need to be addressed regarding public perception and acceptance as identified by the 2002 DWR Recycled Water Task Force. The history and purpose of the 2002 DWR Recycled Water Task Force are described in the exhibit on the next page. The Task Force produced a draft white paper entitled, *Better Public Involvement in the Recycled Water Decision Process*. The focus of this white paper was to address issues related to public perception of recycled water. Discussions and recommendations from the PI&E white paper were included in the Task Force's final report entitled *Water Recycling 2030 Recommendations of California's Recycled Water Task Force*. The issues and recommendations identified by the Task Force are summarized and are expanded upon in this section of the TM.

2.3 Public Perception and Acceptance Issues

Public acceptance is a key element of an agency's ability to site, finance, construct, and operate a water recycling project. It is evident from successful project implementation studies that, over the past two decades, there has been an increase in positive public attitudes regarding water recycling. This is particularly true in areas where the use of recycled water has been in practice for a long time, such as in the areas serviced by the WBMWD and IRWD. Studies have also shown that the greater the level of the familiarity with the subject, the more favorable the response. There are many factors that affect the level of acceptance the public has for recycled water. The case studies in this TM show that public acceptance varies depending on the type of use and tends to increasingly decline when human contact is involved.

The 2002 DWR Recycled Water Task Force White Paper on PI&E identified the following issues as those that can arise when a recycled water project is introduced:

- Water Quality and Public Health and Safety Concerns including Known or Emerging Contaminants of Concern and Health and Safety Issues Related to Vegetation or Water Sources
- Economics including What Will Be the Cost and Who Will Pay for the Project?
- Water Supply Availability and Related Population Growth Issues
- Environmental Justice and Equity Issues
- General Opposition including a Belief that Recycled Water, Especially Indirect Potable Use, Should Be the "Option of Last Resort"[3]

These issues are examined and expanded upon in this TM through case studies.

2.3.1 Water Quality and Public Health and Safety Concerns

The public is aware and concerned about water quality issues. It is important to protect public health when operating, treating, and using recycled water. The 2002 DWR Recycled Water Task Force White Paper on PI&E states that "public acceptance of recycled water use in California ranges from more to less acceptable"[4]

THE 2002 DWR RECYCLED WATER TASK FORCE

The 2002 DWR Recycled Water Task Force was established by Assembly Bill 331 on October 7, 2001 (Water Code Section 13578). The Task Force was a cooperative effort of the California Department of Water Resources, the State Water Resources Control Board, and the Department of Health Services. The Task Force was charged with evaluating the present framework of state and local rules, regulations, ordinances, and permits to identify the opportunities, obstacles, or disincentives to maximizing the safe use of recycled water.

The Task Force was composed of 40 members representing Federal, state, and local governmental and private sector entities, environmental organizations, and public interest groups. To accomplish the Task Force mission, six workgroups were created to address specific issue areas. The six workgroups created addressed the following areas: Economics, Funding/ CALFED Bay Delta Program (CALFED) Coordination, Plumbing Code/ Cross-connection Control, Public Education and Outreach, Regulations and Permitting, and Science and Health/ Indirect Potable Reuse. The workgroups contained Task Force members and other interested participants. Although there may be other approaches to solve California's water requirements, the Task Force was formed to address recycled water issues. Thus, the main focus was on developing a comprehensive single solution for maximizing recycled water use.

The main charge of the Public Information, Education, and Outreach Workgroup was to address issues related to public perception and acceptance, public education programs, and social equity in recycled water projects. In addition, the workgroup identified the entities that need to be aware of the 2002 DWR Recycled Water Task Force and recommended ways and venues to reach such entities.

This group identified issues and potential alternatives, results of past projects, and identified public participation processes and best management practices that could be of assistance for recycled water projects throughout the state.

Source:
2002 DWR Recycled Water Task Force Website.
http://www.owue.water.ca.gov/recycle/taskforce/taskforce.cfm

[3]This controversial statement was made in a 1998 National Research Council publication in reference to the use of recycled water for indirect potable use: "Further, indirect potable reuse is an option of last resort. It should be adopted only if other measures – including other water sources, non-potable reuse, and water conservation – have been evaluated and rejected as technically or economically infeasible." (National Research Council 1998, p. 3).

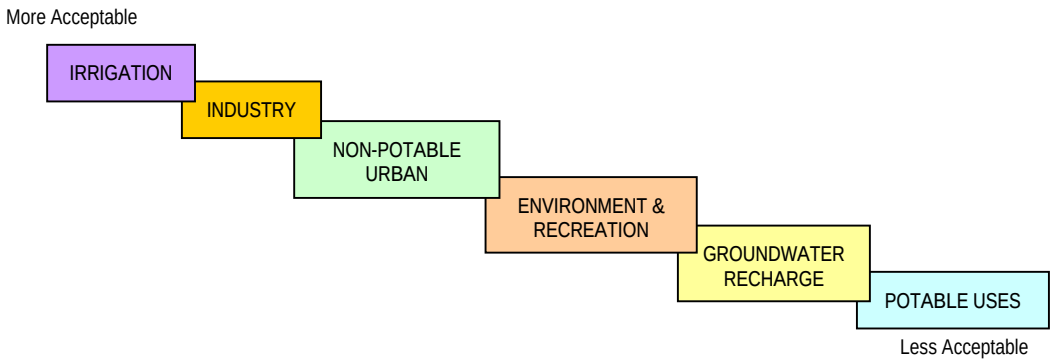
[4] 2002 DWR Recycled Water Task Force. *White Paper on the Public Information, Education, and Outreach Workgroup on Better Public Involvement in the Recycled Water Decision Process*. February 4, 2003.

depending upon the end-user, as shown in Figure 2.1.

Recycled water most commonly has been used for irrigation of pastures and food crops, as well as landscape irrigation at school grounds, parks, golf courses, and along highway medians. It is not clear why irrigation, which includes human food crops, is more acceptable in some cases than industrial uses, such as power generation or cooling. This may be a result of differing levels of individual understanding or knowledge regarding the potential applications of recycled water. In addition, customers may not have experience or knowledge about the infrastructure and operational requirements for implementing recycled water use. This point is illustrated in a memorandum from Mr. Michael Fredericksen of Gen-Probe Incorporated, which was in response to a proposal by the City of San Diego to make recycled water use mandatory for cooling towers. Mr. Fredericksen concluded his memorandum with the following statement:

> "In summary, until extensive real-world testing is done proving that proper water chemistry can be maintained in cooling towers using recycled water, it would be reckless, and risky on the part of the City [of San Diego] from a liability standpoint, to make the use of recycled water in cooling towers mandatory."[5]

FIGURE 2.1
ACCEPTANCE LEVEL OF RECYCLED WATER FOR VARIOUS USES



Source:
Adapted from 2002 DWR Recycled Water Task Force. *Better Public Involvement in the Recycled Water Decision Process.* 2003.

[5]Memorandum from Michael Fredericksen of Gen-Probe Incorporated to the City of San Diego. March 9, 2004.

The city of San Diego has worked to address the concerns and provide informational material regarding the cooling tower industry. These efforts included a city of San Diego sponsored study on the impacts of the new recycled water use criteria and a May 2004 Workshop sponsored in conjunction with the Industrial Environmental Association where representatives from different industries were invited to participate and provide feedback. Both the study and comments from industry representatives at the workshop, showed that there was no change in health or operational concerns resulting from switching water use from potable water to recycled water. [7]

This concern has been overcome by the WBMWD through the use of advance treatment such as Microfiltration (MF) or Reverse Osmosis (RO). The WBMWD currently provides five types of water in order to meet specific customer needs. These treatment types are[8]:

- **Tertiary Water:** Secondary treated wastewater that has been filtered and disinfected. This water is provided for industrial and irrigation uses.
- **Nitrified Water:** Tertiary water that has been nitrified to remove ammonia. This wastewater is provided for industrial cooling towers.
- **Softened Reverse Osmosis Water:** Secondary treated wastewater pretreated by either lime clarification or MF, followed by RO, and disinfection. This water is provided for groundwater recharge.
- **Pure Reverse Osmosis Water:** Secondary treated wastewater that has undergone MF, RO, and disinfection. This water is provided for low-pressure boiler feed water at a Chevron refinery.
- **Ultra-Pure Reverse Osmosis Water:** Secondary treated water that has undergone MF, RO, disinfection, and second-pass RO. This water is provided for high-pressure boiler feed water at industrial sites.

Potential health concerns are also an issue facing recycled water projects. New or emerging contaminants, such as Endocrine Disrupting Compounds (EDCs), Pharmaceuticals and Personal Care Products (PPCPs), and N-Nitrosodimethylamine (NDMA) are examples of constituents that could affect the public's perceptions of recycled water. These emerging contaminants, as well as the public's perception regarding them, will need to be addressed for a

[6]Memorandum from Michael Fredericksen of Gen-Probe Incorporated to the City of San Diego. March 9, 2004.
[7]Personal Conversation with Hossein Juybari of the city of San Diego.

[8] WBMWD website. http://www.westbasin.org/recycle_project.html

project to be successful. Even though many of these constituents are present in raw water supplies including the Colorado River, the public views these constituents of greater concern when they are identified in recycled water. Many consumers believe that a potable water supply, such as a river, which can contain untreated agricultural runoff, untreated stormwater runoff, and treated wastewater discharges, is less objectionable (and safer) when traditionally treated, than advanced treated (MF/RO) recycled water.

Currently, there is no clear explanation for why the public is not equally (or more) concerned about constituents found in potable water supplies. In addition, some stakeholder groups object to recycled water use regardless of safety precautions taken by the project. This is the case even where membrane technologies are employed and recycled water actually receives higher treatment than potable water supplies. The perceived risks that some stakeholders associate with recycled water use is one of the fundamental challenges facing PI&E efforts for recycled water projects. These perceived health and safety risks must be addressed so that these stakeholders understand that advanced treated recycled water has an equivalent or better level of safety and quality compared with potable water supplies.

In addition, PI&E programs need to focus stakeholder attention by providing and explaining the level of reporting and analysis that is required by the DHS and the Regional Water Quality Control Board (RWQCB) before a recycled water project will be permitted. This illustrates the need for successful PI&E programs to address perceived and real issues regarding water quality and public health and safety concerns.

The OCWD has addressed public health concerns about water recycling projects by utilizing technological development, as well as implementing treatment and water quality testing processes that are advanced and innovative. An example of this is the ongoing study of Quantitative Structure Activity Relationship (QSAR). This research is focused on developing models capable of predicting RO rejections for different membranes and constituents that could be used to understand what membranes work best at removal of particular constituents. The removal models could be utilized to develop treatment processes to improve water quality and protect the public against identified constituents of concern. Through innovative technology and advanced testing of water quality, OCWD has begun to obtain public support for recycled

water projects. See the exhibit on this page for additional information about OCWD's current ongoing research initiatives in support of water reuse.

ORANGE COUNTY WATER DISTRICT (OCWD)
WATER QUALITY RESEARCH

The OCWD has a long history of water quality research to ensure public health and safety. For more than 25 years, the OCWD has used reverse osmosis (RO) membranes at its treatment facility, Water Factory 21 in Fountain Valley, California. The OCWD plans to continue the use of RO technology, which will be a central part of the treatment processes used for the Groundwater Replenishment System which is under construction and will replace the existing Water Factory 21 wastewater treatment facility. In addition to the use of RO technology, the OCWD is engaged in research studies to better understand the removal mechanisms for an extensive list of emerging chemicals of concern, including endocrine disrupting compounds, such as 17b-Estradiol; pharmaceutically active compounds, like ibuprofen; trace organic chemicals, such as Nitrosodimethylamine and 1,4-dioxane; as well as other emerging chemicals that may have future health concerns. These are chemicals that could potentially have very low detection levels and unknown health effects. The OCWD is partnering on these studies with the Desalination Research Innovation Partnership (DRIP), whose member agencies include OCWD, Metropolitan Water District of Southern California, San Diego County Water Authority, West and Central Basin Municipal Water Districts, Santa Clara Valley Water District, Alameda County Water District, Sonoma County Water Agency, and the University of California.

Another research study, which is being conducted by the OCWD staff, is focusing on investigating membrane performance with respect to the molecular properties of individual contaminants. The Quantitative Structure Activity Relationship Analysis Research project aims at identifying correlation between the specific structural properties of low molecular weight (LMW) organic compounds and their RO rejection rates. The correlation between LMW organic compounds and RO rejection rates are being developed to construct multivariate regression (MVR) models that will allow prediction of reject quality for a range of RO membrane types. Once finalized, the study results will provide a fundamental understanding of the relationship between the molecular properties of the organic compounds and their rejection through RO membranes. This understanding will also allow optimization of membrane properties for better removal of these and similar organics.

Source:
Orange County Water District's website: www.ocwd.com/_html/_print/_print_pr04/print_pr04_0204grant.htm.

2.3.2 Economic Concerns

The economics of recycled water systems vary with location, cost of potable water, existing facilities, and public acceptance. Costs for recycled water projects include those associated with additional infrastructure development to deliver and manage recycled water projects, as well as the cost for the testing, inspection, and training required to ensure public health and safety. The costs associated with developing the new infrastructure required for implementing a recycled water project can often make the cost of the project seem uneconomical compared to expanding existing systems. For this reason, it is important to incorporate avoided costs into the economic analysis of a recycled water project. Avoided costs include elimination or reduction of costs

associated with potable supply and treatment infrastructure expansions, construction of new outfall pipelines, and identification and development of new water supplies. Beyond economic considerations for a project, financial analyses must also be performed. Financial analyses should incorporate all costs incurred by the agency for the project, as well as any cost reductions resulting from Federal or state subsidies or grants and program components that are being paid for by cost-sharing partners. When developing the economic and financial analysis for a recycled water project, it is important to realize that stakeholders can perceive a project as unnecessary, especially if the driver for the project does not represent an immediate problem and there is a possibility of increases in user's rates or fees to implement the project. Thus, thoroughly explaining and addressing the economic and financial impact of a project is important to a successful PI&E Program. In addition, stakeholders may assess the economics and financials of potential project alternatives in a different manner (i.e. place a different value or assess the costs related to the project with different priorities). Therefore, it is important to provide stakeholders with accurate and complete information so they can make informed decisions. The City of Redwood City is an example of stakeholders developing alternative solutions to water resource issues different from those recommended by the agency project sponsor (i.e. the City of Redwood City). See the Redwood City exhibit on the next page for further information on this example.

2.3.3 Water Supply Availability and Population Growth Concerns

Due to southern California's location and climate, water supply availability is an important consideration for any new project. The state legislature and many local jurisdictions have passed laws requiring new developments to prove that adequate water exists for any new development. Examples of these requirements include California Senate Bills 610 and 221 of 2001, the "Show Me the Water" bills, which require detailed information regarding water availability be provided to city and county decision-makers prior to approval of specified large development projects.

[9]California Department of Water Resources, *State Water Plan Draft 2003 Update*, p. 4-31.

REDWOOD CITY
REDWOOD SHORES RECYCLED WATER PROJECT

Project Description:

Redwood City, California consumes 1,100 acre-feet per year (afy) more imported water (from the San Francisco Hetch-Hetchy system) than its contractual allotment of 12,243 afy. Redwood City has determined that water conservation, in conjunction with water recycling, was the only viable long-term solution to reduce water supply demand to the city's Hetch-Hetchy allotment. A pilot recycling project, the "First Step Project," began operating in August 2000, and provided disinfected tertiary-treated (Title 22) water for irrigation to nearby landscape customers. In addition, two recycled water project feasibility studies were produced in 2001. These studies identified the Redwood Shores community, located near the South Bayside System Authority Treatment Works Plant, as the most reasonable location for implementation of an urban irrigation recycled water system. During the environmental review for the expanded implementation of the pilot project, a Negative Declaration, instead of a more detailed Environmental Impact Report (EIR) was developed because no significant impacts were identified. During the public outreach for the project, only two individuals attended sessions, and few public/agency comments were received. Due to the requirements set forth to qualify for SWRCB funding of the project, a mandatory connection ordinance needed to be passed. Because of the ordinance's requirement and the minimal feedback received during the public outreach effort, the project was placed on a fast track schedule. When the ordinance came up for review by the city council, public resistance to the project emerged regarding health and safety concerns, and the implementation of the mandatory connection ordinance. In order to allay concerns regarding the project, Redwood City implemented a number of measures, including creating a community task force and technical/legal team, conducting a public hearing, producing a draft California Environmental Quality Act (CEQA) EIR with response to comments addendum, and establishing a 'no mandatory use' policy.

Project Relevance:

This project demonstrates that proposing a generally accepted and common recycled water application, such as landscape irrigation, can still be met with opposition. A community that has not used recycled water, and is unfamiliar with the history and facts surrounding recycled water use, may require a more aggressive public outreach effort. Also, it is important to understand the underlying factors behind what is driving public opposition to a project so that the necessary steps can be taken to address these factors. The task force established by Redwood City enabled citizens to develop an alternative plan, which will be implemented as long as it is feasible from an engineering and financial standpoint.

Project Outcome:

The Community Taskforce, set up by Redwood City, presented their alternatives and recommendations to the city council on March 22, 2004. The Taskforce objective was to identify ways to reduce potable water demand by 2,000 afy by 2010 in a financially feasible manner by providing alternatives to using recycled water at schools and playgrounds. The task force recommended that a combination of recycled water use, replacement of natural turf with artificial turf at selected schools and parks (sport fields only), continued use of groundwater at specified locations, and additional water conservation programs be implemented. The implementation of these activities would result in total potable water savings of 2,002 afy at minimal additional cost to the City. In addition, the task force recommended that other measures, such as additional use of groundwater and conservation measures; a commercial toilet replacement program; potential ordinance to implement additional conservation measures; consideration of low-flow urinals, electric eye faucets, and other conservation devices; potential water swaps with other water conveyers; and evaluation of automated landscape irrigation technology and treatment technology, be investigated and potentially implemented.[1]

Lesson Learned:

Public involvement in the project planning process is essential. Regardless of the public's interest in a project at the start, it is important for agencies to continue to identify and address community concerns. This is essential to developing public trust in a project, as well as gaining and solidifying support from elected officials for the project. Rebuilding trust, once lost, is a very expensive and time-consuming process. It is also important to consider a full range of solutions, including nontraditional measures, when determining the economics of a project. This example illustrates that nontraditional measures may be employed as a solution when the public finds traditional approaches unsatisfactory.

Source:

[1]*City of Redwood City Recycled Water Taskforce Report*, March 3, 2004, http://www.redwoodcity.org/publicworks/water/recycling/press_release_04-3-18.htm, and http://www.redwoodcity.org/publicworks/water/recycling/index.html.

Another issue facing southern California is population growth. The population in southern California is projected to expand from over 18.2 million people in 2000 to over 26.9 million by 2030.[10] Stakeholder groups opposed to growth have begun to use the water availability issue to oppose new development and the associated population growth. This has resulted in stakeholder groups, who are opposed to population growth, opposing any project that could potentially enable growth. This would include water projects that are perceived to provide additional water supply, such as recycled water projects. For this reason, it is important to make clear the distinction between a project that creates a new water supply and a project that augments existing supplies. Most recycled water projects provide water supplies that augment existing potable supplies by improving existing water supply reliability or reducing dependence on imported water supplies. Beyond demonstrating and explaining that the function of recycled water is to augment existing water supplies, communities can institute local planning controls. Planning controls are rules or regulations put in place by local government entities that require planning be performed prior to approval of new or expansion of existing development. Planning controls can specify that "new" water supplies will not be used to support growth or the environment, but instead will be used only to preserve water reliability and reduce dependence on imported water for the existing population. These controls can limit the ability of stakeholders to associate recycled water projects with increased development and population growth. Successful PI&E programs should provide information and supporting material that illustrates to stakeholders that recycled water augments existing water supplies and does not constitute a new water supply. It is important to note that stakeholder groups, although motivated by limiting growth, may use other concerns to instigate public opposition to a project.

The Dublin San Ramon Services District (DSRSD) Clean Water Revival Project is an example of a project that was affected by public concern about local population growth. The DSRSD project proposed to treat recycled water with MF/RO and use it to recharge a local groundwater basin. The project was necessary to assist in increasing water supplies and alleviate an effluent discharge problem. Effluent from the DSRSD had to be exported from the Livermore Valley to San Francisco Bay for disposal in an outfall pipeline that had limited capacity. Stakeholders in the region opposed the project because they were concerned that the

[10]California Department of Water Resources, *State Water Plan Draft 2003 Update*, p. 4-31.

additional water supply created by the project would result in population growth in the region. The recycled water project was eventually approved with one major modification--the advanced treated recycled water was used for urban irrigation instead of groundwater recharge.

2.3.4 Environmental Justice and Equity Issues

Environmental justice is defined by the U.S. Environmental Protection Agency (USEPA) as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[11] Typically, environmental justice and equity issues are a result of either procedural or geographic inequity.[12] Procedural inequities occur when there is no "meaningful involvement" of community or stakeholder groups. The USEPA defines "meaningful involvement" as the seeking out and providing for the affected community an "appropriate opportunity" to participate in the decision making process as well as providing the opportunity for the community to have input which will be considered and has the potential to influence the decision-making process.[13] Geographic inequity occurs when the siting, type, and operation of a project places a greater portion of the risk on one community. Environmental justice issues primarily arise on projects that are situated in economically disadvantaged areas.

Environmental justice issues emerge in recycled water project implementation when a disadvantaged community perceives, rightly or wrongly, that it is required to share a majority of the burden for the project. This may be due to project siting, ultimate water application location (where the water is ultimately used), or concerns about decreases in property values. These issues illustrate the importance of effective communication, as well as PI&E programs. Another concern facing agencies where environmental justice issues may arise is the potential for this issue to be used for political opportunism during an election cycle. The potential for political opportunism underscores the importance of developing a PI&E program where

[11]U.S. Environmental Protection Agency, Environmental Justice Homepage, http://www.epa.gov/compliance/environmentaljustice/index.html.

[12]California Office of Planning and Research, *Environmental Justice in California State Government*, p.11.

[13]U.S. Environmental Protection Agency, Environmental Justice Homepage, http://www.epa.gov/compliance/environmentaljustice/index.html.

community and stakeholder involvement occurs at all stages of the project so that stakeholders are involved in the decision-making process and the community knows about and accepts the project. An example of a project that faced environmental justice concerns is the East Valley Water Recycling Project. This project is described in the exhibit on this page.

CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER EAST VALLEY WATER RECLAMATION PROJECT

Project Description:

The goal of the East Valley Water Recycling Project (EVWRP) was to initially deliver 10,000 afy of disinfected tertiary-treated recycled water from the Donald C. Tillman Water Reclamation Plant to Hansen Spreading Grounds (just below Hansen Dam, City of Los Angeles) for groundwater recharge. A three-year demonstration project was approved by the RWQCB, the DHS, and the Upper Los Angeles River Area Watermaster, and began operation in 1999. If water quality monitoring showed favorable results after the three-year demonstration, recharge was to be increased to as much as 35,000 afy. This project was also part of the long-term effort to replace water supply lost as part of the Mono Lake Decision. Environmental groups supported this project because it assisted in protecting Mono Lake from further degradation. Public perception was initially positive, but public participation was not particularly high during the EIR process. However, significant public opposition arose when the local media used the phrase "Toilet to Tap" to describe the project. Concurrently, the project was politicized by mayoral candidates as an example of one area of the city being assigned a greater burden of responsibility and having to deal with a larger share of the impact from the project. Despite a history of approximately 40 years of recycled water groundwater replenishment in the Los Angeles County Montebello Forebay area, the use of the phrase and inference that the public would be forced to drink treated wastewater caused the project to be put on hold after delivering 62 acre-feet (ac-ft) of recycled water. Currently, the City of Los Angeles is performing investigations to determine how to best utilize the existing infrastructure for urban irrigation, commercial, and industrial non-potable uses.

Project Relevance:

This project demonstrates that project success depends upon an accurate assessment of public opinion, public buy-in on the project, and extensive continued proactive public and political involvement in project planning, design, construction, and operation. It also shows that if the public is not properly informed or believes that the project is unsafe, then implementation is unlikely.

Lesson Learned:

Public opinion and opposition can derail a project at any stage of development. The EVWRP was constructed, operational, and had been tested when public pressure caused it to cease operation. Public outreach must continue during all phases of the project. In addition, if opposition to a project arises, the public may need to be informed regarding the project need/drivers, as well as have the steps undertaken to develop the project reviewed. For this reason, it is important to have a transparent well-documented process. Shortly after construction had been completed and recycled water deliveries had begun as part of project testing, the *Daily News*, which had previously written articles supporting the project, published a "Tapping Toilet Water" headline. The article announced that a "Toilet to Tap" project was imminent and that the public had not been informed of this project. News of this project spread to the national media and was the subject of a string of negative jokes on late-night TV talk shows. This also occurred during a mayoral election year, which resulted in candidates using recycled water as a campaign issue as well as issue to support succession of the San Fernando Valley from the city of Los Angeles. In addition, due to the project's location, issues associated with environmental justice were levied against the project. Originally, the project was characterized as putting the burden of the project on less advantaged areas of the city because the recycled water would be recharged and used to service the economically depressed San Fernando Valley. These accusations were unfounded because, although the water would be recharged at a site in a more economically depressed neighborhood, the water would be used to serve customers in other parts of the city. In April of 2002, after spending approximately $55 million on the project, Los Angeles has implemented a costly change in focus to utilize the facilities to supply recycled water for irrigation and industrial uses.

2.3.5 General Opposition

General opposition to a recycled water project is the most difficult issue that can be faced by a PI&E program. For this reason, it is important to work with stakeholders to define what is at the core of their opposition to the use of recycled water. This is vital for the following reasons: (1) it provides an opportunity to initiate a dialogue with the stakeholder and illustrate that the project sponsor is concerned about stakeholder concerns, (2) the underlying concerns may actually fit into one of the other concerns described in the preceding subsections, and (3) it provides an opportunity to work with stakeholder groups to increase their understanding regarding recycled water and its uses. This educational opportunity includes, but is not limited to, sharing information about treatment technologies and procedures used to protect public health and safety, recycled water's importance as a source to augment local water supply, and the economics of implementing a recycled water project.

The most common core concern of stakeholders who have a general opposition to recycled water is the perceived risk associated with water recycling. These groups are often fixated on the unknowns regarding constituents and are driven by fear. These groups often use the "precautionary principle" as a mechanism to oppose projects.

The "precautionary principle" has been defined in different ways by different organizations. These definitions include:

- "When information about potential risks is incomplete, basing decisions about the best ways to manage or reduce risks on a preference for avoiding unnecessary health risks instead of on unnecessary economic expenditures." [14]
- "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[15]
- "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not established scientifically."[16]

[14] USEPA website: http://www.epa.gov/OCEPAterms/pterms.html

[15] Principle 15 from the *Report of the United Nations Conference on Environment and Development*. Rio de Janeiro, June 3-14, 1992 (http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm)

[16] Wingspread Conference Statement website: http://www.gdrc.org/u-gov/precaution-3.html

The "precautionary principle" is the basis of today's risk assessment decision-making process used by regulators. Using the risk assessment principle responsibly encourages risks to be assessed and analyzed, the impacts and effects of the alternatives to be weighed, and the most effective project alternative to be selected. However, if taken to the extreme, as is advocated by

ORANGE COUNTY WATER DISTRICT (OCWD)/ ORANGE COUNTY SANITATION DISTRICT (OCSD) GROUNDWATER REPLENISHMENT SYSTEM

Project Description:

When completed in 2007, the GWRS will provide highly treated recycled water for groundwater and seawater intrusion barrier augmentation. The project includes construction of a new treatment plant in Fountain Valley that will replace the existing Water Factory 21, eight new injection wells, and a 13-mile pipeline connecting the treatment plant to the spreading basins in Anaheim. Treatment will include microfiltration, RO, and ultraviolet light with hydrogen peroxide for disinfection.

The project is driven by four primary drivers:

- Predictions of water shortages for Orange County by 2020 (current demand: 500,000 afy; projected demand: 600,000 afy).
- The need to augment the seawater intrusion barrier as groundwater demands climb.
- Long-term reduction in salinity of the groundwater is expected as the low-salinity GWRS water is blended with high mineral content water primarily from Santa Ana and Colorado Rivers before percolation at the spreading basins.
- Reuse of wastewater eliminates the need for constructing a new ocean outfall.

Project Relevance and Lessons Learned:

For OCWD/OCSD, the PI&E effort has been (and continues to be) extensive. Outreach started on two fronts: with the public and with politicians and community leaders. Focus groups are used extensively to test program messages: education approaches, phone conversations, survey questions, etc. (the project name was developed in a focus group session). Outreach channels include the GWRS website (www.gwrsystem.com), press releases, mail campaigns, tours and briefings (schools and others), cable television ads, telephone surveys, focus groups, and legislative lobbying. One-on-one call-backs are also conducted for those who respond with questions or comments after a mass media campaign.

Significant effort has been placed on identifying demographic sources of potential opposition. Differing cultural views in immigrant communities have emerged as significant differentiators of support. More generally, investigation has indicated (for example) that women, the elderly, and the less educated are more likely to oppose the project. The general approach to garnering support begins with addressing the 'yuck factor' and explaining the technologies involved. Emphasis is also placed on the demonstrated need for the project, and on reliability – why the people should trust the system. Treated water is compared to untreated imported water (also used for recharge), and a study conducted by four Ph.D.s is emphasized, showing that the treated water is the safest available in Orange County (www.gwrsystem.com/about/waterquality.pdf).

The project has strong political support, evidenced by letters of support from local and state politicians, and support resolution from city councils. Focus groups will continue to be held every two years to recheck program messages, gauge support and opposition, and check for new issues. The outreach effort is expected to continue for at least a year beyond implementation.

Source:

GWRS website (www.gwrsystem.com), OCWD Website (www.ocwd.com), OCSD Website (www.ocsd.com), and personal communication with Cindy Ferch, OCWD, January 2004.

some supporters of the "precautionary principle", it can be used to oppose any activity or project that has unknown, unquantified, or known but acceptable risks. This opposition is based on the idea that any risk is too large. For this reason, it is important that project proponents quantify where possible risks exist, including the risk of the "no action" alternative. To do this, (1) the project driver/need should be characterized and understood, (2) the project driver/need should be understood including a determination of what is known and unknown, (3) project alternatives should be identified, and (4) a course of action should be determined and monitored. Using this process and framing the discussion of risks, if any exist, can assist project proponents in proactively addressing public concerns.

Another mechanism that can be used to proactively address concerns regarding risks is the use of a "blue ribbon" panel or commission. A "blue ribbon" panel or commission is a panel comprised of technical experts and/or community members whose mission is to investigate either an issue or a project. For recycled water projects, members can be drawn from academia, public and private sector wastewater or recycled water professionals, and interest groups. These panels or commissions allow for independent assessment of an issue by qualified experts and/or representatives of the affected public, which assists an agency in developing a transparent project alternative assessment process. These "blue ribbon" panels or commissions have been successfully used by the OCWD to investigate new technology (i.e. the development of Water Factory 21) and assess potential risks associated with proposed projects (i.e. the health effects of recharging recycled water from the GWRS project). The exhibit on the next page describes the GWRS project and the efforts of OCWD.

In addition, general opposition to recycled water often arises when indirect or direct potable uses are proposed. Groups that oppose recycled water for unspecific reasons will require more comprehensive and longer PI&E programs because information efforts will first need to be focused on gaining general acceptance of recycled water before acceptance for the specific project can be derived.

2.4 Addressing Public Perception and Acceptance Issues

There are a number of mechanisms that can be employed to address public perception and acceptance issues. The most effective of these is to implement a public involvement plan at the

conception of the project. A public involvement plan can help promote coordination with stakeholders, decision makers, and politicians, provide a vehicle for effective communication and public outreach, and support transparency in the project development process. This subsection provides a list of questions to consider when developing a public involvement plan. The 10-step public involvement process, which was developed as part of an AwwaRF study, will be discussed in the section 3.

This following subsections provides a brief overview of three key elements of a public involvement plan. These three elements are (1) defining and understanding the community and stakeholders, (2) determining the appropriate level of public involvement, and (3) selecting processes and techniques for public involvement.

2.4.1 Defining and Understanding the Community and Stakeholders

One key element of a public involvement plan is to develop a plan describing the community profile and determine the optimal type of community outreach to be performed. Understanding the community profile is at the core of formulating and enacting a successful plan. To formulate the community profile, stakeholders and community participants representing regulatory agencies, community environmental groups, elected officials, the media, potential customers, special interest groups, and senior staff of policy makers must be identified for the affected area. Once a cross-section of stakeholders in the community is assessed, key and influential members of the community should be interviewed. These interviews assist in outlining the key issues and concerns of the community, as well as the best method of communication (i.e. community papers, specific group meetings, and the most convenient time for public meetings). Also, the interviews may provide opportunities to assist in identifying other available communication methods such as existing community E-mail or mailing lists or additional affected community members. Interviews provide an excellent opportunity to establish two-way communication between the public and the agency by providing a forum to educate about the project. This two-way communication allows the agency to ask for initial buy-in on the project, as well as gain feedback regarding the project. A sample interview questionnaire is included in Appendix B.

Another important component of the public involvement plan is communication and coordination within the agency, including obtaining senior management and agency board or

council member support. This internal agency interaction will assist in outlining and formulating the "why, what, who, when, where, and how" for the project.[17] The internal agency input, stakeholder interviews, and demographic research should provide enough information to formulate an effective communication strategy for the project. A communication strategy provides a structure for identifying issues, problems, and actions that need to be addressed.

2.4.2 Determine the Appropriate Level of Public Involvement

Community stakeholder groups typically consist of representatives from a broad cross-section of the public including business, civic, academic, farming, environmental, and regulatory interests. It is important when determining the level of public involvement to be used to ensure that the diverse community is represented in a manner that ensures that each group's views are heard and valued in the decision-making process. If the stakeholder group is made part of the planning process, then the values of the agency can be aligned with stakeholders. This results in the planning process being more representative of the communities' needs.

One mechanism used to ensure that stakeholders concerns are being included into the decision-making process is to appoint a recycled water coordinator. A recycled water coordinator streamlines the two-way dialogue between the agency and the community stakeholder groups. The coordinator's job is to interact with the public, and be responsible for agency responsiveness to community and individual stakeholder concerns. Another mechanism that can assist in ensuring effective levels of public involvement is using Social Marketing or Community (or Customer) Relationship Management (CRM). CRM is discussed in Section 4 of this TM and provides a means to more effective communication and greater insight into stakeholder concerns.

2.4.3 Select Processes and Techniques for Public Involvement

There are a number of ways to disseminate information or perform outreach to the public. Available mechanisms are fact sheets, door to door communication, public advertisement, kiosk displays, flyers, telephone hotlines, public meetings, presentations at community or stakeholder groups, websites, and through the media. Formation of a citizen public advisory committee

[17] Ibid. p.29.

(CAC or PAC) is another method of communicating with the public. A PAC is a committee, task force, or board comprised of residents, stakeholders, or other concerned members of the public affected by the project. The PAC can include representatives from all aspects of the community including, but not limited to, real estate, commerce, construction, homeowners, professional services, academia, environment, retirees, and utility representatives. A PAC can be the forum through which support is gathered, information is disseminated, and the course of the project and plan is maintained. If the public is part of the decision-making process, then there is a reduced likelihood that they will believe that the project was formulated and developed without their input. There will also be an increased level of buy-in to the outcome of the process whether or not they agree with the decision(s).

This mechanism was used by the San Diego City Council to develop support for the issuance of bonds for the Water Department's Capital Improvements Program. In addition, the City of Los Angeles is currently using PACs to develop an Integrated Resource Plan. The City of Los Angeles' PAC is composed of a large number of stakeholders from within the City's boundaries who review and assist in planning future infrastructure. By undertaking this large program, the City has integrated the planning of future facilities within its different departments and obtained public buy-in and recommendations regarding how to address issues associated with growth and changing regulations. Integrating the planning efforts of the City has also enabled solutions to be formulated that balance and address community needs, water supply, stormwater, wastewater, and recycled water related issues in an urban environment.

Public outreach is dynamic – if one approach proves ineffective, identify what assumptions regarding the public were incorrect, and develop another more effective approach. It is common to test outreach approaches on a pilot study group to fine-tune the approach before introduction to the public. This form of outreach demonstrates the agency's commitment to the process of successful communication.

Typical outreach approaches for recycled water projects include:

- Developing presentations and information-gathering sessions with community planning groups, town councils, and civic associations.
- Distributing information kits, pamphlets, brochures, and fact sheets.

- Providing educational information explaining the need for the project, as well as information about the history and safety of recycled water use.
- Implementing a 24-hour project information telephone hotline and an effective web site.
- Informing and educating media representatives regarding details of the recycled water project.
- Implementing, sponsoring, or supporting either new or existing educational programs about recycled water (i.e. Water Environment Federation's Aqua Adventurer).

Social Marketing and CRM, which are discussed in Section 4, also are effective outreach concepts.

2.4.4 Questions to Address

When developing a public involvement plan for a recycled water project, the following questions can assist an agency in identifying potential issues that need to be incorporated into a plan. These questions cover aspects of water recycling projects from conceptual planning to implementation.

- What is the project driver (i.e. regulatory, water supply, environmental)?
- What are the available alternatives to address the project driver (i.e. for water supply shortages, are there other mechanisms such as water conservation and desalination to deal with the water shortage)?
- Are there innovative or nontraditional alternatives that should be considered (i.e. replacing turf with artificial turf to reduce water consumption, which was the recommendation of the Redwood City Community Taskforce)?
- How will the project driver be communicated effectively to the public? Are there issues or groups in the community that might use the project to bring attention to another issue (i.e. no-growth proponents, environmental advisory groups)?
- What available uses are there for recycled water in the community (i.e. industrial, irrigation, environmental)?
- Are there uses that require specialized treatment (i.e. some industries require "boutique" water, which is water that has been treated to remove certain constituents)?
- What uses of recycled water are acceptable to the community?
- What level of risk is acceptable to the community? Do community groups follow the "precautionary principle"?

- How educated is the community about recycled water?
- What is the community profile and what is the best type of communication or outreach program for the community?
- Are there mechanisms available to address community issues regarding recycled water (i.e. Blue ribbon panels, PACs, and/or outreach programs)?
- What are the applicable Federal, state, and local regulations for recycled water?
- Do potential funding mechanisms or regulations require any local regulatory authorization or approval? Will this be acceptable to the public?
- What are the economic impacts to the community of implementing or not implementing a project? Are there perceived concerns about devaluation of property?
- Are there real or perceived social equity or environmental justice issues? What are they and how can they be addressed?
- What level of inconvenience is acceptable to the public during construction (i.e. are there pipeline alignment routes that are more acceptable)?
- What are the types of issues that have arisen on past projects in the community or on projects of the same type? How were the issues addressed? Was the effort a success and what can be learned from the past experience?
- How will transparency of process be provided during the project planning process?
- How will change management be handled on the project?

The list of questions above will not address every potential issue or project stumbling block but they can assist agencies in analyzing the range of problems that have been encountered on past projects.

2.5 Recommendations of the 2002 DWR Recycled Water Task Force

The following discussion summarizes the aspects of the June 2003 report written for the DWR entitled, "Water Recycling 2030, The Recommendations of California's Recycled Water Task Force." The following was reported by the 2002 Recycled Water Task Force in its draft white paper on public involvement in the recycled water decision process:

> "In California, water and wastewater agencies have implemented recycled water projects with varying levels of success, depending on the type of project and other factors. Nonpotable reuse... has been generally accepted by local communities and elected officials."
>
> "The hurdles faced by traditional uses of recycled water; however, pale in comparison to projects in which the eventual end use will be a source of potable (drinking) water. In general, the public's initial response to using recycled water is a visceral reaction from knowing that the source is from water mixed with human sewage (commonly referred to as the "yuck factor")."[18]

The white paper also provides over three pages of PI&E focused recommendations and was incorporated into the June 2003 report *Water Recycling 2030 - Recommendation of California's Recycled Water Task Force*[19]. Most of the public outreach recommendations from this report seek to improve support and participation in water recycling projects at the local level. The report identifies the following as key participation principles for recycled water projects[20]:

1. The public needs to be involved in all phases of project planning with opportunities for involvement in developing and selecting alternatives, not just to be informed of final decisions.
2. Members of the public need to be listened to and responded to with respect. Their values and needs should be incorporated into the decision criteria. Their fears and concerns should be considered real and valid and mitigated with accurate information and, if necessary, changes in project design. Interaction should follow common courtesies of appropriate language, body gestures, and cordiality to keep focus on project issues.
3. Adequate and understandable information needs to be disseminated in many forums on proposed projects and water supply issues in general.
4. Recycled water projects need to be justified on fundamental needs of community desires, such as an adequate and safe water supply or prevention of water pollution.
5. Principles of environmental justice need to be incorporated. The public expects that costs and benefits of projects should be equitably shared.

---

[18] White Paper of the Public Information, Education, and Outreach Workgroup on Better Public Involvement in the Recycled Water Decision Process – DRAFT, California's Recycled Water Task Force, Feb 4, 2003, p. 3.

[19] Water Recycling 2030, Recommendations of California's Recycled Water Task Force, Department of Water Resources, June 2003.

[20] IBID, p. 22.

6. The public needs broad understanding of water supply issues to have a context in which to evaluate recycled water.

Broad PI&E recommendations from the report encompass state, local government, and community actions. The recommendations fall under the following categories:

- Community value-based decision-making model for project planning
- Leadership support for water recycling
- Educational curricula
- State-sponsored media campaign

The primary recommendations under each of these categories are included in Table 2.1. Because of the possibility of negative public opinion, and the great importance in obtaining public support for successful project implementation, it is important to commit to a proactive and open public outreach process. Depending on gauged initial support, public outreach may precede marketing surveys or other potential customer contacts. More favorable and knowledgeable responses to marketing-related questions may be obtained from potential users, including the public, if they first have an opportunity to learn the pros and cons of recycled water use.

TABLE 2.1
SUMMARY OF PI&E RECOMMENDATIONS FROM THE CALIFORNIA DWR 2002 RECYCLED WATER TASK FORCE

REPORT REFERENCE†	RECOMMENDATION
2.1	Community Value-Based Decision-Making Model for Project Planning
2.1.1	Public participation should be increased through vigorous outreach, augmenting the notification requirements stipulated by CEQA and NEPA.
2.1.2	Project planners should hold more public meetings to gather and supply information at appropriate venues.
2.1.3	Project developers should make project decisions that respect and incorporate the community's values and concerns...
2.1.4	Project planners should convene an independent advisory committee comprised of experts in the field and consumers from a variety of viewpoints... to review the proposed project alternatives...
2.1.5	Water recycling should be presented to the public with other alternatives for locally achieving water supply goals.
2.1.6	Local agencies should cultivate and utilize media opportunities for their projects...
2.2	Leadership Support for Water Recycling
2.2.1	The state should take a leadership role on water recycling...
2.2.2	State funding should be provided for public education and outreach.
2.2.3	The state should work closely with local agencies on water recycling. [Vis-à-vis technical assistance, education, and recycled water informational programs].
2.2.4	Appropriate local agencies should adopt well-defined local recycled water ordinances.
2.2.5	Local planning, building code enforcement, health, and public works departments should effectively enforce local recycled water ordinances, through adequate staff and resources. Building inspectors and code enforcement officers should effectively enforce the installation of types of plumbing that would allow the use of recycled water...
2.2.6	Convene a statewide independent review panel on indirect potable reuse to summarize the existing and ongoing scientific research and address public health and safety as well as other concerns, such as environmental justice, economic issues and increased public awareness.
2.3	Educational Criteria
2.3.1	A statewide panel should be convened to recommend changes to public schools and higher education curricula...
2.4	State-Sponsored Media Campaign
2.4.1	The state should develop a water issues information program for radio, television, print, and other media.
2.4.2	The state should work with organizations that have produced videos on water issues, including recycled water, and fund updates and expanded programming...
2.4.3	State agencies should prepare opinion editorial pieces for publication in newspapers throughout the state.
2.4.4	The state should retain an advertising agency/public relations firm to assist in the development of short messages with specific information on urgent topics such as drought, conservation, pollution prevention, water quality, stormwater, wastewater, or recycled water including indirect potable reuse.

† Water Recycling 2030, Recommendations of California's Recycled Water Task Force, California Department of Water Resources, June 2003, pp. 23–38.

3 Public Involvement Programs

3.1 Contents of this Section

Introduction
What is Public Involvement?
10-Step Public Involvement Program
Public Education Programs

3.2 Introduction

The AwwaRF publication, *Public Involvement Strategies: A Manager's Handbook*, was developed to assist utility managers in dealing "with ever-increasing regulatory requirements and more active, skeptical and involved publics. The ultimate objective of this study was to provide managers with a tool to help them solve problems in a way that builds the support of the publics they serve. This will lead to more effective and responsive decisions, and help keep managers abreast of the changing expectations of customers, politicians, and regulators."[21] This AwwaRF Handbook describes a 10-step process to assist in identifying, understanding, and planning a public involvement program.

3.3 What is Public Involvement?

Public involvement is the process of engaging in a dialogue and collaboration with community or stakeholder groups.[22] At the core of public involvement is the concept of two-way communication where ideas can be exchanged and discussed. This communication is important in the development and implementation process for a project and is a method for dealing with public perception issues described in the preceding subsections. It includes meaningful incorporation of the public perspective in value assessment and the decision-making process. Public involvement should be a part of all stages of the project and can

[21] CH2M HILL. *AwwaRF Public Involvement Strategies: A Manager's Handbook.* 1995. p. VII.
[22] U.S. Environmental Protection Agency, *Superfund Community Involvement Handbook*, p. 3.

continue beyond project completion. It is important that agencies base involvement with the public on the following principles:[23]

- The public should be allowed to participate in the decision or actions that affect their lives.
- The public should have the opportunity to influence the decision-making process.
- The public involvement process should communicate the interests and meet the needs of all participants.
- The public involvement process should seek out and facilitate the involvement of all who are potentially affected.
- The public involvement process should allow the public to assist in defining how they participate.
- The public involvement process should explain how the public's input was or was not used.
- The public should be provided with information that enables them to participate in the process in a meaningful manner.

These values are important to being able to identify the issues and concerns of the community. The following subsections will discuss a number of key issues involved in public involvement, including how to develop a public involvement plan, address issues associated with risk, and manage change or recharter projects that have experienced public opposition. These issues will be discussed in the context of the 10-step public involvement process developed in the AwwaRF Handbook.

3.4 10-Step Public Involvement Program

The following steps are discussed in this subsection:[24]

- Frame the Project
- Identify Constraints
- Identify and Describe Decision Steps and Project Milestones
- Identify and Understand Potentially Affected Stakeholders

[23] Ibid. p.7.

[24] CH2M HILL, *AwwaRF Public Involvement Strategies: A Manger's Handbook, pp. V-VI.*

- Determine Vulnerability and Must-Resolve Issues
- Determine the Appropriate Level of Public Involvement
- Select Processes and Techniques
- Develop a Public Involvement Work Plan
- Implement and Monitor the Work Plan
- Manage Change

The step-by-step development process of a public involvement program for a typical recycled water project is represented in Figure 3.1. The key numbers in Figure 3.1 correspond to the circled numbers next to the headings of discussions in this section. Several of these steps may require iterative processes and others can be developed concurrently, and the order altered to fit specific needs. The order provided in this report is the recommended "best order" to these steps but, as regulatory or permitting agencies have different requirements or specific community issues need to be addressed, the order of the steps can be changed. Each of the 10-steps will be explained below by subdividing them into subsets and where available, an example from a project is provided.

3.4.1 Frame the Project (1)

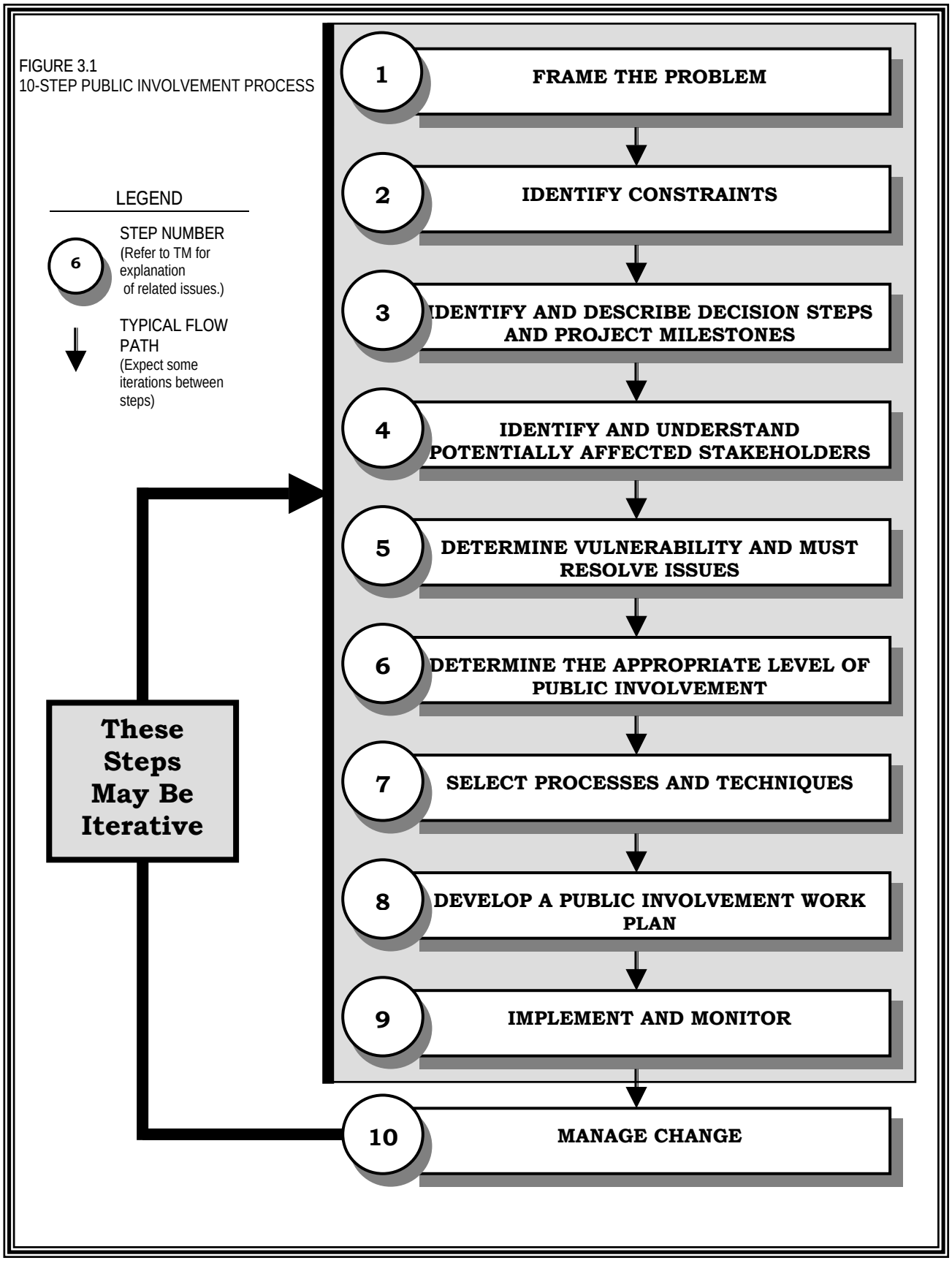
The purpose of this step is to set "boundaries" for how the problem will be defined. These boundaries enable the project planning to focus on the key issues to be addressed.

3.4.1.1 Substeps

There are four substeps that result in proper framing of a project. They are:

- **Define the Problem –** A concise write-up outlining what the problem is must be developed. This description should not include lengthy historical details or recommendations for solving the problem. The focus of this substep is to describe the problem without creating prejudice in the community.
- **Identify the Facts About the Problem –** A concise write-up of the facts regarding the problem should be developed. The facts should be easily understood, as well as agreed upon by the community.

FIGURE 3.1
10-STEP PUBLIC INVOLVEMENT PROCESS



- **Clarify All Assumptions –** All assumptions have to be clearly described and defined to avoid any uncertainty. Having clear assumptions is vital to an open and effective communication process because it provides an opportunity for all participants to start on the same page.

- **Develop the Project Need Statement –** A concise write-up describing the drivers or need for the project should be developed. This description should avoid providing alternatives for solving the problem or any other information that might prejudice the decision-making process.

3.4.1.2 Discussion

When framing the problem, it is important to supply only the facts without including opinions or project alternatives. The sponsoring agency's staff should frame the problem by holding an internal meeting with representatives from all aspects of the agency, including administration, planning, design, operation and maintenance, and public involvement. This internal meeting allows for the boundaries of the problem to be established and a starting point for the public discourse to be set up. Framing the problem enables issues that are outside of the problem's boundaries to be excluded from the discussion so that the process stays on-track. Once the problem has been framed and the clear and concise descriptions for the substeps developed, the problem frame should be provided to the public for external review and consensus building. This is important because external review may result in the identification of additional information or issues that need to be addressed, which changes the problem frame. It is essential that flexibility exist in this step because it is the basis on which all communication about the problem and project will be developed. It is easier to build and maintain credibility in the early stages of the project than to try to establish or re-establish it once the project is underway.

3.4.1.3 Lessons Learned

- Framing the problem or project need in a clear, concise, and unbiased manner is a first step to gaining public support and buy-in on the need for a project. In the process developed for the City of Los Angeles Integrated Resource Plan, stakeholders from within the City's boundaries were brought into the process early-on when only the background information was available about the City's existing resources and future needs. By undertaking this large program, the City has integrated the planning of future facilities within its different departments, as well as obtained public buy-in and suggestions of how to address issues associated with growth and changing regulations. Integrating the planning efforts of the City has also enabled solutions to be formulated that balance and address water supply, stormwater, wastewater, and recycled water-related issues in this urban environment.

- Identifying the facts of a problem and clarifying assumptions are also important components of this step. If the public or stakeholders do not understand the need or how the need was defined, they may believe that other issues motivated the project need. An example of this is the Dublin-San Ramon Services District (See discussion on page 15). In this example, public concern over the project arose because it was believed that the project supported development in the area. In fact the project was developed to address water supply and discharge issues in the area. To rectify the public concern regarding the project, the DSRSD changed the recycled water use type of the project from groundwater recharge to urban irrigation.

- Be cautious of how drivers are presented: is recycling another "waste sink", or is it a water source?[25] One example of this is the GWRS project, which is viewed by residents of Orange County as a water supply project due to a positive public outreach program that explained the need for the project.

3.4.1.4 Questions

- What is the problem or project driver?
- What is the timeframe of the problem or project driver (i.e. future water shortages in 2020, drought proofing, new or upcoming regulations, or an immediate need)?
- What is the history of the problem or project driver?
- What are the key issues related to solving the problem?
- What key assumptions is the problem or project driver based upon?
- Can the problem or project driver be described clearly and concisely to the public? What assumptions must the public buy into to accept the project need?
- What would the project need statement say?

3.4.2 Identify Constraints (2)

The purpose of this step is to identify constraints related to solving the problem or project driver. Constraints can be internal agency limits such as budget and political mandates or external such as public credibility and regulatory requirements.

3.4.2.1 Substeps

There are six substeps that result in the proper identification of constraints of a project. They are:

[25] Personal conversation with Cindy Ferch for Groundwater Replenishment System case study.

- **Identify the Factors That Limit Options –** A list of the factors limiting project alternatives should be developed. Factors that limit your options include, but are not limited to, site size and location constraints, funding or budget limitations, regulatory requirements, schedule constraints, or technological limitations.

- **Determine Which Factors Have Flexibility –** Identify the limiting factors, from substep 1 that have flexibility and then describe how each is flexible or negotiable. Flexibility within constraints includes, but is not limited to, location of project site or pipeline alignment, project funding mechanism, aesthetic issues, operation and maintenance issues, and technological solutions.

- **Determine an Agency's Credibility with the Public –** Identify stakeholder groups or other groups of the public where your agency lacks credibility, and describe why. It is important that this evaluation is done objectively and all possible groups with concerns are identified, regardless of the level of past grievance. An agency's credibility may vary between groups.

- **Determine How to Address Credibility Gaps –** Identify why the agency lacks credibility with each group and develop methods to address credibility gaps. Solutions to credibility gaps range from apologizing or recognizing a past mistake to putting in place mechanisms to improve an agency's interaction with the public (i.e. improving responsiveness to public comments).

- **Determine How the Project Can Damage an Agency's Credibility** - Identify what components of the project have the potential to upset stakeholder groups. Included in this analysis should be a determination of any activity that has the potential to upset or negatively affect the public, politicians, or customers.

- **Determine How to Protect an Agency's Credibility –** Identify mechanisms to implement that will ensure that the public sees the agency as fair, open, and responsive to public concerns regarding the project. It is important to have a transparent process so that the public does not perceive that behind the scenes decisions are being made without public input. Also, identify areas where the agency can proactively address potential concerns, thus garnering additional credibility.

3.4.2.2 Discussion

Credibility is defined as believability or reliability. The amount of credibility an agency has is based on how much confidence its customers, elected officials, and regulators have in the agency's ability to get things done. Credibility is a key issue in working with the public to develop or implement a project. It is difficult for public agencies to gain this from the public today due to past scandals and a general eroding of existing trust in government. For this reason, it is important for agencies to work to preserve existing credibility while attempting to expand public trust. Therefore, when developing the information outlined in the above substeps, agencies must be honest and evaluate all potentialities with an open-mind. Also,

consideration must be given to identify possible changes in constraints during the project planning process. The public may not accept or understand why a project component can not be revised if what they view as constraints differs from the agency's assumed constraints. For this reason, it is important to work with the public to have them assist in identifying what are the project limitations or constraints. If an agency is uncompromising on a component of a project and the public does not understand why, it can lead to feelings of mistrust and lack of credibility for the project.

3.4.2.3 Lessons Learned

- Credibility is a key factor in project success. This is especially important on water recycling projects because of stakeholder concerns regarding health and safety. The Southwest Florida Water Management District (SWFWMD) is an example of an agency that, through a comprehensive public involvement program, has been able to implement a number of projects with the full support of regulators and the public. This was accomplished through development of credibility for the agency through a range of activities from local (i.e. Largo Reclaimed Water personnel wearing purple golf shirts and khaki pants as uniforms, and all promotional items [hats, mugs, pencils, and rain gauges] being purple) to regional (i.e. working with stakeholder groups to identify the best overall solution to water management issues in the region). These activities have enabled the SWFWMD recycled water program to be well recognized, as well as assist in promoting the safety and reliability of recycled water as a water supply source for the region. For additional information on the SWFWMD water recycling programs, see the exhibit on the next page.

- Flexibility in dealing with the public is an important component to maintaining credibility. A number of agencies in California (including DSRSD and the LADWP) have experienced difficulties when planning and implementing recycled water projects due to public concern that the water would enable additional development. The DSRSD is one example of an agency that encountered this difficulty but was able to overcome public concerns by being flexible and incorporating changes that addressed public concerns. The DSRSD accomplished this by changing the project water use type from groundwater recharge to urban irrigation. This alleviated public concerns that recharging groundwater would create additional water supply that could support new development.

- It is much easier to build and maintain trust at the beginning of the process than to try and establish it later on.[26] The Redwood Shores Area Water Recycling Project (see page 14) is an example of a project that had to be rechartered after public opposition arose regarding the project. The public was concerned about the impacts that the project could have on the community and was not fully educated regarding the need for the project. As a result of the opposition a community taskforce was developed to investigate alternatives and make recommendations to address the water supply issues facing the community.

[26]Craig Lichty and Valerie Young. *Redwood City's Water Supply Challenge.* XVIII WateReuse Symposium. September 8, 2003 and Bill Van Wagoner. Personal Communication.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT WATER RECYCLING PROGRAM

Project Description:

Water reuse in Florida is recognized as an important component of both wastewater and water resource management. Reuse offers an environmentally sound means for managing wastewater that dramatically reduces environmental impacts associated with discharge of wastewater effluent to surface waters. In addition, use of recycled water provides an alternative water supply for many activities that do not require potable quality water (i.e. irrigation and toilet flushing), and serves to conserve available supplies of potable quality water. Finally, some types of reuse offer the ability to recharge and augment available water supplies with high-quality recycled water.[1] In 2001, recycled water from reuse systems was used to irrigate 122,382 residences, 419 golf courses, 405 parks, and 188 schools. Irrigation of these areas accessible to the public represented about 44 percent of the 584 million gallons per day (mgd) of recycled water reused[2]. As a result of the state supporting recycled water, local agencies such as the SWFMWD have been able to maximize water resources and implement recycled water projects. These projects are successful through the use of ordinances, pricing of water, and public outreach efforts.

Project Relevance:

Florida and California both face potable water supply scarcity issues. The State of Florida has committed to maximizing the use of recycled water through recognition of finite fresh water resources, and expanding population and future demands. The Water Reuse Work Group Water Conservation Initiative asserts[3] that:

- All water is reused.
- Water is a limited resource.
- Water is water (even raw sewage is 99.9 percent water by weight).
- Water is undervalued and under priced.
- The price of water normally does not reflect scarcity.

As a result of this support, as well as public outreach efforts, the SWFWMD has been able to successfully implement a number of recycled water projects, including lawn irrigation. In addition, because of its comprehensive recycled water program, the SWFMWD has been able to implement recycled water projects that have public support and understanding. This program has also been successful in explaining to the public the safety and value of recycled water.

Lesson Learned:

Through the integration of recycled water projects into the overall water resource and environmental preservation plans targeted for the area, the SWFMWD has been able to successfully implement an extensive recycled water treatment and distribution system. Viewing the natural water systems in the area as an integrated system has enabled the SWFWMD to focus and refine water management methods to maximize limited resources. This approach helps the public to understand that recycled water is another component of the integrated system and assists with gaining acceptance for its use in new ways. In addition, having political and regulatory support for recycled water projects makes them more acceptable to the public from a public health and safety standpoint.

Source:

[1]*Water Reuse for Florida – Strategies for Effective Use of Reclaimed Water*, Reuse Coordinating Committee and the Water Conservation Initiative Water Reuse Work Group, June 2003, p. 4.
[2]IBID, p. 5.
[3]IBID, p.p. 8-12.

3.4.2.4 Questions

- What factors limit project alternatives both internally and externally?
- How will the public or stakeholders view these limitations?
- Do any of the identified limitations have flexibility (either real or perceived)?
- What level of credibility does the agency have with customers, environmentalists, the public, stakeholders, and regulators (look at all levels of the agency from the meter reader to the agency director to assess this)?
- How do other agencies perceive your agency's credibility?
- What can your agency do to regain credibility with different groups? What is the action for each group where the agency lacks credibility?
- Identify issues related to the project that could damage credibility (i.e. who and what action[s])? What proactive actions could be taken to address these issues?
- Is the project development process transparent?

3.4.3 Identify and Describe Decision Steps and Project Milestones

The purpose of this step is to identify and describe the decision-making process for the project. Included in this description should be a discussion of who will make the decisions, and how and when the decisions will occur regarding the project.

3.4.3.1 Substeps

There are four substeps that result in the proper identification of decision steps for the project. They are:

- **Identify How Decisions Will Be Made** - The steps in the decision-making process should be outlined. Included in this outline should be a description of when critical decisions and where meaningful public participation in the process should occur. Also, there should be a discussion regarding the type and level of detail of information the public needs to participate meaningfully in the decision-making process.
- **Identify Who Will Make the Decisions –** Identify what types of decisions need to be made, as well as who will make each type of decision. Identifying the type and responsible party for decisions will enable better internal agency and external (with stakeholders) communication. Decision-makers can be internal (i.e. staff members, agency's director) or external (i.e. public advisory committees).
- **Describe the Difference Between Incremental and Final Decisions –** Identify who is responsible for incremental decisions regarding different aspects of the project and who is

responsible for final decisions or recommendation regarding a project. This is important because incremental decisions regarding projects may be made by agency staff members but the final project alternative may be selected by an agency's board of directors. Understanding who makes what decisions will assist in developing an easy to follow and transparent process for the public.

- **Clarify Necessary Project Information or Approvals –** Identify what and when specific information is needed or approvals must be acquired for the project. The identification should provide information regarding exactly what is needed and from whom. Having these items outlined will enable the public to effectively participate in the process.

3.4.3.2 Discussion

Identifying and describing decision steps and project milestones at the inception of the project assists in creating transparency of process. Having a clear record of what and when decisions need to be made proactively deals with concerns about decisions being made without public input. In addition, it is clear from past project experience that even if a project is planned or constructed, the public can still change the intended purpose of the project (i.e. LADWP's East Valley Water Recycling Project). For this reason, agencies should provide an informational record for the public to follow so that meaningful comment from the public occurs early in the planning process and issues can be addressed and incorporated into the project. In this step, it may be helpful to set up a public advisory committee to either assist in or make recommendations about decisions regarding the project. Another important component to consider in decision-making is upon what the decision will be based. There are a number of methods to employ, especially if committees are the decision-making body. These methods include the nominal group method, decision analysis, multi-attribute utility analysis, and public value assessment. These methods are described in Appendix C.[27]

3.4.3.3 Lessons Learned

- Providing transparency of process is particularly important in decision-making. Even if a project has adhered to proper public involvement processes, if the public perceives that behind the scenes decisions have been made or the process has been set up to select a particular alternative, public opposition may arise, which delays or stops the project. The City of Redwood City Redwood Shores is an example where public sentiment regarding the project delayed and changed the proposed project.

- Providing an outline of the decisions that need to be made is a proactive approach to stakeholder involvement. It also assists in gaining confidence in the process from those who

[27] CH2M HILL. *AwwaRF Public Involvement Strategies: A Manager's Handbook*. pp.D18- D22.

seek out information because those that seek out involvement on their own are already committed one way or the other. [28]

3.4.3.4 Questions

- What are the key decisions regarding the project that need to be made and when will they be made in the timeline?
- Who will make the key decisions?
- Who will make lower-level decisions regarding the project and how will these decisions be tracked?
- Will a public advisory committee or other task force/committee be formed to make decisions? If yes, what will be the roll and responsibilities of the committee?
- What decision-making method, if any, will be used?
- What information needs to be collected or received during the project? How does this information affect the decision-making process?

3.4.4 Identify and Understand Potentially Affected Stakeholders (4)

The purpose of this step is to identify and understand "potentially affected stakeholder" groups. "Potentially affected stakeholders" are stakeholders or stakeholder groups that have a stake in the project outcome.

3.4.4.1 Substeps

There are six substeps that result in the proper identification and understanding of stakeholders of a project. They are:

- **Identify Who Is Concerned About the Problem –** Identify all potential individuals or groups who have either a direct or indirect relation to the project. Directly affected stakeholders include homeowners, ratepayers, businesses, and regulators. Stakeholders who have indirect relationships to the project can include environmentalists, some regulatory agencies, and downstream agencies.
- **Identify Which Stakeholders Must Provide Support for the Project for It to Be Implemented** - Identify groups of stakeholders who either need to support or not oppose the project to ensure success. The support of certain stakeholder groups is key to the success of projects, while gaining agreement that others will not oppose the project may be enough to ensure success.

[28] From personal communication with Cesar Lopez for SDCWA case study, Bill Van Wagoner for East Valley Water Recycling Project case study.

- **Identify Which Stakeholders Must Be Invited to Participate –** Identify stakeholders who, if they are not invited to participate, could become project opponents and use this oversight as an illustration that the planning process was not transparent or fair. These stakeholders often only become interested in a project when it nears completion so it is important to identify them early in the process.

- **Identify Who is too Powerful to Ignore –** Identify individuals who may not have a direct interest in the project but, due to their position in the community, need to support the project for it to be implemented. These individuals include business leaders, large landowners, academics, and influential activists.

- **Identify What Stakeholders Are Likely to Be Concerned About –** Identify what groups or stakeholders will be concerned about what issues. Concerns are either localized (i.e. effects of traffic disruption) or more broad (i.e. concern about quality of life or population growth). Concerns can vary between demographic and economic groups.

- **Identify What Are the Best Ways to Communicate About the Problem and the Best Way for the Public to Participate in the Process –** Identify what is the optimal type and level of communication for each stakeholder group. Each stakeholder or group may prefer that information be provided in different manners. Therefore, it is important to assess each group and determine the optimal communication method. In addition, an agency may want to ask stakeholders how they wish to be provided information about the project.

3.4.4.2 Discussion

Understanding the public and their views about the project is key to successfully implementing a project. Every project will have a number of individuals or groups who will be affected either directly or indirectly by the project. For this reason, it is important to identify their often-divergent concerns and implement processes that enable them to participate in the planning process. These processes include: (1) inviting key stakeholders, whose support for the project is vital, to participate, (2) developing informational materials in a variety of formats, and (3) holding one-on-one interviews with individuals. An agency must not only understand who the stakeholders are but how they prefer to participate. In addition, it is important to ensure that stakeholders or community groups represent the views that exist within the community. Proper understanding and communication is a key to success because often officials and the community leaders believe they both know what would be best, without ever asking individuals in the community how they really feel about the project.

There are a number of PI&E communication tools that can be used to gain information from stakeholders about the project and how they wish to participate. It is important to listen to the public's ideas and modify PI&E materials according to the public's input. This can prevent

large-scale misunderstandings. The following are tools that can be used to assist agencies with informing and educating the public about projects:

- **Printed Materials:** Hard paper materials including maps, white paper documents, brochures, fact sheets, bill stuffers, door hangers, newsletters, lists of experts, bibliographies, and article reprints. Appendix D provides an example of a brochure on the city of San Diego's Water Recycling Project.
- **Community Outreach:** School programs, displays, a community briefing book, information repository, presentations and meetings, briefings for elected officials and speaker's bureaus.
- **Public Meetings:** Give presentations at places where council members, policymakers, and stakeholders meet on a regular basis (i.e. community centers, board meetings, community group meetings, libraries) informing them about the progress and status of the recycled water project.
- **Media Liaison:** Public service announcements, press releases, and editorial board meetings provided to the media.
- **Special Activities:** Slide presentations, videos, and events such as groundbreaking ceremonies, openings, and awards ceremonies.

In addition, there are a number of tools that can be used to solicit information from the public regarding the project. These tools include the following:

- **News Releases:** A one-page notification of an upcoming event related to the project that provides a contact name and phone number for questions.
- **Legal Notices:** A small announcement printed in the newspaper notifying the public regarding the public comment period or date of a public hearing on the project.
- **Public Comment Period:** A timeframe between draft and final study phases where the public is permitted to provide written comment on the project or study.
- **Informational Telephone Lines:** Telephone lines that are set up to provide the public with a place to inquire and comment about the project.
- **Interactive Computer Formats:** A computer program that is set-up to allow users to input comments or answer questions about a project. These computers can be set up at community events or in shopping malls.
- **Information Centers:** A storefront, trailer, or street Kiosk that is set-up to provide information, answer questions, and receive feedback regarding a project.
- **Talk Shows:** Participating as a guest on either a TV or radio talk show to answer questions and solicit comments on a project.

- **Door to Door Canvassing:** Sending agency representatives door-to-door in an area that will be affected by the project to inform people about the potential impact and receive their input and concerns regarding the project.

- **Advisory Groups:** Setting up advisory groups made up of community members to provide input and comment on the project as it is developed.

- **Public Meetings:** Meetings that allow two-way communication between the agency and the public. These meetings can be set up in a number of different formats including small group, large public, open houses, and public hearings.

- **Surveys:** Questionnaires sent to the public or provided to a specific group to determine how they feel about a certain project or activity. Surveys can be in the form of mail surveys, telephone surveys, newspaper coupon or survey, surveys of meeting attendees, personal surveys, and focus groups. The surveys can also be included on a website that provides info on the project.

Appendix E contains more detailed information regarding the communication methods described above.[29] Also, the CD included as Appendix F contains the SWFWMD's Reclaimed Water Guide. This guide provides a number of examples of public information materials used for their overall water recycling program.

3.4.4.3 Lessons Learned

- It is important to identify all stakeholder groups that may be affected by the project. Some stakeholder groups may not become involved in a project until the project triggers a hot-button issue for that group. A number of recycled water projects have been affected by community members reacting to a project after it is built or under design or construction. These groups are often concerned about limiting future development. The DSRSD Water Recycling Project is an example of a project that was affected by concerns regarding growth.

- Implementing information-sharing methods can assist a project in successfully identifying and proactively handling and dealing with stakeholders. The Central Basin Municipal Water District (CBMWD) and the West Basin Municipal Water District have both used proactive programs to interact with stakeholders, including educational programs for children, door-to-door canvassing of affected neighborhoods, active participation in community events, and public information committees. For additional information regarding the CBMWD and WBMWD public information program, see the exhibit on the next page.

[29] CH2M HILL, *AwwaRF Public Involvement Strategies: A Manger's Handbook, pp. D1-D18.*

- Identifying and addressing important issues for specific stakeholders can result in vital support that eases project implementation. The Monterey Regional Water Pollution Control Agency (MRWPCA) early in the planning process identified that health and safety issues were a key component in gaining support for the recycled water project from growers. To address these concerns, the MRWPCA initiated a study to investigate health effects related to using recycled water on crops. This study illustrated to growers that recycled water was safe to use on their crops.

CENTRAL BASIN MUNICIPAL WATER AND WEST BASIN MUNICIPAL WATER DISTRICT WATER PUBLIC INFORMATION AND EDUCATION PROGRAM

Program Description:
The Central Basin Municipal Water District (CBMWD) and West Basin Municipal Water District (WBMWD) have proactive approaches to public information and education. These agencies convey to local policy makers the importance of recycled water use to the region's water resources management, infrastructure improvements, economic stability, and quality of life. The CBMWD and WBMWD are also actively involved in outreach with retail water agencies, the Metropolitan Water District of Southern California, and other public and private entities. The CBMWD and WBMWD 's public affairs activities range from the local to the global level. In the past, the CBMWD has joined its sister agency WBMWD in hosting international seminars that bring together foreign representatives with local water and wastewater experts. Locally, the CBMWD raises awareness of water issues by participating in community events, including the Whittier Uptown Festival. At these types of events, the CBMWD and WBMWD provide the public with information on water recycling, conservation, and water education.

In addition, the CBMWD AND WBMWD work to build relationships with local chambers of commerce, which helps communicate the value of recycled water to city leaders. The CBMWD and WBMWD identified the need for a forum of local agencies, water utilities, municipalities, and legislative offices. In response, the CBMWD and WBMWD each implemented a Public Information Committee (PIC) to coordinate effective public information programs, provide cohesive message dissemination, and foster positive interagency relations. Through regular meetings, the PICs gather representatives from cities, legislative offices, water agencies, and other regional water suppliers. Meeting topics include legislation, water conservation, water education, emerging water issues, media and public relations, city updates, and water agency news.

The CBMWD and WBMWD are also involved in proactively reaching out to the public about upcoming projects. The CBMWD and WBMWD use a number of methods to understand the needs of areas residents as they relate to their projects including door-to-door canvassing, bilingual mailers and other informational material, holding public meetings, and giving access to information about projects through online and telephone communication. For a WBMWD project in El Segundo, California, public information and education efforts were begun over a year before project construction was scheduled to start. This PI&E effort focused on moving construction forward on schedule, preventing delays, and creating community support for the project by educating the public about recycled water, how it works, and how it benefits the community. The effort also focused on explaining to the community how construction would impact residents and businesses. The PI&E efforts included community meetings, setting up a toll free telephone hotline, and door-to door canvassing.

Program Relevance:
The CBMWD and WBMWD have implemented a range of public information and education efforts. These proactive communication efforts with the public have enabled both the CBMWD and the WBMWD to implement a number of projects successfully. These projects have assisted in developing water supplies that augment existing imported supplies as well as protecting existing groundwater supplies.

Source:
Central Basin Municipal Water District website: http://www.centralbasin.org/about_recyc.php and July 11, 2001 IEMT Meeting Minutes from the *Southern California Water Recycling Projects Initiative*

3.4.4.4 Questions

- Which stakeholders are concerned about the problem or project?
- Are there issues in the project that may cause additional stakeholder groups to become interested in the project? If so, what are the issues, who are the stakeholders, and when will they likely become interested in the project?
- Are there key community members that must be invited to participate?
- Who are the stakeholders that are key to implementing the project successfully?
- In what manner does each identified stakeholder want to be informed about the project (i.e. newsletters, one-on-one communication, e-mails, or news media)?
- Do the stakeholder groups really represent the views of the community?
- Do the identified stakeholder groups represent all aspects of the community?
- Are the key political or community leaders represented in the process?
- What are the best methods to proactively communicate with the agency's public?
- What local media outlets need to be included in the process?
- What talk show, newspaper, or other media outlets are available to assist in informing the public about the project?
- What community or other meetings are held where presentations about the project could be provided?
- What upcoming community events are planned where information can be decimated regarding the project?
- Should a Kiosk, customer survey, door-to-door canvass, or another tool be used to obtain informational comments from the public about the project?

3.4.5 Determine Vulnerability and Must-Resolve Issues (5)

The purpose of this step is to identify issues that must be resolved to ensure project implementation. In addition, stakeholders who want to be involved in the process and the issues that are important to them need to be identified.

3.4.5.1 Substeps

There are five substeps that result in the proper identification of must-resolve issues for a project. They are:

- **Identify Points in the Project That Will Provide "Automatic Access" for Stakeholders to the Decision-making Process** - Identify where regulatory, permitting, political or other requirements mandate public access to the decision-making process (i.e. required public hearings). This "automatic access" provides a mechanism to communicate and receive feedback from the public.

- **Identify Points in the Project Planning Process Where Issues Can Delay or Stop the Project –** Determine milestones in the project development (i.e. permitting, financing, or board approval) where issues can delay or stop a project.

- **Determine If There Are Lingering Issues or Other Controversies in the Community That Have Not Been Resolved –** Determine if recent projects have stirred up community opposition or concern. Projects that could have resulted in controversy include waste, power, heavy industry, or social services. If public controversy has occurred, identify the stakeholders or groups who were at the center of the opposition.

- **Determine How Experienced the Ultimate Decision-makers Are with Controversy –** Assess how experienced the decision-makers are with making controversial decisions. In addition, determine if the decision-makers understand the potential difficulties that may arise during the project. Also, educate decision-makers about the successes and difficulties experienced by other recently proposed or implemented projects.

- **Determine If the Decision-making Process Has Adequate Public Involvement –** Analyze decision-making processes used on recent projects, as well as how the public reacted to these processes. Also, determine the level of involvement the public wanted on these past projects. An agency can also survey the public to determine how they feel about the project and what level of participation they would like to see.

3.4.5.2 Discussion

Assessing vulnerabilities is an important step in the implementation of a project and its public involvement planning. If areas where problems or issues might arise are identified and methods to address them planned, then dealing with them, if and when they do arise, is streamlined. Another key factor to ensuring success is understanding what issues are at the core of public and political opposition to past area projects as well as other recycled water projects. As part of this assessment, an agency may want to address these issues with key stakeholder groups, as well as attempt to address lingering controversies, where they can be resolved. At a minimum, stakeholders may need to feel that their issues have been heard and will be considered in future decision-making. If possible, concerns should be incorporated into the planning process and assessed when framing the problem.

Beyond planning for public opposition, how decision-makers will deal with political or public opposition should also be assessed. In planning for a recycled water project, all levels of agency

decision-makers should be briefed on what the community hot-button issues are, as well as where stumbling blocks have been encountered in the past on similar projects. Communication with decision-makers will allow for proper planning and assessment of what level and amount of political pressure is acceptable for potential controversies regarding the project. An agency may want to survey both decision-makers and the public in this planning effort. Being prepared at the onset of the project and having a transparent process are the keys to successful implementation. Another factor to consider is the timeline of elections in the project schedule, as these are timeframes when elements of the project could be politicized. Identifying this information will assist an agency in being cognizant of decision-makers who may use the project for political gain.

3.4.5.3 Lessons Learned

- Educate politicians well ahead of project publicity so that all have an understanding of water recycling issues.[30] It is also important to keep them informed throughout all phases of the project on an ongoing basis.

- Know your politicians and decision-makers. Both the LADWP East Valley Water Recycling Project and the City of San Diego Repurification Project are examples of projects that faced serious stumbling blocks due to politicization. The EVWRP was used as an issue in a mayoral race and the San Fernando Valley area succession proposition.

- Know your neighborhoods and elected officials – support for recycled water from the highest levels of an organization is essential.[31]

- Know the public and stakeholders in the area and their issues. Even projects that are supported by some vocal stakeholder groups can face stumbling blocks. The LADWP's EVWRP was developed in part to replace water lost as a result of the Mono Lake decision. Environmentalists supported this project because it protected Mono Lake but area residents opposed the project for a number of reasons, including health and safety concerns, environmental justice issues, and politicization of the project.

- Emotional drama can overshadow scientific analysis (but science alone will not solve the debate). [32] This is evident from a number of projects that have faced stumbling blocks to project implementation when the public became fixated on a perceived injustice or health and safety issues. A number of recent California water recycling projects have faced growing public opposition when the term "Toilet to Tap" was used by the media as an elementary manner of describing the project to the public.

---

[30] Cesar Lopez, SDCWA. Personal Communication.

[31] Craig Lichty and Valerie Young. *Redwood City's Water Supply Challenge.* XVIII WateReuse Symposium. September 8, 2003

[32] IBID.

3.4.5.4 Questions

- Who are the decision-makers regarding the project (at all levels)?
- What do decision-makers know about recycled water and the issues that face recycled water projects?
- What level of opposition or political pressures are decision-makers willing to accept?
- What key issues have galvanized stakeholders in the past? What controversies have occurred on other projects? Do these need to be addressed or discussed with stakeholders before the project starts?
- Is the use type for recycled water acceptable to the public?
- Are there real or perceived social equity or environmental justice issues? What are they and how can they be addressed?
- Does the project process have adequate public involvement for the stakeholders (i.e. are there comment periods, public meetings, or other methods incorporated into the public involvement process for stakeholder involvement)?
- Do stakeholders need to be surveyed to determine their view of recycled water and/or the project, or the level and type of public involvement required for the project?
- What potential controversies could occur during the project (i.e. permitting, environmental, eminent domain issues, and/or rate or fee increases)?

3.4.6 Determine the Appropriate Level of Public Involvement (6)

The purpose of this step is to assess the appropriate level of public involvement for each stakeholder group.

3.4.6.1 Substeps

There are three substeps that result in determining the appropriate level of public involvement for a project. They are:

- **Identify the Type of Public Involvement Each Stakeholder Wants –** The level of participation for each stakeholder needs to be assessed. Participation levels range from full input in the decision-making process to only receiving information and educational materials about the project. Each stakeholder or group may want a different level of participation so all stakeholders should be assessed.
- **Identify the Best Tool for Communication with Each Stakeholder –** The type of communication, based on substep 1, for each stakeholder should be assessed and the best tool to provide the type and level of information should be selected. Communication methods include media (radio, TV, and newspaper articles, programs and talk shows), one-

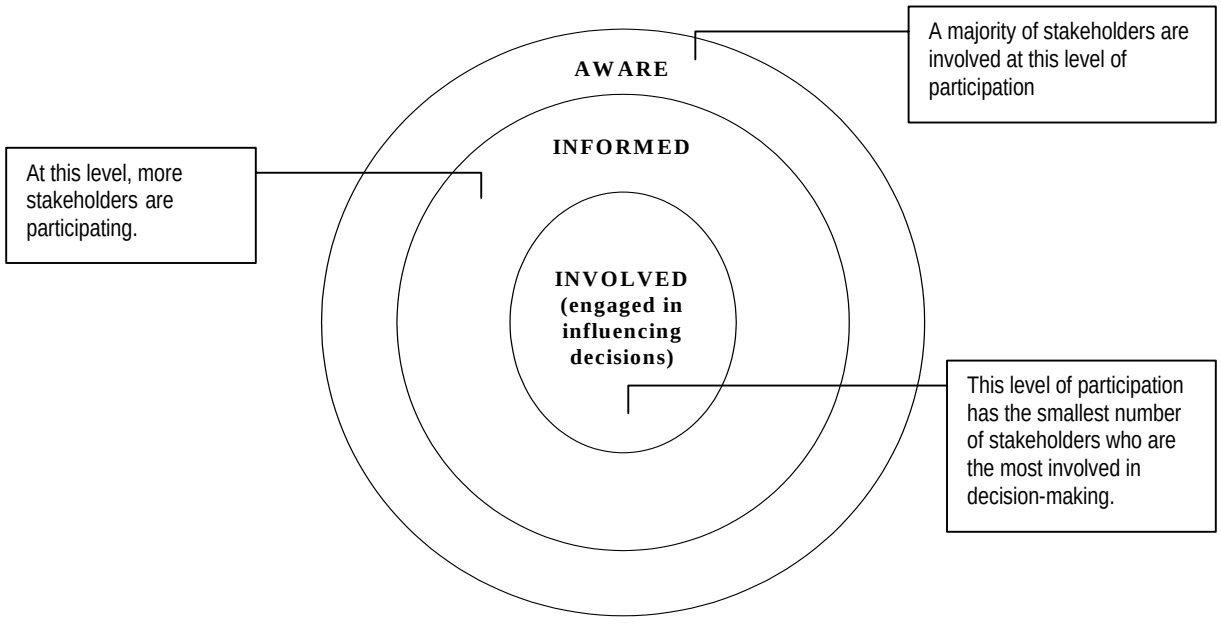
on-one communication (door-to-door canvassing and telephone hotlines), mailers, PACs, and public meetings. See Appendix E for a discussion of different tools available for communication.

- **Assess the Different Stakeholder Group's Values –** Determine what the values are for each stakeholder. This is important because different stakeholder groups may have conflicting values. Stakeholder values are likely to be affected by age, ethnic, social, and economic demographics.

3.4.6.2 Discussion

As part of the project planning process, determinations about the level and type of information and involvement required for each stakeholder group should be assessed. To do this, each stakeholder should be placed in one of three participant level groups: aware, informed, or involved. Figure 3.2 illustrates the levels of participation of each group. Aware stakeholders are those who recognize the existence of a potential project but are not particularly interested in participating directly in the process. Informed stakeholders are knowledgeable about the details of the project concept, the problem it addresses, and the decision-making process for the project. Involved stakeholders are those who are actively engaged in influencing the decisions/outcomes of the project. To determine which level of participation a stakeholder fits best, it may be necessary to survey the stakeholders. A sample stakeholder survey is attached in Appendix B..

FIGURE 3.2
STAKEHOLDER INVOLVEMENT LEVELS



Different concerns or issues and different stakeholder groups may require separate public involvement efforts. Must-resolve and other hot-button issues may require direct two-way communication where stakeholders are either provided a forum to discuss issues or participate directly in decision-making through a PAC. Stakeholders who are concerned about these types of issues are involved stakeholders. Individuals or groups who attend public meetings and visit project websites are informed stakeholders. Other issues may be handled through one-way communication in the form of mailers, bill stuffers, newsletters, or presentations. Stakeholders who accept this level of participation are aware stakeholders. For example, direct dealings might be effective for eminent domain issues while changes to rates or fees could be addressed through mailers. If groups of stakeholders have opposing values, then using a PAC may provide the most effective avenue of participation so that the groups can determine what value compromises are appropriate for each stakeholder group to meet community needs

3.4.6.3 Lessons Learned

Make all project information available to interested stakeholders. This ensures transparency of process and prevents stakeholder concerns about the decision-making process. This can be accomplished by making information available at a document library in the agency's office or providing online access to downloadable information.

- Ensure that information on the decision-making process is clear and fully disseminated to all interested groups. In addition, make sure each stakeholder group is included in the process at their chosen level of involvement. If stakeholders feel they have been excluded from the process or decision-making, they may respond emotionally and begin to distrust the process. This reaction may be difficult to overcome. The Revolting Grandma's of San Diego's initial experience with the City of San Diego Repurification Project and the 2002 DWR Recycled Water Task Force is an example of a group feeling excluded from the process. The Revolting Grandma's entered the public participation process on both of these efforts after they were initiated and as a result felt that they had been excluded. Although this group eventually participated in the process, they will most likely be hesitant in trusting public involvement efforts in the future and will require a higher level of interaction in the decision-making process.[33]

- Provide a range of communication about the project. Different stakeholder groups may want to be more or less involved depending on the issues being discussed. For example, homeowners, whose property may be affected by the project, may want to participate when pipeline alignments are being discussed but may not be interested in the environmental

[33]2002 DWR Recycled Water Task Force. *White Paper on the Public Information, Education, and Outreach Workgroup on Better Public Involvement in the Recycled Water Decision Process*. February 4, 2003. p.16.

documentation process for the project. The WBMWD has used a number of levels of communication to address different stakeholders. See the exhibit on the WBMWD project on page 90.

- Stakeholders should be given equal treatment. Providing special treatment to specific stakeholders or the appearance of unequal treatment may result in angry or emotional responses by other stakeholders.

3.4.6.4 Questions

- Who are the stakeholders and what level of participation does each stakeholder want?
- What is the best method of communication for the level of participation for each stakeholder?
- Does a stakeholder survey need to be performed to determine the level of involvement each stakeholder wants?
- Which stakeholders fit into each category or participation (aware, informed, or involved)?
- What is the best tool(s) for communicating to each group? When will each tool be used?
- When in the project development process will each level of communication be used and what information will be provided?
- Have known stakeholder groups been contacted and asked to identify other groups that might want to participate?
- How will changes in the project development process be disseminated to the different stakeholder groups?
- Should a PAC be set up to assist in decision-making for the project?

3.4.7 Select Processes and Techniques (7)

The purpose of this step is to select what process and techniques will be used to communicate with the public. In the preceding steps, the stakeholders and level and type of communication that best fits each has been discussed. In this step, the actual processes and techniques that will be used by the project will be determined.

3.4.7.1 Substeps

There are three substeps that result in selecting the processes and techniques to use for the project. They are:

- **Identify Types of Communication Needed to Address Stakeholder Desires –** Take the information developed in the first six steps and develop a wish list of potential communication tools that could be used on the project.

- **Determine the Level of Effort (In Cost and Time) That the Agency Is Willing to Accept –** Assess the cost and timeline allotted for the public involvement efforts. This will vary based on the level of involvement of stakeholders and type of project.

- **Assess What Communication Tools Best Fit the Stakeholders' Desires and the Agency's Level of Effort Constraints –** Assess what communication tools are best to fit both stakeholder and agency needs. This can be accomplished by determining the communication tools that best fit (1) obtaining information from the public, (2) getting information to the public, (3) developing a two-way exchange of information, and (4) collaborating on decisions.

3.4.7.2 Discussion

This step focuses on identifying what level of effort for communication best suits the project. This determination is based on two factors: (1) the level of effort in cost and time that the agency is willing to engage in and (2) the level and type of communication that stakeholders desire. Table 3.1 provides a summary of the cost, relative time requirements, relative difficulty, and purpose of some of the commonly used techniques that were discussed in Section 3.4.4. These techniques are grouped into the following categories based on their most common use type:

- Obtaining information from the public.
- Getting information to the public.
- Public Meetings.
- Surveys.
- Methods for collaborative decision-making.
- How each agency assesses these communication tools based upon the type of project.

TABLE 3.1
SUMMARY OF PUBLIC INVOLVEMENT TECHNIQUES

	TECHNIQUE	COST*	TIME	DIFFICULTY	PURPOSE/USES
GETTING INFORMATION TO THE PUBLIC	Bill Stuffers	$	<8 hours	Easy	Notifies public of rate changes and on special events. Provides information about ongoing programs.
	Door Hangers	$	<8 hours	Easy	Notifies public of changes in service. Is temporary and usually for small geographic area.
	Use of Existing Publications	$	<8 hours	Easy	Provides project information in a publication having a specific readership and distribution network in place.
	Information Repository	$	<8 hours	Easy	Used to collect and provide materials pertaining to the project. The level of detail ranges from fact sheets to research reports.
	Newspaper Advertisements	$$	<8 hours	Easy	Notifies public of meetings, events, workshops, etc. Provides an application form for advisory committees.
	Fact Sheets	$$	8-40 hours	Moderate	Includes handouts for public meetings, open houses, and other events; a speakers bureau; and media packets. Development of a series often is useful.
	Briefing Book	$$	8-40 hours	Moderate	Often used to help internal staff respond to questions. Project roles and key project facts are defined.
	Newsletters	$$$	8-40 hours	Moderate	Provides support information over time. Informs stake-holders about project status and upcoming events.
	Displays	$$$	8-40 hours	Moderate	Set up in highly visible locations – libraries, malls, city halls. Conveys project information through imagery.
GETTING INFORMATION FROM THE PUBLIC	Newspaper Coupon/Survey	Variable	8-40 hours	Moderate	Solicits input from the public.
	News Release	$	<8 hours	Easy	Generates media coverage of an event or announces an upcoming meeting, hearing, open house, etc.
	Legal Notices	$	<8 hours	Easy	Used to comply with legal requirements for public notification.
	Public Comment Period	$	8-40 hours	Easy	Often required for permitting. Typically announced with legal advertisement.

*NOTE: $ Least expensive; $$$$ Most expensive; < 8 hours; 8-40 hours; > 40 hours; Easy; Moderate; Difficult

TABLE 3.1 (CONT.)
SUMMARY OF PUBLIC INVOLVEMENT TECHNIQUES

	TECHNIQUE	COST*	TIME	DIFFICULTY	PURPOSE/USES
TOOLS FOR EXCHANGING INFORMATION	Information Phone Line	$			Used for various long-term projects. Allows sharing of information about upcoming meetings, project status and questions.
	Radio Talk Show	$			Once project is under way, provides opportunity to answer questions interactively.
	Speakers Bureau	$			Provides speakers to inform groups about project status and respond to questions.
	Door-to-Door Canvassing	$			For use in a small area that will be directly and seriously affected by activity. Demonstrates commitment and provides for interaction through personal contact.
	Advisory Groups	$$$$			Allows open discussion with many affected parties to share project information and to make recommendations to decision makers.
	Storefront, Trailer or Street Kiosk	$$$$			For high-traffic area, usually in a public place near the project. Provides a visible and interactive means of sharing information.
	Interactive Computer	$$$$			For high-traffic area, usually in a public place near the project. Provides a visible and interactive means of sharing information.
PUBLIC MEETINGS	Small Group Meetings	$$			Presents detailed data or clarifies points of concern to a specific group of stakeholders.
	Public Hearings	$$			Used to obtain public comment on draft plans. Often required for permits and code changes.
	Open Houses	$$$			Gaining favor over large public meetings. Allows onsite observation, visual impact and open atmosphere.
	Large Group/ Small Group Meetings	$$$			Used to present proposals, general information and receive comments.
	Large Public Meetings	$$$$			Provides the public a chance to vent, but usually not interactive. Often held at the beginning or conclusion of the project.

*NOTE: $ Least expensive; $$$$ Most expensive

< 8 hours; 8-40 hours; > 40 hours

Easy; Moderate; Difficult

TABLE 3.1 (CONT.)
SUMMARY OF PUBLIC INVOLVEMENT TECHNIQUES

	TECHNIQUE	COST*	TIME	DIFFICULTY	PURPOSE/USES
SURVEYS	Mail	$$			Used to collect information on demographics, income, personal preferences and sometimes willingness to pay.
	Telephone	$$$			Used in place of or to supplement mail surveys to obtain a higher rate of response.
	Personal	$$$$			Often used with a smaller sample size to collect complex or controversial data.
DECISION MAKING	Delphi Technique	$$$			Market research technique that can be used by utilities to develop criteria for slecting alternatives.
	Nominal Group Technique (NGT)	$$$			Used to rank goals, activities or criteria. Usually applied when there are varying, or competing, objectives.
	Public Value Assessment (PVA)	$$$			Similar to NGT, but helpful where study area is large with numerous interest groups that make using an advisory committee logistically impractical.
	Multi-Attribute Utility Analysis	$$$$			More sensitive technique than NGT or PVA but used for the same purposes.
	Decision Analysis	$$$$			Used to evaluate all interrelated aspects of a particular decision. May be helpful with Integrated Response Planning (IRP) efforts.

*NOTE: $ Least expensive; $$$$ Most expensive; < 8 hours; 8- 40 hours; > 40 hours; Easy; Moderate; Difficult

3.4.7.3 Lessons Learned

- Opponents with time and resources require equal (or more) time and resources from the project proponent.[34]

- Understanding public knowledge regarding the project assists in developing public involvement programs that create successful projects. As illustrated in the Redwood City example, not understanding stakeholders and their views on recycled water can result in a project facing stumbling blocks. On the other hand, successfully assessing stakeholders can result in successful project implementation as is illustrated by the NEWater Project in Singapore

- By assessing what information and level of participation is important for each stakeholder, an agency can develop studies or other documents to assist in allaying specific stakeholder concerns. An example of this is the MRWPCA Water Recycling Project. The MRWPCA determined that growers in the region could oppose the project if they felt that the use of recycled water could affect their ability to provide a safe and healthy product. For this reason, the MRWPCA undertook a crop study to verify that no adverse effects resulted in the use of recycled water to irrigate crops. As a result of this study, growers supported the project. For additional information on the MRWPCA project, see the exhibit on the next page.

3.4.7.4 Questions

- What communication tools do stakeholders and the project sponsor want to use? Develop a wish list of communication tools.

- What level of effort is the agency willing to put forth on public involvement? Is this level of effort commensurate with the project requirements and stakeholder involvement required?

- What tools best-fit stakeholder and agency desires and needs? Do these tools meet all the necessary requirements? Can all identified controversies be handled through the selected communication methods?

3.4.8 Develop a Public Involvement Work Plan (8)

The purpose of this step is to utilize the information collected in the previous steps to develop a public involvement work plan that outlines the public involvement process for the project.

3.4.8.1 Substeps

There are three substeps that result in the development of a public involvement plan. They are:

- **Incorporate the Public Involvement Component of the Project Into the Overall Project Schedule –** Determine what decisions are affected by the public involvement process (from

[34]Craig Lichty and Valerie Young. *Redwood City's Water Supply Challenge.* XVIII WateReuse Symposium. September 8, 2003.

Step 3), how this involvement (Steps 5 and 6) will effect the project schedule, and determine the time that can be allotted for the public involvement process.

- **Develop a Project Planning Budget –** Assess the size and potential controversies associated with the project, determine what communication tools will be used, and assess the cost in either agency man hours or consultant fees required to meet the agency project needs. In general, the cost for public involvement increases with the size of project and the controversies associated with the project.

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY
WATER RECYCLING PROJECT

Project Description:
The MRWPCA Water Recycling Projects are designed to reduce seawater intrusion along the northwest portion of Monterey County by using recycled water instead of groundwater. It began operation in 1998 following almost 20 years of planning. Thus far, over 14 billion gallons of recycled water have been produced for irrigation of high-quality food crops, such as artichokes, lettuce, cauliflower, celery, and strawberries for national and international distribution.

Project Relevance:
The project's success is based on many years of careful planning and an emphasis on customer service. Early on, it was determined through discussions with local growers that produce safety and marketability would be key issues that must be investigated. Consequently, a special five-year field test was conducted in the early 1980s that demonstrated that produce irrigated with recycled water was safe for human consumption. Also, an extensive marketability study confirmed that the produce could be successfully distributed and that labeling was not needed since the irrigation water met state standards. However, local project acceptance was also very important. Support was obtained from:

Agricultural Industry: By including their input in the MRWRCA *Recycled Water Food Safety Study*, agricultural users saw first hand that produce would remain safe to consume, and saw the economic benefits of recycled water as it was the least expensive potential new water source.

Environmental Community: The environmental community approved of the projects because supporting agriculture adjacent to the local communities meant that it would be less likely that the land would be urbanized. Also, environmentalists understood that increased use of recycled water would reduce wastewater discharges into the Monterey Bay Sanctuary.

Local Urban Community: Support for this project has been strong based on an aggressive community education program. These efforts consisted of a school classroom presentation program, frequent treatment plant tours, project exhibits at local community events, presentations to service clubs, and quarterly billing inserts to all wastewater customers outlining the successes of the project.

Lessons Learned:
Public acceptance of recycled water for agriculture requires constant education and acknowledgement. Overall success stems from the ongoing dialogue with local recycled water customers, plus persistence in implementing their vision. One key element of the MRWPCA recycled water program was to study the health and safety effects resulting from using recycled water on food crops. By performing this study, local farmers and environmentalists gained confidence not only in the use of recycled water but also that the MRWPCA was working to provide the best available solution for the area.

- **Develop a Public Involvement Work Plan –** Collect and compile the information regarding the public involvement plan into a single concise document. Typical public involvement work plans consist of the following information (1) project background, (2) description of project issues and stakeholders, and (3) a list of communication tools and the public involvement schedule.

3.4.8.2 Discussion

Development of a public involvement plan relies on the information and understanding developed in steps one through seven. The first element of a public involvement plan is to determine the type and kind of impacts that public involvement can have on the overall project schedule. After this has been assessed, a planning budget can be developed for the public involvement process. Public involvement budgets vary depending upon the type and issues associated with the project. These budgets range from the cost in man hours for agency staff to prepare and attend public meetings and address public comments (if the project consists only of basic public hearings), to agency man hours and consultant fees for development and maintenance of a complex public involvement program. For instance, the Public Utilities Board of Singapore invested in an interactive and permanent visitor center to help educate the public about the NEWater project. This project required not only extensive public communication in traditional forms such as informational ads and fact sheets, ground breaking ceremonies, and support from governmental officials, but also the incorporation of an educational visitor center into the design of the water recycling treatment facility. The NEWater project is described in the exhibit on the next page and a flyer for the project is attached as Appendix G.

A public involvement plan is comprised of a project background, description of the project issues and stakeholders, a list of the communication tools to be used, and the cost in time and materials to implement the plan. The project background should include a definition of the problem, the project-need statement developed in step 1 (including facts and assumptions), a description of the project constraints, and a list and description of the project decision-making steps. The description of project issues and stakeholders should include a description of stakeholders along with their concerns and preferred communication methods, a list of the important issues for the community, and an outline of the best communication methods for building consensus for the project. The list of communication tools should outline what tools will be used, define what each tool encompasses, its objective, and where in the decision-making process is best suited. In addition, an outline of the hours and effort required to

PUBLIC UTILITIES BOARD OF SINGAPORE
NEWater VISITOR CENTER

Project Description:

As part of its program to develop additional water supplies for the island nation of Singapore, the Public Utilities Board of Singapore initiated a pilot effort to reclaim used water from water reclamation plants. Using a combination of MF, RO, and ultraviolet disinfection, the facility was to produce high-grade water for the computer chip industry and indirect potable uses. This would allow water currently used by those industries to be freed up for potable use by the population. The viability of the process was confirmed and a health study showed the safety of the product. A major NEWater Factory was commissioned. Part of the facility plan included a visitor center to acquaint visitors to the concept of NEWater and to develop acceptability in the public. The visitor center, which opened in February 2003, has become a key destination for citizens and tourists alike and is a key element in Singapore's strategy to combine advanced technology with public understanding.

Project Relevance:

Experiences in the U.S. and elsewhere had shown that public understanding of water reuse often fails due to the stigma associated with used wastewater. The Public Utility Board realized from the outset that having a comprehensive education program to reach out to the public was essential to build the understanding needed for the project.

Lack of comprehensive understanding of the water cycle, water reuse and membrane technology were some of the challenges that confronted the project. While the engineering community knows that technologies exist to develop high-grade water from treated water, the fact is not well known or accepted by the lay public. Long-term acceptance of these technologies seem inexorably tied to developing a growth in public understanding of both the preciousness of fresh water supplies globally but also an appreciation that all water is and always has been 'used'. Communicating information related to indirect potable reuse of treated effluent is one of the most, if not the most, challenging water-related public acceptance issue.

Lessons Learned:

The Public Utility Board recognized that it needed to find a comprehensive solution to develop public acceptance and support. A key focus of the strategy was the development of the NEWater Visitor Center that was a key focus of the public education and outreach strategy to address public awareness and acceptance of this threshold issue. The Public Utility Board decided to include a visitor center right in the plant to build awareness, confidence and acceptance of the product water and the processes that manufactured it. The Center was conceived to be a fun learning environment where visitors can absorb facts through a multiplicity of learning techniques. Through different techniques that appealed to various styles of learning, visitors were exposed to information about this challenging topic in a fun, engaging learning environment. They were presented with information about safety, reliability, and the sustainability of NEWater processes and product water. The learning experience was divided into six main sectors that developed messaging which built understanding from one sector to the next.

Since opening in February 2003, the NEWater Visitor Center has become not only a destination for the community to come to learn about water quality and water supply, but it has also become a tourist destination with information about water reuse being provided in local hotels. More than 110,000 visitors have toured the facility. The use of leading-edge communication technologies that combine public understanding with technological advancements may point the way for other projects that are exploring the used of recycled water.

Source:

AwwaRF Case Study prepared by Linda McPherson of CH2M HILL.

implement each tool should be developed. The final component of a public involvement plan is the time and materials required to implement the overall plan. Other additional materials that can be included in the plan are lists of media contacts, politicians or elected officials, and addresses for stakeholders. An agency can choose to either release the public involvement plan or part of the plan to the public or keep it as an in-house planning document. Providing the public involvement plan to the public is another way to establish a transparent planning process because it outlines the project and when decision-making will occur. Also, if clearly written, it can assist in outlining for the public how, when, and where they can participate in the project. A questionnaire that can be used to assist in developing a public involvement work plan is attached as Appendix H.

3.4.8.3 Lessons Learned

- Although the CEQA and NEPA documentation process can provide a framework for addressing public opposition and providing education, projects often require additional PI&E efforts to fully address stakeholder concerns. This is especially true for less accepted uses of recycled water, such as groundwater recharge.

- Developing a complete public involvement plan assists an agency in identifying stakeholder needs and aids in the successful implementation of projects. By implementing a comprehensive public involvement program, the Public Utilities Board of Singapore has been able to implement an indirect potable reuse project.

3.4.8.4 Questions

- What public involvement activities affect, or could affect, the project schedule?

- What level of effort is necessary for public involvement? What communication tools will be used? What is the cost in time and man-hours of using these tools?

- Have all the components of the public involvement plan been outlined and described? Are the descriptions clear, concise, and easily understandable?

- Will the public involvement plan be disseminated to the public?

3.4.9 Implement and Monitor the Work Plan (9)

The purpose of this step is to provide ongoing assessment of the public involvement work plan once it has been implemented. Tracking the status of the public involvement work plan enables an agency to ensure that the plan is working effectively and the desired communication is occurring with stakeholders.

3.4.9.1 Substeps

There are three substeps that result in effective monitoring and implementation of a project's public involvement plan. They are:

- **Maintain Internal Agency Communication –** Contact and interaction regarding the project, especially changes, should be maintained with all employees involved in the project. This is important to ensure credibility by maintaining consistency in message. Also, this interaction provides a mechanism for collecting a range of perspectives about the project.

- **Evaluate the Effectiveness of the Public Involvement Plan –** Continually evaluate what is working and what is not working in the public involvement plan. Communication techniques or the frame of the problem may have shifted during development of the project. Therefore, evaluating the effectiveness provides an opportunity to be flexible in addressing changes in stakeholder needs or the project.

- **Determine If New Information Affects the Projects' Direction –** The project's frame and driver should be evaluated to determine if they still apply.

3.4.9.2 Discussion

Flexibility is a key component of a successful public involvement plan. This is important because stakeholder concerns and agency needs evolve over time. Therefore, an agency's ability to be flexible will result in successfully addressing these evolving needs and implementing the project. A component of flexibility is to maintain proper internal and external communication, which provides a mechanism for different perspectives to be stated regarding the project and the public involvement plan. Continuous internal agency communication is a vital part of this because it ensures a consistent message, which aids in maintaining credibility. Also, agency staffers at different levels may receive informal feedback from different stakeholders that is valuable in continuing to meet the public's needs.

It is important to remember that public involvement efforts are dynamic. Therefore, implementing changes in the program does not mean that the plan is not successful, but rather, that other communication methods may be more effective. The Redwood City case study is an example that illustrates how changing the method of interaction can result in an effective process. In this example, the public involvement plan evolved from one-way communication to a two-way interactive communication process where residents became active in the decision-making process.

3.4.9.3 Lessons Learned

- Stakeholder and agency perspectives and needs change. For that reason, it is important to have flexibility in the public involvement process. There are a number of examples of projects whose objective changed once stakeholder groups became actively involved in the project planning process (i.e. LADWP EVWRP, Redwood Shores Water Recycling Project, and the DSRSD Water Recycling Program).

3.4.9.4 Questions

- Are stakeholders involved in the project planning process at the optimal level?
- Do the planned public involvement levels meet the evolving needs of the stakeholders and effectively address project issues?
- Are agency employees involved and informed about the project? Is the right level of information being provided?
- Does sufficient flexibility exist in the public involvement process?
- Do the project frame and needs statement still apply? Are they clear and easily understandable?

3.4.10 Manage Change (10)

The purpose of this step is to manage changes to the project or the public involvement process while still maintaining agency credibility.

3.4.10.1 Substeps

There are three substeps that result in the proper management of change for a project. They are:

- **Protect Agency Credibility By Addressing Credibility Events –** Monitor events, related and unrelated to the project, which can affect an agency's credibility. It is important to address these issues even if they do not relate to the project, as they can affect an agency's overall credibility.
- **Continually Evaluate Constraints –** Continually examine the constraints that were developed in step 2 to determine if they still apply. In addition, changes in the regulatory environment or technologies may also affect what constraints apply to the project.
- **Communicate With Elected Officials –** An agency should communicate with existing and newly elected officials on a continual basis to ensure they understand and are comfortable with the project. In addition, the concerns and information required by a newly elected official need to be incorporated into the public involvement process.

3.4.10.2 Discussion

Managing change while maintaining credibility is the most difficult part of any project. Change can occur for a number of reasons on a project, including newly elected officials, changes in regulatory requirements, technological advancements, agency staff changes, or project schedule revisions. It is important to proactively address these issues so that the public involvement process is not affected. Proactively addressing these issues may involve either incorporating them into the decision-making process or re-evaluating the project public involvement plan. Also, other indirectly related issues must be addressed to maintain agency credibility. Ignoring these issues can result in angry stakeholders who use the project to address unrelated concerns.

Another component of managing change is to continuously evaluate project constraints to verify that they still apply and that new constraints have not arisen. Constraints can change dramatically when stakeholders are actively involved in the decision-making process. What agency staff view as too costly to implement may be the optimal solution to stakeholders when they assess the risks involved in the project.

3.4.10.3 Lessons Learned

- Do not rush – invest in planning. Fast-tracking a new recycled water project is very risky.[35] Fast tracking a recycled water project may result in project development occurring before public acceptance and/or regulatory approval is gained, which can result in increased costs due to changes in the project.

- Even in cases where there is a clear driver for the use of recycled water to augment existing water supplies to meet future demands, opposition can swell. Do not assume that the need for recycled water is fully understood. This is evident in the Redwood Shores Area Recycling Project, which was a project with a clear water supply project driver that only met opposition in the final planning stages. Redwood City's ability to manage change on the project resulted in a different project being developed than was first planned.

- Out-of-context comments are difficult to debunk and the Internet is not always right.[36] The Redwood City project faced opposition from a citizens group concerned about growth and health and safety issues. The city used experts and data to show that not only was the water safe for landscape irrigation but even if no growth occurred in the area water supply reliability was still at risk. The concerned citizens group countered using information from the Internet and emotion issues such as the safety of children playing on the fields, which are difficult to address.

[35] Personal Communication. Richard Mills, SWRCB.

[36] Craig Lichty and Valerie Young. *Redwood City's Water Supply Challenge.* XVIII WateReuse Symposium. September 28, 2003

3.4.10.4 Questions

- Are there issues, direct or indirect, that might affect the agency's credibility? Have these issues been addressed?
- Have the project frame or constraints evolved or changed?
- Are there new regulations, technologies, or agency staff that need to be brought into the project planning process?
- Have newly elected officials been briefed on the project and its public involvement process? Have their concerns been incorporated in the public involvement process?
- Are there communication techniques that are not working as effectively as needed?
- Is the level of public information in the right format for stakeholders?

3.5 Public Information and Education Programs

In addition to public involvement, agencies can sponsor or support public information and education programs. Public information and education programs have been used widely in California by water and wastewater managers to support the use of recycled water and specific project implementation. Larger agencies have often established in-house public information offices staffed with talented individuals and resources dedicated to maintaining communication with their communities. Smaller agencies or agencies just starting their water recycling projects often use specialists in public affairs and public relations or sponsor existing water education programs. There are a number of examples of PI&E approaches that have been used in the past, including:

- WBMWD's Water Education Program (Planet Protector Water Explorations).
- City of San Diego Guaranteed Water Program.
- South Florida Water Management District's Water Education for Teachers (WET).
- Municipal Water District of Orange County (MWDOC) Education Program.

The case studies for these examples are provided on the following pages. In addition to these programs, the AWWA WaterWiser website has a database of other water conservation information and educational programs that have been implemented in the past.[37]

[37] WaterWiser website: http://www.awwa.org/waterwiser/CorePage.cfm?CI=9

WBMWD'S
WATER EDUCATION PROGRAM (PLANET PROTECTOR WATER EXPLORATIONS)

Program Description:
West Basin Municipal Water District's water education program, Planet Protector Water Explorations, is offered free of charge to service area schools. Annually, thousands of students participate in this collaborative environmental education program, which joins the WBMWD with the Roundhouse Marine Studies Lab and Aquarium. Planet Protector Water Explorations begins as a field trip program to the WBMWD Water Recycling Facility and Visitors Center in El Segundo. Students get a lively presentation, guided tour of the facility, and explore the Visitors Center's fun, hands-on exhibits. Students then go to the Manhattan Beach Pier to visit the Aquarium where they touch a live baby shark, kiss a sea cucumber, and shake hands with a sea star during a fast-paced marine science lesson. The WBMWD's water education programs are not solely geared for school children, there are also tour programs and educational material for adults.

Source:
West Basin Municipal Water District's website: http://www.westbasin.com/public_education.htm

CITY OF SAN DIEGO
GUARANTEED WATER PROGRAM

Program Description:
The City of San Diego Guaranteed Water Program exempts research and development or industrial manufacturing firms from mandatory water restrictions during droughts in exchange for participation in daily water conservation programs, including the use of recycled water. To qualify, a company must do the following: use recycled water where feasible, as well as install ultra low-flow toilets, water-conserving showerheads and other water-efficient fixtures. The business is exempt from mandatory water supply cuts during water warnings when these requirements are met. According to San Diego Municipal Code 67.3806(d), a water warning occurs when the Water Department is not able to meet the demands of its customers.

The City also participates in the SDCWA Recycled Water Certification Workshop. The SDCWA Recycled Water Certification Workshop was developed to train potential recycled water users about recycled water. All permit holders are required to attend this training. The workshop is conducted several times a year. These classes offer information on the basics of recycled water, how it is produced, water management and irrigation techniques, cross-connection prevention, health issues, and record keeping.

Source:
City of San Diego website: http://www.sandiego.gov/water/recycled/guaranteed.shtml

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
WATER EDUCATION FOR TEACHERS (WET)

Program Description:

The SWFWMD provides educational programs and materials for both adults and children throughout the region. The SWFWMD believes that education provides an opportunity to teach about, and foster, an environment for responsible decision-making regarding South Florida's water resources. The SWFWMD uses their web-site, educational programs, and materials to target a broad audience. In addition, the SWFWMD works with a variety of educational institutions and groups to provide information about the environment (e.g. Project WET). Project WET is an exciting inter-disciplinary water education program for Florida's teachers and other educators working with young people in grades K-12. The program can be integrated into the existing curricula of a school, museum, university pre-service class, or community organization. The goal of Project WET is to facilitate and promote awareness, appreciation, knowledge and stewardship of water resources through the development and dissemination of classroom-ready teaching aids, and through the establishment of internationally and state-sponsored Project WET programs. The Project WET activities promote critical thinking and problem-solving skills, and are easily integrated into subjects including: chemistry and physics, life science, earth systems and natural resources, social studies, history, language arts, fine arts and culture. In Florida, Project WET is sponsored by the South Florida, St. Johns River, Suwannee River, and Southwest Florida Water Management District's and the Florida Department of Environmental Protection. The Project WET guide provides more than 90 hands-on water activities.

Source:

Southwest Florida Water Management District's Website: http://www.sfwmd.gov/stude/projwet.html

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY EDUCATION PROGRAM

Program Description:

Recognizing the importance of educating young people and setting early habits of water conservation, the MWDOC created a school program and began introducing it to classrooms throughout Orange County, California. It was the first water conservation curriculum to be recognized by the California Department of Education. Twenty-five years later, the education program reaches more than 135,000 Orange County students annually. A distinctive feature of the MWDOC program is classroom participation of the education staff. MWDOC education representatives are dedicated to teaching Orange County students about current water issues and spreading the message of water conservation. Teachers present the program directly to the students and are able to address water issues relevant to each school or the area of interest for each class.

In addition to presenting information to students and answering questions, education representatives leave handout materials, take-home information, and follow-up guidelines for teachers. This allows the classroom teacher to incorporate the materials and program information into his or her own lesson plan. The program is financed totally by MWDOC with no cost being passed on to the schools or the school districts. The program's star is its mascot, Ricki the Rambunctious Raindrop. Using a mascot provides an easily recognizable symbol for water education and conservation.

The following is a curriculum guide by year for the program:

Kindergarten: *Ricki and the Forms of Water* - A felt board presentation about the forms of water: liquid, solid, gas. Student coloring books provided.
Grade 1: The Water Cycle - An audio-visual presentation featuring Ricki the Rambunctious Raindrop. This program introduces students to the water cycle. Student coloring books provided.
Grade 2: The Water Cycle Part II - An audio-visual presentation that reviews the water cycle and introduces more advanced concepts. Student coloring books provided.
Grade 3: The Amazing Adventures of Ricki Raindrop and Ginny Groundwater - An audio-visual presentation featuring Ricki the Rambunctious Raindrop and his new friend Ginny Groundwater. This program introduces the concepts of water importation, our groundwater basin, treatment, and distribution. Student activity books are provided.
Grade 4: Admiral Splash - Presentation about California's water history, supply, treatment, and conservation ideas. Student handouts, teacher guides, and a video are provided.
Grade 5: Be Water Wise - Humorous movie discussing the Do's and Don'ts of water conservation. Student handouts and teacher guide are provided.
Grade 6: California Smith, Water Investigator - Student materials, a teacher guide and video explore Southern California's present and future water supply and the need for water conservation.
Grades 7 & 8: The Water Puzzle: Putting the Pieces Together - Review the different elements of the water story. Current issues such as transfers, recycling, and banking are explored. Student activity books are provided.
Geography of Water - This unit includes master of six maps of California designed to teach concepts such as elevation, population, and physical features. Includes a teacher guide, questions for students, lesson extenders, and supplementary activities.
Is there Water in 2025? - Live, professional theater program presented in assembly format. This presentation introduces the concept of droughts and the importance of water conservation in a lively format.

Source:

Municipal Water District of Orange County website: http://www.mwdoc.com/Education/water_education.html

4 Innovative Ideas for PI&E Programs

4.1 Contents of this Section

Introduction
Community Relationship Management (CRM)
Social Marketing – Changing Public Behavior
Branding of Product or Agency
Social Psychology of Human Reaction to Water Recycling
Proactive Versus Reactive Approaches
Spotlighting of Innovative or Advanced Technology

4.2 Introduction

The extension to the public arena of traditional marketing and community relationship practices that have been historically used in the commercial arena is proving to be more effective than traditional approaches (such as "Decide, Announce, Defend"). However, the public arena is fundamentally different because public agencies often need to modify public behavior (i.e., implement water conservation, stop littering, or other individual practice changes) while gaining support and enlisting/obtaining guidance from "the public." A balance is often necessary, with the need to modify public behavior, and the need to understand and incorporate public opinions and values. These two goals can cause the public to become confused about what an agency is doing.

This section describes mechanisms such as CRM and social marketing, as well as provides examples of educational programs that can be used. It is important to note that it may be necessary to separate education efforts from public information programs for a specific project. This section also provides information on innovative approaches and technologies for public information and education efforts. In addition, the discussion of the different approaches for public information and education includes examples of programs and projects that have employed these different mechanisms.

4.3 Community Relationship Management (CRM)

CRM is focused on the relationship between the community member or customer (stakeholder) and the organization or agency. The "C" in CRM can mean "Customer" when referring to traditional sales relationships, or "Community" for not-for-profit, public agency, or other similar environments. Regardless of who the stakeholder is, the following central tenets remain the same:

- Better relationships with individuals mean greater success.
- The stakeholder is the focus no matter what the organization's purpose.
- Individual attention in the form of customized information treats each person as an individual, and can be pivotal to success because each person will get the information they need, when they need it, in the format they desire, and they will receive feedback on their voiced concerns.
- Multi-tiered communication recognizes that stakeholders will talk to each other about important issues, and that different messages or communication approaches may be more successful at different tiers within a stakeholder group or organization, and for different audiences (e.g., community, employees, elected officials, business partners, funding agencies, regulatory agencies, central government).

Maintaining effective one-on-one dialogs with individuals is feasible on a large scale because of computer technology. Relatively recent innovations such as interactive web sites, permission-based E-mail distribution, and specially customized database systems (examples include *ebase* by TechRocks, and *relate* by evolving software) allow information to be tailored to the specific requirements of an individual. These new technologies can distribute and receive the information, organize it, identify links, and produce statistics. However, because relationships are dependent on human interaction and not technology, combining technological capabilities with human interaction is important. Effective communication channels combine technologies with a "human interface" (call centers, one-on-one or group meetings) and/or traditional communication media (printed materials and radio/television).

Typical applications of CRM are:[38]

Database - a CRM database allows agencies to:

[38] DataInstincts Website www.DataInstincts.com.

- Record a history of each individual's interaction and ensures that the right people receive the right information throughout the project.
- Note meetings attended, documents sent, and records of telephone and e-mail dialogue.
- Generate mailing distribution lists for unique outreach messages.
- Sort public information by category, geographic areas, level of interest, etc.
- Note preferences on how each individual prefers to receive information, either by mail, E-mail, fax, or phone, postal service, or other.

Web Site - Adopting interactive web tools early in the project can provide a direct and efficient means of one-on-one dialog. A web site can:

- Provide project information 24 hours a day, 7 days a week.
- Clearly state the project's purpose, schedule of events, and important public meetings, and make available key reports and studies.
- Be used for question/answer dialogue between the public and project planners.

E-mail: E-mail distribution lists specific to issues and geographic area, allow very precise channeling of information. Privacy of collected E-mail addresses and other personal information is a critical issue, and must be emphasized to those providing it.

- **Call Center:** Call centers both distribute and collect information. The persons who answer the phone must know the project and key stakeholders so they can interact with callers at a high functional level. The call center may be staffed 24 hours a day, 7 days a week, and can be the "one-stop shop" for project information, complaints, and problems.

Mark Millan of DataInstincts 1-to-1 Marketing Solutions™ provides the following insight on how his company approaches CRM: [39]

- A one-to-one approach is key - the property owner, homeowner, and elected official have vastly different information needs: one size does not fit all.
- Each individual can decide the format, frequency, and content of information provided to them.
- A call center is a learning center and, in addition to sharing information, can be used to gauge public reaction. Public reaction may reshape ideas, change outreach messages, or approaches, and prevent large-scale misunderstandings.

[39] Mark Millan, DataInstincts Website www.DataInstincts.com and personal communication October 2003.

- Distributing and collecting real-time (very current) project data is a simple but very powerful idea, which is made possible through the combination of the enabling technologies and the call center.
- No positioning (spinning) of information is done: consistent and neutral presentation of information is critical to establishing and maintaining the trust of the community.

The CRM approach is more costly to implement compared to the traditional "Decide-Announce-Defend" method. However, depending on the project, the added implementation cost of CRM may mean the difference between success and failure. The City of Redwood City, California is using CRM to re-establish public trust for a recycled water irrigation and distribution project that was put on hold due to public and political opposition (See the exhibit on page 14 for more information). Other jurisdictions using CRM for recycled water implementation include the Town of Windsor, California and the City of Santa Rosa, California.

4.4 Social Marketing – Changing Public Behavior

While the purpose of CRM is to understand and meet the needs of the stakeholders, social marketing seeks to bring about social change using approaches traditionally applied to product and service marketing. The Social Marketing Institute identifies the following applicable marketing concepts:[40]

- The ultimate objective of marketing is to influence action.
- Action is undertaken whenever target audiences believe that the benefits they receive will be greater than the costs they incur.
- Programs to influence action will be more effective if they are based on an understanding of the target audience's own perceptions of the proposed exchange.
- Target audiences are seldom uniform in their perceptions and/or likely responses to marketing efforts and so should be partitioned into segments.
- Marketing efforts must incorporate all of the "4 Ps":
- Create an enticing "Product" (i.e., the package of benefits associated with the desired action).
- Minimize the "Price" the target audience associates with the "Product".

[40]Social Marketing Institute website: www.social-marketing.org.

- Make the exchange and its opportunities available in "Places" that reach the audience and fit its lifestyles.
- Promote the exchange opportunity with creativity and through channels and tactics that maximize desired responses.
- Recommended behaviors always have competition that must be understood and addressed.
- The marketplace is constantly changing and thus, program effects must be regularly monitored and management must be prepared to rapidly alter strategies and tactics.

These concepts are similar to those presented in the 10-step public involvement process. The specific components of a program, as well as what educational materials should be introduced, and to whom, when, and how the effectiveness is to be gauged, are still dependent on the project. The California SWRCB is seeking to answer these questions as they pertain to water issues[41]. The impetus of this effort is the mandatory public education requirements in National Pollution Discharge Elimination System (NPDES) permits.

Two social marketing pilot tests were completed in late 2003 by the LADPW[42]. The studies sought to gauge the effectiveness of promoting environmental responsibility in two well-defined neighborhoods: East Los Angeles and Inglewood. Identical approaches and education materials (billboards and newspapers) were used in each neighborhood. The less-economically affluent East Los Angeles community had a more positive response and greater public involvement to the project. The difference in response may be due to the "level of ownership" of the issue accepted by each community or the coordinating body (nongovernmental versus governmental entities). The final results of this study are still being formulated; however, preliminary results indicate that different communities respond to different approaches.

What is a Brand?

A brand is the proprietary visual, emotional, rational, and cultural image that you associate with a company or a product. When you think Volvo, you might think safety. When you think Nike, you might think of Michael Jordan or "Just Do It." When you think IBM, you might think "Big Blue." The fact that you remember the brand name and have positive associations with that brand makes your product selection easier and enhances the value and satisfaction you get from the product.

Source:
A Short Introduction to Branding.
BrandSolutions website: www.brand.com

[41] Tom Mays. Personal communication. December 8, 2003.
[42] Melinda Barret. Personal communication, December 15, 2003.

4.5 Branding of Product or Agency

Branding is the use of an image, trademark, or message to convey a consistent, simple, and instantly recognizable concept. The exhibit below identifies some commonly-known brands, and what they represent. While the cited examples pertain to traditional goods and services, the same concepts can apply to the recycled water sector (refer to the discussion on Social Marketing).

Brands are built upon values, which refer to a person's or organization's beliefs (priorities) about specific issues that are acted upon. Brands are effective when a person's values agree with those upon which the brand is based. A brand is the result of a "boiling down" of issues to a simple message.

While the distillation of complex ideas into a simple message can clearly be effective (see sidebar) when directed, the results can be very detrimental if not directed, or if a competing or detrimental brand catches hold. Consider the "Toilet to Tap" brand that first began circulation in the early 1990s. This well-known example points to a very significant problem with the boiling down of ideas. Some issues are complex, therefore, "boiling down" can also result in

> "People brand ... products, organizations, other people, task forces, alliances, or any identity whether we like it or not. ... [I]t is important to clearly state in very simple terms who you are and what value you stand for. If you don't, others will do it for you."
> Source:
> Resource Trends Inc.: The Investment Problem
> www.ResourceTrends.com

over simplifying an issue (i.e. "dumbing down"). Branding can stifle (or severely bias) open and informed debate, and may reinforce polarized positions. Therefore, it is important to establish a strong, supportive brand early, as evidenced by the damage done by "Toilet to Tap" label on the City of San Diego Repurification Project and the LADWP East Valley Water Recycling Project.

How Can Branding Assist Implementation of Recycled Water Projects

Branding can assist agencies in the planning and development of recycled water projects by providing a mechanism to create consumer confidence by expressing an agency's values. Values refer to the priorities or commitments of a person or organization toward particular

issues. Communicating about values and creating alignment of the agency's values with those of the public are central to gaining support for (and investment in) recycled water projects.[43] Concepts of marketing and branding can be an effective technique for communicating the value of recycled water to the public, encouraging utilities to align their values with those of the receiving community and to gain public trust.

When communicating about a specific project or needed investment it is important to understand that people will perceive "value" based on the following key principles[44]:

Problem – People need to clearly understand and accept the problem that needs to be solved. Will water demands soon exceed supply? Do we need to limit or reduce wastewater discharges?

Alternatives – People will evaluate solutions to the problem relative to each other. Alternative solutions must be explored and if recycled water does not have the highest perceived value, it may not be the option adopted by the community. This is fine as long as the community retains its trust in the utility and invests appropriately to solve the stated problem.

Risk – There is risk to every solution. The emphasis should be on identifying and communicating risk relative to benefits for each alternative. A key factor in perceptions of risk for recycled water is the ability of the utility to create water quality confidence and establish itself as the source of quality, not where the water came from.

In general, the key idea is to align the values of the agency with those of the receiving community and to communicate ways in which recycled water meets the needs of the community. This often means that the agency must change, which can be challenging. As with change in any organization, some will resist and some will accept readily – but the shift from a "Decide, Announce, Defend" approach to a "value-centric" outlook is essential to obtaining public support and investment. Traditional outreach programs often include significant education components, which can miss the opportunity to engender the trust necessary to garner full support. This is because the approach is focused on the presentation of information

[43] John Ruetten. Resource Trends, Inc. Personal communication, February 6, 2004 and Resource Trends Inc. website: http://www.ResourceTrends.com

[44] IBID.

that may or may not be orientated toward creating the proper dialogue about values and motivations.

4.6 Social Psychology of Human Reaction to Water Recycling

The social psychology of human reaction to water recycling is an emerging arena of study. Developing a better understanding of how individuals react to water recycling can assist economists, psychologists, and sociologists to more effectively address the public's perception of water recycling. As an initial step in looking at water recycling from this point of view, the WateReuse Foundation sponsored a workshop in January 2004 to assess the human reactions to water recycling, especially indirect potable reuse (IPR). One of the goals of this workshop was "to develop an understanding of how social psychology research could address the challenge of better integrating water reclamation and reuse systems into urban water supply."[45] This workshop identified the basic tenets of human cognition and reaction to issues, aspects of PI&E efforts that could incorporate basic human reactions, and areas of future study that would be beneficial to implementation of water recycling projects. A summary of this workshop is provided in Appendix I.

There are two common laws regarding human cognition, the law of contagion and the law of similarity. "The Law of Contagion suggests that when a pure object comes into physical contact with a contaminated object, the contamination is passed to the pure object."[46] Physical contact between objects will cause people to respond with revulsion to both objects. Also, the effect of this contact is only slightly influenced by degree of contact. Thus, public perception of water recycling is governed by the fact that it was or once was called "wastewater" or "sewage water." Therefore, the public's negative perception or reaction to recycled water (i.e., the "yuck factor") can remain even after extensive communication of technical information regarding the advanced treatment and safety mechanisms put in place to protect the public.

The second law is the Law of Similarity. This law "suggests that appearance equals reality. Something is perceived to be what it looks like."[47] Therefore, recycled water is associated with

[45] Brent Haddad. *Summary of Research Needs Assessment Workshop: Human Reactions to Water Reuse*. January 5-6, 2004.

[46] IBID.

[47] IBID.

wastewater, which is viewed to be unclean, unsafe, and contaminated; therefore, recycled water must be unclean, unsafe, and contaminated. If the public reacts to issues using both of these laws then "people would find nearly everything to be disgusting."[48] For this reason, perception regarding an issue is framed through a "process of categorizing and ignoring parts of reality."[49] This is accomplished using two systems of human judgement, a reason-based system and an affective system. The reason-based system uses "analysis, logic, and calculation"[50] to make decisions. The affective system bases judgements on intuition, automatic responses, and feelings or emotion. The manner in which these two decision systems frame an issue results in how the issue is perceived. This perception is often based on an individual's assessment of the benefit-to-risk ratio. Also, perceptions can be affected by a stigma associated with a particular issue. "A stigma is a distinguishing mark that indicates something is immoral, non-aesthetic, disruptive, or dangerous."[51] In the past, the "Toilet to Tap" label has stigmatized recycled water projects and resulted in negative public perception.

The workshop identified a number of strategies that could be incorporated into PI&E efforts to address human reactions to water recycling projects. These included:

- Stressing the "natural" aspects of treatment processes, such as natural filtration.
- Creating a separation between water recycling and the history of where the water originated.
- Framing recycled water in a positive manner. Recycled water like "most water contains molecules that, at some time in their history, have been associated with wastewater."[52] However, unlike most other water sources, which are viewed as acceptable, recycled water often faces a negative stigma and is deemed unacceptable.
- Refraining from focusing PI&E programs on the health safety of recycled water because it reminds the public of the origins of the water and may not be reassuring.
- Developing positive stories about water recycling to combat the negative "Toilet to Tap" stigma.

[48] IBID.

[49] IBID.

[50] IBID.

[51] IBID.

[52] IBID.

- Identifying and creating benefits for a proposed project that counteracts or exceeds the public's assessed risk. "Disposal benefits" are not well received by the public.[53]

A complete list of strategies that emerged from the workshop is provided in Appendix I. The workshop also identified a number of areas of future study that would be beneficial to implementation of water recycling projects, these areas included:[54]

- Developing a mental model of how people think about urban water supply.
- Identifying the effects of segmentation and learning on stakeholder perception of IPR.
- Identifying ways to break the "Toilet to Tap" chain associated with IPR.
- Identifying attitudes toward IPR as environmental stewardship.
- Understanding the core opposition to IPR projects.
- Understanding public perception regarding IPR and identifying how to gain acceptance.

Investigating public perception regarding water recycling projects using social psychology is a new concept that could provide strategies and a greater understanding of stakeholders. The knowledge and tools gained from this effort could be used to adjust implementation strategies so that recycled water projects, particularly IPR projects, have greater acceptance from the public.

4.7 Proactive Versus Reactive Approaches

The earlier a PI&E program begins, the greater the likelihood of success. This lesson is evident in all the approaches and research performed. In addition, the lesson regarding PI&E programs is consistently voiced in discussions with educational experts and recycled water authorities. In all but the most straightforward recycled water project implementations, the old approach and attitude of "Decide-Announce-Defend" increases the risk of significant public and/or political opposition. Therefore, it is important to do more than the public involvement requirements of the state and Federal environmental review processes. Building strong support from an educated public will increase the likelihood of success and decrease the potential effects of groups who for whatever reason want to sidetrack the project.

[53] IBID.

[54] IBID.

The following are proactive approaches that are often part of successful PI&E programs:

- **Involve public participation in all phases of the project:** Gathering and exchanging information during all phases of a project is one of the most successful approaches in the implementation of recycled water projects. This effort often does not stop with the completion of construction, but can continue for years after a recycled water project is operational, when use expands with population or industrial growth, or new markets are sought. This is the polar opposite of the reactive "Decide-Announce-Defend" approach.

- **Discuss concerns of growth:** The offsetting of potable water demand through the use of recycled water can be seen to enable growth. Those who oppose growth often seize upon recycled water as the villain. It is important to either put in place local regulations or inform the public of recycled water as an augmenting source.

- **Analyze Costs/Benefits:** Costs include financial considerations, as well as costs linked to implementation and maintenance. Another consideration is the value of the water in the minds of the consumers. The benefits will vary and include a more "drought-proof" and reliable water supply; a more consistent quality of water (no seasonal fluctuations), including "boutique water" for industrial applications; reduction in wastewater discharges, which may eliminate the need to expand discharge or outfall facilities; or other indirect benefits. An example of indirect benefits is Caltrans reducing fertilizer costs for landscaping along freeways irrigated with recycled water due to the nutrients that are present in some recycled water. This example shows that whatever the form of the costs and benefits, the full range of possibilities should be considered.

- **Develop targeted education programs:** Everyone agrees that education programs are necessary to effect long-term change. The difficulty is in gauging the effectiveness of any given program, as well as determining if the resources committed are the most cost effective for the desired result. Education about recycled water must be targeted at different groups, including the general public, small business (including small farmers), agribusiness (including food processors), and industries, depending on specific project objectives. Social Marketing and CRM are examples of innovative approaches for outreach and education of the public.

4.8 Spotlighting of Innovative or Advanced Technology

Californians have, in general, displayed a high level of acceptance of recycled water use, including irrigation (landscaping and some food crops), industrial uses, and groundwater recharge. With advancements in water treatment technologies, the viability and safety of reusing water has increased. The different levels of treatment required for the various uses can lead to confusion. This is of particular concern when "boiling-down" issues into simple terms. With growing concerns over potential health effects of emerging pollutants, spotlighting innovative reliable treatment methods and advanced technologies can help to allay fears. Also,

specially treated recycled water or "boutique water" can be spotlighted as an improvement over the potable supply in some areas for certain industrial needs. The following section discusses innovative or advanced treatment technology.

Level of Treatment

DHS has specified (in addition to other recycled water regulations) the levels of treatment required for traditional recycled water applications as shown in Table 4.1. The greater the contact level with humans and the longer or more repetitive the contact, the higher the required treatment level. Four levels of treatment, ranging from undisinfected secondary to disinfected tertiary, are currently specified by the state. DHS includes common membrane technologies (MF, nanofiltration, and RO) in its definition of tertiary treatment. Specific technologies approved for recycled water treatment are listed in the DHS Treatment Technology Report for Recycled Water[55].

The focus of DHS regulations is the removal of pathogens and reduction of turbidity where human contact is concerned. Pathogen removal and turbidity reduction is effective, relatively simple, and "tried and true." Emerging pollutants such as endocrine disruptors, pharmaceuticals (including caffeine), disinfection byproducts, and others, are not addressed specifically and, currently, some can only be removed efficiently through advanced treatment such as membrane technologies. Emerging pollutants and their proper treatment is most likely to be an area where future public concern is focused. Advanced and innovative treatment technologies will need to be developed to address these emerging constituents of concern.

In addition, increases in concentration of more traditional constituents such as TDS (salinity), pH, nutrients, and mineral content may result in new treatment levels or technology for industrial, agricultural and environmental users.[56] For this reason, treatment requirements in the future may extend beyond the current basic DHS stipulated levels, and may be more user (or process) specific. Several southern California agencies are already producing "boutique water" from their recycled water systems. Agencies that use advanced technologies, or unique

[55]DHS website: www.dhs.ca.gov/ps/ddwem/default.htm.

[56]CH2M Hill. *Technical Memorandum #2: Water Quality Analysis*. Southern California Water Recycling Projects Initiative Phase II. January 2003.

Table 4.1

Recycled Water Uses Allowed in California

Use Type	Treatment Level: Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Irrigation				
Food crops where recycled water contacts the edible portion of the crop, including all root crops	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Parks and playgrounds	**Allowed**	Not Allowed	Not Allowed	Not Allowed
School yards	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Residential landscaping	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Unrestricted access golf courses	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Any other irrigation uses not prohibited by other provisions of the California Code of Regulations	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Food crops where edible portion is produced above ground and not contacted by recycled water	**Allowed**	**Allowed**	Not Allowed	Not Allowed
Cemeteries	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Freeway landscaping	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Restricted access golf courses	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Ornamental nursery stock and sod farms	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Pasture for milk animals	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Nonedible vegetation with access control to prevent use as a park, playground or school yard	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Orchards with no contact between edible portion and recycled water	**Allowed**	**Allowed**	**Allowed**	**Allowed**
Vineyards with no contact between edible portion and recycled water	**Allowed**	**Allowed**	**Allowed**	**Allowed**
Non food-bearing trees, including Christmas trees not irrigated less than 14 days before harvest	**Allowed**	**Allowed**	**Allowed**	**Allowed**
Fodder crops (e.g. alfalfa) and fiber crops (e.g. cotton)	**Allowed**	**Allowed**	**Allowed**	**Allowed**
Seed crops not eaten by humans	**Allowed**	**Allowed**	**Allowed**	**Allowed**
Food crops that undergo commercial pathogen-destroying processing before consumption by humans	**Allowed**	**Allowed**	**Allowed**	**Allowed**
Ornamental nursery stock, sod farms not irrigated less than 14 days before harvest	**Allowed**	**Allowed**	**Allowed**	**Allowed**
Supply for Impoundment				
Non-restricted recreational impoundments, with supplemental monitoring for pathogenic organisms	**Allowed**[1]	Not Allowed	Not Allowed	Not Allowed
Restricted recreational impoundments and publicly accessible fish hatcheries	**Allowed**	**Allowed**	Not Allowed	Not Allowed
Landscape impoundments without decorative fountains	**Allowed**	**Allowed**	**Allowed**	Not Allowed

Notes:

Table developed by WateReuse and available on their website at <*http://www.watereuse.org/Pages/information.html*>.

Refer to the full text of the latest version of Title-22: California Water Recycling Criteria. This chart is only a guide to the September 1998 version.

Footnotes:

[1] With "conventional tertiary treatment." Additional monitoring for two years or more is necessary with direct filtration.

[2] Drift eliminators and/or biocides are required if public or employees can be exposed to mist.

[3] Refer to Groundwater Recharge Guidelines, California Department of Health Services.

Table 4.1 (Cont.)
Recycled Water Uses Allowed in California

Use Type	Treatment Level: Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Other Uses				
Groundwater recharge	**Allowed under special case-by-case permits by RWQCBs[3]**			
Flushing toilets and urinals	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Priming drain traps	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Industrial process water that may contact workers	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Structural fire fighting	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Decorative fountains	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Commercial laundries	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Consolidation of backfill material around potable water pipelines	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Artificial snow making for commercial outdoor uses	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Commercial car washes not done by hand & excluding the general public from washing process	**Allowed**	Not Allowed	Not Allowed	Not Allowed
Industrial boiler feed	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Nonstructural fire fighting	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Backfill consolidation around nonpotable piping	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Soil compaction	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Mixing concrete	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Dust control on roads and streets	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Cleaning roads, sidewalks and outdoor work areas	**Allowed**	**Allowed**	**Allowed**	Not Allowed
Flushing sanitary sewers	**Allowed**	**Allowed**	**Allowed**	**Allowed**
Supply for Cooling or Air Conditioning				
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist	**Allowed[2]**	Not Allowed	Not Allowed	Not Allowed
Industrial or commercial cooling or air conditioning not involving a cooling tower, evaporative condenser, or spraying that creates a mist	**Allowed**	**Allowed**	**Allowed**	Not Allowed

Notes:

Table developed by WateReuse and available on their website at <*http://www.watereuse.org/Pages/information.html*>.

Refer to the full text of the latest version of Title-22: California Water Recycling Criteria. This chart is only a guide to the September 1998 version.

Footnotes:

[1] With "conventional tertiary treatment." Additional monitoring for two years or more is necessary with direct filtration.

[2] Drift eliminators and/or biocides are required if public or employees can be exposed to mist.

[3] Refer to Groundwater Recharge Guidelines, California Department of Health Services.

configurations of technology, to achieve enhanced water quality for specialized purposes include:

- **West Basin Municipal Water District, California** WBMWD produces five different qualities of recycled water from two process streams that produce Title 22 and advanced treated recycled water. Title 22 water meets DHS Title 22 requirements, and is a standard recycled water treatment level (tertiary) suitable for non-potable irrigation and industrial uses. Advanced treated recycled water is a high-quality recycled water produced for injection into groundwater wells to form a seawater intrusion barrier. The advanced treated recycled water meets or exceeds the USEPA drinking water standards.

- **Groundwater Replenishment System, Orange County, California:** The Orange County Water and Sanitation Districts, GWRS project will recharge groundwater through infiltration basins and injection wells. The four main project drivers include minimize future water shortages, reduce mineral (total dissolved solids [TDS]) concentrations in groundwater, improve the sea water intrusion barrier, and eliminate or delay the need for an additional ocean outfall. The process stream includes MF, RO, ultraviolet light and hydrogen peroxide disinfection, and demineralization before groundwater injection and percolation.

- **Irvine Ranch Water District, California:** IRWD produces tertiary-treated recycled water through traditional processes. In 1991, IRWD became the first water district in the country to obtain DHS permits for the use of recycled water for toilet flushing in commercial buildings. IRWD's facilities and several commercial high-rise office buildings now use recycled water to flush toilets. Potable water demand has dropped as much as 75 percent in these buildings.

[57]DHS website: www.dhs.ca.gov/ps/ddwem/default.htm.

[58]CH2M Hill. *Technical Memorandum #2: Water Quality Analysis*. Southern California Water Recycling Projects Initiative Phase II. January 2003.

5 PI&E Programs: Successes and Difficulties

5.1 Contents of this Section

Introduction
Examples of Successes
Examples of Challenges

5.2 Introduction

Over the past 10 years, several water recycling projects have faced public and political opposition sufficient to prevent implementation. Some of these have been indirect potable projects (groundwater recharge or reservoir augmentation) and some have been more traditional irrigation projects. This section summarizes those components that have been identified as contributing to either the success or the challenges experienced during project implementation.

5.3 Examples of Successes

One of the most successful ways to develop public acceptance is to point to existing projects with a track record of success. There are many successfully operating recycled water projects in California. Two example projects are the IRWD Recycled Water System and the West Basin Water Recycling Project. A brief synopsis of each project is provided in the exhibits, whose locations are identified in Table 5.1. These example projects have successfully implemented PI&E programs early in the project-planning process. In addition, an effective strategy to establish an early customer base (i.e., users of the recycled water) was identified to help generate project understanding and support. Also, there was information available to respond to public concerns early in the process.

Having a proactive head start on public involvement assists in identifying and addressing user's concerns, designing a project that best meets the community's needs, and developing community advocates for the project. To build strong support, an agency may need to go beyond the public involvement required by the state and Federal environmental review process. As previous discussed, to supplement participation through public hearings and

review, it is a good strategy for the agency sponsoring the water recycling project to establish a customer forum and/or a community task force. Explaining the community's water supply and the environmental benefits frequently associated with water recycling provides an ideal foundation upon which to build a PI&E program.

5.4 Examples of Challenges

Some major water recycling projects have either been unsuccessful in implementing a project or had to significantly revise the planned project. These stumbling blocks have usually been the result of some form of public or political opposition. The East Valley Water Recycling Project, San Diego Water Repurification Project, Redwood Shores Recycled Water Project, and the MRWPCA Water Recycling Project are four projects that experienced difficulties during different stages of planning and implementation. A description of each of these projects can be found at the page location provided in Table 5.1. Common stumbling blocks encountered during implementation of recycled water projects include:

- Public concerns regarding equally distributing the burden for the project across economic and geographic areas.
- Public perception concerns regarding water quality and public health and safety.
- Public concerns regarding the cost and who will pay for the project.
- General opposition to concept of water recycling by the public.
- Population and development growth opponents that associate implementation of recycled water projects with a continued ability to allow growth in a community.

TABLE 5.1
EXAMPLES OF RECYCLED WATER PROJECTS THAT EXPERIENCED SUCCESSES AND DIFFICULTIES

Organization	Project Name	Exhibit Location Page Number
Successful Projects		
Irvine Ranch Water District	IRWD Recycled Water System	89
Orange County Water District/ Orange County Sanitation District	Groundwater Replenishment System	20
Southwest Florida Water Management District	SWFWMD Water Recycling Program	37
West Basin Municipal Water District	WBMWD Recycled Water Projects	90
Projects that Experienced Difficulties		
City of Los Angeles Department of Water and Power	East Valley Water Reclamation Project	17
City of Redwood City	Redwood Shores Recycled Water Project	14
City of San Diego	San Diego Water Repurification Project	88
Monterey Regional Water Pollution Control Agency	MRWPCA Water Recycling Project	57

CITY OF SAN DIEGO WATER REPURIFICATION PROJECT

Project Description:

The City of San Diego Repurification Project was developed to augment the City's water supply. The proposed project consisted of construction of a water repurification facility with a capacity of up to 20 mgd, which would take treated water from the North City Water Reclamation Plant and treat it to advanced levels using RO, MF, ozone disinfection, and other processes. The repurified water would then be transported over 20 miles to the San Vicente Reservoir to be blended with imported raw water supplies from the San Diego Aqueduct. After a minimum of one-year retention time, the blended water would be conveyed to the City's Alvarado Filtration Plant and treated further before being introduced into the City's potable water delivery system. The project was developed in part to satisfy the future water supply needs of San Diego, which was a clear driver for project need. However, the City of San Diego put the project on indefinite hold due to negative public perceptions regarding the project's public health and safety.

Project Relevance:

This project's planning efforts began just after the drought of 1991 and 1992. The City and SDCWA researched and planned this project in anticipation of future droughts despite the 1993 and 1994 wet years. Public outreach included almost 100 one-on-one interviews with city residents from diverse backgrounds, telephone interviews, and focus groups. Sixty percent of the telephone respondents interviewed favored the project when it was described. The DHS approved the project and representatives from various groups backed the project. In 1994, an independent panel of scientists endorsed the project. A citizens' advisory committee examined the project in detail and concluded that it would provide a needed source of water for the region. The initial San Diego Union-Tribune editorial about the project stated that the "repurified water" is safe, but questioned if the region could afford it. Further outreach work included a brochure and related fact sheets, a video describing the project, a slide presentation, a speakers' bureau effort, taste tests (where repurified water was clearly favored), feature stories in newspapers and other media outlets, and a telephone informational line. However, this project was eventually put on hold indefinitely due to negative public perception resulting from politicization of the project. Project opponents and politicians used negative terminology as part of their opposition to the project, including the 'toilet to tap' label. The negative terminology was also used by the press (i.e. an article was printed in the San Diego Union-Tribune under the heading "State backs sewage-drinking-water plan" and a cartoon was printed showing a man and a dog queuing to drink out of a toilet) and resulted in negative public perception issues related to the project including environmental justice issues, water quality concerns, and health and safety concerns.

Lesson Learned:

Project sponsors must recognize the potential for strong controversy with indirect potable projects. Project timing must be considered in the broader sense to avoid political opportunism, if possible. With such projects, a thorough education and cooperation of politicians and potential users is mandatory for success.

IRVINE RANCH WATER DISTRICT
RECYCLED WATER SYSTEM

Project Description:

The IRWD Michelson Water Reclamation Plant can produce up to 15 million gpd of disinfected tertiary-treated Title-22 compliant water for reuse. The distribution system consists of 245 miles of pipe, eight storage reservoirs, and 12 pump stations. Reclaimed water is stored in winter months, and some is exported to the Orange County Water District. Water recycling has been a significant resource in the IRWD service area for decades. Through a combination of proactive public education, reduced rates for recycled water, encouragement of voluntary recycled water use, strong partnerships with the private sector and regulators, the use of pilot projects, and a demonstrated need through long-term planning for recycled water as augmentation for water supply, the IRWD has been extremely successful in implementing non-potable recycled water projects. The IRWD was the first district in the U.S. to obtain permits for the use of community-supplied reclaimed water for interior (toilet flushing) within IRWD facilities and other commercial buildings. This has reduced potable demand in these buildings by up to 75 percent.

Project Relevance:

This program demonstrates the degree of success and support attainable through significant front-end outreach, and a long-term integrated approach clearly recognizing the importance and necessity of recycled water as a water supply resource. This positive approach and interaction with the public and users has ensured smooth implementation of recycled water projects.

Lesson Learned:

Leadership and support at the highest level of the organization are critical, and will result in the right value statement for customers, and the right mind-set within the organization ensuring long-term success. Partnerships negotiated ahead of time and voluntary recycled water use are keys to IRWD's success.

WEST BASIN MUNICIPAL WATER DISTRICT WATER RECYCLING PROJECT

Project Description:

The WBMWD provides wholesale potable water and recycled water to 17 South Bay cities and several unincorporated areas in Los Angeles County. Currently, seawater barrier wells are injected with a 50/50 percent blend of imported water and recycled water. Industrial customers represent the largest recycled water sales in the WBMWD. Of the total 27,331 ac-ft of recycled water served to 169 reuse sites in FY 2001-2002, 91 percent or 24,782 ac-ft went to four industrial customers. The remaining 165 reuse sites used 9 percent or 2,549 ac-ft. Each of the four industrial customers has specific water-quality needs that require additional treatment beyond tertiary treatment prior to use. The WBMWD worked with the industrial customers to identify the most cost-effective treatment available for their needs.

The WBMWD serves five different types of recycled water to meet specific customer needs. The five types of water are: (1) Irrigation grade, (2) Nitrified (for cooling towers), (3) Lime clarification/RO treated recycled water (for blending into an injection barrier), (4) MF/RO treated recycled water (for use in low-pressure boilers), and (5) MF/RO with additional RO treated recycled water (for use in high-pressure boilers). WBMWD's customers have responded enthusiastically to its recycled water programs. The key is creating a financial arrangement that works for all parties.

Project Relevance:

Success of the WBMWD recycled water program is based on the following:

- Development of three core messages used in all community efforts that build on the WBMWD's reputation as a leader in water quality and commitment to water reliability. These messages address areas of interest to specific groups. For example, water purveyors who were most interested in cost and water quality were provided with the following messages: (1) Expanding the Seawater Barrier Project is cost effective; and (2) Water quality testing is ongoing and continues to demonstrate the safety of the recycled water produced at the WBMWD's El Segundo plant. Environmental interests who want to know about the proposed project's effect on the environment were given the following messages: (1) The Seawater Barrier Project will reduce the amount of effluent flowing from the Hyperion Plant to Santa Monica Bay, which means better water quality in the Bay and near-shore ocean, as well as fewer beach closures; (2) Reducing dependence on imported water is good for the environment, and (3) It helps avoid negative environmental impacts associated with importing water through the Bay-Delta and the energy costs associated with pumping.
- Convey to local policy makers how the WBMWD's efforts assist in meeting the region's need for water resources management, infrastructure improvements, economic stability, and quality of life.
- Involvement in outreach with retail water agencies, the Metropolitan Water District of Southern California, and other public and private entities to continue to inform and educate about recycled water.
- Establishment of relationships with local chambers of commerce to assist in communicating of the value of recycled water to city leaders.
- Identification of the need for a forum of local agencies, water utilities, municipalities, and legislative offices. In response, the WBMWD implemented the public information committee (PIC) to coordinate effective public information programs, provide cohesive message dissemination, and foster positive interagency relations. Through regular meetings, the PIC gathers representatives from cities, legislative offices, water agencies, and other regional water suppliers. Meeting topics include legislation, water conservation, water education, emerging water issues, media and public relations, city updates, and water agency news.
- Creation of public affairs activities that range from local to global levels: (1) Globally - hosting international seminars that bring together foreign representatives with local water and wastewater experts; (2) Locally - raising awareness of water issues by participating in community events, including the annual Earth Day event held at Polliwog Park in Manhattan Beach, California.

Lesson Learned:

Continuous interaction and education with the public is of vital importance to the success of the West Basin recycled water program. This interaction enables WBMWD to continually assess and address concerns of the public, which assists in ensuring the continued success of the program.

Source:

WBMWD website: http://www.westbasin.org/

6 Recommendations and Conclusions

Water supplies are limited in southern California. Most of the state's developed water is transported hundreds of miles from northern California for use in semi-arid and densely populated southern California. This long-term water import dependency, coupled with regular droughts, makes future water supplies a vital concern to southern California residents. The DWR has predicted chronic water shortages by the year 2020 and the need for water is expected to grow, driven by increasing population and the need for protection of the Delta. DWR "predicts that by the year 2020, Californians will be short 7 million ac-ft of water per year during a drought and 2.9 million ac-ft in an average year. The California State Legislature has adopted goals for water recycling that include providing for at least 1.5 million afy of recycled water by the year 2020. An ac-ft of water is enough to supply two families of four for one year."[59] Water reuse projects are essential to the water resources management of the region. Using drought-proof recycled water can partially help resolve water supply problems by reducing dependence on freshwater for uses such as landscape irrigation, dust control and industrial cooling; thus, the most treated source of water can be reserved for public drinking water.

Water recycling provides an additional viable resource of water to augment our growing water needs. Water conservation, including the use of recycled water, has enabled the City of Los Angeles to largely meet the needs of its growing population necessitating only minor increases in imported water supplies since the 1970's even with the addition of approximately 1-million people.[60] For this reason, it is important that PI&E programs are developed to continue the successful implementation of recycled water projects. Recycled water represents a safe and reliable water supply that helps to mitigate future droughts or shortages of imported water supplies, and provides a stable foundation for maintaining and improving California's economic prosperity and quality of life.

[59] Dublin San Ramon Services District website: http://www.dsrsd.com/what_we_do_services_offered/recycledwaterfaq.html.

[60] Bill Van Wagoner. Personal communication.

6.1 Recommendations for Public Information and Education Program Strategic Goals

There are a number of strategic goals that can be implemented to assist agencies in successfully implementing recycled water public information and education programs. These strategic goals include:

1. **Strengthen understanding and informed decision-making on recycled water issues**.
    - Survey the public on inquiries as to recycled water use, quality, and their relation to environmental and economic vitality.
    - Coordinate information and education activities.
    - Investigate means to increase stakeholders time spent reading and learning about recycled water resources.
    - Develop a paid advertising strategy for special or important events.
    - Provide access to timely and reliable information through the public information network, library, and media outlets.
    - Survey results regarding awareness of recycled water information, education services, and number of requests for information.
2. **Develop a public information service network. Disseminate recycled water information publications, news releases and articles**.
    - Conduct surveys of the general public, institutions, businesses, and policy makers regarding awareness of recycled water information and education services and how recycled water issues relate to environmental and economic vitality.
    - Provide timely and reliable access to recycled water information through libraries or other resource centers.
    - Support or provide recycled water curriculum designed for instruction in elementary and secondary schools.
3. **Increase the local media market coverage**.
    - Survey local media to determine their interests and information needs for recycled water.
    - Call local reporters monthly with story ideas.
4. **Increase demographics of groups involved in policy and operational decisions (number, variety, and geographic distribution).**

- New and modified policies and programs annually developed with public input.
- Public attendance at events such as public forums, hearings, and commission meetings.

5. **Assess and revise, if necessary, agency comment cards to elicit more feedback**.
6. **Maintain effective communication linkages with local elected officials and members of the general assembly**.
7. **Promote the interaction of advisory committees, interest groups, friends groups, and the public at large in all aspects of the project planning process**.

Gather public input regarding planned project and public involvement process

- Randomly survey the public to determine their need for recycled water information and develop marketing strategy based on survey results.
- Use the Internet and agency's home page as a source for the public and agency staffs to monitor and comment on planning efforts.
- Periodically survey the public to gather input on public information and education programs.

8. **Implement, maintain, and update effective public involvement plans.**

6.2 Recommendations on Public/Media Opposition

As mentioned previously, one of the difficulties that agencies have encountered is public opposition to projects, which most commonly is driven by the media or project opponents using negative language to describe a recycled water project (i.e. the "Toilet to Tap"). This negative branding of recycled water can result in suspending development of recycled water projects as well as leaving a long-term stigma in the public's mind regarding recycled water or the project sponsoring agency. In addition, this stigma can carry over to other agency projects including those not related to recycled water. As discussed in this TM, establishing a strong, supportive brand early can be an important mechanism to avoid negative branding. However, much more can be done by agencies, both individually and collectively, to proactively address and deal with negative public and media generated language and images.

Proactive planning for such potential project barriers is an effective way to prepare for dealing with negative reactions. One method to do this is for agencies to create protocols or "fact sheets" for answering potential questions surrounding their projects or plans. This

methodology can be employed by individual agencies as well as the recycled water industry in dealing with negative language and images from project opponents and the media. From an industry standpoint, it may be of value to interview water recycling agencies and to develop a Frequently Asked Questions document. This document could specifically addresses the negative language and images that have been used by project opponents and the media against past water recycling efforts.

APPENDIX A
GLOSSARY OF TERMS

Glossary of Terms

Active Listening— Active listening refers to a special attentiveness to the information being shared. It involves listening for the interest, feelings, and values in a conversation, as well as the facts delivered. It is a critical skill for fully understanding the stated positions of public involvement participants.

Collaboration – A specific kind of cooperation where there is a commitment to working together to solve problems or generate options. A collaborative process is one committed to taking full advantage of the "brain trust" (and the diversity of talent represented by a cross-section of the people affected by a project.

Conflict Management – A process and facilitation to cope with the differences that will normally arise between stakeholders (and between stakeholders and the agency) in a Public Involvement process.

Consensus--The point at which agencies and the public agree they can live with the recommendations or findings enough that the activity or project can move forward. Although unanimity is seldom achieved, continuous coordination throughout the study process is expected to garner support from most agencies and much of the public.

Context – The setting or environment of a project, PI event or information. Context includes the background, current situation, history, and purpose of a project that gives it meaning in any given situation. Without context, it is difficult to understand the reason for something.

Convening – The process of calling together those concerned with and/or affected by a project.

Facilitation--Facilitation is guidance of a group in a problem-solving, idea generating, or option-creating process. The facilitator is neutral with regard to the issues or topics under discussion. The facilitator works with the group as a whole and provides procedural help in moving toward a conclusion.

Framing and Reframing – Understanding the needs and emotional content behind a negative comment, and restructuring the comment into a more neutral or positive framework while respecting the speaker.

Influence – The ability to affect the outcome of a project indirectly through bringing new data, new understanding, or new options to the process.

Inter-agency Agreements – Sets of written accords that demonstrate concurrence among the parties on how to proceed through (and behave during) a project.

Interest-based Problem Solving – The opportunity to work from the true concerns that individuals and groups (stakeholders) have about a project rather than from a stated position that may or may not fully reflect the concern.

Negotiation – A process of "give-and-take" and compromise to resolve a conflict. When successful, negotiation results in a sense of shared risk and mutual satisfaction for all parties.

Partnering Mission – How the vision (or successful project) will be accomplished. The mission focuses on the way the project will be conducted by the project team.

Partnering Vision – What the ultimate successful project would accomplish. The vision focuses on outcomes, not on specific alternatives.

Procedural Needs—Needs that stakeholders and PI participants have concerning the way they are able to participate in the decision-making process, including input into alternative selection. It has to do with how the overall process is communicated and managed, how input is gathered, what is done with the input, and how the final decision is made.

Psychological Needs – This refers to the emotional content of the public involvement process. For the most part, people can not clearly state their psychological needs and may believe that you do not care about their needs. Psychological needs most often are communicated as feelings and values statements.

Public Hearings--Meeting formally advertised and convened to afford any person who deems their interest to be affected an opportunity to be heard. Testimony at the hearing is made part of the official public record.

Public Involvement—A process that encourages the public to participate in project development. A successful Public Involvement Program facilitates the exchange of information among project sponsors, stakeholders and the general public, and includes such techniques as meetings, surveys, committees, presentations, informational materials, etc.

Public Involvement Plan-- The approach to information sharing, data gathering and decision-making among project sponsors, stakeholders and the general public. A PI plan will define the outreach techniques to be used at each step in the decision-making process, such as meetings, surveys, committee representation, public hearings, and other events. It will also include a plan for media coverage and support, a resource and budget estimate, and a timeline that coincides with the critical path for the project.

Stakeholder-- A person or entity with an interest in the problem or project and its results. In addition to the term stakeholders, the terms the public and community groups are also used to represent groups with an interest in the problem or project.

Substantive Needs – These needs have to do with the real (concrete) issues of a project. For instance, a need for safety at a children's school crossing is a substantive need.

Target Group – In Public Involvement, the group whose interest or commitment is being sought.

APPENDIX B
SAMPLE STAKEHOLDER SURVEY

SAMPLE STAKEHOLDER SURVEY

This sample stakeholder survey is designed to assist agencies in assessing the appropriate level of public involvement for stakeholders or stakeholder groups, as described in Step 6 of the 10-Step Public Involvement Process. To do this, sample survey questions are provided.

- How would you describe the problem? Does it differ from the way the agency has described it? What is the history of the problem (not the project) as you see it? What is causing the problem?
- What are the key issues related to solving the problem?
- How do these issues affect you personally and/or the organization you represent?
- Do you feel the project scope, as described, is an appropriate way to address the problem?
- What types of activities/structures would be most helpful in developing the best solution to the problem? What approaches have worked well in the past and why? What approaches have been unsuccessful, and why?
- How do you (or the organization you represent) want to be involved in the project? How much time can you (or a representative of your organization) commit to the process? What type and level of information do you want to receive? How often? In what forms?
- What would be the most effective way to provide information about the project to the general public? How interested do you think the general public will be? What level and type of information should be provided? How often? In what forms?
- Who else should we be talking with (what other groups are affected, what organizations represents them, who are the appropriate contacts)?
- Are there any other questions you wish we would ask?

APPENDIX C
AWWARF PUBLIC INVOLVEMENT STRATEGIES: A MANAGER'S HANDBOOK TOOLS THAT ASSIST DECISION-MAKING

MAKING DECISIONS COLLABORATIVELY

A variety of decision-making techniques are available to help utility managers structure problems, evaluate data, determine the value of information, account for uncertainty and evaluate competing alternatives. The decision techniques come from economic analysis, psychological studies of group interaction, private-sector strategic planning and public utility planning. The techniques vary in their complexity, ease of use and statistical defensibility. As a general rule, the techniques that are easier to explain and use may be good for generating a group consensus statement, but may lack the statistical validity of other more rigorous techniques. It is therefore important to understand the purpose for which the tool is to be used and the participants that are participating in the process.

The techniques described in this section have all had successful application in the context of public involvement, although not necessarily in the water provider industry. They are presented in order of ease of use and complexity, beginning with the easiest and ending with the most difficult.

Decision Techniques Can Help:

- Increase public understanding of how decisions are made
- Build consensus before conflict arises
- Incorporate diverse goals and values
- Demonstrate responsiveness to concerns

- Identify better solutions
- Increase defensibility of decisions
- Build support for a preferred solution
- Build trust in the organization
- Make decisions easier for elected officials

Delphi Technique,

Description

The Delphi technique is a method to receive input on a decision from a group of recognized experts in a given field. The experts often lend credibility to a decision and provide a measure of outside objectivity. The Delphi technique is typically conducted through the mail, in which the experts respond to an open-ended questionnaire. The results of the questionnaire are tabulated and sent back to the experts. Upon reading the tabulation, the experts can report on why their responses differ from the norm and can revise their initial response if they believe that they have learned something from the responses of other participants.

Typical Uses

The Delphi technique is often used by market researchers when developing products. In the context of utility decision making, this technique can be used to develop criteria for selecting among project alternatives or in developing preferences or "weights" for the criteria.

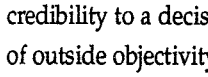
Advantages

Objective experts can increase a utility's credibility and can provide new or useful information to the process. The responses are typically anonymous, which encourages candid reporting. The survey process is usually inexpensive in comparison to other decision techniques.

Disadvantages

The opinions of experts in a given field often do not match the opinions of the general public. Although a blue ribbon panel lends credibility, the Delphi technique is not a tool to use instead of public opinion.

Nominal Group Technique,



Description

Developed through studies of group psychology and decision making, the Nominal Group Technique (NGT) is a structured technique that combines diverse values into a consensus opinion. The technique uses a group of individuals, often some form of advisory group, to participate in a series of facilitated discussions. The participants discuss issues as a group, assign numerical preferences or "weights," and evaluate and discuss the results of their weights as a group. A computer is used to perform a statistical analysis. The process of discussing, weighting and evaluating may be repeated until the group is comfortable with the results and the statistical analysis shows stability.

Typical Uses

The NGT typically is used to rank goals, activities or criteria. It is usually applied where there are varying, or competing, objectives, such as minimizing cost or minimizing environmental impacts.

Advantages

The NGT incorporates diverse viewpoints into a consensus opinion. It is often used when decision makers must show exactly how a particular interest group or criteria affected a decision. The NGT allows for ample discussion and interaction on the issues, focuses on the important points and fosters group problem-solving. The communication that occurs between diverse interests is often as valuable as the recommendation itself. The NGT has a high probability of making a final decision.

Disadvantages

A balance of interests is important for the credibility of the process. The technique can generate an overreliance on the numerical rankings, and it relies on self-determination of the weights rather than through actual choices between competing alternatives.

Public Value Assessment, $$, ◕, ≈

Description

Public Value Assessment (PVA) embodies many of the same principals as the NGT. However, instead of a group discussion and ranking of goals, activities, criteria or project alternatives, the ranking is completed by separate interest groups. The scores of the alternatives are then arranged numerically on a matrix, allowing the decision maker to identify where particular groups may have a consensus opinion on a particular option.

Typical Uses

PVA is typically used when it is impractical to use the advisory group either for logistical or political reasons.

Advantages

PVA allows more room for final judgment by a decision maker. Managers or decision makers are usually more comfortable when using this technique. PVA also allows ranking to be shown by a particular interest. For example, a ranking of project alternatives by consumer interests and a ranking by environmental interests may identify some areas of agreement or disagreement.

Disadvantages

PVA does not provide for a dialogue between differing interests. It also may not give a clear choice or a final decision.

Multi-Attribute Utility Analysis, $$$, ◕, ≈

Description

Multi-Attribute Utility Analysis (MUA) is a method that clarifies and breaks down decisions about a problem with multiple attributes. It provides a means to consider the "utility" or importance of each attribute and to assemble multiple

issues into a single score. A specific utility function is developed for each attribute, such as project cost, to measure its degree of acceptability over a range of conditions. The project alternative with the highest aggregate utility will be the apparent best alternative.

Typical Uses

MUA is used when a highly sensitive technique is needed to evaluate the particular strengths and weaknesses of competing alternatives. It is useful when decision makers want to show how the results are influenced by the particular utility of an attribute or its importance weight.

Advantages

MUA provides a structure for breaking down the components of a decision, so they can be clearly evaluated by a group of decision makers. Developing the utility function (that is, the degree of acceptability over a range of conditions; for example, at what cost does a project alternative begin to become unacceptable?) can be good for consensus-building. It also allows varying utilities to be considered.

Disadvantages

MUA can be relatively difficult to understand and communicate. It generally requires a more complete knowledge of economic principles than most members of the general public have. Determining the utility functions of individual attributes may be difficult, and the technique may tend to focus decision makers too heavily on quantitative interpretations.

Decision Analysis, $$$$, ◕, ≈

Description

Decision analysis is an umbrella term that encompasses a variety of techniques (some include MUA as a method of decision analysis). A distinguishing factor of decision analysis is that it provides a means for evaluating decisions when conditions are uncertain, such as the impact of a particular regulation, the performance of a given technology or the acceptance by the project stakeholders. Decision analysis is typically a computer-assisted process. Decision makers can change a model to fit new data or project circumstances. In addition, it can illustrate how different elements of a decision relate to each other.

Typical Uses

Decision analysis is widely recognized as a planning tool in the electric utility industry where all interrelated aspects of a particular decision must be considered simultaneously. For example, simultaneous decisions may include demand forecasts, conservation and demand-side management, potential regulatory impacts, the expected life of existing and future facilities and availability of electric power from other sources. Decision analysis has been used in a similar fashion in the wastewater industry to evaluate options for sludge management. Decision analysis may be used increasingly in the water provider industry to assist with Integrated Resource Planning efforts.

Advantages

When decision analysis is applied in the context of public involvement, it can be an excellent tool for developing a consensus opinion on the nature and extent of the problem that is to be evaluated. Decision analysis also can be used to elicit value trade-offs–that is, the importance weights developed in the NGT, PVA or MUA techniques–in a manner that has greater statistical validity and allows for a clearer demonstration of how the trade-offs, or weights, influenced the decision.

Disadvantages

Decision analysis is the most difficult technique to use in a purely public setting. If decision analysis is used to elicit weights, many carefully worded questions are needed. The process relies on mathematical principles that are generally difficult to explain to an audience of nonspecialists. This may create a feeling of a "black box" that leaves some participants doubtful of the eventual outcome.

APPENDIX D
CITY OF SAN DIEGO RECYCLED WATER PROJECT – SAMPLE RECYCLED WATER BROCHURE

THE CITY OF SAN DIEGO

Recycled Water

use in San Diego

Recycled Water Use in San Diego

Recycled Water Makes Sense for San Diego

In San Diego, water is too precious a resource to use just once. A safe, dependable water supply is vital to our economy and quality of life. San Diego currently imports up to 90 percent of its water supply from Northern California and the Colorado River.

To meet future water demands and avoid shortages, while reducing our dependence on imported water, the City of San Diego has built the North City Water Reclamation Plant and the South Bay Water Reclamation Plant. These plants treat wastewater to a level suitable for irrigation, manufacturing and other non-drinking, or non-potable purposes. The North City Plant has the capability to treat 30 million gallons a day and the South Bay Plant can treat 15 million gallons a day. Recycled water (also referred to as reclaimed water) gives San Diego a dependable, year-round, locally controlled water resource. Using recycled water is cost-effective, reliable and good for the environment.

About the City of San Diego Water Department

The City of San Diego Water Department is committed to providing our customers with safe, high-quality, reliable water service. Through the use of long-range planning, innovative cost-saving measures and cutting-edge technology, the Water Department is working to ensure safe, reliable service for generations to come.

For more information about the City of San Diego Recycled Water program, please call (619) 533-7485
Visit our website at:
www.sandiego.gov/water/recycled

Recycled Water Uses

Landscape irrigation is the single largest use for recycled water within the City of San Diego. Recycled water is also used for industrial processes, cooling towers, soil compaction, dust suppression, circuit board washing and toilet and urinal flushing.

The City is currently working with businesses, public agencies, homeowners associations, and academic institutions with proximity to the optimized system to retrofit their properties and educate them on the use of recycled water.

Many customers are already using recycled water. Some of these customers include General Atomics, Motorola, CalTrans, UCSD, Torrey Pines Municipal Golf Course, Nissan Design, Burnham Institute, Metro Biosolids, Miramar Landfill, and the City of Poway.

Rules and Regulations

The State of California Department of Health Services sets the standards for required levels of treatment and types of uses for recycled water. These standards are included in the California Code of Regulations, Title 22.

There are extensive rules and regulations covering its usage. These include proper signage and making sure all pipes, sprinkler heads, meter boxes and other irrigation equipment are properly marked or color-coded purple to distinguish them from potable supplies and avoid any potential for cross-connections. The Water Department will work with customers to ensure they are in compliance with all State and local health regulations.

Approved uses include irrigation of food crops, parks, playgrounds, school yards, residential landscaping, common areas, nurseries, freeway landscaping, golf courses, pastures for animals and wetland projects. Additional approved uses are for recreational water bodies including fishing, boating, fish hatcheries, and for industrial processing, commercial laundries and soil compaction.

To obtain a copy of *"Rules and Regulations for Recycled Water Use and Distribution within the City of San Diego,"* Call the City's Development Services Department, Publications Section, at (619) 446-5100 or visit their office on the second floor of the Development Services Center, 1222 First Avenue, San Diego. For more information about the Recycled Water Program, please call **(619) 533-7485.**

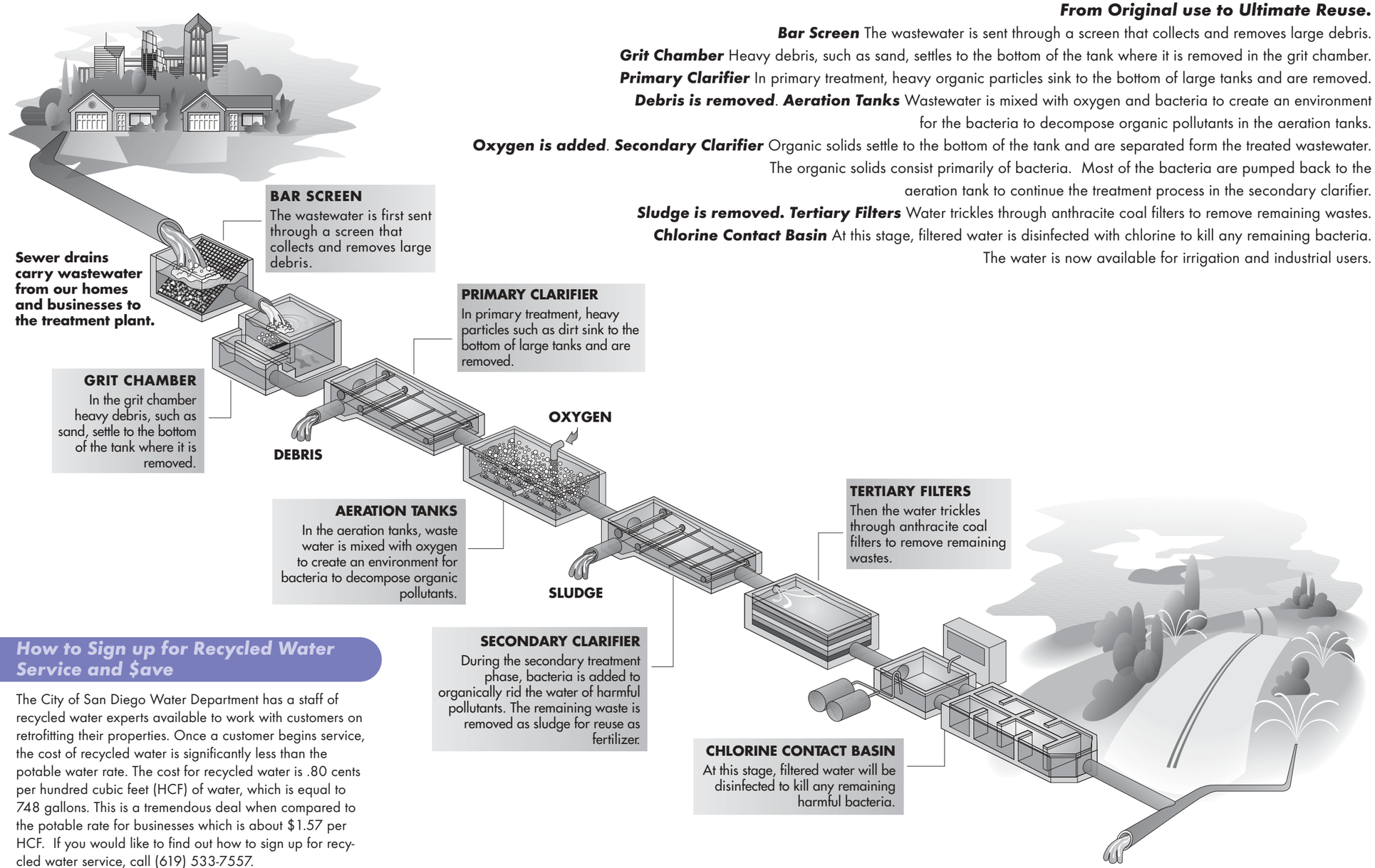
Quality and Safety

Recycled water is approved for nearly all uses except drinking. Careful monitoring by responsible local health and water quality control agencies ensures that the City of San Diego produces a high quality water product that meets all federal, state and local water quality standards. According to the strict standards set out in Title 22 of the California Code of Regulations, recycled water is safe for all human contact. For more than 30 years, recycled water has been safely used throughout the country in recreational lakes, sprinkler systems for homes and businesses, for crop irrigation and manufacturing processes. Since recycled water is used for non-drinking purposes, a separate set of distribution pipelines has been built to deliver water from the North City Water Reclamation Plant and the South Bay Water Reclamation Plant to customers.

Typical Recycled Water Treatment Process:

From Original use to Ultimate Reuse.

Bar Screen The wastewater is sent through a screen that collects and removes large debris.
Grit Chamber Heavy debris, such as sand, settles to the bottom of the tank where it is removed in the grit chamber.
Primary Clarifier In primary treatment, heavy organic particles sink to the bottom of large tanks and are removed.
Debris is removed. ***Aeration Tanks*** Wastewater is mixed with oxygen and bacteria to create an environment for the bacteria to decompose organic pollutants in the aeration tanks.
Oxygen is added. ***Secondary Clarifier*** Organic solids settle to the bottom of the tank and are separated form the treated wastewater. The organic solids consist primarily of bacteria. Most of the bacteria are pumped back to the aeration tank to continue the treatment process in the secondary clarifier.
Sludge is removed. Tertiary Filters Water trickles through anthracite coal filters to remove remaining wastes.
Chlorine Contact Basin At this stage, filtered water is disinfected with chlorine to kill any remaining bacteria. The water is now available for irrigation and industrial users.



How to Sign up for Recycled Water Service and $ave

The City of San Diego Water Department has a staff of recycled water experts available to work with customers on retrofitting their properties. Once a customer begins service, the cost of recycled water is significantly less than the potable water rate. The cost for recycled water is .80 cents per hundred cubic feet (HCF) of water, which is equal to 748 gallons. This is a tremendous deal when compared to the potable rate for businesses which is about $1.57 per HCF. If you would like to find out how to sign up for recycled water service, call (619) 533-7557.

Eight Easy Steps to Use Recycled Water

1. Conduct Site Assessment
The Water Department cross-connection staff will review customer's preliminary site assessment and list of requirements that need to be met in order for property to accept recycled water.

2. Sign User Agreement/Letter of Intent
The customer signs User Agreement or Letter of Intent to commit the City to provide recycled water and the customer to use recycled water. The recycled water will be used under all Water Department Rules and Regulations for Recycled Water.

3. Prepare Retrofit Design
Customer or authorized representative prepares design to retrofit site according to the State and County health regulations.

4. Design Review and Plan Check
The customer or authorized representative submits preliminary design including site assessment report to the City for review. A conceptual drawing of the customer's site is required for approval by the County Department of Environmental Health. Also, the customer is required to complete design plan check process and pay appropriate fees.

5. Retrofit Property
The customer or authorized representative performs retrofit work on site.

6. Test System
Upon completion of the retrofit work, a cross-connection test by the City and the contractor will be performed with final approval of retrofit work by the County Department of Environmental Health.

7. Meter/Service Installation
After the customer pays fees based on the size of the recycled water meter the City then processes and schedules installation. The City notifies customer prior to distributing water and sets meter.

8. Train Staff
Irrigation Supervisor attends the Recycled Water Certification Workshop sponsored by the San Diego County Water Authority. The customer receives water and enjoys the benefits and cost savings of using recycled water.

Recycled Water Site Supervisor Certification Workshop

This one-day certified course is designed to provide irrigation supervisors with a basic understanding of recycled water and how to operate and maintain a safe, efficient operation. Understanding similarities and differences between recycled and potable water is critical to the successful operation of a recycled water system.

The class, sponsored by the San Diego County Water Authority, costs $35 per person. Fee includes materials, continental breakfast and lunch.

Topics covered in this class include the following:

- ***What is a recycled water site supervisor?***
- ***Introduction to recycled water use***
- ***Guidelines for recycled water use water management techniques***
- ***Cross connection control backflow testing***
- ***Common problems/Recommended solutions***

For dates and times of upcoming classes or additional information call the County Water Authority at 858-522-6756.

Guaranteed Water Program

The Guaranteed Water Program exempts research and development or industrial manufacturing firms from mandatory water restrictions in times of drought in exchange for their participation in daily water conservation programs, including the use of recycled water.

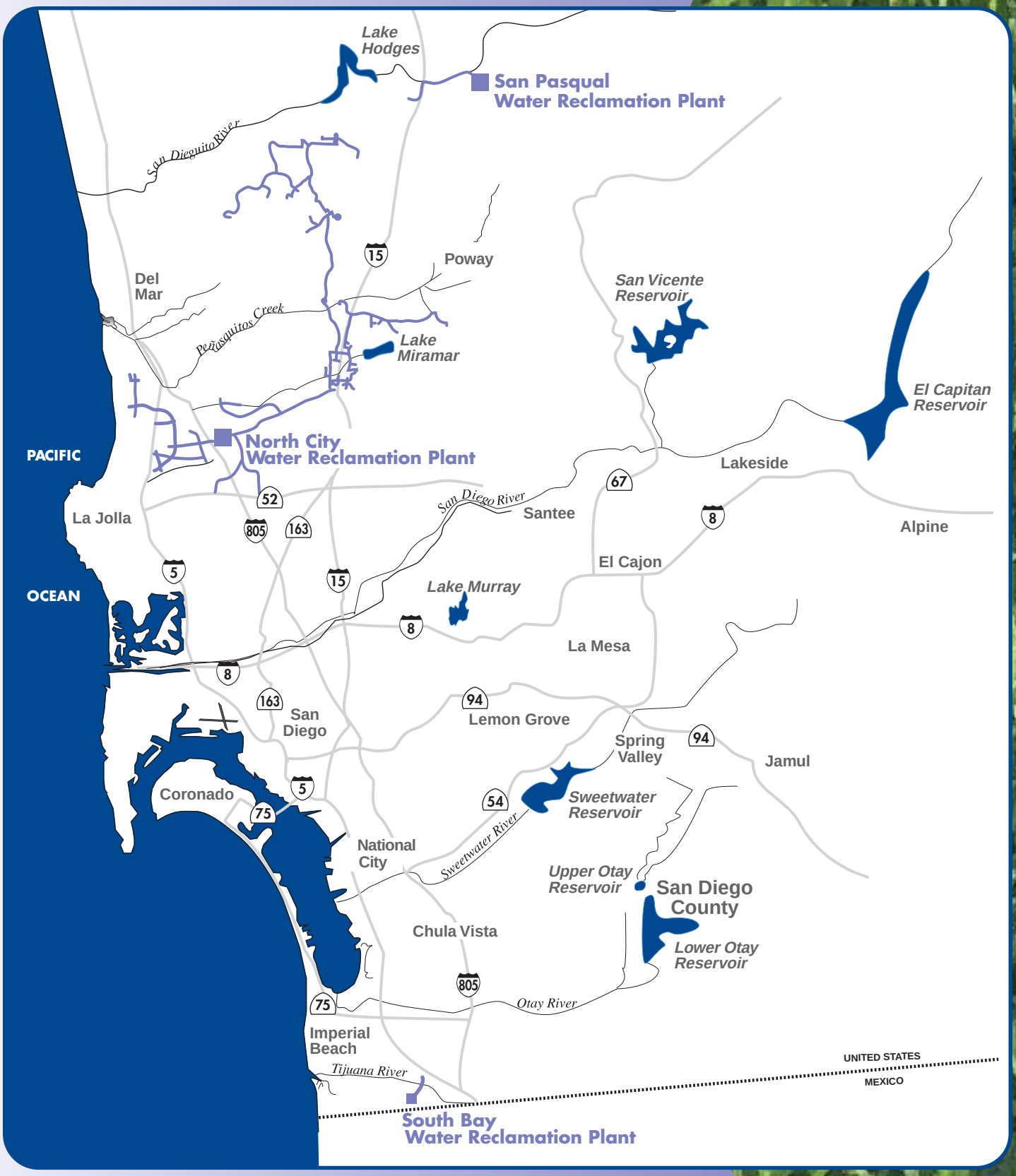
To qualify, a company must use recycled water where feasible, install ultra low-flow toilets, water-conserving showerheads and other water-efficient fixtures. Once this is done, the business is exempt from mandatory water supply cuts during a Water Warning when other businesses are being required to conserve water.

According to **San Diego Municipal Code 67.3806(d)**, a Water Warning occurs when the Water Department is not able to meet the demands of its customers. Upon implementation, local businesses are required to conserve water while businesses under the Guaranteed Water Program are exempt from mandatory cutbacks.

To participate in the City's Guaranteed Water Program, please call (619) 533-4243

City of San Diego
Recycled Water Program
Water Department

Recycled Water Distribution System



Visit our website at: www.sandiego.gov/water/recycled

This information is available in alternative formats upon request.

Printed on Recycled Paper

APPENDIX E
AWWARF PUBLIC INVOLVEMENT STRATEGIES: A MANAGER'S HANDBOOK COMMUNICATION TOOLS

Public Involvement Processes and Techniques

The techniques available for implementing public involvement can vary according to their purpose, cost and ease of implementation. Before selecting which techniques to use, understand your objectives in seeking public involvement and know how those objectives relate to the project decisions that are going to be made.

The public involvement techniques presented in this appendix have been grouped according to their purpose:

- Getting information to the public
- Getting information from the public
- Methods for exchanging information
- Methods for making decisions collaboratively

Two techniques have been given their own category:

- Public meetings
- Surveys

Note: A series of icons are used to provide information on the relative cost of a total $ to $$$, the amount of staff time required ◔, ◑ or ●, and the degree of difficulty often encountered in implementation: ▬, ≈ or ≈.

Notes:

$ Least expensive	◔ < 8 hours	▬ Easy
$$$ Most expensive	◑ 8-40 hours	≈ Moderate
	● > 40 hours	≈ Difficult

TECHNIQUES FOR GETTING INFORMATION TO THE PUBLIC

Newspaper Advertisements, $$, ◔, ▬

Description

Display advertisements differ from legal notices in that displays are printed in a commonly read section of the newspaper. Advertisements can range in size from a quarter to a full page. Rates vary according to the media market, the newspaper and whether it is a weekly, daily or Sunday edition. Rates are charged by the column inch, with a 4- x 8-inch advertisement running 28 column inches. Many newspapers have their own graphics department that can create your display advertisement from the words that you send to them via telephone or fax.

Typical Uses

Notification of public meetings, events, workshops and open houses. Application form for public advisory committees.

Advantages

Reaches a wide audience, particularly if sized and placed appropriately. Relatively inexpensive.

Disadvantages

Selecting the wrong newspaper for the area. Running the advertisement only once or placing the advertisement too soon to the date of the event will diminish its effectiveness.

Bill Stuffers,

Description
A small notification, often printed in multiple colors, that fits into the invoice received by customers.

Typical Uses
Notification of changes in rates, special events or information about an ongoing program.

Advantages
Uses an existing distribution format and network. Easy to implement.

Disadvantages
Conveys limited information because of its small size. May be thrown away before it is read.

Door Hangers,

Description
Printed color notice, typically 3 inches x 7 inches with a hole suitable for hanging on a doorknob.

Typical Uses
Providing notification of upcoming, temporary changes in service or providing information on meter reading.

Advantages
Easy to implement and distribute, reaches a wide audience with a message that is hard to ignore.

Disadvantages
Conveys limited information because of its small size.

Fact Sheets,

Description
A small publication typically limited to one to three pages. Fact sheets use text, graphics and photographs to summarize current or proposed activities for a project. The fact sheet is written in an easy-to-understand format.

Typical Uses
Often used as handouts to support other activities such as public meetings, open houses, workshops, speakers bureaus, information repositories or meetings with special interests. A series of fact sheets may be developed to cover several topics associated with one particular project.

Advantages
Fact sheets give readers concise information quickly. If a fact sheet covers several topics, readers may select from the topics that interest them. Most word processing software can easily provide a published appearance. Fact sheets can be photocopied for inexpensive and fast distribution.

Disadvantages
It takes time to design an effective fact sheet that preferably uses columns for text and is interspersed with graphics or photographs. Pages of

solid text are less likely to be read. Careful coordination between the writers and the technical staff is required to ensure that the information is accurate, but easy to read.

Newsletters,

Description

Newsletters typically cover a variety of topics about a project and are distributed periodically to a mailing list. Newsletters follow format guidelines similar to fact sheets (see Fact Sheets), but usually require more detail.

Typical Uses

Newsletters support public involvement efforts that occur over a sustained period of time. Their intent is to keep a wide variety of stakeholders informed about the project. Newsletters provide information on technical aspects and upcoming events or offer opportunities for public involvement.

Advantages

Because newsletters typically are sent to a mailing list of individuals who have expressed an interest in the project, newsletters offer an excellent way to keep a core audience informed. If done well, newsletters typically are read by those who receive them. Their format may be longer than a fact sheet and give more detailed information.

Disadvantages

Mailing lists may become out-of-date. Newsletters (usually the first edition) often promise or imply a continued series. Utility interest or resources must be maintained to ensure that the newsletters can be distributed regularly.

Displays,

Description

A display is typically a collection of visual and print information and may include maps, schedules, fact sheets, newsletters and photographs. Displays may be mounted on a tabletop or on an easel. Displays are most effective when they are accompanied by a knowledgeable staff person who can answer questions.

Typical Uses

Displays are usually set up in highly visible locations such as libraries, shopping malls, trade shows or interest group meetings. They can be used to convey information during any project phase, but are particularly helpful in presenting information about a project need and ongoing educational programs. Displays typically rely on images to communicate information. Large amounts of text reduce the effectiveness of a display. Displays are often used to support information repositories or speakers bureaus.

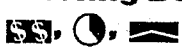
Advantages

Displays can evolve over the course of the project. The information and images can change to fit the needs of the audience or reflect the progress of the effort. Displays typically are portable so that they can be set up easily at various locations.

Disadvantages

Because displays communicate information visually, they need to be professionally done to attract attention and lend credibility to the message. Collecting the images and assembling them into a cohesive message can be time-consuming and difficult. The display also requires logistical coordination to keep track of users and locations.

Briefing Book,



Description

Briefing books provide concise information about a project to a specific audience. The content of a briefing book is a function of the intended readers and the purpose for which they will need the information. Briefing books are short, typically about 10 to 15 pages with the emphasis on factual text, rather than pictures or graphics. They typically describe the project need, the work that has progressed to date, responses to outstanding or controversial issues, decisions to be made and financial information.

Typical Uses

Briefing books have been developed for several groups to use: (1) internal staff and management to help them respond to questions from the pubic and to understand their project roles; (2) elected officials to help them respond to inquiries from constituents or prepare for decisions they will make; and (3) editorial boards of media outlets to provide them with key facts about the project and contact persons.

Advantages

Briefing books convey a special sense of responsibility to the recipients because the books are providing information for particular action. Briefing books are a good method for specifically acknowledging the importance of a particular stakeholder group to the project.

Disadvantages

Briefing books developed for large, generic audiences begin to resemble newsletters without the visual appeal of graphics or photographs. If this is the case, they lose their advantage of conveying a sense of importance to key stakeholders.

Information Repository,

Description

Information repositories are often mandated by regulation, as part of a public review and comment process. Repositories are typically located in an area of a library or municipal building where all relevant project information is made available for public review. Public information materials as well as technical data are available for public review. Repositories can be as small as a designated shelf in a reference library or they can be used in conjunction with a display to draw attention to the project material.

Typical Uses

Repositories typically are used for providing large amounts of project information to individuals interested in a greater level of detail than that provided by other informational

materials developed for a public involvement program.

Advantages

Repositories are easy to set up and easy to maintain. Utilities can boost their credibility by establishing a repository and referring to it frequently in their information materials–even if few individuals read the materials.

Disadvantages

Information must be updated periodically to show that progress is being made on the project. A repository may be inaccessible to the general public if the building in which it is housed has inconvenient hours.

Use of Existing Publications,

Description

Publishing information about your project in a newsletter or bulletin of an existing publication, such as the newsletter of a stakeholder group.

Typical Uses

Publishing the availability of a speakers bureau or the date for an upcoming event.

Advantages

Stakeholder groups are often looking for articles or notices to fill space in their publications. The publications are a good way to reach members of the public with a likely interest in the project.

Disadvantages

May be difficult to coordinate with the volunteer editors of the individual publications because the publication dates vary.

TECHNIQUES FOR GETTING INFORMATION FROM THE PUBLIC

Newspaper Coupon or Survey (cost and difficulty vary with how elaborate you make this)

Description

Buy newspaper advertising space or work with the newspaper to publish a coupon or survey for public response in conjunction with an article or a feature on the issues in question. The coupon or survey can include both specific questions and request for a listing of general concerns.

Typical Uses

Soliciting input on a topic that is already in the news and the subject of debate. In conjunction with a map indicating upcoming utility project locations and requesting comments and concerns.

Advantages

May elicit substantial response. Reaches a broad audience. Very inexpensive if the newspaper views this as a public service or as newsworthy.

Disadvantages

Response is not representative and may be anonymous, so it is hard to know how to interpret the information received.

News Releases,

Description

A news release is typically a one-page notification to area media of an upcoming event or the availability of information on a newsworthy event. A brief description of the event is accompanied with a contact name to call for more information.

Typical Uses

News releases are used to generate media interest in media-oriented events, such as press conferences, facility tours or public meetings.

Advantages

News releases are easy to prepare and can be faxed to the appropriate contact. Because they are intended to generate media interest about a utility, they usually receive best results if followed up with a telephone call.

Disadvantages

If a media contact list is not current or complete, the news release will have minimal effect. Telephone calls are supplanting the use of written releases in many media markets.

Legal Notices,

Description

A legal notice is a small announcement printed in area newspapers notifying the public of the availability of a public comment period or the date of a public hearing. In some cases, notices may need to be printed in the *Federal Register* or the state equivalent. A legal notice is the minimum notification required by law.

Typical Uses

To comply with legal requirements for public notification. In some instances, a display advertisement may take the place of a legal notice.

Advantages

Compliance with all legal procedures. Noncompliance could be legal ground for delay sought by project opposition.

Disadvantages

Almost no one reads legal notices as a method of keeping informed. Legal notices are not an effective public involvement tool. Failure to comply may place the project in legal/procedural jeopardy.

Public Comment Period,

Description

After a particular study is completed, but before it is considered final, a waiting period of about a month may be allowed for any interested member of the public to submit written comments about it to the decision-making body. The waiting period allows interested parties, even those who have not participated earlier, to respond before a final decision is made. It also creates a public record of their opinion to those who have the authority to address their concerns.

Typical Uses

A comment period is sometimes a regulatory requirement. Even when it is not required, it can provide a "decompression period" between the completion of debate about a project and the actual implementation. It enables all parties to decide what their level of commitment is to furthering or opposing the project.

Advantages

Addresses issues of fairness and openness by providing one last chance for everyone to express an opinion. Low cost. Some people may not be committed to serious opposition but want it "on the record" that they opposed the project; this satisfies that desire.

Disadvantages

May be seen as meaningless window dressing that does not influence decision making. Is the most distant and "coldest" form of communication. Does not allow for interaction, learning or compromise; each group is just taking a position.

TECHNIQUES FOR EXCHANGING INFORMATION

Information Line Telephone Number,

Description

Set up a telephone line for receiving inquiries about your project. Publish the telephone number with every communication about the project, so people can call for information on upcoming meetings, be added to the mailing list or request a briefing packet or special information. Develop a form to log calls and the responses to them. The telephone should be staffed by a person who has been trained in how to respond to questions and knows to whom to refer various kinds of requests. Provide an answering machine or voice mail service with the line so that people can leave messages 24 hours a day.

Typical Uses

Widely used for all kinds of projects, especially where the project extends over a long period and involves a variety of meetings, mailing lists, opportunities for reviewing project data and so forth.

Advantages

Helps prevent customer frustration with finding who is responsible for what or how to get involved. Does not require much cost or time commitment. Enables you to keep better track of how many calls are being received on what subjects and to document responses and follow-up.

Disadvantages

Needs to be part of a broader program to elicit opinions and participation. Requires a responsible and responsive person to staff the line.

Interactive Computer Formats, $$$, ◕, ≈

Description
A computer program that enables the public to ask questions or provide input. A notebook PC can be equipped with a program that asks for customer opinions and shows some result or how opinions relate to consequences.

Typical Uses
For use at fairs, shopping malls, lobby or reception areas and other places where there is a broad range of public traffic. Can be mobile enough to take to meetings, schools and so forth.

Advantages
High impact because this is a relatively new technology and can show interesting graphics. Its interactive nature involves people much more than when they are simply receiving information. Communicates an image of leadership and cutting-edge technology.

Disadvantages
Expensive. Some segments of the public do not like to use computers. Needs to be more than a gimmick; must relate to the issues in question.

Storefront, Trailer or Street Kiosk, $$$, ◕, ≈

Description
Rent a storefront or set up a trailer or kiosk that provides immediate information about the project and allows people to ask questions and fill out surveys or submit other comments. Usually must be staffed by someone knowledgeable about the project or program.

Typical Uses
For projects where the site is a heavily trafficked public place or when ongoing project activities affect a specific area or neighborhood over a long period.

Advantages
High visibility, represents a major commitment. Reaches a portion of the public who are most aware of the project.

Disadvantages
May be difficult to keep staffed. Security can be a problem. If space is not donated or part of other project facilities, the cost of both space and staff can skyrocket.

Radio Talk Shows, $, ◑, ═

Description
Provide a guest for radio or television talk shows. The format may include answering questions from telephone callers or from a studio audience. This medium can help people better understand your project. Public access television channels often have a regular time slot for this type of program and can provide production advice and assistance. You may also show some graphics or presentation materials as part of a television program.

Typical Uses

At mid-project when issues have already surfaced and debate is under way. This format enables you to show that you have been receiving and paying attention to public input and that you can respond to controversial issues in a nonconfrontational setting.

Advantages

Requires little time and financial commitment to test the waters. Most utility projects are not particularly interesting to the public and do not evoke much response. If your project is of interest to the public, then you need to tailor your activities accordingly. Creates a tape that can be part of public involvement documentation showing outreach efforts to the whole community.

Disadvantages

Typically does not yield much input, and it is uncertain how many people it reaches.

Be sure you know what you are walking into. Is there a possibility that the host is hostile? Are you ready to respond to any question that may be called in?

Speakers Bureau,

Description

Having a speakers bureau means being prepared to send people out to speak to groups about your project. The speakers can use overheads or a 10-minute video or slide show for a more consistent presentation and make the speaking assignment easier. Speakers can take along a survey or ask questions to elicit input at these meetings. You may seek out speaking engagements or simply make this service available on request.

Typical Uses

To inform groups about complex projects that have broad public impact.

Advantages

Creates powerful, direct communication that presents your story and makes people feel that the department or utility is not a faceless bureaucracy. Outreach aspect of it demonstrates your commitment to public involvement and accountability.

Disadvantages

Can be time-consuming, and you must be well prepared so that the presentations are beneficial. Usually the most credible and effective speakers already have too many demands being made on their time and may not be available when you need them.

Door-to-Door Canvassing,

Description

Water department/utility employees may go door-to-door to inform people of the potential impact of a utility project and ask about their input and concerns.

Typical Uses

When a small area will be seriously affected or inconvenienced by your activities (for example, a major commercial street will be dug up to replace lines), one-on-one contact is appropriate. This form of contact is highly recommended if potentially serious health hazards are involved. Even if not all people in the affected area can be contacted personally, a documented effort of this kind should be made. Another application would be canvassing a neighborhood where previous concerns or recent utility activities have led to difficult relations.

Advantages

Demonstrates a strong commitment to communicate. Enables people with complex problems (for example, a merchant whose parking or entryway will be blocked to business) to describe the problem and seek solutions and compromises. Working with each individual may be much more productive than working with a group all voicing their concerns. Where a hazard is involved, your presence communicates the seriousness of the situation.

Disadvantages

If this level of communication is not really needed, may be seen as a waste of ratepayer money. Finding people at home and willing to talk can be a problem in residential areas.

Advisory Groups,

Description

Advisory groups are loosely divided into two categories: technical and public advisory groups. Technical advisory groups may consist of regulators from appropriate agencies or outside technical experts and may facilitate a regulatory review process or lend credibility in some circles. Technical panels, however, may not represent the values of the publics concerned with the project and should not be considered a substitute for a public group if one is warranted.

Public advisory groups ideally represent the geographical and interest group distribution of the affected community. Public advisory groups can be either standing (that is, they continue to exist and are not tied to a specific effort) or they can be created for a specific project. Some public advisory groups develop their own leadership roles, such as chair and vice-chair, while others are facilitated by a member of the utility or by an outside consultant. Some public advisory groups function with some autonomy. They can hire their own consultants or expert speakers and meet without representation by the utility. The degree of leadership and autonomy depends on the needs of the project for public credibility and the needs of the utility convening the committee.

Typical Uses

Public advisory groups are most often used to review and comment on project alternatives developed by the utility. Public advisory groups can be used very effectively to provide value setting or ranking of alternatives through participation in an explicit, structured decision process.

Advantages

Advisory groups can provide diverse opinions that may not exist on a technical panel or on a utility's internal project team. If the group is structured correctly and is allowed to affect the outcome of the project, then it is likely that the problem-solving process will account for and reflect the values of the community.

Disadvantages

An advisory group can be helpful in formulating a project that addresses a community's values and needs or it can be harmful to the credibility of the utility. Advisory groups that do not accurately represent the key stakeholders of the community will lack credibility with the public and may be labeled a "sham" or a "whitewash." Advisory groups that are convened before a utility has determined what to do with them can lose interest quickly or create their own objectives.

A Caution on Advisory Groups

Advisory groups are particularly prone to the phenomenon called "groupthink," which is the predominant cause of poor decision making in teams. Groupthink is the striving for consensus that overrides the ability of individual members to seek realistic alternatives. In the name of consensus, groups can omit various points of view or simply ignore the ideas of others that may not agree with the larger group opinions. Strategies for avoiding groupthink are:

- Foster an open climate for discussion
- Avoid insulating the group from outside criticism
- Assign everyone the role of critical evaluator
- Avoid being too directive

Issues to resolve when establishing an advisory group

The following questions should be answered before establishing an advisory group:

- Will the group be developed for a specific project?
- How will you ensure a defensible selection process?
- Which interests will be represented?
- Which project decisions will the group affect?
- How long will the group exist?
- What will the members do at the meetings?
- How will relevant information be provided to the group?
- Will the group participate in any structured decision methods?

- Do you need an outside facilitator?
- How frequently will the group meet?
- How will the group be operated (chairperson versus facilitator)?
- Will the group have a charter and ground rules?
- Will the group meet without the presence of the utility?
- Will the utility be a member of the group?
- Will the group have the appropriate financial, logistical and management support?
- Does the project schedule have flexibility to accommodate group activities?

A Special Note on Advisory Groups

Developing an advisory group is entering into a relationship. In this relationship, a utility must demonstrate that it can adapt to the needs and concerns of the group. A utility must also be flexible in the project schedule and budget to accommodate the group. Advisory groups that understand that the utility can adapt to the schedule and budget, yet still operate within reasonable boundaries, will work hard to help solve problems with the utility and lend tremendous public credibility to the process and the outcome.

PUBLIC MEETINGS

Public meetings can take a variety of forms, depending on your objectives and the amount of information about a project already available to the public. It is important to remember that "form follows function" in the development of formats for public meetings. The most frequently used formats in public meeting are described in this section.

Small Group Meetings,

Description

Small group meetings range from three to 10 people. The participants may represent one particular interest group, such as an environmental group or a watershed management district, or they may represent a mix of interests. Such meetings are an opportunity for substantive presentation and discussion of information. The format, unless used for a specific purpose such as mediation, is relatively informal to allow for plenty of give-and-take between the participants.

Typical Uses

Small group meetings are typically used when a group of organized stakeholders has a very high interest in the project. The meetings are a good forum to present detailed data or to clarify points of concern, opposition or support for a particular project or its elements.

Advantages

Small group meetings allow a utility to demonstrate special interest in a particular group of stakeholders by establishing a forum and providing support materials to meet their particular

needs. The meetings also are an opportunity to move beyond public posturing that often occurs in larger meetings and encourage meaningful communication.

Disadvantages

Specific stakeholders may suspect favoritism if they are excluded from a small group meeting. It is difficult to reach large groups of individuals through the small group meeting process.

Large Public Meetings, $$$, ◕, ≈

Description

The size may vary considerably, from 30 to 1,000 people. Large group meetings are open invitations to all members of the public to learn more about a project and to express their concerns to project decision makers. The standard format usually includes presentations supported by audiovisuals from representatives of the utility followed by a question-and-answer period from the public.

Typical Uses

Large public meetings are often held at the beginning or at the end of a project. The meetings are a means to provide information about the study that will be undertaken or the activities that are proposed. Large public meetings often constitute the typical utility definition of public involvement. They are being used less frequently in favor of other meeting formats and techniques for public involvement.

Large public meetings are sometimes held at the request of the community for a number of reasons. The community may be (1) unaware of other meeting forums, (2) starved for project information, (3) eager for an opportunity for large group "venting" to get media attention, or (4) interested in intimidating project decision makers.

Advantages

Large meetings are a good way to show the public that the utility is open and willing to provide information. In addition, they can provide project information to a large group and can "test the water" for public opinion. They can be a mechanism of relieving community anger if tension is high.

Disadvantages

Relatively little substantive information is exchanged during large public meetings. Emotion and group mores or "mob mentality" is the rewarded form of behavior. Large group meetings are often used to stage media events by interests opposing the project or the problem-solving process. Any topic can come up during a large group meeting. This is particularly difficult if a utility has problems with previous mistakes or maintaining credibility.

Large Group and Small Group Meetings, $$$, ◕, ≈

Description

In this meeting forum, participants are divided into small discussion groups for part of the meeting. The groups can each be assigned a different task or they can be assigned the same task. The groups can be created randomly, by interest or by expertise.

Typical Uses

Large and small group meetings are used to present proposals or information or to receive comments. They are generally used as working sessions on a particular topic.

Advantages

Information is conveyed to large groups of individuals, but substantive discussion and recommendations can occur in small groups. If developed correctly, this format can break down the communication barriers frequently presented by large group meetings. In this setting, participants can communicate with each other on concerns or project trade-offs. This can be an opportunity for a utility to illustrate the difficulty or complexity of the project decision making.

Disadvantages

A high level of logistical organization is required, and the rationale and instructions for the meeting must be communicated clearly to the participants. Senior level staffing is required because each small group is often facilitated by a knowledgeable utility representative.

Open Houses, $$$, ◕, ≈

Description

Open houses are opportunities to present a broad array of project-related information to the general public. An open house usually lasts about six hours with members of the interested public participating at their convenience. Informational stations are prepared on a variety of topics and distributed throughout a large room or several rooms. Participants can circulate freely among the stations and read the displays that interest them. At each station they can discuss the topic with knowledgeable project representatives. Participants' concerns and questions can be recorded at each station.

Typical Uses

Open houses are rapidly gaining favor as replacements for large group public meetings. Some agencies use the open house format to replace the standard format for public hearings. (See description on public hearings.)

Advantages

Substantive information can be exchanged with members of the interested public. If handled carefully, the public can feel more in control by determining when they will attend and what information they will discuss. The opportunities for public posturing are minimized by clustering discussion into small groups around information stations. Utility staff feel more comfortable in this setting than standing in front of a

large group. This increased comfort can allow clearer and more personal communication to occur.

Disadvantages
Preparing information stations can be expensive and time-consuming. The public can be startled by the format if they are anticipating the traditional public meeting. The open house can be criticized as manipulative by an antagonistic public. A public meeting is easier to manipulate by antagonists and therefore favored by such groups.

Public Hearings,

Description
Public hearings are formal settings where public comment is received by the utility. A highly structured format is used, often with a designated hearing officer present to officiate. Typical public hearings are not designed to present project information, but are strictly opportunities to create official records of public comment.

Typical Uses
Hearings are often required by statutory environmental reviews at the state or federal level. They are often used to receive public comments on draft or final project alternatives.

Advantages
Hearings must be held if they are required by law. In the traditional format, their primary advantage is conformance with procedural requirements.

Disadvantages
There is no opportunity for education or exchange of information. If the hearings are not preceded by a good education or involvement program, the comments may not be focused on the problem addressed by the project. Because responses to comments are generally required from a project proponent (utility), this can be a time-consuming and generally unproductive effort.

SURVEYS

Surveys of varying forms are being used more as utilities seek answers to questions regarding the consumer's willingness to pay for increases in water quality or service. Surveys can be informal, meaning that methods can be used to collect information that may be useful but are not statistically defensible. Most survey results must withstand scrutiny and therefore necessitate carefully applied techniques. Statistical defensibility is best achieved by experienced practitioners of surveys. This information on surveys is intended as an overview, not as a substitute for qualified external assistance.

Mail Surveys,

Discription

A questionnaire is mailed to a large audience requesting responses on a variety of issues. Small surveys can be inserted as bill stuffers, while large surveys can be conducted in separate mailings.

Typical Uses

Mail surveys are often used to collect information on demographics, income and personal preferences.

Advantages

They are the least expensive form of surveys, requiring minimal organization and personnel. Relatively complex questions can be asked of the respondents because the questions are available for them to read.

Disadvantages

Response rates to mail surveys is traditionally low, approximately 30 percent or less. Mailing out reminders or follow-up notices increases the administrative cost. Mail surveys do not allow a utility to clarify questions, explain procedures or probe for more complete questions. If responses are not received, it is difficult to determine if the respondent received the survey or if he or she chose not to respond.

Telephone Surveys,

Description

Telephone surveys use a centralized telephone bank with a team of interviewers asking several questions. The interviewers are supplied with a list of telephone numbers selected at random from a utility's service area. The surveys are usually conducted between 5 to 7 p.m.

Typical Uses

They are often used in place of, or to supplement, mail surveys and to boost the rate of response.

Advantages

Telephone surveys offer the fastest turnaround time of all of the survey methods. Interviewers can clarify questions, probe for more information and reinforce answers. Because the conversation is strictly verbal, there is less opportunity for the interviewer or the respondent to allow personal biases to interfere with the data collection process.

Disadvantages

Certain populations lack telephones, including students, minorities, rural residents and less affluent individuals. Other populations commonly have unlisted numbers such as females, urban dwellers and working-class members of ethnic groups. Managing and obtaining telephone directories can be logistically difficult. The length of the interview and the complexity

of the questions are limited because the attention span of respondents over the telephone is limited.

Personal Surveys,

Description

Personal surveys are face-to-face interviews where the questions are asked and the responses are recorded during a conversation. If presented correctly, the questions will enable people to respond in their own words.

Typical Uses

Personal surveys focus on indentifying and understanding participant's feelings or values on particular topics. For example, although mail or telephone surveys may determine the percentage of a population willing to pay more for increased drinking water quality, personal surveys will enable a utility to understand why a person would pay more, what "more" means, when he or she would not pay more, and how he or she feels about the utility's ability to spend the money wisely.

Advantages

Personal surveys are the best tool for obtaining in-depth and complex information and for controlling the interview. Interviewers can control visual and verbal cues, enabling almost any type of question to be asked. More thoughtful answers are usually obtained because respondents have time to concentrate more on their answers.

Disadvantages

Interviewers must be recruited, trained and supervised, thereby greatly increasing the cost of personal surveys over the other approaches. If the population sample is geographically dispersed, the cost of administering the survey can increase even more.

Focus Groups,

Description

The term "focus group" is used frequently and loosely with little acknowledgment of the formal structure required to administer a focus group correctly. A focus group is not merely a small group discussion, an informal survey or a series of working meetings on a particular topic. Similar to surveys, focus groups require skilled practitioners to administer the process correctly to ensure defensible results.

Focus groups use randomly selected participants or members of a particular interest group. Groups of five to 10 people are formed, and they are often paid for their time. A facilitator skilled in eliciting comments and reactions directs the conversation of the group by asking several questions on a particular topic. The group conversation typically lasts about two or three hours and is held in a room with a one-way mirror. The administrators of the focus group observe the conversation from behind the one-way mirror and record the participants' answers to the questions.

Focus groups are convened until the administrator can anticipate the comments that are made. This often requires convening three to four groups.

Typical Uses

Focus groups are typically used by market research firms to determine preferences of particular demographic groups to certain products. Political campaigns have begun to rely heavily on focus groups to understand public opinion on particular issues and to formulate winning political positions.

Water utilities may use focus groups to anticipate community reaction to a proposed project. This information can help develop the proposal further and can help anticipate the reaction from the larger public body.

Advantages

Focus groups do not provide a statistically valid analysis of public opinion, but they can gauge the level of public reaction. This advantage is typically realized if the focus groups are used early in the decision process. Focus groups are generally easier and less costly to implement than the survey techniques described earlier.

Disadvantages

Focus groups require a skilled, experienced facilitator. The composition of the groups will affect the answers that are received; therefore, the participants must be selected to reflect the demographic diversity of the study area. Focus groups are not substitutes for discussions with key stakeholder groups.

APPENDIX F
CD CONTAINING PDF VERSIONS OF THE INITIATIVE PI&E TM AND THE SWFWMD'S RECLAIMED WATER GUIDE

The CD contains an electronic version of this document as well as a copy of the SWFWMD's Reclaimed Water Guide.

APPENDIX G
THE PUBLIC UTILITIES BOARD OF SINGAPORE NEWATER PROJECT PUBLIC INFORMATION FLYER

The NEWater Cascade Area and Eco Pond serve to provide the visual and sensory treats for visitors to complete their NEWater experience.

WD042003007PDX 178603.CP.5G 4/17/2003 kk

The team who made this groundbreaking project

a reality injected a full complement of expertise that made the Bedok NEWater Visitor Centre a triumph of engineering, art and messaging:

CH2M HILL - Internationally renowned for their expertise in water and resource management, has 10,000 employees serving clients from 120 locations on six continents. CH2M HILL leads the engineering industry by stressing the importance of environmental education related to water issues.

New Media Magic - Expertise in interactive displays, audio and visual media so advanced and effective that even designers and students learn from it.

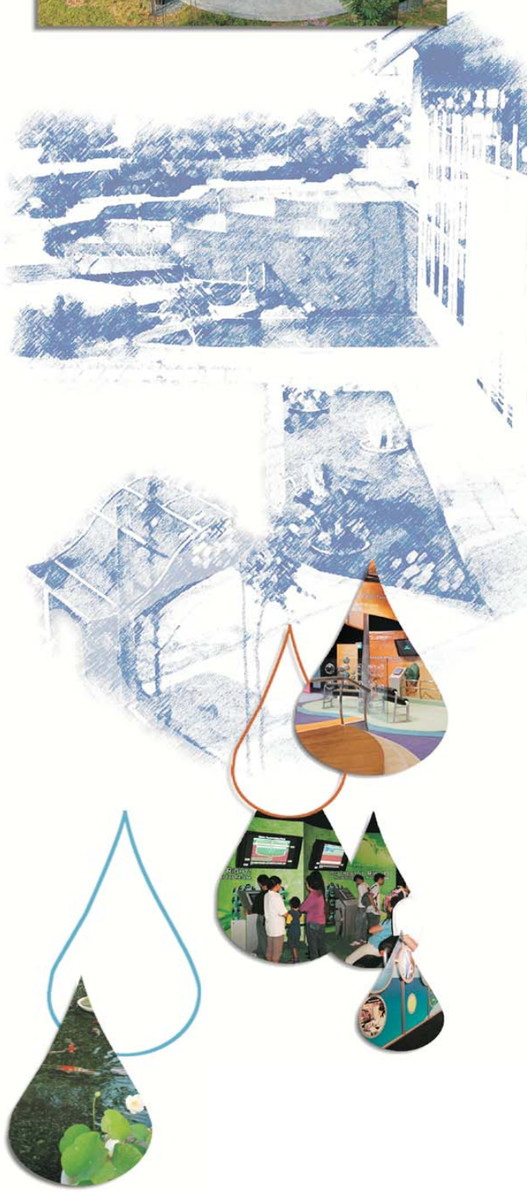
Pico Art International - The specialists whose design-build-and-commission projects in museums and exhibitions are backed with a network of offices and factories stretching from England to India, from USA to Australia.

This team created an international milestone of technology and public relations, winning the hearts and minds of a population to a new way of water management, and overcoming ingrained fears and prejudices to water re-use.

Today, Singapore citizens accept and welcome NEWater in their reservoirs. **Through the expertise of CH2M Hill, New Media Magic and Pico Art, this is a success story that can continue to solve other water supply challenges around the world. Make it part of your success story too.**

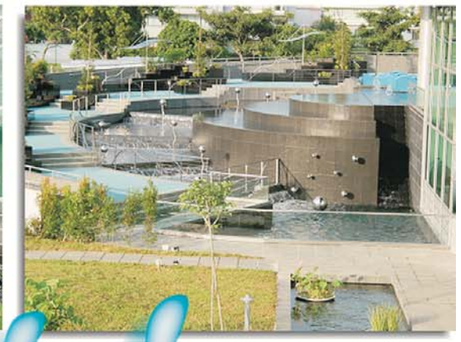
For further information contact:
Linda Macpherson **CH2M HILL**
ph 503.235.5000
lmacpher@ch2m.com

CH2M HILL
825 NE Multnomah, Suite 1300
Portland OR 97232-2146 USA



NEWater Visitor Centre

Bedok NEWater Factory, Singapore



inning Minds to Water Re-Use

When the Bedok NEWater Factory was built in Singapore it was the first water re-use facility in the world to incorporate a world-class visitor centre.

The mission was important: build public awareness and acceptance of leading-edge technologies that treat reclaimed, used water to a standard up to - *and beyond* - World Health Organization potable standards.

CH2MHILL in association with PICO and new media magic

CH2MHILL in association with PICO and new media magic

Highlights of the NEWater Visitor Centre...

Opening mindsets and breaking barriers

The "Journey Through the Water Cycle" Exhibit Hall introduces how Singapore manages its water supply. Visitors can play games on six multi-media interactive computer stations within the main hall.

SECTOR 3
Journey Through the Water Cycle

In the Auditorium, a presentation on "Waters of Singapore" is screened.

SECTOR 2
Auditorium

The Entrance Foyer is the starting point for the journey through the Centre.

SECTOR 1
Entrance Foyer

SECTOR 4
Walk on NEWater

SECTOR 5
NEWater Process Explorer

The heart of the NEWater Visitor Centre is in the NEWater Process area where visitors can view the actual factory that produces NEWater for industries, commercial buildings, and Indirect Potable Use.

At the end of the journey, visitors can view the NEWater Factory control room and test their knowledge at the NEWater Challenge multimedia interactive exhibit.

SECTOR 6
NEWater Challenge

Plan view of the NEWater Visitor Centre

The "Water Reuse: At Home and Abroad" presentation provides explanations on the concept of indirect potable use (IPU) of reclaimed water.

SECTOR 4
Water Reuse: At Home and Abroad

SQUARE FEET	SQUARE METERS	NEWater Visitor Centre Measurements
1,830	170	Entrance Foyer
3,660	340	Auditorium
7,320	680	"Journey Through the Water Cycle" Exhibit Hall
3,660	340	IPU, Walk on NEWater, and Wall of Water
3,337	310	Elevated Walkway
1,830	170	NEWater Challenge
6,300	585	Open Terrace
8,180	760	Cascade Area (pool and walkway)
13,300	1,235	Main Water Feature
3,660	340	Function Room (inclusive of kitchen and store)
53,077	**4,930**	**TOTAL**

The NEWater Visitor Centre is incorporated into a 23 million gallons (88,000 cubic meters) per day plant. It explains the technologies that go into the manufacture of NEWater from treated, used water and builds awareness, confidence and acceptance of the product and the process that manufactures it. In a fun learning environment, visitors absorb facts through printed displays, touch-screen interactives and video presentations. Through the different displays, visitors learn about safety, reliability and sustainability of the NEWater process and product. The architectural and interior design of the NEWater facility combines elements of pure engineering with spacious, comfortable and feel-good spaces to encourage absorption of the messages. Messages on water resource management are communicated in a fun, stimulating and interactive manner. The Centre brings together state-of-the-art communication technology with the most recent research on public perception challenges. Since opening on February 21, 2003, the center has received an average of 2,000 visitors per week (March 2003 figures), and is booked several months in advance through its website: www.pub.gov.sg\newater

APPENDIX H
SAMPLE PUBLIC INVOLVEMENT WORK PLAN QUESTIONNAIRE

Public Involvement Planning Worksheet

Step One

Frame the Problem

Name of Project:_____

Project Definition:

_____

_____

_____

_____

_____

Project Facts:

- _____
- _____
- _____
- _____
- _____

Project Assumptions:

- _____
- _____
- _____
- _____
  _____
  _____
- _____

Project Need Statement:

_____

_____

_____

_____

Public Involvement Planning Worksheet

Step Two

Identify Constraints

Which factors limit your options? (These may or may not include budget, schedule, technology, consent orders, regulations.)

- _____
- _____
- _____
- _____
- _____

Where can you be flexible?

- _____
- _____
- _____
- _____
- _____

Where or with whom does your organization lack credibility? Why?

- _____
- _____
- _____
- _____
- _____

How can you earn more credibility?

_____

_____

_____

_____

_____

How can this project damage your organization's credibility?

How are you going to protect your credibility during the project?

Public Involvement Planning Worksheet

Step Three

Identify Decisions Steps and Project Milestones

Decision Steps	Information to Move to Next Step	Type of Approval Needed	Who Needs to Approve	Schedule	Opportunity to include Public Values
1					
2					
3					
4					
5					

Public Involvement Planning Worksheet

Step Four

Stakeholder Identification

Who will be concerned about the problem/project need?

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

Whose support do you need to implement a project?

- _____
- _____
- _____
- _____

Who should be kept informed about the project?

- _____
- _____
- _____
- _____

Which issues must be resolved to get the support necessary to implement a solution?

- _____
- _____
- _____
- _____

Public Involvement Planning Worksheet

Step Five

Determine Vulnerability

Does the public have automatic access to the decision process? (i.e. political approval, permit approval, zoning applications, or public meeting requirements?)

_____

_____

_____

Have other controversial activities been debated in the project area? (such as electric power, hazardous waste, industrial discharge permits, transportation projects, prisons)

-
-
-
-

Who are the ultimate decision-makers?

-
-
-

How experienced are they with public controversy?

_____

_____

_____

Do they have a reason to defer the decision until another time?

_____

_____

_____

Public Involvement Planning Worksheet

Step Six

Appropriate Level of PI

Stakeholder Profile Sheet (fill out one sheet per stakeholder)

Name/Address /Organization/Telephone/Fax/E-mail

_____

Has this stakeholder formulated a position on the project yet?

_____

Issues of Concern

_____

_____

_____

_____

_____

Expectations for involvement (assign the symbol that best fits the stakeholder's expectations)

- Satisfied with only receiving information ○
- Looking for opportunity to provide feedback ◐
- Expecting to influence some aspect of the decision ●

Public Involvement Planning Worksheet

Step Seven

Select Process and Techniques

What techniques will you use to meet expectations for influencing decisions?

a. Technique _____
   Stakeholders to include
   - ■
   - ■
   - ■

b. Technique _____
   Stakeholders to include
   - ■
   - ■
   - ■

c. (List additional techniques if necessary)

Which decisions will they influence?

a._____

b._____

c. _____

What information will they need?

a._____

b._____

c. _____

What information will you need from them? When?

a._____

b._____

c. _____

Public Involvement Planning Worksheet

Step Seven

Select Process and Techniques

What techniques will you use for exchanging information?

a. Technique _____
   Stakeholders to include
   - ■
   - ■
   - ■

b. Technique _____
   Stakeholders to include
   - ■
   - ■
   - ■

c. (List additional techniques if necessary)

What information do the stakeholders need to participate?

a._____

b._____

What information do you expect to receive?

a._____

b._____

When do you need the information?

a._____

b._____

Public Involvement Planning Worksheet

Step Seven

Select Process and Techniques

What techniques will you use for providing information to the public? ◯

a. Technique _____
   Stakeholders to include
   - ■
   - ■
   - ■

b. Technique _____
   Stakeholders to include
   - ■
   - ■
   - ■

c. (List additional techniques if necessary)

When will you distribute the information?

a. _____

b. _____

c. _____

d. _____

How will you distribute the information?

a. _____

b. _____

c. _____

d. _____

Public Involvement Planning Worksheet

Step Eight

Develop Work Plan

What is your project schedule (Attach timeline if necessary):

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Decision Step						
PI Process						

Describe Project Team:
Manager:
Technical Specialists:
PI Responsibilities:
Spokesperson:

Summarize how and where PI will be used to affect decisions:

Public Involvement Planning Worksheet

Step Nine

Implement and Monitor the Plan

What may interfere with plan implementation?

What will interfere with plan effectiveness? How will you know?

At what points will you be able to monitor the effectiveness of the plan?

-
-
-
-
-
-

How will you know you have enough support to move from one step in the decision to another?

Public Involvement Planning Worksheet

Step Ten

Manage Change

Have any specific events impacted to your organization (anywhere) that may affect your credibility?

Have you received any new information that may affect need, facts, or assumptions?

Which constraints are being challenged, by whom?

Can the challenger be successful in modifying the constraint?

Do you have any new elected officials?

When was the last time you talked with existing office holders?

Have you met with the media on your own initiative?_____

_____

_____

_____

APPENDIX I
WATEREUSE FOUNDATION SUMMARY OF RESEARCH NEEDS ASSESSMENT WORKSHOP: HUMAN REACTIONS TO WATER REUSE

Research Needs Assessment Workshop: Human Reactions to Water Reuse

January 5-6, 2004
West Basin's Water Recycling Facility
El Segundo, CA

Summary prepared by Brent Haddad, April 15, 2004*

Participants:

Jim Crook (Water Reuse Consultant)
Brent Haddad (University of California, Santa Cruz)
Craig Lichty (Kennedy/Jenks)
Edward Little (West Basin Water District)
Rick Martin (U.S. Bureau of Reclamation)
Wade Miller (WateReuse Foundation)
Darryl Miller (West Basin Water District)
Jeff Mosher (WateReuse Foundation)
Rich Nagel (West and Central Basin Municipal Water Districts)
Dave Requa (Dublin San Ramon Services District)
Paul Rozin (University of Pennsylvania)
Paul Slovic (University of Oregon/Decision Research)
Ron Wildermuth (Orange County Water District)
Ron Young (Elsinore Valley Municipal Water District)

Sponsor: WateReuse Foundation

Goals of the Workshop:

- to develop an understanding of how social psychology research could address the challenge of better integrating water reclamation and reuse systems into urban water supply.

- to identify research questions that could clarify and expand on this concept.

- to list potential academic collaborators on research programs in this area.

Workshop Process:

On Day One, after introductions and welcoming remarks, Brent Haddad provided an overview of the challenge of urban water supply and the potential role for water reuse. A series of talks followed on the processes, prospects, and challenges facing the industry.

* The author expresses thanks to Jim Crook, Wade Miller, Jeff Mosher, Carol Nemeroff (Arizona State University), Paul Rozin, and Paul Slovic for their comments on this report, and to the WateReuse Foundation for sponsoring this project.

Speakers were Jim Crook, Craig Lichty, Wade Miller, and Rich Nagel. Social psychologists Paul Rozin and Paul Slovic then gave presentations on human reactions to contagion and naturalness, as well as how humans perceive and calculate risk. There was substantial discussion between presentations.

On Day Two, a group discussion was facilitated by Brent Haddad and Jeff Mosher. The goal was to frame the issues, identify research questions, and identify potential collaborators.

Framing the Issue:

Public policy processes surrounding proposals to introduce urban indirect potable reuse (IPR) systems have come to involve multiple, polarized stakeholders. The processes are characterized by:

- Communication of extensive amounts of technical information. The basic message is that water reuse technology comprises a number of barriers for the removal and/or inactivation of microbial and chemical contaminants in water. Following the water's treatment through a water reuse facility, it is suitable for numerous uses, including reintroduction into ground waters and surface waters intended for human use. This suitability can be demonstrated through water quality analysis.

- A public reaction described as the "yuck factor." The yuck factor can be traced to two aspects: (1) the public's psychological repugnance to wastewater, and (2) the inability to definitively demonstrate that all potentially hazardous anthropogenic compounds that may be present in the wastewater have been eliminated or reduced to insignificant levels. Other sources of water, especially bottled water sold in stores, are far more acceptable.

- Resistance to IPR projects often starts with small groups at the grass-roots level and intensifies as local politicians become involved. Resistance can be launched at any time during the project development and implementation process, regardless of how much public money has already been spent on the project.

It appears that IPR proponents and opponents are talking past each other with resulting delay and/or cancellation of proposed IPR projects. Insights from social psychology concerning human cognition may provide alternative ways forward (Haddad and Kelso, 2003).

Comments of Paul Rozin: Of particular interest are practices of human cognition: patterns of perception, learning, and reasoning that lead to attitudes about water reuse and IPR. Two "laws," or common patterns of cognition, apply here (Rozin et al. 1993; Rozin and Nemeroff, 1990).

The **"Law of Contagion"** suggests that when a pure object comes into physical contact with a contaminated object, the contamination is passed to the pure object. Thus, people will respond with revulsion to both things following their contact. This principle has the following properties:

- Physical contact is required for contagion to operate. Examples include a cockroach touching a salad or Adolf Hitler wearing a sweater: people would want nothing to do with the salad or sweater no matter what scientific evidence could be produced to demonstrate that they are healthy/clean;
- The contagious effect is only slightly influenced by dose (degree of physical contact);

The perceived presence of contagion is often, though not always, permanent. For some people, nothing works to purify contaminated objects, but for the majority, there are two primary ways to reclaim them: for those using a physical-contact model of contagion, extreme measures of purification are often effective (e.g., to get rid of HIV-related contagion in silverware, melting down the silverware into molten metal and then refashioning it into new silverware would actually work to purify it.) Second, for those using a "spiritual" (or non-physical) model, "opposite-contact" could redeem the objects. Thus if a sweater was contaminated by contact with Hitler, then having Mother Teresa wear it could remove the contagion. In the case of water reuse, an endorsement from a "pure" pro-environment organization such as Greenpeace, or a group such as La Leche League, which endorses and provides advice to new mothers on breastfeeding, might serve as a purifying action.

Thus, psychological contamination is easy to accomplish, whereas psychological purification is difficult to achieve. This implies that extended discussions on the safety of IPR are not able to move peoples' feelings away from the sense that IPR water is contaminated.

A way to understand the law of contagion is to consider a thing's "**essence**." People consider objects to have an essence that is not subject to the laws of physics. In addition to a thing's physical nature, the history of it is part of what it is. Consequently, people associate purity with what has happened to a thing in the past, not just its current chemical profile. As a result, perceptions of recycled water include both what is in it as well as where it has been and what it once was. However, the historical aspects that are included in IPR's narrative do not have to dwell on its prior urban use since all water has a very long history. The public perception of the essence of IPR water can change if the public understanding of IPR water's history changes.

The "**Law of Similarity**" suggests that appearance equals reality. Something is perceived to be what it looks like. A container known to contain drinkable liquid marked "poison" will not be consumed.

These two common patterns of cognition, if unchecked, would be highly debilitating to peoples' ability to care for themselves. They suggest that people would find nearly

everything to be disgusting! People deal with these predispositions through a process known as "**framing**." Framing is a process of categorizing and ignoring parts of reality. People often choose not to think about where something has been (e.g., pillowcases in hotels, forks and plates in restaurants) so that they can take advantage of the benefits their use provides.

There appears to be a predisposition toward "**naturalness.**" Natural objects are unprocessed and untouched by humans, have no additives, and come from nature. People consider natural things to be healthier, tastier, and better for the environment, even though there often is no evidence to support these claims. People prefer natural things to artificial or processed things, even when the two things are chemically identical. Although many "natural" events kill thousands of people every years, including hurricanes, floods, and earthquakes, the general population prefers natural processes to human processes (e.g., natural processes for the removal of chemicals are preferred over human-engineered treatment processes), and consider process more important than content when evaluating the naturalness of something.

When humans consider change in their lives, they **overemphasize the period of adjustment** – which could be pleasant or unpleasant – more than the subsequent period when a person's sense of well-being likely returns to its previous state or even improves. That is, people adapt much more than they think they will.

Comments of Paul Slovic: With respect to human judgment and decision making, a key concept is "**affect**" – a feeling that something is good or bad (Slovic et al. 2003; Slovic et al. 2002; Slovic, 1987). Affect is a key element in the practice of rational thinking. There are two parallel, interacting systems of human judgment. The first is reason-based and characterized by analysis, logic, and calculation. The second (the affective system) is intuitive, automatic, and experiential, and connected to feeling. When these two systems react to risk, one system utilizes calculation while the other utilizes feeling. It is impossible to avoid affective reasoning.

Affective decision making begins with an assessment of the benefits: do I like what is being proposed? If yes, risk is perceived to be low. If no, risk is perceived to be high. Part of the evaluation process involves creating images for one's self of the thing happening.

An example of the how calculative and affective systems differ can be provided graphically. Figure 1.a shows a calculative approach to risk-benefit calculation. Calculations of risks and benefits occur independently of each other. The cross-hatched area indicates choices a risk-neutral person might take since the benefits outweigh the risks. Figure 1.b shows an affective approach in which an individual associates the level of risk with the level of benefit. The enclosed area captures all risk-benefit calculations for a particular individual. The greater the perceived benefit, the *lower* the perceived risk. The cross-hatched area indicates risks a risk-neutral person might take. So while experts consider risk and benefits to be positively related, the public often perceives them to be reciprocally related.

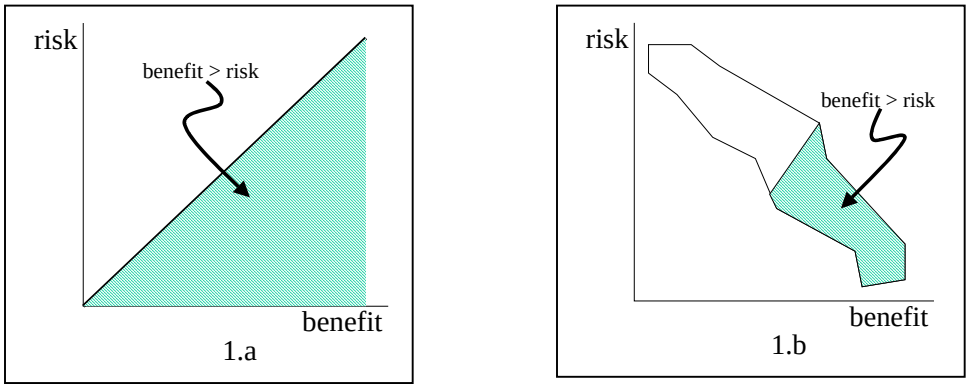


Figure 1. Risk-benefit graphs

One way to reduce adverse reactions to high risk events is to build familiarity with the risk over time and to desensitize the person subject to the risk, perhaps by "flooding," a process of complete exposure to the thing which demonstrates that the individual is capable of handling it. Another approach is "**desensitizing,**" whereby an individual is gradually exposed to a specific condition (e.g., exposure to spiders in order to overcome fear of spiders.)

Another aspect of affective risk assessment is that people take positions on their options based on their feelings toward potential outcomes in terms of a perceived reference point, not just on their probability of harm. Individuals take more pleasure in the restoration of something bad, such as improving low water quality, than in an equivalent improvement from the current position. Thus, restoration of lost quality should be perceived more favorably than an equivalent change framed as an improvement of current quality.

Risk analysis and risk management are unavoidably political. Individuals take advantage of the unknowns to advance a position arrived at through other forms of reasoning (e.g., affective).

Some products become stigmatized. A **stigma** is a distinguishing mark that indicates something is immoral, non-aesthetic, disruptive, or dangerous (Kunreuther and Slovic, 1999; Gregory et al. 1995). Examples include nuclear power plant cooling towers and genetically-engineered foods. "Toilet-to-tap" is a stigma that requires de-conditioning or other means of removal.

In evaluating scientific data, the public asks who is profiting from a proposal or point of view. If there is a clear profit opportunity, the public is less likely to find the data credible.

The follow synthesis emerged from the presentations:

1. The water reuse industry should stress the "natural" aspects of their treatment processes, such as natural filtration steps.
2. Find ways to create a "break" in the history of the water. Even the term "indirect potable reuse" underlines the history of the water supply, which is part of its essence in the eyes of the public.
3. Most water contains molecules that, at some time in their history, have been associated with wastewater, but people still consume it. This is a matter of framing.
4. Public information campaigns that focus on health safety serve as reminders of the origins of IPR water and ultimately may not be reassuring to the public.
5. Public concerns about the health effects of IPR water may actually be expressions of concerns linked to the "law of contagion" which, due to its irrationality, people are unwilling to express directly. Therefore, a generic medical endorsement of IPR may not be convincing to the public, while an endorsement from a well-known local pediatrician may be.
6. Alternative, positive stories to "toilet-to-tap" must be developed.
7. It is important to develop a "mental model" of individuals who have opposed IPR facilities in the past. This can be done in part by analyzing their public comments.
8. Public water agencies should protect their status as non-profit-oriented entities, since this increases the credibility of their statements about water quality, treatment reliability, and safety of the water.
9. The more benefits a proposed project has, the lower the public's assessed risk will be. Therefore, proposed IPR projects must offer very substantial benefits. "Disposal benefits" are not well received by the public.
10. It may be possible to overcome a stigmatized product by thoroughly purifying the product, or by changing its essence through substantial education, including case study examples of use (as a substitute for actual use), or by testimonials of current users who, by their own "pure" nature, transfer a perception of purity to the product.
11. It may be possible to segment audiences/parties to IPR policy debates and identify the extent to which they demonstrate affective reasoning and behave according to the laws of contagion and similarity, or other scientifically-irrational forms of logic.
12. Risk assessment and management can provide insights to part of the policy process but not all. It is only peripherally related to such issues as environmental justice and local politics, which also come up in IPR debates.

Proposed Research Program

Based on the above discussion and synthesis, the following research projects are recommended:

1. *Mental models of water quality.* This study would perform baseline analyses of how people think about urban water supply. Survey questions about the role of time, dilution, passage through rivers, and treatment plants in purification would be developed. For example, people would be asked to trace the history of the tap water (or bottled water) that they drink. The goal is to identify calculative vs. intuitional attitudes toward water quality, and the extent to which individuals switch between these two approaches. It would further shed light on how people resolve seemingly inconsistent attitudes that condone children swimming in an untreated lake but not playing on a lawn irrigated with reclaimed water. The importance of public trust in the water agency would also be examined, for example by having people evaluate equivalent water reuse proposals issued by a variety of entities or by no entity. Likewise, peoples' responses to a variety of potential endorsers of reclaimed water (e.g., government agencies, a known local pediatrician, etc.) would also be evaluated. This survey would be performed in geographically diverse sections of the U.S. in an effort to capture regional differences in attitudes.

2. *Effects of segmentation and learning on stakeholder perception of IPR.* This study would begin with a randomly drawn sample of individuals. They would be tested with respect to their attitudes toward IPR, including attitudes toward "naturalness," beliefs about the adaptability of human feelings, and disgust sensitivity. Based on this initial screening, the sample would be divided into sub-samples according to level of affective vs. calculative reasoning, adverse reaction to contagion, and other factors. The subsets would then be provided educational material about IPR and attitudes are tested again. One aspect of this study would explore the extent to which perceptions of benefits influence perception of risk. This would be done by establishing a baseline understanding of a subject's perceived benefits and risks of a project, educating them about the benefits, and then re-testing their perception of risk. This project would provide insight into what kinds of IPR educational material are effective with various individuals and stakeholders.

3. *Breaking the "toilet-to-tap" chain.* This experiment would look for ways to break, modify, or minimize the importance of the perceived use-chain of IPR water. The study would involve a survey that allows individuals to evaluate physical design options for IPR projects in terms of their ability to frame out links with prior urban use. Other approaches, such as explanations of existing process designs, would also be tested. The study would also seek to clarify causes for the stigmatization of IPR water by sorting out the roles played by health concerns and the "yuck factor," and how to deal with them.

4. *Attitudes toward IPR as environmental stewardship*. This study would ask people to compare IPR to other environmental goods and services. It would test the extent to which the public associates IPR with terms such as sustainability and restoration. It would seek to identify the extent to which people see IPR as restoring damaged water or improving adequate water. People would be provided with alternative descriptions of the IPR process (e.g., technical, ecological) and asked for which description results in a more positive association with the produced water. This study would shed light on how IPR and IPR treatment processes could be framed in terms of communicating with the public.

5. *Understanding the core opposition to IPR.* This study would develop a mental model of the most active public opponents to IPR. Members of the "Safe Water Committee" in the Dublin-San Ramon, California, area, "Revolting Grandmothers" in Coral Gables, Florida (and San Diego, California), and the "Safe Water Coalition" in Redwood City, California, would be identified and interviewed on a voluntary basis. The purpose is to broadly understand the attitudes and perceptions of active opponents to IPR, as well as how they connect with their less-engaged but sympathetic supporters and the public at large, in order to develop alternative project designs or communication approaches that would satisfy their concerns.

6. *Introducing IPR and other recycled uses.* This study would involve laboratory experiments intended to identify the process by which initially-disgusted individuals can come to accept IPR and other recycled uses of water. Two approaches would be taken. (1) Subjects who are repulsed by IPR or other uses of recycled water would be given substantial incentives to drink or otherwise utilize the water. The rate and course of acceptance over time would be measured and analyzed. (2) Different subjects would be provided with comparative information between IPR water and their current drinking water. The information would cast the subject's existing drinking water in a more realistic light compared to IPR water, possibly reducing the customer's comfort level with their existing water supply or increasing the customer's comfort level with IPR. The level of acceptance of IPR water or other recycled water uses would then be gauged.

Collaborators

This research area falls in the realm of social psychology with emphases on risk perception and human reaction to contagion. In terms of risk perception, every U.S. research university has experts in this area, found in psychology, economics, and sociology departments, although the latter two disciplines have different approaches and research interests. Expertise in human response to contagion is less widespread, but can be found in psychology departments and schools of public health.

References

Gregory, R., Flynn, J., and Slovic, P. (1995). Technological Stigma. *American Scientist* 83: 220-223.

Haddad, B., and Kelso, D. (2003) "Understanding the Public Reaction to Indirect Potable Reuse Projects," Delivered at the Water Reuse Workshop sponsored by the Centers for Disease Control and Prevention, May 14, Atlanta.

Kunreuther, H., and Slovic, P. (1999). Coping with Stigma: Challenges & Opportunities. *Risk: Health Safety & Environment* 269 (Summer).

Rozin, P., Haidt, J., and McCauley, C.R. (1993). Disgust. In M. Lewis and J. Haviland (Eds.), Handbook of Emotions, pp. 575-594. New York: Guilford.

Rozin, P., and Nemeroff, C.J. (1990). The laws of sympathetic magic: A psychological analysis of similarity and contagion. In J. Stigler, G. Herdt and R.A. Shweder (Eds.), Cultural Psychology: Essays on comparative human development (pp. 205-232). Cambridge, England: Cambridge.

Slovic, P. (1987). Perception of Risk. Science 236 (April 17): 280-85.

Slovic, P., Finucane, M., Peters, E., and MacGregor, D. (2002). The Affect Heuristic. In T. Gilovich, D. Griffin, and D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment* (pp. 397-420). New York: Cambridge University Press.

Slovic, P., Finucane, M., Peters, E., and MacGregor, D. (2003). Risk as Analysis and Risk as Feeling: Some Thoughts About Affect, Reason, Risk, and Rationality. *Risk Analysis* (in press).

APPENDIX J
BIBLIOGRAPHY

2002 Recycled Water Task Force. 2003. White Paper on Public Information, Education, and Outreach Workgroup on Better Public Involvement I the Recycled Water Decision Process. Retrieved August 29, 2003 from http://www.owue.water.ca.gov/recycle/docs/WorkgroupWhitePapers.htm.

2002 Recycled Water Task Force. June 2003. Water Recycling 2030 Recommendations of California's Recycled Water Task Force. Retrieved July 12, 2003 from http://www.owue.water.ca.gov/recycle/taskforce/taskforce.cfm

American Water Works Association California/Nevada Section. 1992. Guidelines for Distribution of Non-Potable Water. California: American Water Works Association.

American Water Works Association. August 30, 1996. AWWA Government Affairs – Water Reuse. Retrieved November 10, 2003 from http://www.awwa.org/Advocacy/govtaff/REUSEPAP.cfm.

Asano, Takashi. 2001. Water From (Waste) Water – the Dependable Water Resource. Davis, CA: University of California at Davis.

Associated Press. 2003. Foul event: Wrong water sent to homes. Retrieved November 4, 2003 from http://www.usatoday.com/news/offbeat/2003-08-01-water_x.htm.

Attwater, William, R. 1987. Federal Antidegradation Policy. Memorandum dated October 7, 1987. Sacramento, California: California State Water Resources Control Board.

Bailey, Harold – Padre Dam Municipal Water District. November 13, 2003. Personal communication. Los Angeles, California.

Blythe, Dave – Moulton Niguel Water District. November 18, 2003. Personal communication. Los Angeles, California.

California Environmental Protection Agency. 2003. Recommendations of the California Environmental Protection Agency Advisory Committee on Environmental Justice to the CAL/EPA Interagency Working Group on Environmental Justice.

California Urban Water Agencies. 1998. Urban Water Recycling Feasibility Assessment Guidebook. California: Bookman-Edmonston Engineering Inc.

CH2M HILL. AwwaRF Public Involvement Strategies: A Manager's Handbook. 1995.

City of Corona. 2001. Recycled Water Master Plan and Market Study. Corona, California: Boyle Engineering Corporation.

City of Los Angeles Department of Water and Power. 2003. Initial Study/Proposed Negative Declaration – West Valley Water Recycling Project. Los Angeles, California: Camp Dresser & McKee Inc.

City of Redwood City. 2002. Water Recycling Feasibility Study for the Redwood Shores Area. City of Redwood City, California: Kennedy/Jenks Consultants.

City of Redwood City. 2003. Redwood City Recycled Water Project. Retrieved November 10, 2003 from http://www.redwoodcity.org/water.

City of Redwood City. 2003. Redwood City Water Financing Plan, February 2003 Update. City of Redwood City, California: Bartle Wells Associates.

City of Redwood City. Water Recycling Taskforce Report. March 3, 2004.

City of San Diego. 2003. Recycled Water Program. Retrieved November 10, 2003 from http://www.ci.san-diego.ca.us/water/recycled.

City of Santa Rosa. 2003. Incremental Recycled Water Program. Retrieved November 10, 2003 from http://www.recycledwaterprogram.com.

Dublin San Ramon Services District. Recycled Water Services. Retrieved June 6, 2004 from http://www.dsrsd.com/what_we_do_services_offered/recycledwaterfaq.html.

Haddad, Brent. *Summary of Research Needs Assessment Workshop: Human Reactions to Water Reuse*. January 5-6, 2004. El Segundo, California.

Irvine Ranch Water District. December 10, 2002. IRWD and Opus West Corporation Sets Precedent with Recycled Water Use in Air Conditioning Cooling Towers. Irvine, California: Irvine Ranch Water District.

Juybari, Hossein – City of San Diego. Personal communication. August 9, 2004.

Lichty, Craig and Valerie Young. 2003. Presentation to XVIII WateReuse Symposium: Redwood City's Water Supply Challenge. San Antonio, TX: Kennedy/Jenks Consultants and CH2M HILL.

Longoria, Raymond R. Paper for the 2000 AWWA Water Reuse Conference. Rate Setting for Industrial Reuse in San Marcos, Texas.

Lopez, Cesar. San Diego County Water Authority. September 2003. Personal communication. Los Angeles, California.

Los Angeles County Department of Public Works. 2003. San Gabriel River and Montebello Forebay Water Conservation System. Retrieved September 18, 2003 from http://ladpw.org/wrd/publication/system/montebello.cfm.

Los Angeles County Recycled Water Advisory Committee. 2003. Recycled Water User's Manual – A Comprehensive Guide to the Safe Introduction and Use of Recycled Water in Los Angeles County (Revised Draft). California: Los Angeles County.

Millan, Mark – DataInstincts. October 24, 2003. Personal communication. Los Angeles,

California.

Millan, Mark. February 28, 2003. CRM (Community Relationship Management), Essential Element to Successful Recycled Water Projects. Presented to California WateReuse Association conference on February 28, 2003, San Francisco, California. Retrieved from http://www.datainstincts.com/essential_elements.htm on October 22, 2003.

Mills, Richard – California State Water Resources Control Board. September 12, 2003. Personal communication. Los Angeles, California.

Mills, Richard and Jeff Stone. 2002. Regulatory Framework of Water Reclamation in California, PowerPoint presentation to 2002 Recycled Water Task Force, September 12, 2002.

Moulton Niguel Water District. February 2003. WaterLines newsletter: Recycled Water Program Enters Final Phase. Laguna Niguel, California: Moulton Niguel Water District.

National Research Council (NRC). 1994. Ground Water Recharge Using Waters of Impaired Quality. Washington, DC: National Academy Press.

National Research Council. 1998. Issues in Potable Reuse – The Viability of Augmenting Drinking Water supplies With Reclaimed Water. Washington DC: National Academy Press.

Needham, Jerry. April 17, 2002. Tainted Water Sent to Homes. San Antonio Express News. Retrieved November 4, 2003 from http://news.mysanantonio.com/story.cfm?xla=saen&xlb=290&xlc=674435.

Orange County Water District. 2003. Groundwater Replenishment System. http://www.gwrsystem.com.

Robinson, John. Presentation for the 2003 Annual AWRA Water Resources Conference, San Diego, California. An IEUA Recycled Water Success Story.

Safe Water Reuse. 2003. http://safewaterreuse.org.

San Diego County Water Authority. 2003. Water Management – Recycled Water. Retrieved November 10, 2003 from http://www.sdcwa.org/manage/sources-recycling.phtml.

San Diego County. 2000. 2000 Urban Water Management Plan, section 4.3: Water Recycling. Retrieved August 29, 2003 from http://www.sdcwa.org/news/plan2000-4.pdf.

Sanitation Districts of Los Angeles County. 2003. Water Reuse Summary for Fiscal Year 2000-2001. Whittier, California: Los Angeles County.

Serna, Marc - West Basin Municipal Water District. November 18, 2003. Personal communication. Los Angeles, California.

Smith, Dennis – CH2M Hill. Personal communication. August 5, 2003. Los Angeles, California.

South Bayside System Authority (City of Redwood City). 2001. Plans Underway to Expand Recycled Water Project; First Season Hailed as a Success. Retrieved September 12, 2003 from http://www.redwoodcity.org/serivces/works/recycled_water2000.html

State of California. 1997. Water Recycling Funding Guidelines. California State Water Resources Control Board Office of Water Recycling. Retrieved November 19, 2003 from www.swrcb.ca.gov/recycling/recyfund/guide.pdf.

State of California. 2001. California Health Laws Related to Recycled Water - The Purple Book - Excerpts from the Health and Safety Code, Water Code, and Titles 22 and 17 of the California Code of Regulations. Sacramento, California: California Department of Health Services.

State of California. 2001. Guidelines for the Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water. Sacramento, California: Department of Health Services.

State of California. 2003. Environmental Justice in California State Government. Office of the Governor, Planning and Research.

State of California. 2002. 2002 Statewide Recycled Water Survey. Sacramento, California: State Water Resources Control Board Division of Financial Assistance.

State of California. 2003. Porter-Cologne Water Quality Control Act (California Water Code, Division 7). Sacramento, California: State Water Resources Control Board. Chapter 7, Article 2, Sections 13510 to 13512; Chapter 7, Article 7, Section 13550 to 13556.

State of California. 2003. State Water Resources Control Board: Water Recycling Programs. Retrieved November 10, 2003 from http://www.swrcb.ca.gov/recycling.

State of California. 2003. Treatment Technology Report for Recycled Water. California Department of Health Services. Carpenteria, California: Division of Drinking Water and Environmental Management.

State of California. 2003. Water Recycling 2030 – Recommendations of California's Recycled Water Task Force. Sacramento, California: California Department of Water Resources.

State of California. 2003. Water Recycling Construction Program and Facilities Planning Grant Program documentation. Retrieved from http://www.swrcb.ca.gov/recycling/ recyfund. Sacramento, California: State Water Resources Control Board Division of Financial Assistance.

State of California. California Public Utilities Code. Sacramento, California. Section 1501.

State of California. California Constitution, Article 10, Section 2.

State of California. California Water Code. Sacramento, California: State Water Resources Control Board. Division 1, Chapter 6, Article 2, Section 461.

State of Florida. 1999. Reclaimed Water Guide. Brooksville, Florida: Southwest Florida Water Management District.

State of Florida. 2001. Regional Water Supply Plan. Brooksville, Florida: Southwest Florida Water Management District.

State of Florida. 2003. Water Reuse for Florida – Strategies for effective Use of Reclaimed Water. Department of Environmental Protection. Retrieved August 29, 2003 from http://www.dep.state.fl.us/water/reuse/docs/valued_resource_Final%20Report.pdf.

Stone, Jeff – California Department of Health Services. August 12, 2003. Personal communication. Los Angeles, California.

Thompson, Ken – CH2M Hill. September 16, 2003. Personal communication. Los Angeles, California.

Ticker, Joel and Raffensperger, Carolyn. 1996. The Precautionary Principle in Action: A Handbook.

Toskas, Stacey, December 2003. Back to Basics: It's All About Relationships, CRM Magazine, Issue #37. Retrieved from http://www.crmmagazine.com.au on December 15, 2003.

United States Bureau of Reclamation. 2003. White Paper on the Southern California Water Recycling Regional Partnership. Temecula, California: CH2M Hill.

United States Department of State. November 24, 1922. The Colorado River Compact. Santa Fe, New Mexico.

United States Environmental Protection Agency. Environmental Justice Webpage. http://www.epa.gov/compliance/environmentaljustice/index.html.

United States Environmental Protection Agency. Superfund Community Involvement Handbook. April 2002.

Upper Los Angeles River Area Watermaster. 1999. Groundwater Pumping and Spreading Plan for the Upper Los Angeles River Area, Los Angeles County - 1998-2003 Water Years. Los Angeles County, California.

Van Wagoner, William – Los Angeles Department of Water and Power. September 2003. Personal communication. Los Angeles, California.

Waldie, D.J. December 1, 2002. Los Angeles' Toilet-to-Tap Factor. LA Times reprint retrieved August 1, 2003 from http://safewaterreuse.org/toilet-to-tap.htm.

Walters, Joe - West Basin Municipal Water District. November 17, 2003. Personal communication. Los Angeles, California.

WateReuse Association. 1998. Recycled Water Uses Allowed in California. Alexandria, VA: WateReuse Association.

West Basin Municipal Water District. 2003. Recycled Water – the Facility. Retrieved November 10, 2003 from http://www.westbasin.com/recycle_project.htm.

West Basin Municipal Water District. 2003. Recycled Water – the Project. Retrieved November 10, 2003 from http://www.westbasin.com/recycle_facility.htm.

Willis, David. April 18, 2000. Toilet Water on Tap. BBC News. Retrieved September 15, 2003 from http://news.bbc.co.uk/1/hi/sci/tech/717966.stm.

Young, Valerie – CH2M Hill. September 2003. Personal communication. Los Angeles, California.