Water System Operation and Maintenance Manual

This O&M Manual belongs to:

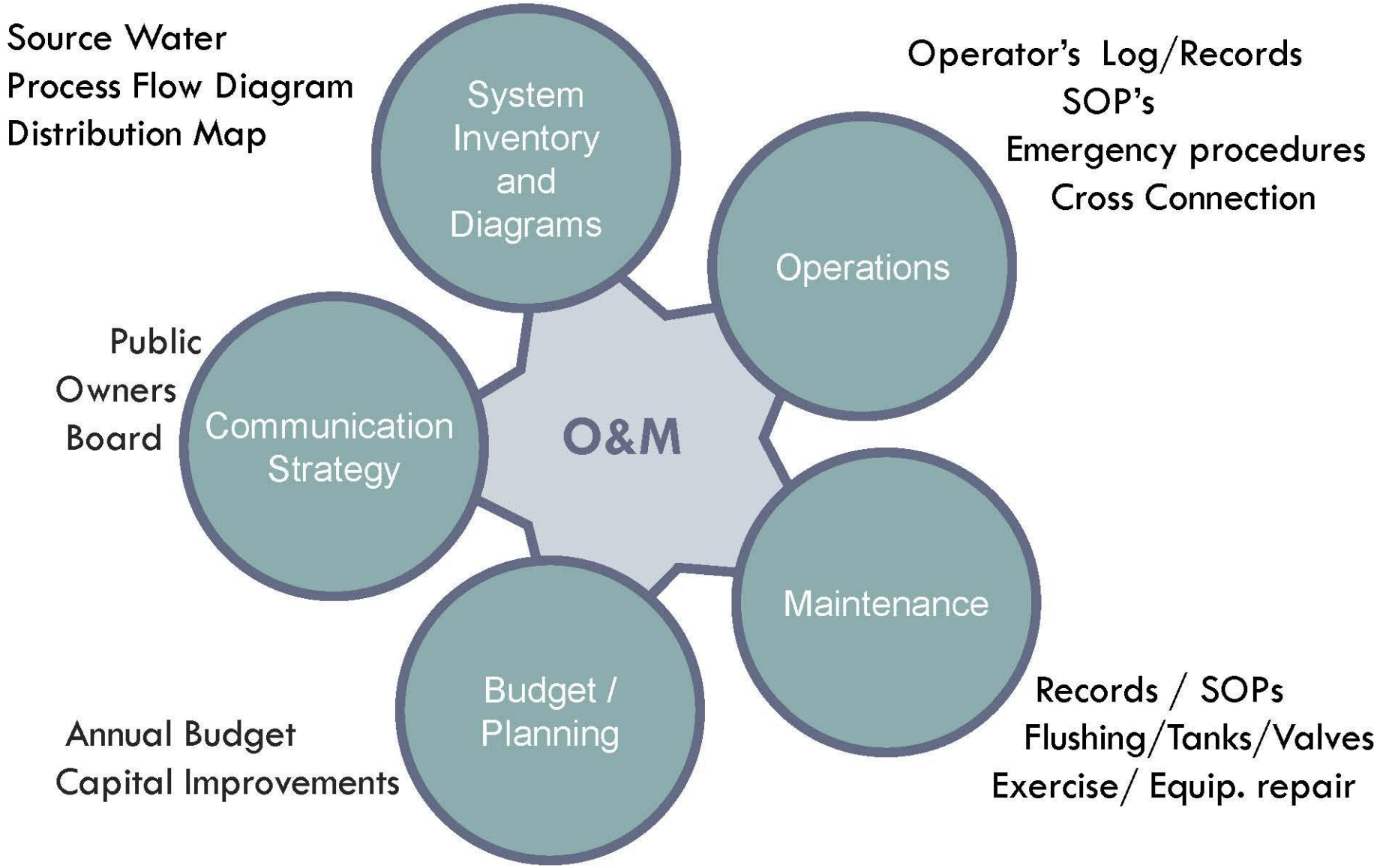
_____

PWSID #: _____

Completed by: _____

Date: _____

Components of O&M



O&M Manual Template Overview and Instructions

What is a system operation manual and why is it important to me?

A system operation manual is your practical guide to the everyday operation of your system. A properly developed and maintained system operation manual is important because it will help you to:

- Improve your system's reliability
- Reduce costs of maintaining your system and plan for repair and replacement
- Meet current and future regulatory requirements
- Train temporary or new staff
- Follow documented procedures during an emergency
- Facilitate sanitary surveys and other state inspections
- Better communicate with management, board, council or owner, and the public

Manual Instructions

This manual template is separated into 13 sections. Each section begins with an instruction page that provides the following information:

- The purpose of this section
- Questions to ask yourself in regards to this section
- Steps to completing section

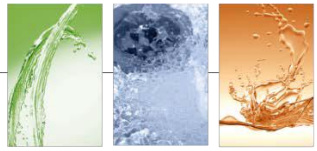
Each section will follow the same structure beginning with the instruction page, followed by examples on blue pages and templates on yellow pages.

In addition to the introduction information described above, each section contains yellow "template" pages and blue "example" pages. The blue "example" pages can be removed when they are no longer useful in helping you fill out your "template."

Who can help me develop this manual for my system?

Contact your Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division for assistance and more information on training opportunities.

Water Quality Control Division Headquarters	303-692-3500
Toll-free within Colorado	800-866-7689

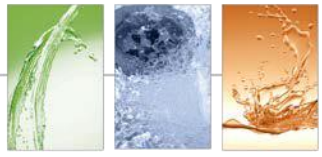


O&M Manual Components

Section Name	Complete
Asset Inventory	☐
Budget	☐
Communication Strategy	☐
Contact List	☐
Cross Connection Control	☐
Emergency Response Plan	☐
General Water System Information	☐
Job Descriptions	☐
Maintenance Logs/SOP	☐
Master Plan	☐
Operation and Maintenance Planning	☐
Operations SOP/Logs	☐
Organizational Chart	☐
System Maps	☐
Distribution	
Source Water	
Treatments	

O&M Manual Revisions Log

DATE	SECTION	REVISION	SIGNATURE



General Water System Information

General Water System Information

Why is this important?

The purpose of having general water system information in your O&M manual is to have in one place, key information regarding your specific system. This will also be a helpful tool when describing your system to people unfamiliar with it.

Ask yourself these questions:

1. What is the official name of my system?
2. Who are my owner and ORC?

Building your general water system information

Step 1

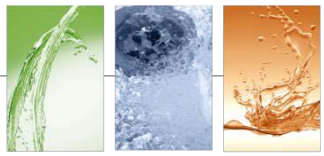
Review example general water system information located on the next page (blue paper).

Step 2

Using your general water system information template (yellow paper), begin to fill out the key information.

Step 3

Fill out your water system's name, system identification number, location, system owner and system ORC.



General System Information

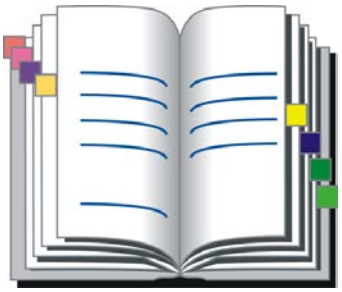
Water System Name	*Town of Sierra*
System identification Number (PWSID)	*CO 123456*
Location/Town	*Town of Sierra, Colorado*
System Owner	*Town of Sierra*
System ORC	*Paul Neuman*

General System Information

Water System Name	
System identification Number (PWSID)	
Location/Town	
System Owner	
System ORC	

Contact List

Contact List



Why is this important?

The purpose of a contact list is to have an easy and accessible list of important people and personnel for your water system. A completed contact list will allow for improved communication.

Ask yourself these questions:

1. Who do I need to talk to on a regular basis to run this water system?
2. Who do I need to call in case of an emergency?

Building your contact list:

Step 1

- Review example contact list located on the next page (blue paper).

Step 2

- Brainstorm a list of people you contact regarding your system on a regular basis. Write all the names that come to mind on a sheet of paper.

Step 3

- Refine the list, include routine contacts, emergency contacts, and people you talk to during critical times throughout the year.

Step 4

- Gather contact information and add to your template. This should include:
  - *Address*
  - *Phone number*
  - *Email*

Step 5

- Update and revisit the contact list regularly.

EXAMPLE

Contact List

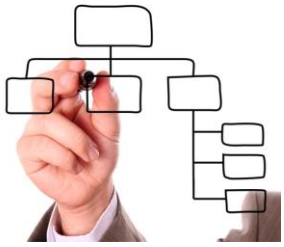
Contact Name	Contact Position	Contact Address	Contact Phone Number	Contact Email
Clint Eastwood	Town Manager	100 Main St. Sierra, CO 81264	394-714-1171	C.Eastwood @ sierra.gov
Paul Newman	Operator	699 W. Elm St. Sierra, CO 81264	394-927-2654	Paul.Neuman @ gmail.com
John Denver	Equipment Supply	6972 Mountain Blvd. Sierra, CO 81264	394-812-1703	JohnDenver @ yahoo.com
Steve McQueen	Campground owner	917 East Dr. Sierra, CO 81264	394-269-9975	Steve.McQ @ gmail.com
Jessica Simpson	Total Coliform Sampler-Resident	1117 Applewood Ln. Sierra, CO 81264	394-819-0085	N/A

Contact Name	Contact Position	Contact Address	Contact Phone Number	Contact Email

Contact Name	Contact Position	Contact Address	Contact Phone Number	Contact Email

Organizational Chart

Organizational Chart



Why is this important?

The purpose of having an up to date organizational chart is to clearly lay out the structure and organization of your water system, depicting the managers and staff who make up your organization. This helps to describe how your system divides work, authority, and responsibility.

Ask yourself these questions:

1. Who is responsible for managing the water system?
2. How are the people in the water system organized?
3. What is the chain of command in the water system organization?
4. Who does the everyday work in the system?

Building your organizational chart:

Step 1

- Review example organizational charts on the following page (blue paper).

Step 2

- Using your contact list, determine which contacts are important people in your water system (e.g. managers, employees, etc.).

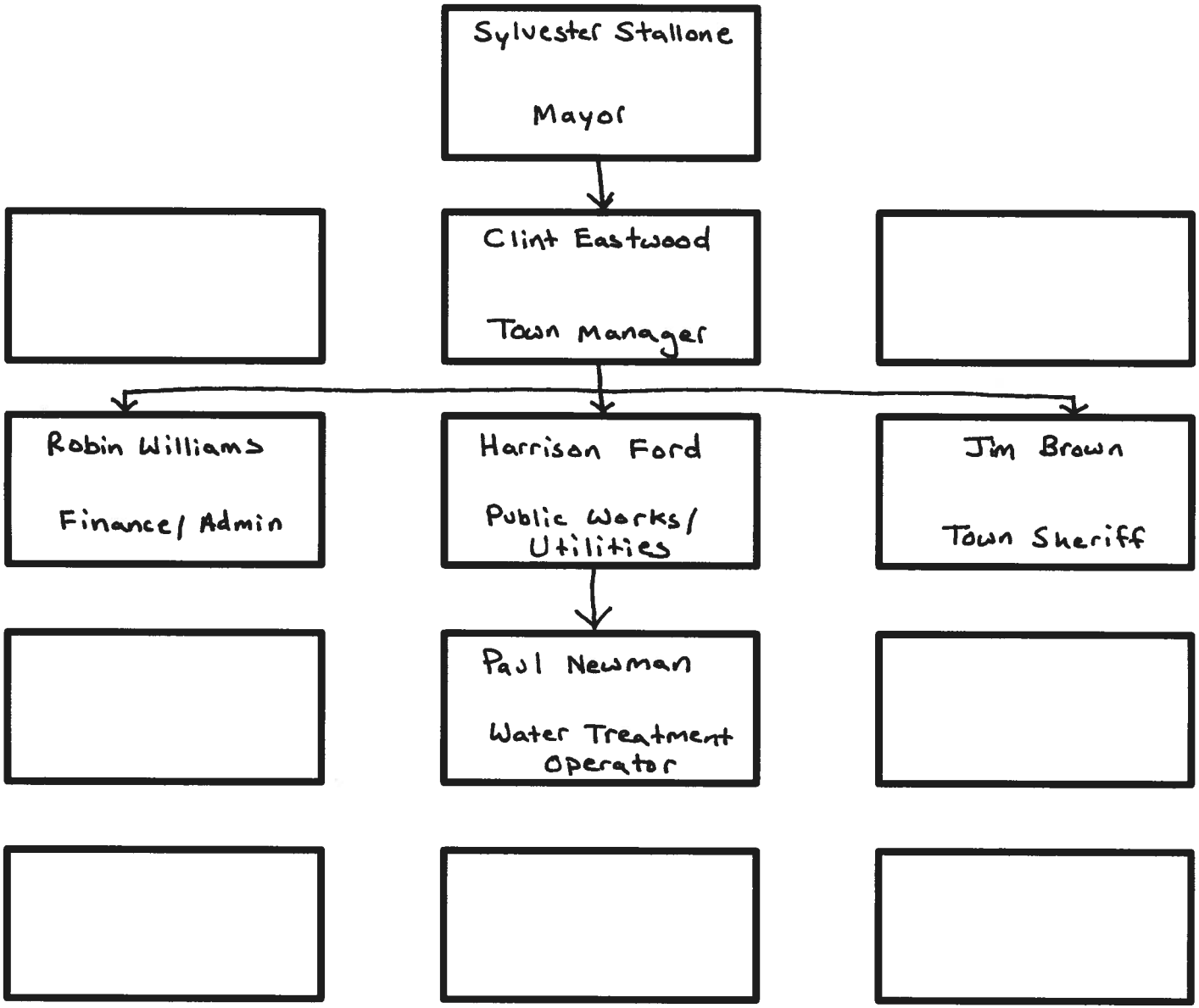
Step 3

- Using the organizational chart template (yellow page), place key people in boxes keeping in mind the chain of command and how information flows.

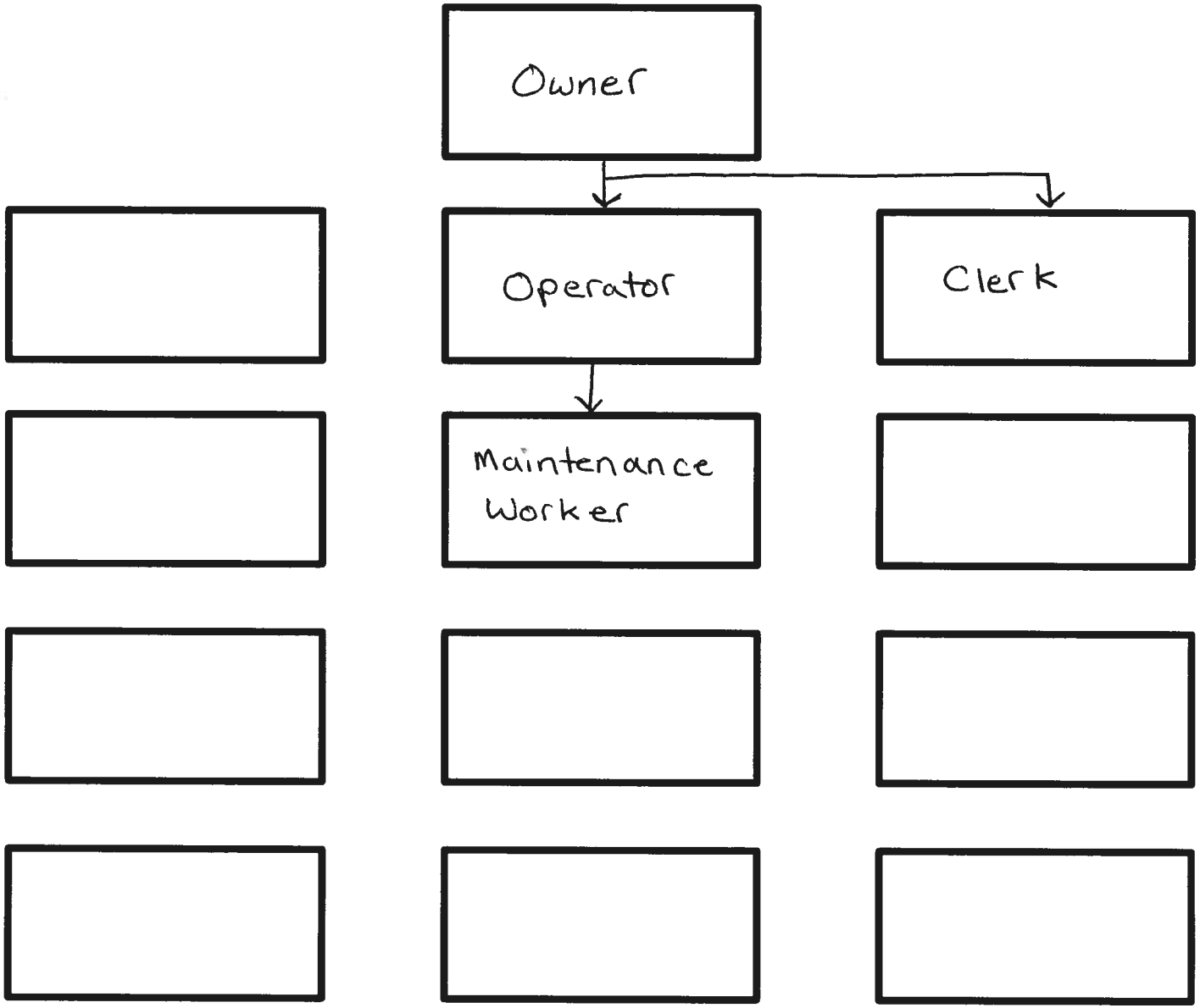
Step 4

- Using the questions asked in step 3 as reference, draw lines between the boxes to show the chain of command and flow of information.

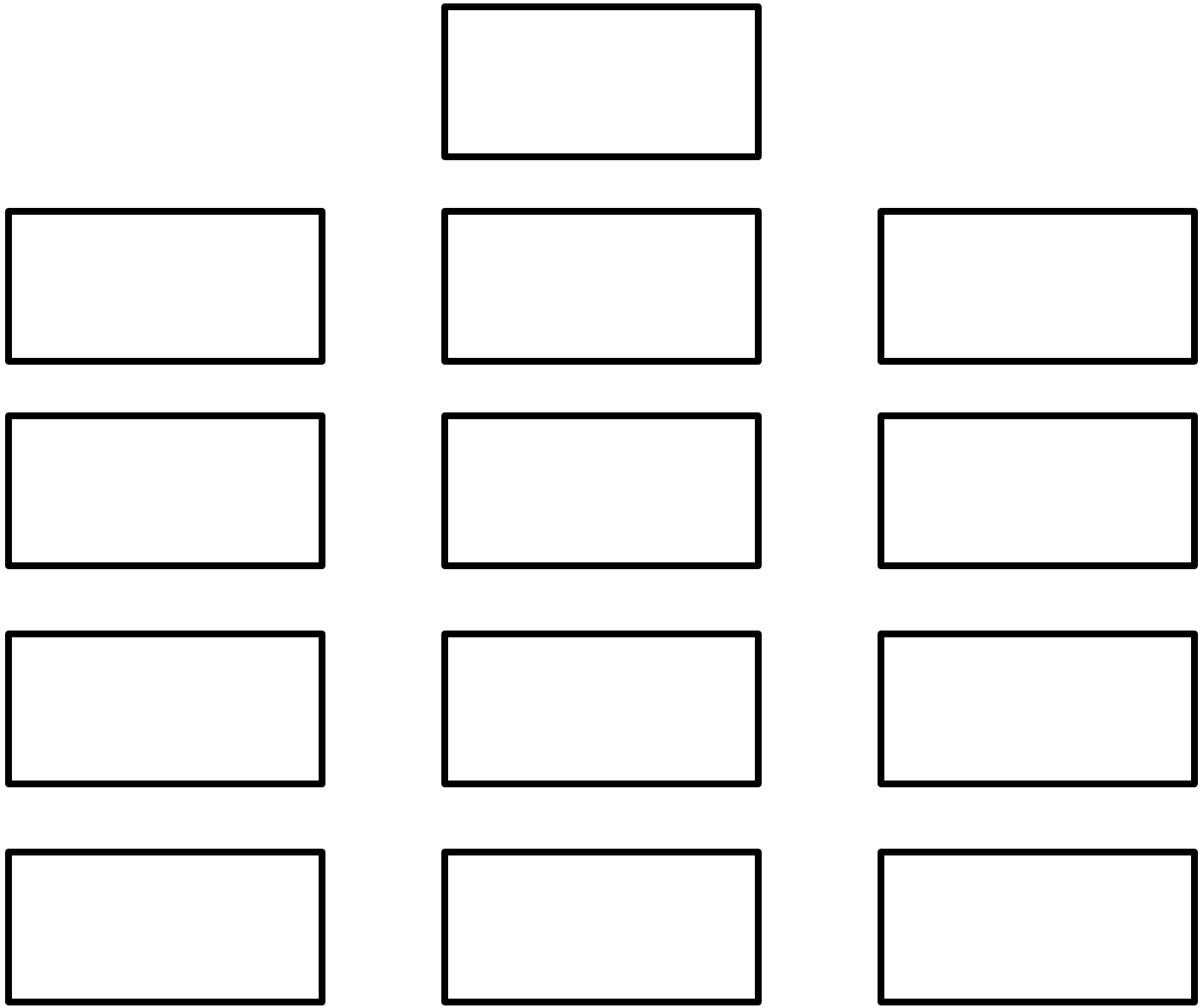
Town of Sierra Organizational Chart



EXAMPLE Organizational Chart



_____ Organizational Chart



Job Descriptions

Job Descriptions

Why is this important?

Having clearly written and current job descriptions will help make employees more effective in their identified roles. As a result, your system will run more efficiently. Job descriptions provide a road map and safeguard for everyone working with the system.

Ask yourself these questions:

1. What positions require job descriptions?
2. What skills are critical for performing specific jobs?
3. What training or certification level is required?

Building your job descriptions:

Step 1

- Review example job descriptions located on the next two pages (blue paper).

Step 2

- Make a list of the critical positions in your water system that require job descriptions (refer to organizational chart).

Step 3

- Using the owner and operator job description templates (yellow paper) as well as the blank templates, complete job descriptions for the list of critical positions created in Step 2.

Step 4

- Review and update job descriptions regularly. Visit www.getintowaterco.org for industry specific job description templates.

Owner/Legal Entity

Name: Clint Eastwood

List of Primary Responsibilities:

☑	Ensure the facility is operated by an Operator in Responsible Charge (ORC) with appropriate certifications
☑	Ensure all process control and system integrity decisions about water quality or quantity affecting public health or environment are made by an ORC
☑	Ensure a certified operator is available on-site or in contact as needed to initiate appropriate actions in a timely manner for each operating shift
☑	Keep a current ORC Reporting Form on file with the Water Quality Control Division

Requirements or Certifications

☐	
☐	
☐	

List of Additional Responsibilities:

☑	Provide for adequate funding to maintain and operate the water system.
☑	Work closely with operator to communicate regularly with the board /council.
☐	
☐	
☐	
☐	

Water Treatment Operator

Name: Paul Newman

List of Primary Responsibilities:

☑	Control the processing of raw, treated, and finished water
☑	Prepare and control chemical addition for water
☑	Observe and respond to variations in operating conditions
☑	Interpret instrument readings and adjust
☑	Operate valves, gates and pumps
☑	Maintain logs and records
☑	Collect and/or analyze process control samples
☑	Inspect and test new, modified, or repaired facilities prior to placing them in service
☑	Implement preventative maintenance programs for facilities
☑	Comply with laws, regulations, and reporting requirements

Requirements or Certifications

☑	Class C Water Facility Operator License
☐	
☐	

List of Additional Responsibilities:

☑	Prepare and maintain Emergency Response Plan
☐	
☐	
☐	
☐	

Owner/Legal Entity

Name: _____

List of Primary Responsibilities:

☐	Ensure the facility is operated by an Operator in Responsible Charge (ORC) with appropriate certifications
☐	Ensure all process control and system integrity decisions about water quality or quantity affecting public health or environment are made by an ORC
☐	Ensure a certified operator is available on-site or in contact as needed to initiate appropriate actions in a timely manner for each operating shift
☐	Keep a current ORC Reporting Form on file with the Water Quality Control Division

Requirements or Certifications

☐	
☐	
☐	

List of Additional Responsibilities:

☐	
☐	
☐	
☐	
☐	
☐	

Water Treatment Operator

Name: _____

List of Primary Responsibilities:

☐	Control the processing of raw, treated, and finished water
☐	Prepare and control chemical addition for water
☐	Observe and respond to variations in operating conditions
☐	Interpret instrument readings and adjust
☐	Operate valves, gates and pumps
☐	Maintain logs and records
☐	Collect and/or analyze process control samples
☐	Inspect and test new, modified, or repaired facilities prior to placing them in service
☐	Implement preventative maintenance programs for facilities
☐	Comply with laws, regulations, and reporting requirements

Requirements or Certifications

☐	
☐	
☐	

List of Additional Responsibilities:

☐	
☐	
☐	
☐	
☐	

Name:

List of Primary Responsibilities:

☐	
☐	
☐	
☐	
☐	
☐	
☐	
☐	
☐	
☐	

Requirements or Certifications

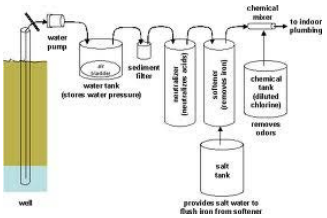
☐	
☐	
☐	

List of Additional Responsibilities:

☐	
☐	
☐	
☐	
☐	

System Maps

Diagram and Maps



Why is this important?

System diagrams and maps show the key components of a treatment process and the spatial characteristics of the distribution system. Creating system maps and diagrams helps reinforce your understanding of the system, share information with others and identify where the system can be improved.

Ask yourself these questions:

1. What are the key components in terms of source, treatment, and distribution in my water system?
2. Where do I sample and monitor specific analytes and parameters?

Building your Process Flow Diagram

Step 1

- Review example process flow diagram located on the next page (blue paper).

Step 2

- Identify the major unit operations in your water treatment process. These could include:
  - *Well*
  - *Chlorinator*
  - *Storage Tank*
  - *Filter*
  - *Sampling Points (EPRD, raw water tap, etc)*

Step 3

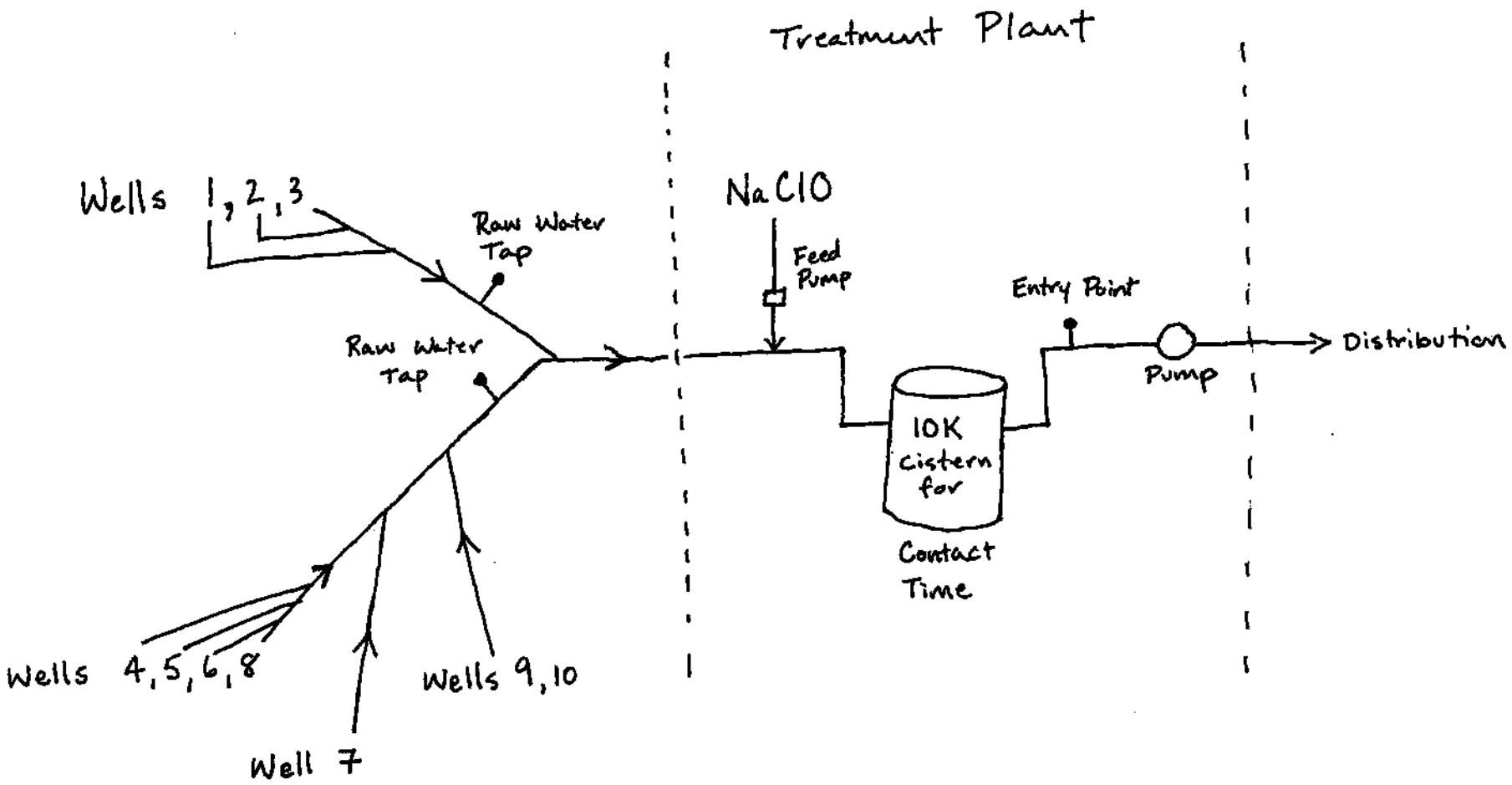
- On the templates provided (yellow page), label each treatment process to show how the water flows through the system.

Step 4

- Identify the chemical feed locations and water quality monitoring locations on the same drawings.

EXAMPLE

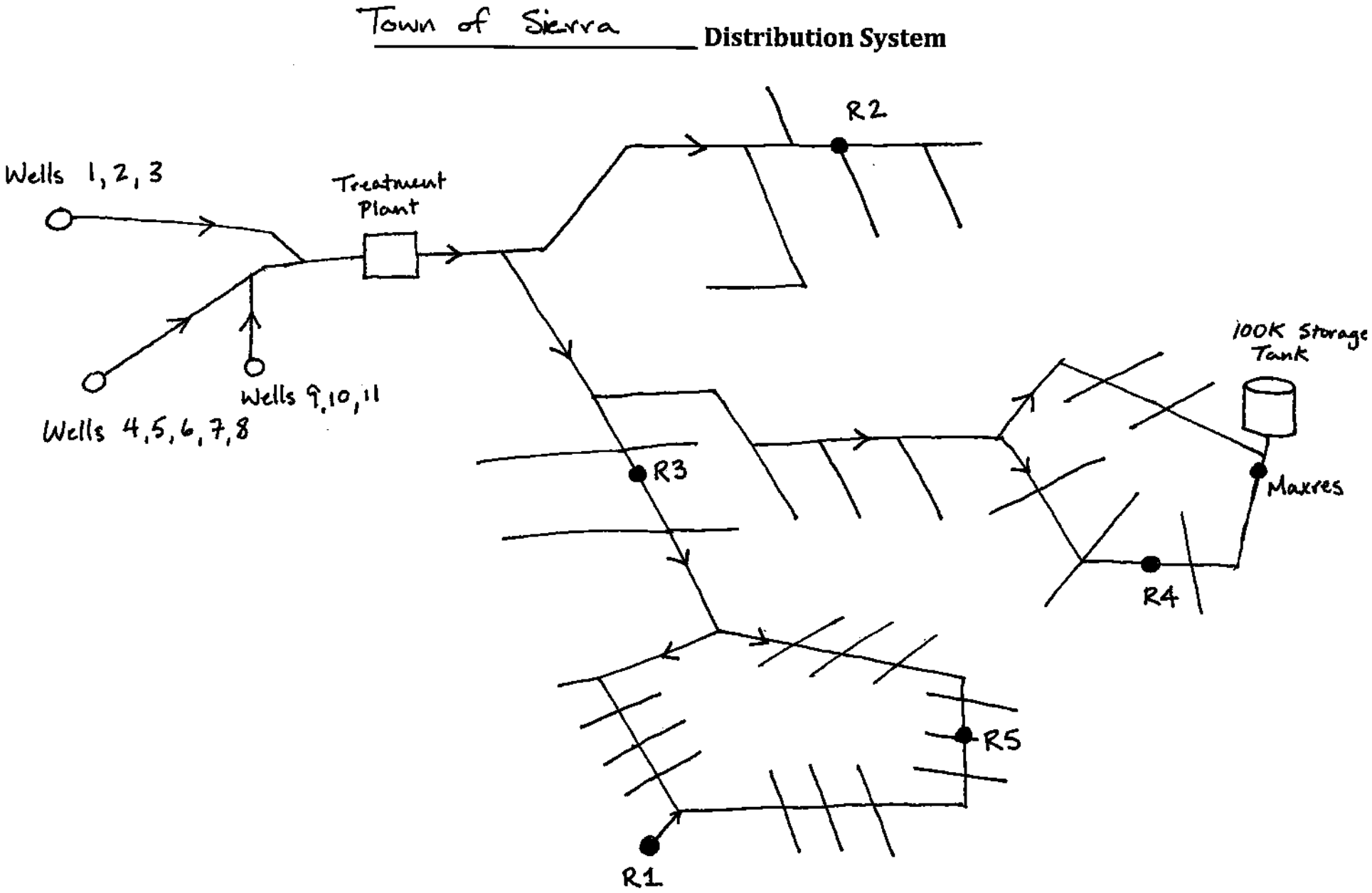
Town of Sierra **Process Flow Diagram**



_____ Process Flow Diagram

_____ Process Flow Diagram

EXAMPLE


Town of Sierra
Distribution System
R2
Wells 1, 2, 3
Treatment Plant
Wells 9, 10, 11
Wells 4, 5, 6, 7, 8
100K Storage Tank
R3
Maxres
R4
R5
R1

EXAMPLE

_____ Distribution System

Master Plan

Master Plan

Why is this important?

A Master Plan is a comprehensive plan that serves as blue print for the future of your water system. A master plan:

- Summarizes the components of the water treatment and distribution system,
- Evaluates water short- and long-term water demand including fire protection and delivery needs,
- Assesses the performance of the water system, and
- Identifies necessary improvements to remedy deficiencies and accommodate future growth.

As an operator, you should be familiar with and contribute important information to your system's master plan.

Ask yourself these questions:

1. Is a master plan available for my water system?
2. Does my water system have the treatment and supply capacity to meet current and future population demand?
3. What important information can I contribute to my system's master plan?

Building your master plan

Step 1

- Review example master planning template on the next page (blue paper).

Step 2

- Using the templates provided (yellow paper), read through the "Questions to Ask Yourself" column and think about who is primarily responsible for this. Record your response in the third column.

Step 3

- Review each question again, and record in the final column, your role as an operator.

EXAMPLE

Master Planning Template - Understanding Your Role as an Operator in Master Planning

Topic	Questions to Ask Yourself	Who Has Primary Responsibility for This?	What is My Role as Operator
Source Water	• Do you have enough source water to meet projected needs over the next 20 years?	Owner of the system and/or governing unit of the community	Manage the system properly. Communicate to your supervisor/board about source water supply.
	• Do you have a source water protection program in place?	Owner and/or primary operator	Following procedures established in the protection program, such as completing and submitting required reports. Bring source water protection up to your supervisor/board if you do not know if one is in place.
Facilities and Resources	• Is the capacity of the system appropriate to meet water demands through the next 20 years?	Owner of the system	Help supervisor/owner/board understand current capacity of system.
	• Is your system in compliance with all applicable Federal and State of CO regulations?	Owner of the system	Run the system according to the rules and regulations, as well as in accord with the established policies and procedures. Communicate areas of non-compliance and what is needed to address the non-compliance.
	• Does your system have certified personnel adequate for now and in the future?	Owner of the system	Obtain and maintain license and/or certifications that fit your system. Identify any assistance you need to get the job done, in particular, if/when dictated by changes in regulations.
	• Does your system prepare an annual budget?	Owner and/or chief operator of the system	Either prepare it or gather information for the person(s) who do(es).
Fire Protection	• Does the water system have adequate storage to provide water to all customers and meet fire flow requirements?	Owner of the system	Proper maintenance, monitoring, and reporting. Communicate any deficiencies in fire protection storage or planning.

Master Planning Template - Understanding Your Role as an Operator in Master Planning

Topic	Questions to Ask Yourself	Who Has Primary Responsibility for This?	What is My Role as Operator
Source Water	• Do you have enough source water to meet projected needs over the next 20 years?		
	• Do you have a source water protection program in place?		
Facilities and Resources	• Is the capacity of the system appropriate to meet water demands through the next 20 years?		
	• Is the capacity of your pumping system and distribution system adequate?		
	• Is your system in compliance with all applicable Federal and State of CO regulations?		
	• Does your system have certified personnel adequate for now and in the future?		
	• Does your system prepare an annual budget?		
Fire Protection	• Does the water system have adequate storage to provide water to all customers and meet fire flow requirements?		

Emergency Response Plan

Emergency Response Plan

Why is this important?

The purpose of an Emergency Response Plan (ERP) is to establish procedures and organizational structure to prepare for and respond to emergencies. An ERP helps to enhance system security, minimize damage, lessen liability and above all, protect public health.

Ask yourself these questions:

1. Who is in charge when emergencies occur?
2. What types of emergencies belong in my emergency response plan?
3. What roles do I play in both preparation and response?

Building your emergency response plan

Step 1
- Review example emergency response plan located on the next page (blue paper).

Step 2
- Using the template provided (yellow paper) enter your system information.

Step 3
- Identify the people in your system's chain-of-command. Who is responsible for managing emergencies and making key decisions?

Step 4
- Identify the events that may cause emergencies at your system, starting with the events that have the highest probability of occurring.

Step 5
- Complete the emergency notification section. If an organization or department does not apply to your water system, put a line through the entry.

Step 6
- Using the list of emergencies from Step 4, complete the response actions for those specific events.

EXAMPLE

System Information

Keep this basic information easily accessible to authorized staff for emergency responders, repair people, and the news media.

System information

System Identification Number	CO123456	
System Name and Address	Town of Sierra	
Directions to the System	Exit 64 off highway/interstate 72	
Basic Description and Location of System Facilities	Groundwater well pumps to chlorinator + then into a storage tank which is then pumped to the customers	
Location/Town	Town of Sierra	
Population Served and Service Connections from Division of Drinking Water Records	300 people	_____ connections
System Owner	Town of Sierra	
Name, Title, and Phone Number of Person Responsible for Maintaining and Implementing the Emergency Plan	Harrison Ford - Public works / utilities	394-714-1176 Phone 394-714-1176 Cell N/A Pager

Chain of Command – Lines of Authority

The first response step in any emergency is to inform the person at the top of this list, who is responsible for managing the emergency and making key decisions.

Chain of command – lines of authority

Name and Title	Responsibilities During an Emergency	Contact Numbers
Harrison Ford – Public works/ utility Director	Responsible for overall management and decision making. The public works director is the lead for managing the emergency, coordinating w/ supporting agencies & providing the public with information.	
Paul Newman – Operator	In charge of running water system, performing inspections, maintenance & sampling as well as relaying critical information, assessing facilities & providing recommendations to the utility director	726-827-1492

Chain of Command – Lines of Authority

The first response step in any emergency is to inform the person at the top of this list, who is responsible for managing the emergency and making key decisions.

Chain of command – lines of authority

Name and Title	Responsibilities During an Emergency	Contact Numbers

EXAMPLE

Events that Cause Emergencies

The events listed below may cause water system emergencies. They are arranged from highest to lowest probable risk.

Events that cause emergencies

Type of Event	Probability or Risk (High-Med-Low)	Comments
Fire	Med	Dry summers occur often in Colorado
Main / Line Break	Med	
Boil Water Notice (consequence of emergency)	Low	

Events that Cause Emergencies

The events listed below may cause water system emergencies. They are arranged from highest to lowest probable risk.

Events that cause emergencies

Type of Event	Probability or Risk (High-Med-Low)	Comments

Emergency Notification

Notification call-up lists - Use these lists to notify first responders of an emergency.

Emergency Notification List				
Organization or Department	**Name & Position**	**Telephone**	**Night or Cell Phone**	**Email**
Local Law Enforcement	Officer on Duty	726-111-9999 or 911	—	N/A
Fire Department	Officer on Duty	726-111-9988 or 911	—	N/A
Emergency Medical Services	Medic on duty	726-111-9977 or 911	—	N/A
Water Operator (if contractor)	N/A	—	—	—
Primacy Agency Contact (CDPHE)	Water quality division	303-692-3500	—	—
Hazmat Hotline	24 hour env. release/incident report line	877-518-5608	—	—
Interconnected Water System	N/A	—	—	—
Neighboring Water System (not connected)	Town of Portage	714-927-6444	—	—

Emergency Notification

Notification call-up lists - Use these lists to notify first responders of an emergency.

Emergency Notification List				
Organization or Department	**Name & Position**	**Telephone**	**Night or Cell Phone**	**Email**
Local Law Enforcement				
Fire Department				
Emergency Medical Services				
Water Operator (if contractor)				
Primacy Agency Contact				
Hazmat Hotline				
Interconnected Water System				
Neighboring Water System (not connected)				

EXAMPLE

Service / Repair Notifications				
Organization or Department	**Name & Position**	**Telephone**	**Night or Cell Phone**	**Email**
Electric Utility Co.	Lights on —	726-841-6276	—	—
Electrician	N/A			
Gas/Propane Supplier				
Water Testing Lab.	Labworks USA	726-814-7200		
Sewer Utility Co.	Sierra WWTP (see previous)			
Telephone Co.				
Plumber				
Pump Supplier				
"Call Before You Dig"				

Service / Repair Notifications				
Organization or Department	**Name & Position**	**Telephone**	**Night or Cell Phone**	**Email**
Electric Utility Co.				
Electrician				
Gas/Propane Supplier				
Water Testing Lab.				
Sewer Utility Co.				
Telephone Co.				
Plumber				
Pump Supplier				
“Call Before You Dig”				

Priority Customers				
Organization or Department	**Name & Position**	**Telephone**	**Night or Cell Phone**	**Email**
Hospitals or Clinic(s)	St. Joes -	726-941-6400	—	—
Public or Private Schools	Haverhill Elementary/Middle/ High School	726-171-8000	—	—
Wastewater Treatment Plant	Sierra WWTP	726-914-6250	—	—
Adult Care Facility	After Care Homes	726-917-1000	—	—

State, Federal or Tribal Notification List				
Organization or Department	**Name & Position**	**Telephone**	**Night or Cell Phone**	**Email**
State or Tribal Police				
Regulatory Agency State/Federal/Tribal				
Authorized Testing Laboratory				

Priority Customers				
Organization or Department	**Name & Position**	**Telephone**	**Night or Cell Phone**	**Email**
Hospitals or Clinic(s)				
Public or Private Schools				
Wastewater Treatment Plant				
Adult Care Facility				

State, Federal or Tribal Notification List				
Organization or Department	**Name & Position**	**Telephone**	**Night or Cell Phone**	**Email**
State or Tribal Police				
Regulatory Agency State/Federal/Tribal				
Authorized Testing Laboratory				

Response Actions for Specific Events

In any event, there are a series of general steps to take:

1. Analyze the type and severity of the emergency;
2. Take immediate actions to save lives;
3. Take action to reduce injuries and system damage;
4. Make repairs based on priority demand, and
5. Return the system to normal operation.

The following tables identify the assessment, set forth immediate response actions, define what notifications need to be made, and describe important follow-up actions.

A. Fire

Assessment	Identify severity of the fire
Immediate Actions	1) Notify Fire Department and give location/fire info. 2) If structural fire, terminate electrical power to structure 3) Ensure access to fire is open & clear for authorities
Notifications	1) Fire Department 2) Owner
Follow-up Actions	Once fire is extinguished, assess damage & costs. Identify if system can be operated Notify owner of damage, costs & other affects on the system.

Response Actions for Specific Events

In any event, there are a series of general steps to take:

1. Analyze the type and severity of the emergency;
2. Take immediate actions to save lives;
3. Take action to reduce injuries and system damage;
4. Make repairs based on priority demand, and
5. Return the system to normal operation.

The following tables identify the assessment, set forth immediate response actions, define what notifications need to be made, and describe important follow-up actions.

A.

Assessment	
Immediate Actions	
Notifications	
Follow-up Actions	

B. Main Line Break

Assessment	· Identify leak · Identify replacement / repair parts needed
Immediate Actions	· Valve off the area of the leak · Isolate the area · Set up road blocks / baracades
Notifications	· Contact repair crew · Notify residents involved · Notify state (whenever you lose pressure to system) · Call for locates (telephone, gas) · Contact Fire Department of any hydrants out of service
Follow-up Actions	· Ensure leak is repaired · Flush hydrants. · Collect Baati sample · Inform the State

C. Boil order / Bottle order

Assessment	· Positive (E. Coli) - Fecal indicator · Assess Metals content of water. Is boiling appropriate? · Investigate cause
Immediate Actions	· Contact CDPHE · Public Notice · Media if requested by State
Notifications	· State · Residents - Media
Follow-up Actions	· Monitor TC + chlorine parameters · State notification boil order has been lifted · Public Notice

B.

Assessment	
Immediate Actions	
Notifications	
Follow-up Actions	

C.

Assessment	
Immediate Actions	
Notifications	
Follow-up Actions	

D.

Assessment	
Immediate Actions	
Notifications	
Follow-up Actions	

E.

Assessment	
Immediate Actions	
Notifications	
Follow-up Actions	

D.

Assessment	
Immediate Actions	
Notifications	
Follow-up Actions	

E.

Assessment	
Immediate Actions	
Notifications	
Follow-up Actions	

Alternative Water Sources

Tie into adjacent water supply system

Water Systems within One-Quarter Mile of our System	Feasibility of Connecting
NOT POSSIBLE!	

Alternate source(s) of water

Alternative Sources	Names	Phone	Availability	Is the Water Safe for Drinking?
Bottled water Suppliers for potable water use	Water Supply Inc	726-824-1000	24/7	Yes
Tanker trucks in the area available to deliver bulk water for non potable use	Sierra Water Co.	726-172-6500	Mon - Sun 8 - 6pm	No

Alternative Water Sources

Tie into adjacent water supply system

Water Systems within One-Quarter Mile of our System	Feasibility of Connecting

Alternate source(s) of water

Alternative Sources	Names	Phone	Availability	Is the Water Safe for Drinking?
Bottled water Suppliers for potable water use				
Tanker trucks in the area available to deliver bulk water for non potable use				

Emergency Response Plan

System Information

System Name: _____
Public Water System (PWS) Number: _____
Lead Operator Name/#: _____
Back-up Operator Name/#: _____
Owner Name/#: _____
Population Served: _____ **Number of Service Connections:** _____
Attach treatment schematic and distribution system map from Monitoring Plan.

Emergency Contact Information

Life threatening emergency always dial: 911
CDPHE 24-Hour Emergency Hotline: 1-877-518-5608
CoWARN (to receive aid from other utilities) Website: www.cowarn.org
County Sheriff #: _____
Critical Customer Contact #s: _____
Alternate Sources of Water Supply Name/#: _____
Emergency Power #: _____ **Electrician #:** _____
Plumber #: _____ **Locates/Excavator #:** _____
List of Critical Equipment/Chemicals with Supplier Name/#: _____
_____
_____
Name/# of Neighboring Utilities: _____
_____

Emergency Response Procedures

Shut-down procedures and location of shut-off valve: _____
_____
_____
_____
Start-up procedures: _____
_____
_____
_____
Public notification procedures: _____
_____
Location of fire extinguisher/safety equipment: _____
Location of spare or repair parts: _____

Additional Resources

The CoWARN website contains resources for planning and responding to emergencies:
http://www.cowarn.org/

Operation and Maintenance Planning

List of Available Operation and Maintenance Resources

Why is this important?

Having a checklist of available O&M resources (manual, SOPs, logs) will help you organize your resources and identify gaps.

Ask yourself these questions:

1. What do I do on a daily and weekly basis to maintaining my water treatment system?
2. Which activities or pieces of equipment involve SOPs, manufacturer's specifications, or record keeping logs?
3. Do I have the right tools?
4. What documents or logs do I need to develop?

Building your list of available O&M resources

Step 1
- Review example list of available O&M resources on next two pages (blue paper).

Step 2
- Using the templates provided (yellow paper), place an "X" in the "Have" box if you have that resource available for each critical O&M activity.

Step 3
- Using the templates provided (yellow paper), place an "X" in the "Need" box if you are missing that resource for each critical O&M activity.

Step 4
- Ask yourself if there are any activities missing. If so, use the second template (yellow page) to list additional activities and critical resources.

Step 5
- If any of the activities do not apply to your system, draw a line though that activity.

Town of Sierra

EXAMPLE

List of Available O&M Resources

	Activity	Resources					
		SOP		Manufacturer's Specification		Log/Record Keeping Form	
		Have	Need	Have	Need	Have	Need
Operational	**Start-up**	☒	☐	☐	☐	☒	☐
	Routine Checks	☐	☐	☐	☐	☐	☐
	o Flow	☒	☐	☐	☐	☒	☐
	o Measuring chlorine residual; adding chlorine	☐	☒	☐	☐	☒	☐
	o Maintaining pressure	☒	☐	☐	☐	☒	☐
	o Visual inspection of facilities	☒	☐	☐	☐	☒	☐
	Sampling	☐	☐	☐	☐	☐	☐
	o Total Coliforms	☒	☐	☐	☐	☒	☐
	o Nitrates/Nitrites	☒	☐	☐	☐	☒	☐
	o	☐	☐	☐	☐	☐	☐
	o	☐	☐	☐	☐	☐	☐
	Shut-down	☒	☐	☐	☐	☒	☐
Maintenance	**Source**						
	o Well	☒	☐	☐	☐	☒	☐
	o Meters (e.g. flow)	☒	☐	☐	☐	☒	☐
	Treatment						
	o Chlorinator	☐	☒	☒	☐	☐	☒
	~~o Other chemical treatment equipment~~	☐	☐	☐	☐	☐	☐
	o Control valves	☒	☐	☒	☐	☒	☐
	Distribution						
	o Flushing	☒	☐	☐	☐	☒	☐
	o Hydrants	☒	☐	☐	☐	☒	☐
	o Valve exercise	☒	☐	☐	☐	☒	☐
	o Tank inspection	☐	☒	☐	☐	☒	☐

List of Available O&M Resources

	Activity	Resources					
		SOP		Manufacturer's Specification		Log/Record Keeping Form	
		Have	Need	Have	Need	Have	Need
Operational	**Start-up**	☐	☐	☐	☐	☐	☐
	Routine Checks	☐	☐	☐	☐	☐	☐
	o Flow	☐	☐	☐	☐	☐	☐
	o Measuring chlorine residual; adding chlorine	☐	☐	☐	☐	☐	☐
	o Maintaining pressure	☐	☐	☐	☐	☐	☐
	o Visual inspection of facilities	☐	☐	☐	☐	☐	☐
	Sampling	☐	☐	☐	☐	☐	☐
	o Total Coliforms	☐	☐	☐	☐	☐	☐
	o Nitrates/Nitrites	☐	☐	☐	☐	☐	☐
	o	☐	☐	☐	☐	☐	☐
	o	☐	☐	☐	☐	☐	☐
	Shut-down	☐	☐	☐	☐	☐	☐
Maintenance	**Source**						
	o Well	☐	☐	☐	☐	☐	☐
	o Meters (e.g. flow)	☐	☐	☐	☐	☐	☐
	Treatment						
	o Chlorinator	☐	☐	☐	☐	☐	☐
	o Other chemical treatment equipment	☐	☐	☐	☐	☐	☐
	o Control valves	☐	☐	☐	☐	☐	☐
	Distribution						
	o Flushing	☐	☐	☐	☐	☐	☐
	o Hydrants	☐	☐	☐	☐	☐	☐
	o Valve exercise	☐	☐	☐	☐	☐	☐
	o Tank inspection	☐	☐	☐	☐	☐	☐

List of Available O&M Resources

	Activity	Resources					
		SOP		Manufacturer's Specification		Log/Record Keeping Form	
		Have	Need	Have	Need	Have	Need
Operational		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
Maintenance							
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐

Operation SOP/Logs

Operation and Maintenance Schedule

Why is this important?

The purpose of having a well organized O&M schedule is to ensure critical activities are performed on time, and at a frequency that supports continuously reliable operation.

Ask yourself these questions:

1. What O&M activities should I perform on a regular basis?
2. Which of these activities are critical to operating and maintaining my water system?
3. When do O&M activities need to be performed?
4. What are the training and tool requirements to conduct these efforts?

Building your O&M schedule

Step 1

- Review example O&M schedules on next two pages (blue paper).

Step 2

- Using the templates provided (yellow paper) place an "X" to show the frequency of each of the critical activities at your water system. (note: some may have more than one "X")

Step 3

- Using your list of available O&M resources, transfer any added activities to the blank O&M template and place an "X" on the frequency of the activity at your water system.

Step 4

- If you have any activities that do not apply to your water system, draw a line through the activity.

Town of Sierra

EXAMPLE

List of Available O&M Resources

	Activity	Resources					
		SOP		Manufacturer's Specification		Log/Record Keeping Form	
		Have	Need	Have	Need	Have	Need
Operational	**Start-up**	☒	☐	☐	☐	☒	☐
	Routine Checks	☐	☐	☐	☐	☐	☐
	o Flow	☒	☐	☐	☐	☒	☐
	o Measuring chlorine residual; adding chlorine	☐	☒	☐	☐	☒	☐
	o Maintaining pressure	☒	☐	☐	☐	☒	☐
	o Visual inspection of facilities	☒	☐	☐	☐	☒	☐
	Sampling	☐	☐	☐	☐	☐	☐
	o Total Coliforms	☒	☐	☐	☐	☒	☐
	o Nitrates/Nitrites	☒	☐	☐	☐	☒	☐
	o	☐	☐	☐	☐	☐	☐
	o	☐	☐	☐	☐	☐	☐
	Shut-down	☒	☐	☐	☐	☒	☐
Maintenance	**Source**						
	o Well	☒	☐	☐	☐	☒	☐
	o Meters (e.g. flow)	☒	☐	☐	☐	☒	☐
	Treatment						
	o Chlorinator	☐	☒	☒	☐	☐	☒
	~~o Other chemical treatment equipment~~	☐	☐	☐	☐	☐	☐
	o Control valves	☒	☐	☒	☐	☒	☐
	Distribution						
	o Flushing	☒	☐	☐	☐	☒	☐
	o Hydrants	☒	☐	☐	☐	☒	☐
	o Valve exercise	☒	☐	☐	☐	☒	☐
	o Tank inspection	☐	☒	☐	☐	☒	☐

List of Available O&M Resources

	Activity	Resources					
		SOP		Manufacturer's Specification		Log/Record Keeping Form	
		Have	Need	Have	Need	Have	Need
Operational	**Start-up**	☐	☐	☐	☐	☐	☐
	Routine Checks	☐	☐	☐	☐	☐	☐
	o Flow	☐	☐	☐	☐	☐	☐
	o Measuring chlorine residual; adding chlorine	☐	☐	☐	☐	☐	☐
	o Maintaining pressure	☐	☐	☐	☐	☐	☐
	o Visual inspection of facilities	☐	☐	☐	☐	☐	☐
	Sampling	☐	☐	☐	☐	☐	☐
	o Total Coliforms	☐	☐	☐	☐	☐	☐
	o Nitrates/Nitrites	☐	☐	☐	☐	☐	☐
	o	☐	☐	☐	☐	☐	☐
	o	☐	☐	☐	☐	☐	☐
	Shut-down	☐	☐	☐	☐	☐	☐
Maintenance	**Source**						
	o Well	☐	☐	☐	☐	☐	☐
	o Meters (e.g. flow)	☐	☐	☐	☐	☐	☐
	Treatment						
	o Chlorinator	☐	☐	☐	☐	☐	☐
	o Other chemical treatment equipment	☐	☐	☐	☐	☐	☐
	o Control valves	☐	☐	☐	☐	☐	☐
	Distribution						
	o Flushing	☐	☐	☐	☐	☐	☐
	o Hydrants	☐	☐	☐	☐	☐	☐
	o Valve exercise	☐	☐	☐	☐	☐	☐
	o Tank inspection	☐	☐	☐	☐	☐	☐

List of Available O&M Resources

	Activity	Resources					
		SOP		Manufacturer’s Specification		Log/Record Keeping Form	
		Have	Need	Have	Need	Have	Need
Operational		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
Maintenance							
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐

Standard Operating Procedures

Why is this important?

Standard Operating Procedures (SOPs) provide step-by-step instructions for completing O&M tasks. Well written SOPs provide direction, improve communication, reduce training time, and improve work consistency.

Ask yourself these questions:

1. What activities require SOPs?
2. Do I have up-to-date SOPs for all of my critical activities?

Building your Standard Operating Procedures

Step 1

- Review both example SOPs (blue paper). The first is a basic version of an SOP and the second is a more detailed version.

Step 2

- Using your list of available O&M resources, review which activities are missing SOPs at your water system.

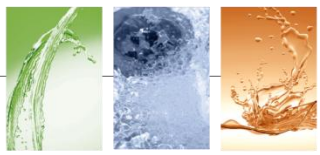
Step 3

- To develop each individual SOP, it is recommended you walk through the actual steps and take notes.

Step 4

- Using the templates provided (yellow paper) and your prepared notes, develop your tailored SOPs.

Colorado Department of Public Health and Environment



SOP For: Total Coliform Sampling

Date developed: 8/29/2011

Background

The Total Coliform Rule exists to protect public health by monitoring for fecal and other disease causing pathogens in drinking water.

Compliance with the Total Coliform Rule is based on the presence or absence of total coliform bacteria. If all routine samples tested negative (absent) for the presence of total coliforms, no additional testing is required for that monitoring period.

Routine samples per month = 1 sample

Sample locations = See monitoring plan siting plan. Samples should be both rotated and representative of the water system.

Number of repeat samples required = 4 samples (between 25-1000 population served)

SOP For: Total Coliform Sampling

Date Prepared: 10/7/2011

Background

of samples per month = 1

Sample location: (see monitoring plan siting plan)

# of repeat samples if (+) = 4 samples

Procedure

Step 1 - Pre-label the bottle and fill out the Chain of custody (COC) prior to sampling

Step 2 - Wash your hands prior to testing. Remember, you are working with a sterile bottle.

Step 3 - Remove faucet screen as it is a safe haven for bacterial growth

Step 4 - Disinfect with a 10% solution of clorox solution or rubbing alcohol from a spray bottle. (Do not flame as this is old school, and can be dangerous or could destroy the new age plastic faucets)

Step 5 - Run cold water for at least four to five minutes before collecting a sample.

Step 6 - Test your chlorine residual to assure that you have a representative residual. Record your chlorine residual on the bottle and on the COC.

Step 7 - Remove the seal, and open the bottle carefully, not touching the inside of the cap or inside of the bottle.

Step 8 - Do not set the cap down on the counter, but hold it between your fingers while collecting the sample

Step 9 - Fill the bottle slowly just above the fill line or 100 milliliter mark. (A little over is better than a little under)

Step 10 - Get the sample to the lab as soon as possible. Keep it chilled and in a cooler when transporting the sample

Sampling Notes

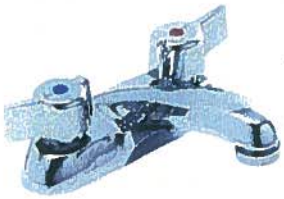
- Collect samples within the first part of the week, month, or quarter of your monitoring schedule
- All routine sample sites need to be representative of the entire system as well as rotated throughout the entire system
- Samples should not be taken from an outside spigot/hydrant, a tap that has a gooseneck faucet, or swivel faucet, as these faucets often generate false positives. (see pictures below)

Outside spigot

Gooseneck faucet

Swivel faucet

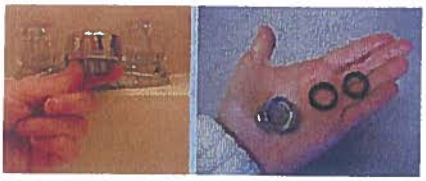
- Examples of **acceptable** sampling faucets:



Example I

Example II

Sampling Procedure

Step 1: Pre-label the bottle and fill out Chain of Custody (COC) prior to sampling.	
Step 2: Wash your hands prior to testing. Remember, you are working with a sterile bottle.	
Step 3: Remove faucet screen as it is a safe haven for bacterial growth.	
Step 4: Disinfect with 10% solution of Clorox solution or rubbing alcohol from a spray bottle. (Do not flame as this is old school, and can be dangerous or could destroy the new age plastic faucets)	
Step 5: Run cold water at least four to five minutes before collecting a sample	

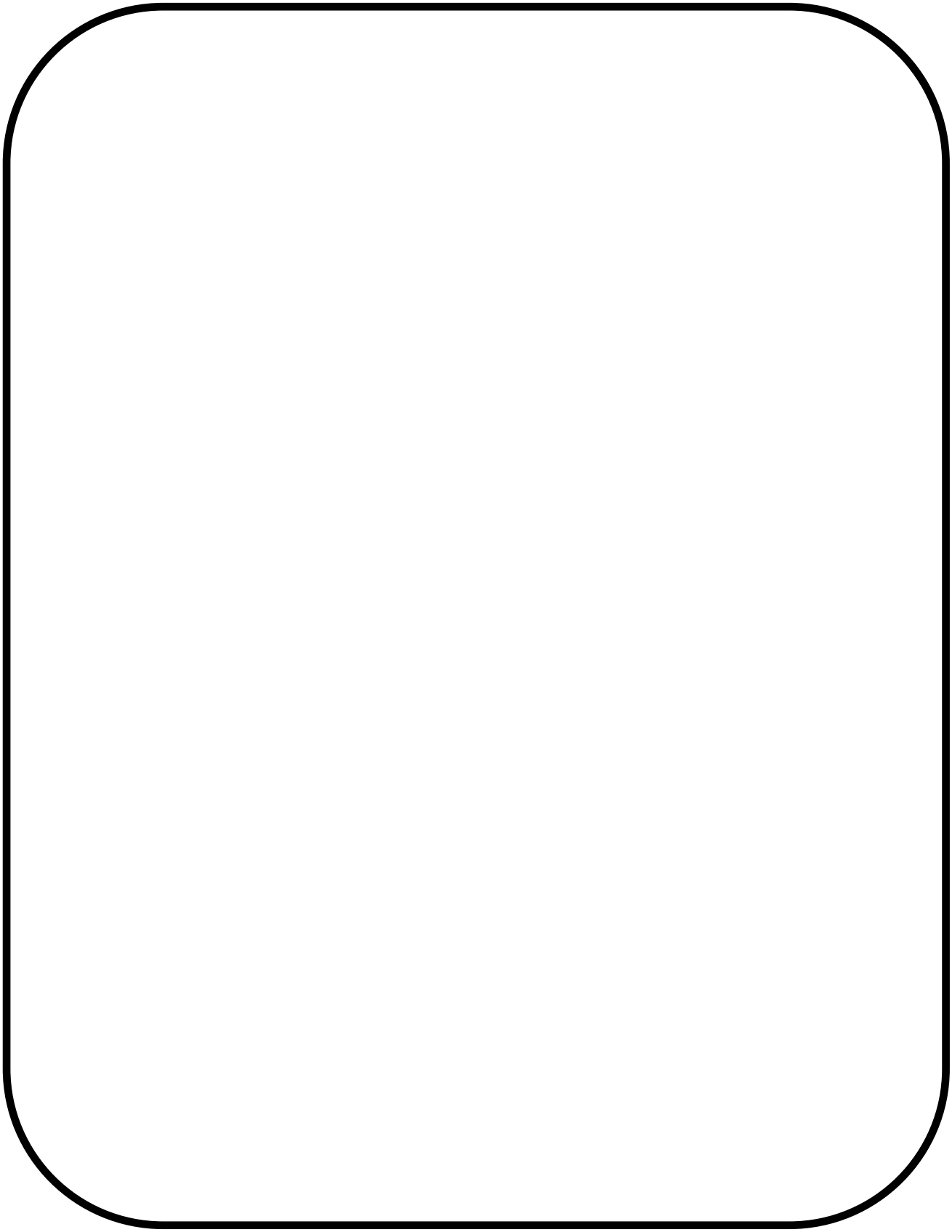
Step 6: Test your chlorine residual to assure you have a *representative* residual. Record your chlorine residual on the bottle and on the Chain of Custody.	
Step 7: Remove the seal, and open the bottle carefully, not touching the inside of the cap or the inside of the bottle.	
Step 8: Do not set the cap down on the counter, but hold it between your fingers while collecting the sample	
Step 9: Fill the bottle slowly just above the fill line or the 100 milliliter mark. (A little over is better than a little under the mark)	
Step 10: Get the sample to the lab as soon as possible. Keep it chilled and in a cooler when transporting the sample.	

SOP For: _____

Date Prepared: _____

Background

Procedure

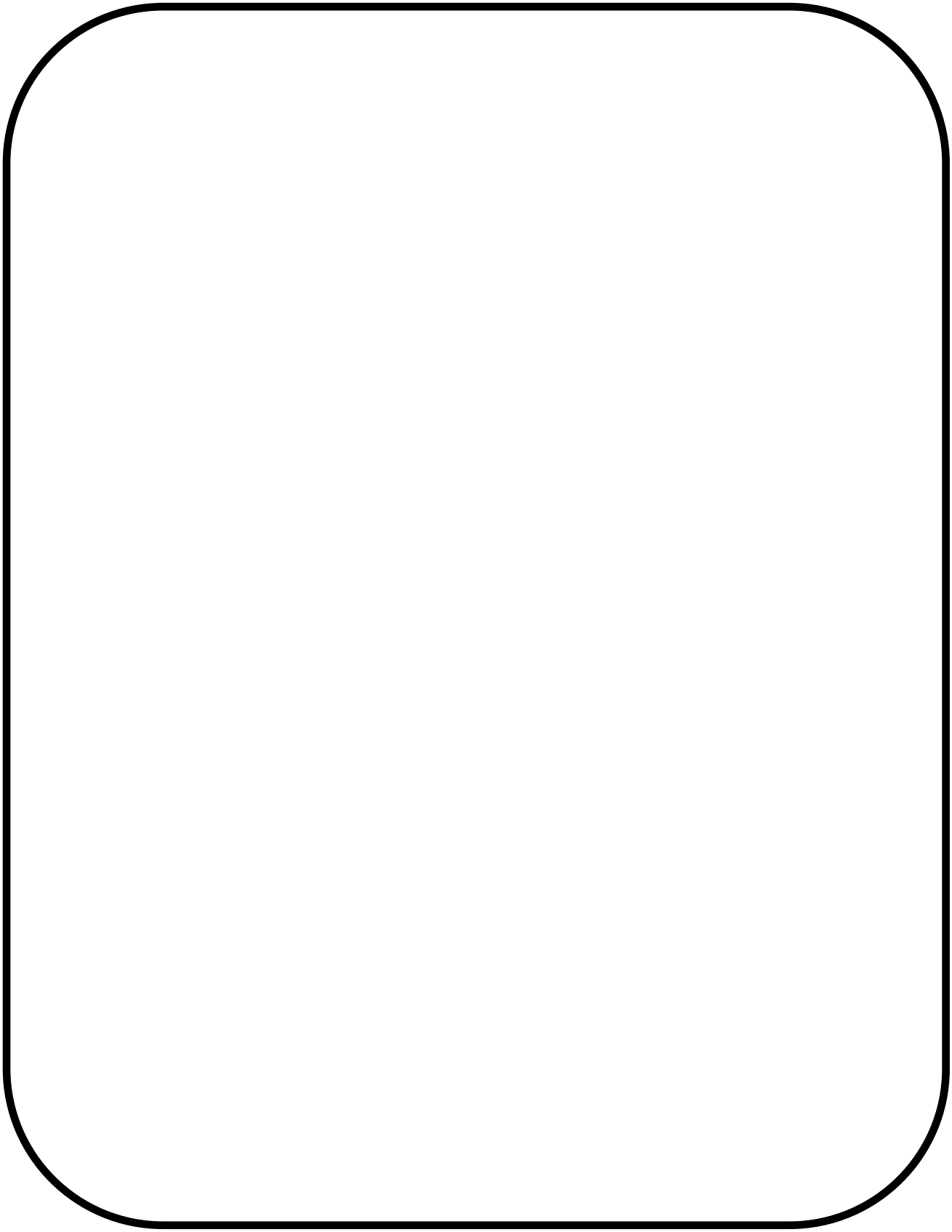


SOP For: _____

Date Prepared: _____

Background

Procedure

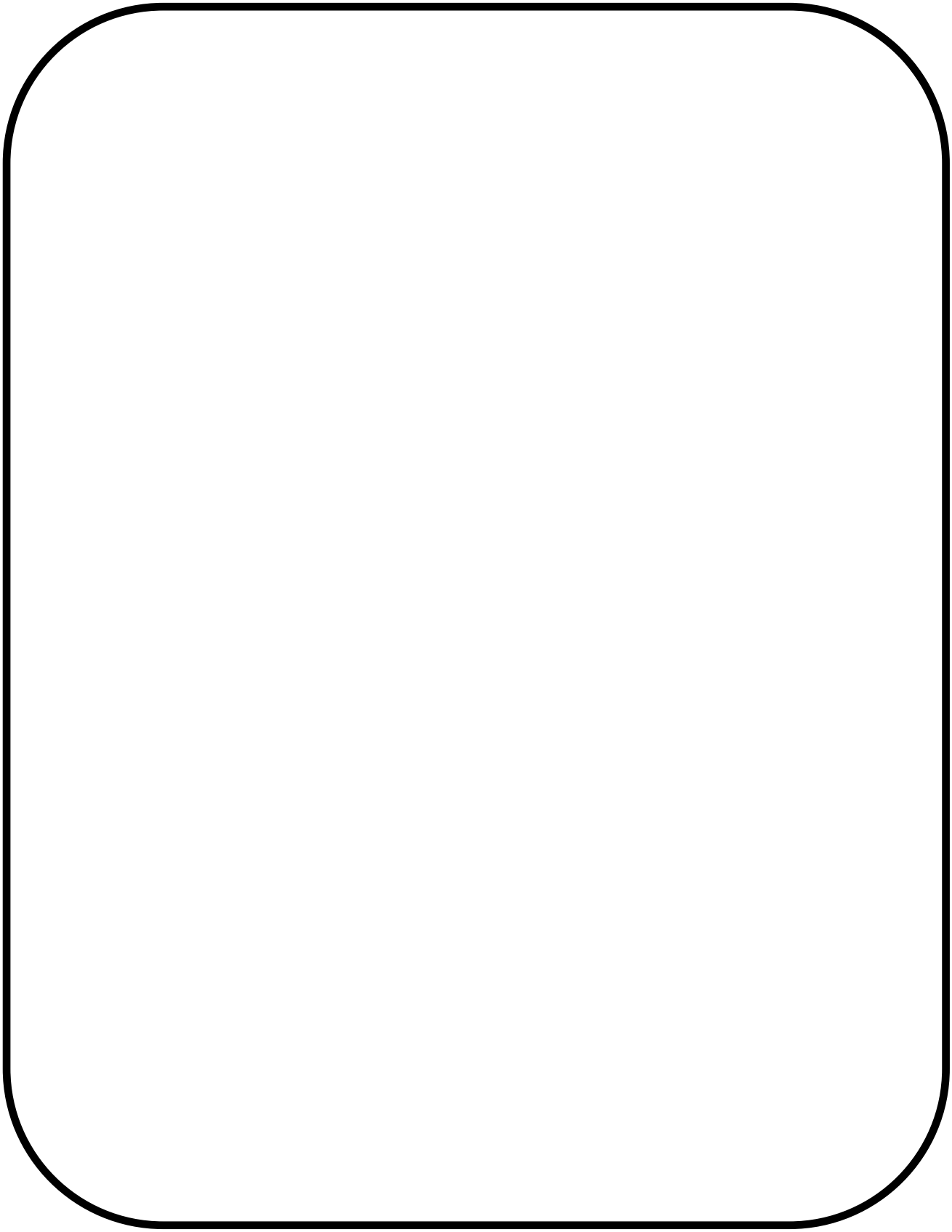


SOP For: _____

Date Prepared: _____

Background

Procedure

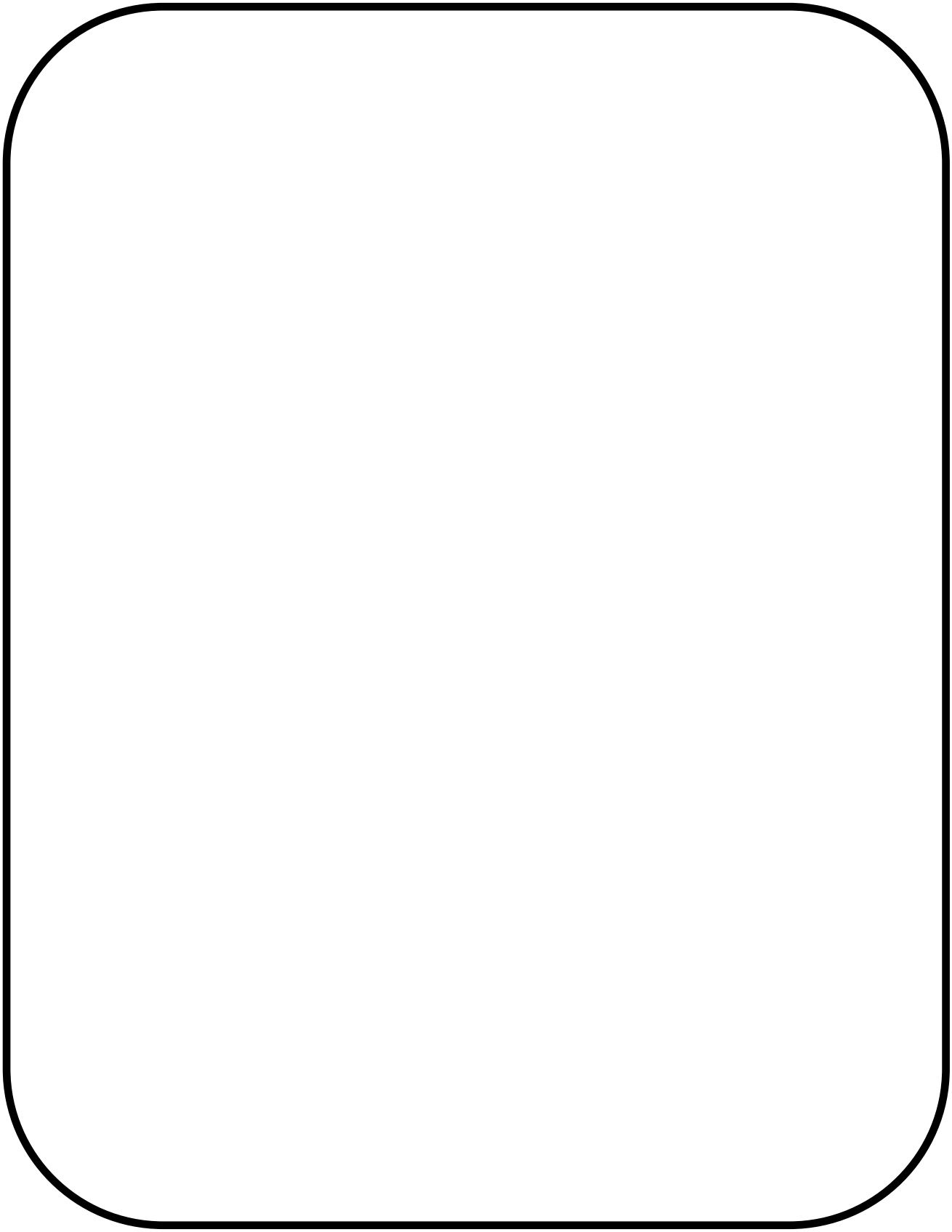


SOP For: _____

Date Prepared: _____

Background

Procedure



EXAMPLE

Routine Operations Log for PWSID# C0012345 (2012)

	Date	Time	Operator Initials	Chlorine Residual	Influent meter reading	Flow (gpm)	Pump setting	Solution tank level	Comments	Response actions taken
			TARGET	0.4 - 0.7	N/A	10	40/60	3'		
1	4/5	10:30	PN	0.4	101 K	10	40/60	3'		
2	4/12	10:00	PN	0.5	202 K	10	40/60	3'		
3	4/19	10:30	PN	0.4	309	10	40/60	2.5'		
4	4/26	10:30	PN	0.6	550	10	40/60	2.5'	Demand increase	Note demand next week
5	5/02	10:00	PN	0.5	670	10	40/60	2.25'	Demand returned to normal	
6	5/09	10:15	PN	0.6	770	10	40/60	2'	Solution Tank Low	Refilled to 3'
7	5/16	10:20	PN	0.4	870	10	40/60	3'		
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

Routine Operations Log for PWSID# _____

	Date	Time	Operator Initials	Chlorine Residual	Influent meter reading	Flow (gpm)	Pump setting	Solution tank level	Comments	Response actions taken
			TARGET							
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

Routine Operations Log for PWSID# _____

	Date	Time	Operator Initials	Chlorine Residual	Influent meter reading	Flow (gpm)	Pump setting	Solution tank level	Comments	Response actions taken
			TARGET							
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

Routine Operations Log for PWSID# _____

	Date	Time	Operator Initials	Chlorine Residual	Influent meter reading	Flow (gpm)	Pump setting	Solution tank level	Comments	Response actions taken
			TARGET							
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

Maintenance SOP/Logs

Recordkeeping/ Maintenance Logs

Why is this important?

The purpose of having well organized recordkeeping and maintenance logs is to document how you are maintaining and operating your system. Records and logs provide proof that activities were performed, help identify recurring or costly maintenance problems, support requests for funding new equipment, and are required to fulfill a variety of regulatory requirements.

Ask yourself these questions:

1. What O&M activities and information do I need to track in my water system?
2. Which activities require Operation/Maintenance logs?
3. How will I document these efforts?
4. Who is responsible for these records?
5. How can information from these records help me in other areas of my overall system management?

Building your record keeping/maintenance logs

Step 1

- Review the example recordkeeping/maintenance logs on the following pages (blue paper).

Step 2

- Using your list of available O&M resources, review which activities are missing recordkeeping/maintenance logs for your water system.

Step 3

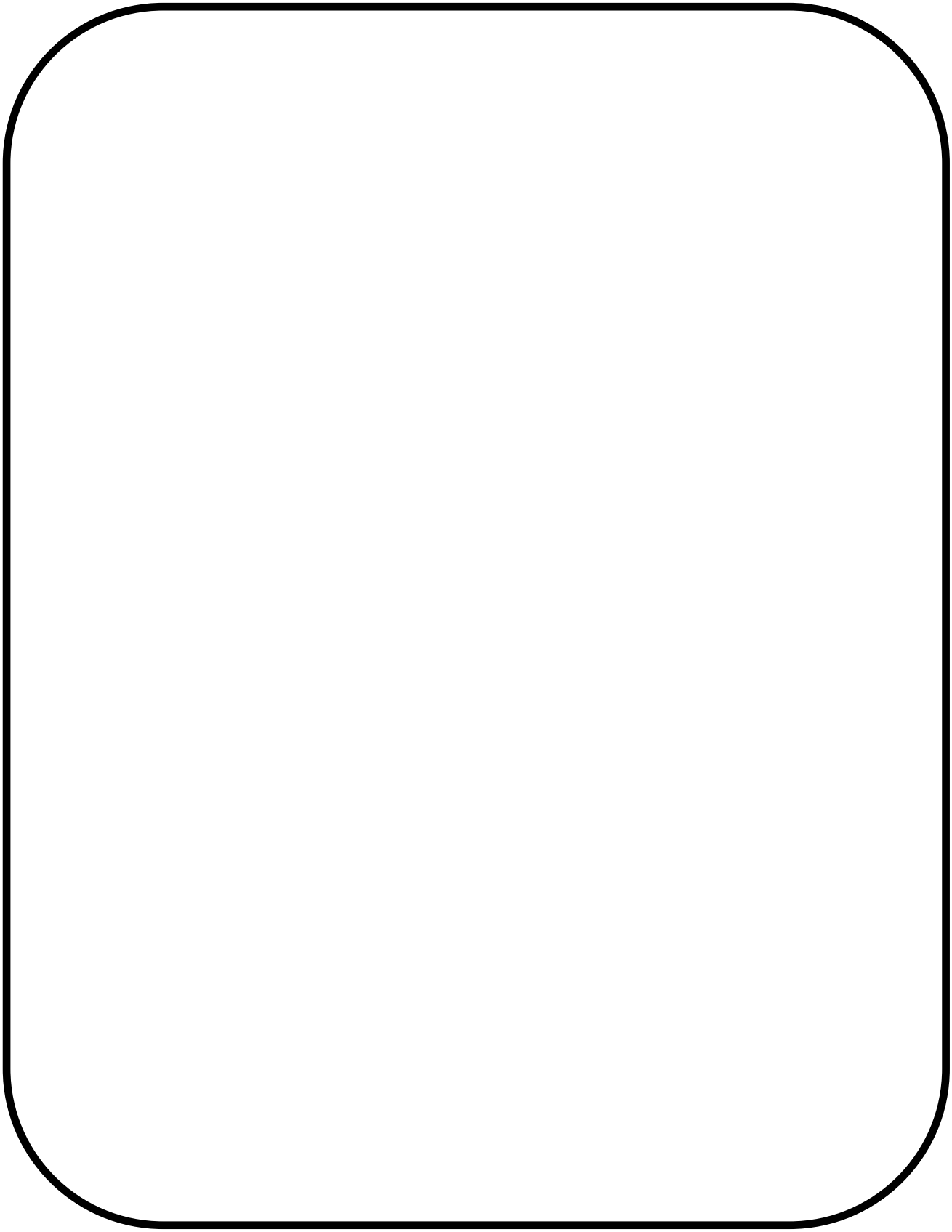
- Using the templates provided (yellow paper), prepare the missing recordkeeping/maintenance logs for your system. Brainstorm any additional recordkeeping/maintenance logs needed for your system.

SOP For: _____

Date Prepared: _____

Background

Procedure

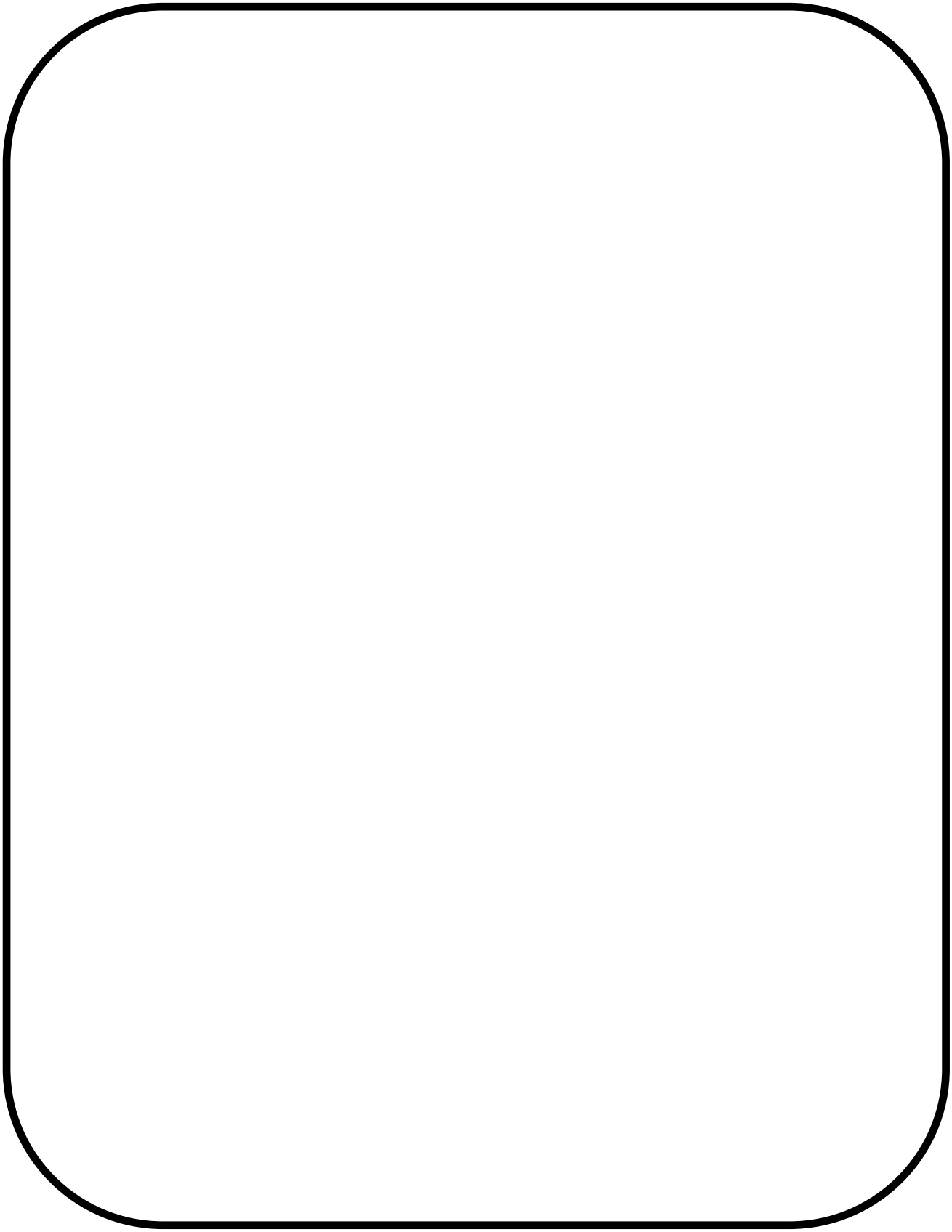


SOP For: _____

Date Prepared: _____

Background

Procedure



EXAMPLE

MAINTENANCE LOG

Maintenance Item	LMI Chemical Metering Pump
Vendor Contact #	1-215-293-0401
Model #	E722-363-SI
Serial #	96011342B
Installation Date	9/14/2002
Installation Location	Chem. Feed Building

Maintenance

Maintenance Activity	Date Performed	Notes
Replaced valve ball + seal rings	10/1/2010	Seal rings worn - Leaking at tubing
Replaced Diaphragm	12/17/2010	Yearly replacement of Diaphragm Also replaced valve/springs
Replaced Tubing	3/12/2011	Tubing had worn ends
Checked zero on pump/ re-zeroed pump	6/12/2011	Incorrect pump stroke length

Spare Parts

Spare Part List (From Manufacturer)		Spare Parts Inventory	
Part	Item #	Part	Number of Spare Parts
Rebuild kit	RPM-362/368	Seal Ring	5
Valve Balls	E70-498SP	Valve Ball	5
Tubing	Pipe 1/2" NPT-M	Diaphragm	2
Seal Ring	E70-498SR	Cartridge Valve	5
Cartridge Valve	E70-512 CV	Valve Spring	5
End Assembly	LE-362-SI	Tubing	25'

Maintenance Item	
Vendor Contact #	
Model #	
Serial #	
Installation Date	
Installation Location	

Maintenance

Maintenance Activity	Date Performed	Notes/Costs

Spare Parts

Spare Part List (From Manufacturer)		Spare Parts Inventory	
Part	**Item #**	**Part**	**Number of Spare Parts**

Maintenance Item	
Vendor Contact #	
Model #	
Serial #	
Installation Date	
Installation Location	

Maintenance

Maintenance Activity	Date Performed	Notes/Costs

Spare Parts

Spare Part List (From Manufacturer)		Spare Parts Inventory	
Part	**Item #**	**Part**	**Number of Spare Parts**

Maintenance Item	
Vendor Contact #	
Model #	
Serial #	
Installation Date	
Installation Location	

Maintenance

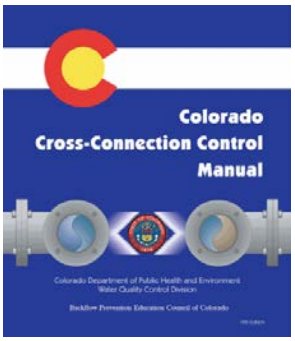
Maintenance Activity	Date Performed	Notes/Costs

Spare Parts

Spare Part List (From Manufacturer)		Spare Parts Inventory	
Part	**Item #**	**Part**	**Number of Spare Parts**

Cross Connection Control Program

Cross Connection Control Program



Why is this important?

The purpose of a cross connection control program is to prevent contaminated water from entering the potable water distribution system. This program is required to meet Colorado Primary Drinking Water Regulations.

Ask yourself these questions:

1. Where are my potential cross connection locations?
2. How will I communicate cross connection control concerns to the businesses and homes served by my water system?
3. Where do I need to install and maintain cross connection control devices?

Building your cross connection control program

Step 1

- Review and complete the attached template.

Step 2

- Review the Colorado Cross-Connection Control Manual for specific guidance. http://www.backflow.org/manual.htm

SAMPLE CROSS-CONNECTION CONTROL PROGRAM
For Small Systems

Introduction

This Policy addresses Article 12 of the Colorado Primary Drinking Water Regulations that states a public water system shall have no uncontrolled cross-connections to a pipe, fixture, or supply, any of which contain water not meeting provisions of the drinking water regulations.

A cross-connection is any point in a water distribution system where chemical, biological, or radiological contaminants may come into contact with potable water. During a backflow event, these contaminants can be drawn or pushed back into the potable water system. A backflow prevention device installed at every point of cross-connection prevents contaminated water from entering the potable water distribution system.

Any hazardous cross-connection discovered to be uncontrolled will be corrected within 10 days or the water service will shut off. The Colorado Department of Public Health and Environment will be informed of the hazardous connection and the corrective action being taken.

Identification of Potential Cross-Connections

Per Article 12, the **(add your name: (i.e. town's/municipality's/public water system's/district's)** operator performed a survey of the public water system on (**This Date)** and identified a list of potentially hazardous cross-connections, prioritized by degree of hazard. This list is included **on an attached sheet**. From this date forward, any new water service installation will be inspected for compliance with these requirements for backflow prevention.

Public Education

The **(add your name: (i.e. town/municipality/public water system/district)** will educate system users about the potential health risk that cross-connections pose, with an emphasis on cross-connections at or within homes and other residences.

Installation of Devices

The **(add your name: (i.e. town/municipality's/public water system's/district's)** will require system users to install and maintain backflow prevention devices on potentially hazardous service connections, as stated in Article 12. All service connections within the water system must comply with Article 12 and the *Colorado Cross-Connection Control Manual.*

Each cross-connection may require a different type of backflow prevention device, commensurate with the degree of hazard posed by the cross-connection. Approval for the devices needs to be given by the water system operator or, water system engineer.

Annual Testing

Article 12 requires that backflow prevention devices be tested annually by a certified backflow prevention technician. The following is a list of certified technicians in our area, their certification numbers, and contact information:

(provide list)

Record Keeping

Testing and maintenance records will be kept for three years, per the requirements of Article 12.

List of Backflow Prevention Devices

The following approved devices can be used for backflow prevention:

- Vacuum breaker
- Double-check valve assembly
- Reduced pressure principal backflow assembly
- Air gap

The Colorado Department of Public Health and Environment accepts the use of backflow preventers that have received approval by either University of Southern California Foundation of Cross-Connection Control and Hydraulic Research or the American Society of Sanitary Engineers (ASSE).

The following is a list of common cross-connections and devices that may be used to prevent backflow:

Type of Cross-Connection	Backflow Prevention Device
Hose bib	Vacuum breaker
Fire sprinkler system; Solar house using potable water as heat source	Double check valve assembly on water only line. Approved reduced pressure principal backflow assembly on branch lines carrying chemicals.
Photographic processors and developers	Reduced pressure principal backflow assembly
Hot water boilers	Reduced pressure principal backflow assembly
Water hauler tank filling station	Air gap

Additional resource:
Colorado Cross-Connection Control Manual; Corporate Discount Books, (303)465-0465

POTENTIAL CROSS-CONNECTIONS
SAMPLE LIST

"The water supplier must conduct a systematic survey of all facilities connected to the water distribution system before backflow prevention assemblies can be required at the service-connections. The survey can then be used to determine the degree of hazard posed by each facility connected to the water distribution system.

"Information in this manual, combined with interviews with facility managers, will help the water supplier to determine the degrees of hazard. Facilities presenting health hazards to the water distribution system will require containment assemblies. Those cross-connections viewed as the most severe hazards will have the highest action priority for correction."

Source: Colorado Cross-Connection Control Manual, March 2000, pages 11-12

System Survey Conducted By: _____ Date:_____

Potential Cross-Connection	Street Address of Potential Cross-Connection	Degree of Hazard: Contamination or health hazard = **High**, Pollution hazard = **Low**
Elementary school fire sprinkler system		
Photo developer		
Car wash		
Apartment building boiler system		
Irrigation sprinkler system		
Ice cream dipper well		
Construction site		
Residential hose bibbs		

EXAMPLE

Cross Connection Control Plan for PWSID # CO012345

In accordance with Article 12 of the Colorado Primary Drinking Water Regulations, the following Cross Connection Control program has been implemented to minimize the risk of contamination during a backflow and back pressure event.

It is the responsibility of this water system to:

- Identify potentially uncontrolled hazardous cross connections
- Require all service connections to install a containment device that is consistent with the degree of the potential for hazards posed by the uncontrolled cross connection.
- Approve of the installation of all containment devices
- Verify and retain records of annual testing for each containment device by a certified cross control technician for three years.
- Verify and retain records of maintenance for each containment device for three years.

Address	**Land use description** (Residential, Retail, Toxic Industrial, etc.)	**Required device type**	**Installation confirmed?** (Y/N)	**Annual testing, maintenance logs?** (Have/Need)
Grant Municipal Airport	Industrial	RPZ	Y	Have
Grant Fill Station	Commercial (Toxic)	RPZ	Y	Have
210 Grant Blvd.	Agriculture (Non-toxic)	Dual Check	Y	Have
Ole Grant Heights	Residential	Dual Check	Y	Have
New Grant Heights	Residential	Dual Check	N	Need

Cross Connection Control Plan for PWSID # _____

In accordance with Article 12 of the Colorado Primary Drinking Water Regulations, the following Cross Connection Control program has been implemented to minimize the risk of contamination during a backflow and back pressure event.

It is the responsibility of this water system to:

- Identify potentially uncontrolled hazardous cross connections
- Require all service connections to install a containment device that is consistent with the degree of the potential for hazards posed by the uncontrolled cross connection.
- Approve of the installation of all containment devices
- Verify and retain records of annual testing for each containment device by a certified cross control technician for three years.
- Verify and retain records of maintenance for each containment device for three years.

Address	**Land use description** (Residential, Retail, Toxic Industrial, etc.)	**Required device type**	**Installation confirmed?** (Y/N)	**Annual testing, maintenance logs?** (Have/Need)

Asset Inventory

Asset Management Plan

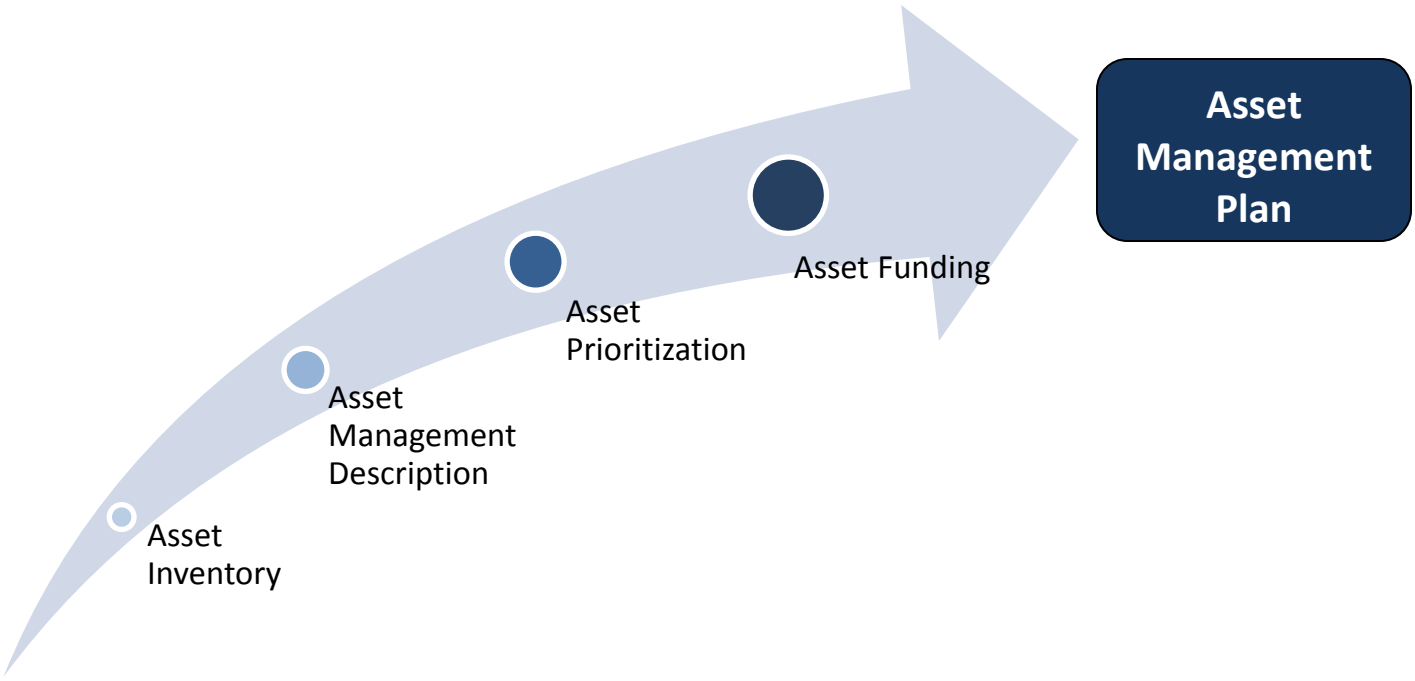
Why is this important?

Having a complete and up-to-date asset management plan will help you make better operational decisions, prepare for and respond to emergencies and plan and pay for future repairs and replacements. Understanding and maintaining your system's assets is critical to your system's long-term success.

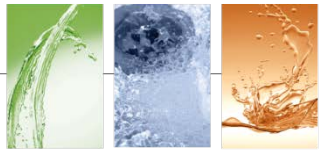
Ask yourself these questions:

1. Which assets are most critical to my water system operation?
2. What factors are important to the prioritization of my assets?
3. Do I have the available funds to pay for the maintenance, repair and replacement of assets?

Building your Asset Management Plan:



Colorado Department of Public Health and Environment



Asset Inventory

Why is this important?

The purpose of an asset inventory is to create a list of the critical assets/equipment in your water system and detail their condition, age and other important information. Having a complete asset inventory will aid in communicating current and future need for equipment repair or replacement.

Ask yourself these questions:

1. What should be included on my list of assets/equipment?
2. Where are my assets located?
3. How old are my assets?
4. What condition are my assets in?
5. Do I know the procedure for replacing assets?

Building your Process and Equipment List

Step 1
- Review example asset inventory list located on the next page (blue paper). Brainstorm a list of your water system's assets.

Step 2
- Using the template provided (yellow paper), list your system's assets in the first column.

Step 3
- List the location of the asset as well as the manufacturer name and contact information.

Step 4
- List the date when the asset was installed in the "Date in Service" column.

Step 5
- Describe the condition of the asset.

EXAMPLE

Date Worksheet Last Updated: 9/17/2011

System Inventory Worksheet				
Asset	**Location**	**Manufacturer Name/Contact Information**	**Date in Service**	**Condition**
Well	645 Park Ln.	ABC Groundwater Wells (864) 927-6142	1990	Good
Well Pump	645 Park Ln.	J+J Super Pump (864) 912-4276	1990	Good
Chlorine feed tank	100 Tribe Blvd	Inutech Inc. (269) 804-9165	2009	Good / Fair
Chlorinator	100 Tribe Blvd	XYZ Mfg. (394) -726-8194	2006	Good
Storage Tank	1601 W. Main	Inutech Inc. (269) 804-9165	2002	Good
Distribution System Piping	Throughout system	Piping Inc. (392) 816-4446	1952	Fair / Poor
Valve #1	645 Park Ln.	Floright Inc. (727) 814-9276	1990	Poor
Valve #2	1601 W. Main	Floright Inc. (727) 814-9276	1990	Poor

* Briefly describe the condition of each asset. Focus especially on conditions that may influence the useful life (for example, rust or broken parts)

Date worksheet last updated:

System Inventory Worksheet				
Asset	Location	Manufacturer Name/Contact Information	Date in Service	Condition

Briefly describe the condition of each asset. Focus especially on conditions that may influence the useful life (for example: rust or broken parts)

Date worksheet last updated:

System Inventory Worksheet				
Asset	Location	Manufacturer Name/Contact Information	Date in Service	Condition

Briefly describe the condition of each asset. Focus especially on conditions that may influence the useful life (for example: rust or broken parts)

Budget

Budget

Why is this important?

Having an up-to-date budget for your water system ensures your system has adequate resources to operate reliably and handle emergencies. As an operator, you should be familiar with and contribute to your system's budget.

Ask yourself these questions:

1. What are the key components to my daily, monthly, and yearly expenses?
2. Where do revenue and income come from?

Building your budget

Step 1

- Review example budget on the following page (blue paper).

Step 2

- Using the example provided, brainstorm other budget items to be included and add them to the template provided (yellow paper).

Step 3

- Using the template provided (yellow paper) and other information regarding your system's budget, fill out the your system's five year budget.

EXAMPLE

Revenue/Income	2011	2012	2013	2014	2015	Expenses	2011	2012	2013	2014	2015
Rates	$ 55,000.00	$ 55,000.00	$ 55,000.00	$ 55,000.00	$ 55,000.00	**Operations and Maintenance**					
Fees and Services	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	Salaries and Benefits	$ 30,000.00	$ 30,900.00	$ 31,827.00	$ 32,781.00	$ 33,765.00
Hookup Charges	$ -	$ -	$ -	$ -	$ -	Contract Operation	$ -	$ -	$ -	$ -	$ -
Grants & Loans - e.g. SRF						Maintenance	$ 1,000.00	$ 1,030.00	$ 1,060.90	$ 1,092.73	$ 1,125.51
Other Sources - e.g. interest	$ 200.00	$ 200.00	$ 200.00	$ 200.00	$ 200.00	Power and Other Utilities	$ 2,500.00	$ 2,575.00	$ 2,652.00	$ 2,731.00	$ 2,813.00
						Regulatory Fees	$ 500.00	$ 515.00	$ 530.00	$ 546.00	$ 563.00
						Treatment Chemicals	$ 100.00	$ 103.00	$ 106.00	$ 109.00	$ 112.00
						Monitoring/Testing	$ 2,000.00	$ 2,060.00	$ 2,121.00	$ 2,185.00	$ 2,250.00
						Transportation	$ -	$ -	$ -	$ -	$ -
						Materials, Supplies, and Parts	$ 150.00	$ 154.50	$ 159.14	$ 163.91	$ 168.83
						Office Suplies	$ 200.00	$ 206.00	$ 212.18	$ 218.55	$ 225.10
						Miscellaneous	$ 300.00	$ 309.00	$ 318.27	$ 327.82	$ 337.65
						General and Administrative					
						Engineering and Professional Services	$ -	$ -	$ -	$ -	$ -
						Insurance	$ 1,000.00	$ 1,030.00	$ 1,060.90	$ 1,092.73	$ 1,125.51
						Debt Service					
						Miscellaneous	$ 100.00	$ 103.00	$ 106.09	$ 109.27	$ 112.55
						Reserve Funds					
						O&M Reserve	$ 7,500.00	$ 7,500.00	$ 7,500.00	$ 7,500.00	$ 7,500.00
						CIP Reserve					
						Other Reserve	$ -	$ -	$ -	$ -	$ -
						Capital Projects					
						Multi-year/Recurring	$ 7,000.00	$ 7,000.00	$ 7,000.00	$ 7,000.00	$ 7,000.00
						One time				$ 2,500.00	
Total Revenue/Income	**$ 57,200.00**	**$ 57,200.00**	**$ 57,200.00**	**$ 57,200.00**	**$ 57,200.00**	**Total Expenses**	**$ 52,350.00**	**$ 53,485.50**	**$ 54,653.48**	**$ 58,357.00**	**$ 57,098.15**

	2011	2012	2013	2014	2015
Number of Taps:	250	250	250	250	250
Average Monthly Revenue Needed per Tap: (total expenses ÷ # of customers ÷ 12)	$ 17.45	$ 17.83	$ 18.22	$ 19.45	$ 19.03

Revenue/Income	2011	2012	2013	2014	2015	Expenses	2011	2012	2013	2014	2015
Rates						**Operations and Maintenance**					
Fees and Services						Salaries and Benefits					
Hookup Charges						Contract Operation					
Grants & Loans - e.g. SRF						Maintenance					
Other Sources - e.g. interest						Power and Other Utilities					
						Regulatory Fees					
						Treatment Chemicals					
						Monitoring/Testing					
						Transportation					
						Materials, Supplies, and Parts					
						Office Suplies					
						Miscellaneous					
						General and Administrative					
						Engineering and Professional Services					
						Insurance					
						Debt Service					
						Miscellaneous					
						Reserve Funds					
						O&M Reserve					
						CIP Reserve					
						Other Reserve					
						Capital Projects					
						Multi-year/Recurring					
						One time					
Total Revenue/Income	$ -	$ -	$ -	$ -	$ -	**Total Expenses**	$ -	$ -	$ -	$ -	$ -

	2011	2012	2013	2014	2015
Number of Customers:					
Average Monthly Revenue Needed per Customer:					

(total expenses ÷ # of customers ÷ 12)

EXAMPLE

Asset Management Plan

Date Worksheet Last Updated: 9/17/2011

Asset Management Plan										
	Description		Prioritization				Funding			
Asset[1]	Activity Type	Explanation	Justification	Repair/Replacement Date	Priority	Rank	Total Estimated Cost	Cost Per Year	Type of Expense	Funding Source[2]
Well	¤ Purchase ¤ **Project** ¤ Ongoing ¤ Other	Replace well	In 2030 well will be at the end of its useful life.	2030	¤ High ¤ Medium ¤ **Low**	8	$10,000	$525	¤ O&M ¤ **Capital** ¤ **One time** ¤ Recurring	¤ O&M ¤ **CIP** ¤ Loan ¤ Other
Well Pump	¤ **Purchase** ¤ Project ¤ Ongoing ¤ Other	Replace well pump	End of useful life in 2014.	2014	¤ High ¤ **Medium** ¤ Low	5	$4,000	$1,333	¤ O&M ¤ **Capital** ¤ **One time** ¤ Recurring	¤ O&M ¤ **CIP** ¤ Loan ¤ Other
Chlorine Feed Tank/Tubing	¤ Purchase ¤ Project ¤ **Ongoing** ¤ Other	Tubing/Tank repair + Maintenance	Required yearly replacement of tubing per manufacturers recomendation	2012	¤ **High** ¤ Medium ¤ Low	3	$ 500	$ 500	¤ **O&M** ¤ Capital ¤ One time ¤ Recurring	¤ **O&M** ¤ CIP ¤ Loan ¤ Other
Chlorinator	¤ **Purchase** ¤ Project ¤ Ongoing ¤ Other	Replace chlorinator	End of useful life in 2016.	2016	¤ High ¤ **Medium** ¤ Low	6	$ 4,000	$ 800	¤ O&M ¤ **Capital** ¤ **One time** ¤ Recurring	¤ O&M ¤ **CIP** ¤ Loan ¤ Other
Storage Tank	¤ Purchase ¤ **Project** ¤ Ongoing ¤ Other	Tank repair + replacement	In 2030 we will need to replace storage tank due to it being near end of life	2030	¤ High ¤ Medium ¤ **Low**	7	$ 15,000	$ 790	¤ O&M ¤ **Capital** ¤ **One time** ¤ Recurring	¤ O&M ¤ **CIP** ¤ Loan ¤ Other
Distribution System Piping	¤ Purchase ¤ **Project** ¤ Ongoing ¤ Other	Replace one section of piping per year	Piping is deteriorating at older sections of distribution system. Customer complaints	2014	¤ **High** ¤ Medium ¤ Low	4	$ 7,000	$ 7,000	¤ O&M ¤ **Capital** ¤ One time ¤ **Recurring**	¤ O&M ¤ **CIP** ¤ Loan ¤ Other
Valve #1	¤ **Purchase** ¤ Project ¤ Ongoing ¤ Other	Replace valve #1	Valve is in very poor condition + has no redundancy	2011	¤ **High** ¤ Medium ¤ Low	1	$ 1,000	$ 1,000	¤ O&M ¤ **Capital** ¤ **One time** ¤ Recurring	¤ O&M ¤ **CIP** ¤ Loan ¤ Other
Valve #2	¤ **Purchase** ¤ Project ¤ Ongoing ¤ Other	Replace valve #2	Valve is in very poor condition & has no redundancy	2011	¤ **High** ¤ Medium ¤ Low	2	$ 1,000	$ 1,000	¤ O&M ¤ **Capital** ¤ **One time** ¤ Recurring	¤ O&M ¤ **CIP** ¤ Loan ¤ Other
	¤ Purchase ¤ Project ¤ Ongoing ¤ Other				¤ High ¤ Medium ¤ Low				¤ O&M ¤ Capital ¤ One time ¤ Recurring	¤ O&M ¤ CIP ¤ Loan ¤ Other
	¤ Purchase ¤ Project ¤ Ongoing ¤ Other				¤ High ¤ Medium ¤ Low				¤ O&M ¤ Capital ¤ One time ¤ Recurring	¤ O&M ¤ CIP ¤ Loan ¤ Other

[1]Asset from Asset Inventory

[2]For Budget Template

Date Worksheet Last Updated:

Asset Management Plan										
	Description		Prioritization				Funding			
Asset[1]	**Activity Type**	**Explanation**	**Justification**	**Years until Action Needed**	**Priority**	**Rank**	**Total Estimated Cost**	**Cost Per Year**	**Type of Expense**	**Funding Source[2]**
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other

[1] Assest from Asset Inventory

[2] For Budget Template

Date Worksheet Last Updated:

Asset Management Plan										
	Description		Prioritization				Funding			
Asset[1]	Activity Type	Explanation	Justification	Years until Action Needed	Priority	Rank	Total Estimated Cost	Cost Per Year	Type of Expense	Funding Source[2]
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other
	⌑ Purchase ⌑ Project ⌑ Ongoing ⌑ Other				⌑ High ⌑ Medium ⌑ Low				⌑ O&M ⌑ Capital ⌑ One time ⌑ Recurring	⌑ O&M ⌑ CIP ⌑ Loan ⌑ Other

[1] Assest from Asset Inventory

[2] For Budget Template

Communication Strategy

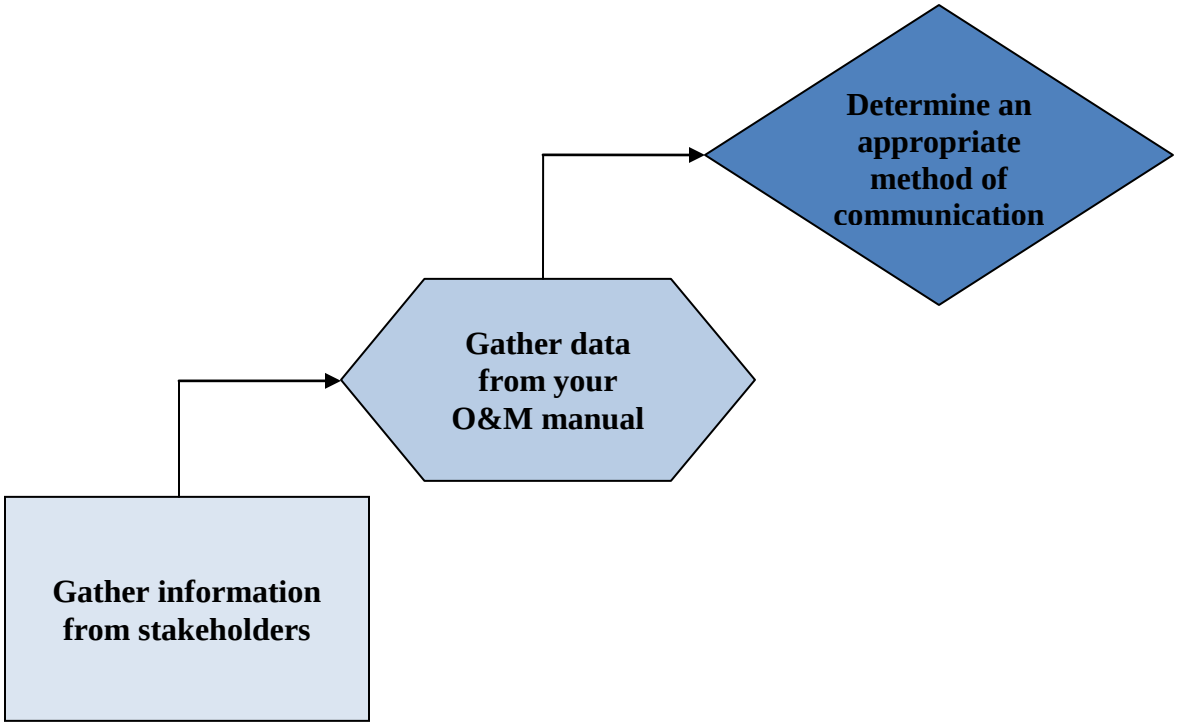
Why is this important?

As operator of your water system you are in the best position to advocate for the ongoing needs of the system. Use every chance to educate stakeholders about system strengths and opportunities for improvement.

Ask yourself these questions:

1. Who do I need to regularly communicate with?
2. What information do I need to gather from my stakeholders?
3. What data can I use to make my case?
4. What methods will I use to effectively communicate to my stakeholders?

Building your Communication Strategy



EPA
United States
Environmental Protection
Agency

Talking To Your Decision Makers:
A Best Practices Guide

Introduction	
Purpose	This Guide will help you better understand: ◆ The role of the local individual(s) or group(s) that oversee and make decisions affecting your water system. ◆ The benefits of having a good relationship with decision makers. ◆ How to effectively communicate your needs to these decision makers.
Target Audience	This Guide is intended for operators and owners of community water systems serving fewer than 10,000 persons.

General Responsibilities of Decision Makers	
Decision makers can play a significant role in ensuring that your system is operating efficiently, that your needs are addressed, and that your customers understand the challenges you face and recognize the hard work that you do.	
Financial Responsibilities	◆ Review and approve annual budgets and monitor annual spending. ◆ Make financial decisions to ensure your system has sufficient funds to meet current and future needs. ◆ Acquire and approve financing for infrastructure repairs or upgrades. ◆ Acquire and approve financing to enhance system security. ◆ Acquire and set aside funding for operator training and certification.
Managerial Responsibilities	◆ Hire and supervise system staff. ◆ Set staff policy and job descriptions. ◆ Set and provide guidance on system policies. ◆ Determine the strategic vision and goals for the system. ◆ Resolve staff conflicts and address staff needs or complaints.
Communication	◆ Keep customers informed of the current status of the system, upcoming projects, rate setting, staffing changes, and any other key decisions. ◆ Serve as a liaison between system staff and the community. ◆ Ensure that the community is aware of the system's emergency response procedures.

For additional information:
Call the Safe Drinking Water Hotline at 1-800-426-4791, visit the EPA Web site at www.epa.gov/safewater/, or contact your state drinking water representative.

Communicating Effectively with Decision Makers

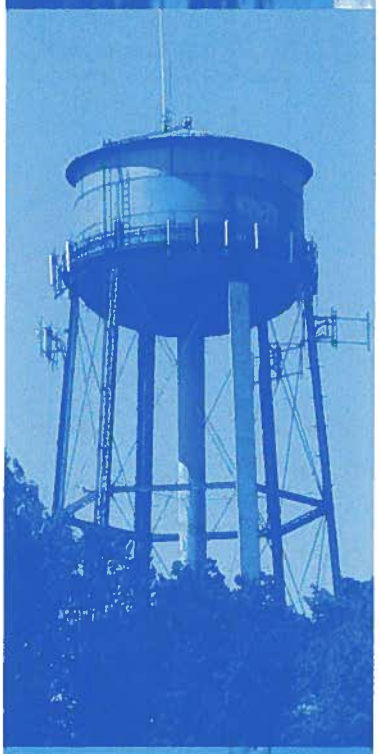
All decisions should be guided by principles that look to the present and future needs of the water system and what is best for the system's customers and the community. Speak with decision makers regularly to avoid communication mishaps and to develop responsive relationships with them. Your communication with decision makers can take many different forms, from short daily updates on your system to more formal meetings. Effective methods of communication include:

- Daily or weekly e-mail updates
- Phone calls for updates on specific issues or to get information
- Weekly memos with system status updates
- Suggestion boxes near bill collection areas
- Formal meetings or presentations for requests for new equipment or rate changes

If you already have a good relationship with decision makers, you have a good foundation for ensuring that these meetings are productive and successful. Regardless of your relationship, though, you should always approach meetings with a firm understanding of the issues, your goals, and the audience you are addressing (especially if meetings with decision makers are open to the public). Keep the following in mind when preparing for and attending a meeting with decision makers:

Carefully prepare your case and use supporting documentation.	
Infrastructure Upgrade	◆ Bring operational and maintenance records to the meeting with decision makers. ◆ Obtain cost estimates from reputable vendors.
Security System Upgrade	◆ Explain why the water system is vulnerable to security breaches. ◆ Explain how an upgrade will address these issues.
Rate Increase	◆ Bring documentation outlining the impact of past rate increases on your system. ◆ Bring estimates or financial models showing that the rate increase will help your system to continue to provide the appropriate level of service desired by customers.
Tailor your presentation according to the topic and the audience.	
New or Inexperienced Decision Makers	◆ Briefly describe your water system, your experience, and your training. ◆ Explain technical terms when talking to decision makers.
Understand Competing Demands	◆ Learn what other funding needs exist in the community. ◆ Explain how your project will protect public health and benefit the community.
Give decision makers the information they need to state your case to the community.	
Improve Communication with Customers	◆ Give decision makers non-technical, straightforward reasoning that they can repeat to consumers. ◆ Explain how your proposal will help your system to provide safe, high-quality drinking water to consumers.
Work with decision makers to develop solutions that everyone can agree on.	
Build Respect	◆ Work to understand decision makers' priorities and opinions and help them to understand your own. ◆ Realize that decision makers may not always be able to accommodate your suggestions, especially if decision makers must make community-wide funding decisions.
Understand Common Goals	◆ Remember that decision makers are working towards finding solutions that are in the best interest of the community. ◆ Build a strong working relationship with decision makers so that you can work together to achieve your ultimate goal of providing safe drinking water to the community.

EPA
United States
Environmental Protection
Agency



Water System Owner Roles and Responsibilities: A Best Practices Guide

Introduction

Purpose	This Guide will help you better understand: ◆ Your roles and responsibilities in delivering safe drinking water to your system's customers. ◆ Additional responsibilities, which can vary depending on your system size, characteristics (e.g., complexity of treatment), managerial structure, and regulatory requirements. All system owners share several key responsibilities that are critical to meeting your ultimate goal - providing an adequate and safe supply of drinking water.
Target Audience	This Guide is intended for owners and operators of all public water systems serving fewer than 10,000 persons.

System Operation

Work to ensure that the system as a whole is functioning properly, efficiently, and in a financially responsible way.

General Responsibilities

- Annually assess your system's technical, managerial, and financial capacity:
  - Ensure that your system's infrastructure (pumps, pipes, tanks, etc.) is in good working order.
  - Determine whether staffing levels are adequate.
  - Work with the system operator to ensure that all staff training needs are met.
  - Review your system's budget annually to assess whether your system is collecting enough revenue each year to cover costs of operating and maintaining the system.
- Determine and plan future infrastructure maintenance and replacement needs with the system operator.
  - Develop and maintain an asset management plan to inventory assets of the system.
  - Develop and maintain a Cross Connection Control and Backflow Prevention Program.
- Discuss treatment optimization with the system operator and develop an optimization plan that includes goals for the water system to meet.
- Identify available sources of local, state, and federal funding with help from regulators, planning departments, and technical assistance providers.

For additional information:
Call the Safe Drinking Water Hotline at 1-800-426-4791, visit the EPA Web site at www.epa.gov/safewater/, or contact your state drinking water representative.

Regulatory Compliance

Support your system in complying with all relevant regulations and protecting your customers' health.

General Responsibilities

- Make sure the system operator is aware of all relevant regulations, including sampling, reporting, and record keeping requirements.
- Stay informed of sample results and make sure all follow-up sampling, reporting, record keeping, and public notification requirements are met.
- Ensure the system is in compliance with existing and upcoming regulations; work with regulators as necessary.
- Communicate with state and local officials to increase your awareness of new and upcoming regulations and tools that can help promote regulatory compliance and system security (e.g., guidance material, new treatment technologies, etc.).

Communication

Maintain a positive relationship with customers, regulators, and the system operator and keep them informed of your efforts to provide high quality drinking water.

General Responsibilities

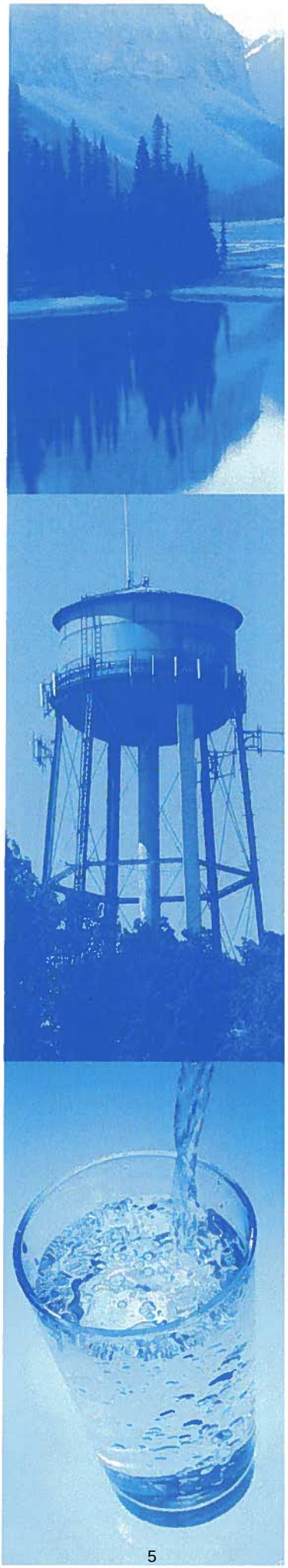
- Maintain open channels of communication with staff concerning budget issues, regulatory changes, or planned staffing changes.
- Inform customers of the need for infrastructure investments and rate changes and the resulting link to maintaining drinking water quality.
- Confirm that annual Consumer Confidence Reports are accurate and delivered on time, if applicable.
- Meet regularly with the operator for updates on routine system inspections and scheduled maintenance.

System Security

Protect your system against natural disasters and vandalism.

General Responsibilities

- Invest in any necessary security upgrades (e.g., fences around system facilities, closed-circuit television). Inspect critical facilities and components, including door locks and fencing, as part of daily inspections
- Update the Emergency Response Plan and participate in exercise drills with the system operator.
- Make sure that you and the system operator know whom to contact in case of an emergency.
- Develop procedures for handling new and terminated employees (e.g., collecting keys, changing locks and computer passwords).
- Communicate with state and local officials and your community to increase your awareness of new developments and tools.



EPA United States Environmental Protection Agency

TALKING TO YOUR CUSTOMERS ABOUT CHRONIC CONTAMINANTS IN DRINKING WATER

A BEST PRACTICES GUIDE

This fact sheet will help you understand the importance of communicating with the public about chronic contaminants – both regulated and unregulated. It also describes effective strategies for getting your message out.

What Are Chronic Contaminants?

Drinking water contaminants that can cause health effects after continuous long-term exposure at levels greater than the maximum contaminant level (MCL) are considered "chronic" contaminants. Examples of chronic drinking water contaminants regulated by EPA include inorganic contaminants like arsenic, cadmium, and copper; organic contaminants such as pesticides and industrial chemicals; and radiological contaminants like radium and uranium.

In contrast, "acute" contaminants can cause short-term health effects within hours or days of exposure. Microbes such as *E. coli* and *Cryptosporidium* are examples of contaminants that can cause an acute health risk. Some chronic-type contaminants can also fall in this category if they are present at high enough concentrations to cause immediate health effects. For example, nitrate levels over the MCL can cause "blue-baby" syndrome in children less than 6 months.

What Do My Customers Want To Know About Chronic Contaminants?

Your customers are likely to wonder:

- What types of chronic contaminants are in my drinking water?
- How do they get into my drinking water?
- Should I be concerned?
- What are the health effects?
- What is EPA's standard for these contaminants?
- What is my drinking water utility doing to reduce or remove these contaminants?

EPA's Web site has extensive information on each regulated contaminant and has several fact sheets on chronic contaminants that you can print out or order for your customers. For more information on the contaminants that are currently regulated by EPA, go to the EPA Web site at http://www.epa.gov/safewater/contaminants/.

Why Should I Talk To My Customers About Chronic Contaminants?

It is important that the public understands that there are no immediate health risks from consuming drinking water containing a regulated chronic contaminant at levels below the MCL. Customers should be aware that chronic contaminant levels exceeding the MCL could cause cancer, liver or kidney problems, reproductive difficulties, or other health effects. In addition, sensitive groups of people, such as the young, elderly, pregnant women, and cancer patients may be more susceptible to adverse health effects at any level of exposure.

Every communication with the public provides an opportunity to:

- Build the public's trust;
- Develop closer ties to your community;
- Explain your utility's commitment to delivering safe drinking water;
- Prepare the public for future communication about health risks; and
- Gain support for investment in their water system.

How Are Chronic Contaminants Regulated?

In 1974, Congress passed the Safe Drinking Water Act (SDWA) to give EPA the authority to set standards to ensure the safety of drinking water provided by public water systems. The SDWA, which was amended in 1986 and 1996, directs EPA to establish non-enforceable health goals called maximum contaminant level goals (MCLGs) which reflect the level at which no adverse health effects are expected from a particular contaminant. Once an MCLG is established, EPA sets enforceable standards for contaminants called maximum contaminant levels (MCLs). MCLs are set as close to the health goals as possible considering cost, benefits, and the ability of public water systems to detect and remove contaminants using appropriate treatment technologies. When there is no reliable method to measure a contaminant that is economically and technically feasible, EPA develops a treatment technique requirement rather than an MCL. EPA continues to assess the occurrence of unregulated contaminants through the Unregulated Contaminant Monitoring Regulation (UCMR). Information about the UCMR can be found at http://www.epa.gov/safewater/ucmr/.

What Kind of Public Notification about Chronic Contaminants is Required?

EPA published a revised Public Notification Rule on May 4, 2000 to make it easier and more effective to communicate with consumers. Public notification is required for any of the following SDWA violations:

- Exceedances of maximum contaminant levels (MCLs) or maximum residual disinfectant levels (MRDLs);
- Violation of treatment techniques;
- Monitoring and testing procedure violations; and
- Failure to comply with the schedule of a variance or exemption.

Other situations (not violations) that require public notification include:

- Operation under a variance or exemption;
- Occurrence of a waterborne disease outbreak or other waterborne emergency;
- Exceedance of the secondary maximum contaminant level for fluoride;
- Availability of unregulated contaminant monitoring results;
- Exceedance of the nitrate MCL in non-community systems that have been granted permission by the primacy agency to continue to exceed the nitrate MCL of 10 mg/l (although they must not exceed 20 mg/l).

More information on public notification requirements can be found at http://www.epa.gov/safewater/publicnotification/.

How Can I Talk To My Customers?

When proactively engaging the public about chronic contaminants, public water systems have many options. In addition to providing required annual Consumer Confidence Reports, other avenues for communication may include:

- Host public meetings;
- Invite the public on facility tours;
- Publish articles in local newspapers;
- Provide interviews on local television and radio programs;
- Host a Web-based discussion forum;
- Post notices in places groups congregate (grocery stores, community centers, health clinics, etc.);
- Use bill inserts; and
- Partner with local government officials, healthcare providers, religious institutions, elder care providers, and other community leaders to share information.

What Are Some Best Practices For Effective Communication About Chronic Contaminants?

If you expect that your public water system will exceed EPA's standard for a contaminant or that the costs of compliance may require public funding, communicate early and often. The most effective communication efforts follow these simple steps:

- Provide simple, straightforward, *and consistent* messages;
- Describe potential adverse health effects and populations at risk;
- Describe actions you are taking to correct the situation and when you anticipate it will be resolved;
- Describe actions the consumer can take such as using alternate water supplies and when to seek medical help;
- Provide links to useful information resources such as EPA's Web site.
- Use graphics, photographs, maps, charts, and drawings to illustrate your messages;
- Assume that consumers will only read the top half of the notice or what can be read in ten seconds;
- Display important elements in bold and/or large type in the top half of the notice;
- Communicate in multiple languages to meet the needs of your non-English speaking consumers; and
- Include contact information for further information in *all* communications.

Where Can I Learn More About Chronic Contaminants and Communication?

To learn more about chronic contaminants, visit EPA's Safe Drinking Water Web site at http://www.epa.gov/safewater or call the Safe Drinking Water Hotline at 1-800-426-4791.

A useful primer on health risk communication can be found at http://www.atsdr.cdc.gov/risk/riskprimer/.

Office of Water
www.epa.gov/safewater

EPA 816-F-07-022
October 2007

Communication Strategy

Communication Assessment and Strategy

Why is this important?

Identifying your stakeholders and developing a communication strategy helps you maintain positive relationships with customers, regulators, and decision makers, and helps you keep them informed on important aspects of the water system.

Ask yourself these questions:

1. Who do I need to regularly communicate with?
2. What do I need to communicate to my stakeholders?
3. When do I need to communicate?
4. How/what methods will I use to effectively communicate to my stakeholders?

Building your communication assessment and strategy

Step 1
- Review example communication assessment and strategy tool on next page (blue paper).

Step 2
- Using the template provided (yellow paper) in the first row identify the audience or stakeholder who requires information. Provide their name if available.

Step 3
- In the second row, write down the type of information required by the stakeholder.

Step 4
- In the third row identify the frequency of communication with the stakeholder.

Step 5
- In the last row, write down the methods of communication that will typically be used for communicating with this stakeholder.

Communication Assessment and Strategy Tool

Audience (Stakeholders)	Customers	Board	Specific Customers		
Topic/Information Required	Consumer Confidence Water Quality Report	Routine water system report	Notice about upcoming line flushing		
Frequency of Communication	Annually	Monthly	Two weeks in advance of activity		
Methods of Communication	Included in bill	Presentation at Board meeting	Door hangar or email or reverse 311		

Communication Assessment and Strategy Tool

Audience (Stakeholders)					
Topic/Information Required					
Frequency of Communication					
Methods of Communication					

Communication Planning and Delivery

Why is this important?

Having a communication plan helps you organize your thoughts and communicate effectively with all of your stakeholders.

Ask yourself these questions:

1. What do I need to accomplish? (Am I relaying information or asking for something?)
2. Why is this information important?
3. How can I most effectively communicate my point to my superiors?

Building your communication planning and delivery

Step 1
- Review example communication planning tool on next page (blue paper).

Step 2
- Using the templates provided (yellow paper), circle what type of information you are trying to communicate, your method of communication, and your audience.

Step 3
- In the next box, write down the primary purpose for your communication and any action or decision you would like to get out of the communication event.

Step 4
- Next, write as many examples of why this communication is important.

Step 5
- What are the impacts of your decision? (For example, are there regulatory, financial or operational impacts that you need to communicate?)

Step 6
- Finally, write down any associated costs of the activity and where you think the funding could come from, any deadlines for decision makers, and steps for follow-up.

Communication Planning Tool

Circle the type of activity, method and audience:

(1) Type of Activity: (a) Purchase Equipment (b) Project Update (c) Announcement (d) Other _____

(2) Method: (a) Memo (b) Email (c) Presentation (d) Other _____

(3) Audience: (a) Board or Council (b) System Owner or Supervisor (c) Customers (d) Other _____

Primary Purpose for Communication:

Need a new valve at the well head

Is there a specific action or decision required?

Approval of $1000.00 for a new value

Why is this Important?

1. Valve is in poor condition and needs replacing before it fails.
2. There is no redundancy for this valve, so if it fails, the water system must shut down
3.

Impacts of Your Decision (Positive or Negative):

If this fails, there is no redundancy and the town will be without water.

Financial (if applicable)

1) **Cost** $1,000.00

2) **Options considered/multiple bids (if applicable)** N/A

3) **Source of funding** Capital Projects Budget

Timing, Deadline(s)/Due Date(s):

ASAP

Follow Up Plan and Contact Information:

If approved, construction will begin immediately

EXAMPLE EMAILS

Not So Good

Email

Subject: Reminder of 10am Meeting Sched. 10/05 on PASS Process.

Subject: Meeting

Hi Jim,

I just wanted to remind you about the meeting we have scheduled next week. ☺ Do let me know if you have any questions!!!!

Cute but emoticons and overuse of exclamations don't look professional.

Best wishes,

Mark

The friendly tone is okay but essential details are missing. If Jim hasn't heard anything about the meeting, or forgotten about it, he'll have to write back for more information.

Better

Subject: Reminder of 10am Meeting Sched. 10/05 on Rate Setting

The subject is specific and relevant. Jim doesn't even have to open the email to have the basic information

Hi Jim,

I just wanted to remind you about the meeting we have scheduled for Monday, October 5, at 10:00am. It's being held in conference room A, and we'll be discussing the new proposed rates.

If you have any questions, feel free to get in touch (x3024).

Best Wishes,

Mark

EXAMPLE MEMOS

Not So Good

To: Katherine

From: Steve

Date: 20 October 2011

Subject: Quitting

I am putting this in writing so you know that I quit.

It's been real.

Better

To: Katherine Chumen, System Owner

From: Stephen Tusker, Operator

Date: 20 October 2011

Subject: Notification of My Resignation

Purpose of memo

I am writing to inform you of my intention to resign as operator of the Sierra Trailer Park.

I have enjoyed working at the trailer park for the past four years. The training has been excellent and I have gained valuable experience working within an efficient and professional team environment. In particular, I have appreciated your personal guidance during these first years of my career.

I feel it is time to further develop my knowledge and skills in a different environment. Before I leave, I would like to offer my assistance in finding and training a replacement so the system maintains uninterrupted service.

I would like my last work day to be Saturday, 19 November. This will allow me to complete my current workload and help train a new operator. I hope this is acceptable to you.

Once again, thank you for your support.

Indicates timing for decision and why

Explains the positive and negative impacts of the decision

Communication Planning Tool

Circle the type of activity, method and audience:

(1) Type of Activity: (a) Purchase Equipment (b) Project Update (c) Announcement (d) Other _____

(2) Method: (a) Memo (b) Email (c) Presentation (d) Other _____

(3) Audience: (a) Board or Council (b) System Owner or Supervisor (c) Customers (d) Other _____

Primary Purpose for Communication:

Is there a specific action or decision required?

Why is this Important?

1.

2.

3.

Impacts of Your Decision (Positive or Negative):

Financial (if applicable)

1) **Cost**

2) **Options considered/multiple bids (if applicable)**

3) **Source of funding**

Timing, Deadline(s)/Due Date(s):

Follow Up Plan and Contact Information: