TCEQ REGULATORY GUIDANCE
Small Business and Environmental Assistance Division
RG-501 Introduction • April 2014

Managing Small Public Water Systems: Introduction

Who should use this guide?

This guide is for any person involved in the management or operation of a small utility. This includes the following groups:

- utility board members
- utility owners
- system operators
- council members
- utility managers

How will this guide help?

This utility-management guide is not intended to be exhaustive but—used correctly—it will guide you in the right direction. It will help you, the owner or operator:

- understand the rules
- comply with the rules
- develop tools to plan for, manage, and operate a sustainable utility

This guide also contains worksheets and tables that you can keep in a file or binder and add to as things change at the utility.

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at <info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=3&ti=30&pt=1>.

How is this guide organized?

This guide is organized into five parts, each available as a separate document.

Part A. Asset Management

Part A includes worksheets and instructions to help you conduct an inventory of the water system's resources; prioritize repairs and replacements; plan for future needs; and develop a budget.

Part B. Source Assessment and Planning

Part B explains how to identify your utility's drinking-water source; follow best-management practices for sustaining your source; and identify options for alternative sources, if needed.

Part C. Operation and Maintenance

Part C provides worksheets that help you create your own operation and maintenance manual for your utility and maps out a program for scheduling and performing preventive and general maintenance.

Part D. Compliance

Part D describes the investigation and enforcement process; identifies the violations that can lead to fines and enforcement; presents enforcement scenarios for water systems; and provides tables that summarize the requirements for sampling, monitoring, and reporting.

Part E. Resources

Part E includes a listing of resources that may help you as you create and carry out your asset management plan and conduct everyday operations at your facility.

Where can I go for more help?

For one-on-one compliance assistance, contact the Small Business and Local Government Assistance (SBLGA) specialist in the TCEQ office for the region where you are located, or call the SBLGA hotline, 800-447-2827.

For financial, managerial, and technical assistance, contact the TCEQ's Water Supply Division at 512-239-3105.

How can I obtain TCEQ publications?

Publications produced by the TCEQ are available to order or download on the Web page at <www.tceq.texas.gov/publications>. Click on the first link, Catalog of Current Publications, and conduct a Current Titles Search.

To order copies of a publication, please contact the Publications Section at 512-239-0028, or by mail:

TCEQ Publications, MC 118
PO Box 13087
Austin, TX 78711-3087

For More Information

For confidential assistance with environmental compliance, contact the Small Business and Local Government Assistance Hotline at 800-447-2827, or visit <www.TexasEnviroHelp.org>.

TCEQ REGULATORY GUIDANCE
Small Business and Environmental Assistance Division
RG-501a • April 2014

Managing Small Public Water Systems: Part A, Asset Management

Contents

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY • PO BOX 13087 • AUSTIN, TX 78711-3087

Introduction

Part A of the *Managing Small Public Water Systems* series includes worksheets and instructions to help you conduct an inventory of your utility's resources; prioritize repairs and replacements of assets; plan for future needs; and develop a budget. As an addendum to this part of the guide, we have also developed an electronic workbook that contains all the worksheets and instructions that are included in Part A, Asset Management. An electronic version of Part A is available at the SBLGA's Public Water Supply Compliance Tools Web page: <www.tceq.texas.gov/goto/help4pws>.

As you work though Part A, you may find it beneficial to review other parts of the series to help you prepare a comprehensive asset management plan. To view or download the complete series go to the TCEQ Small Business and Local Government Assistance section's Web page Public Water Supply Compliance Tools at <www.tceq.texas.gov/goto/help4pws>. If you do not have Internet access, call the SBLGA's hotline number 800-447-2827 for a paper copy of the complete series *Managing Small Public Water Systems* (publication RG-501).

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at <info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=3&ti=30&pt=1>.

Asset Management: The Basics

What is asset management?

Asset management can be defined as "a planning process that ensures that you get the most value from each of your assets and have the financial resources to rehabilitate and replace them when necessary." This includes "developing a plan to reduce costs while increasing the efficiency and the

reliability of your assets."* For a water system, an "asset" includes the source of water (aquifer or surface water), along with any building, tool, piece of equipment, furniture, pipe, and machinery used in the operation of the system.

Asset management can help you—the manager or operator—get the most value out of the assets that make up your water system. It can also help you maintain the financial capacity to make scheduled repairs and planned replacement of assets *before* there is a crisis.

This guide includes instructions and worksheets to help you complete each of the four steps of asset management. You should adjust your plan based on your own experience and the particular characteristics of your system. You should also reevaluate your plan every year, updating each of the worksheets provided in this booklet. Your plan is useful only as long as it reflects the current conditions of your water system.

To ensure your system is sustainable for the next five to 30 years, it is important to evaluate immediate needs along with future needs. For successful asset management planning to occur, you must consider:

- potential growth or decline in population served
- equipment cost
- inflation
- overall age and life span of the infrastructure within your system

How do I practice proper asset management?

Step 1. Take an inventory of your system and prioritize your assets.

Document what assets you have and determine how critical each of your inventoried assets is to your plant operations. This will help you make informed decisions to ensure that you have funds available for the repair or replacement of the vital parts of the system.

* *Asset Management: A Handbook for Small Water Systems*. U.S. Environmental Protection Agency, 2003, page 5.

Step 2. Develop a comprehensive plan for managing your assets.

Based on your prioritization in Step 1, identify the repairs and replacements you expect to make in the next five years and the estimated amount of money your system needs to set aside or reserve for these expenses.

Step 3. Develop a budget for managing your assets.

Based on your comprehensive plan from Step 2, identify your expected revenues for the next five years—and compare them to your expected expenses. This process may involve conducting a rate study.

Step 4. Implement your asset-management plan.

Once you have completed the initial three steps of your asset-management plan you need to implement it. Work with your management team—including council and board members, if appropriate—to complete your identified repairs and maintenance, and to make sure that you have the technical and financial means necessary to provide reliable service.

1. Inventory Your System and Prioritize Your Assets

Use the System Inventory and Prioritization Worksheet at the end of this section to create a comprehensive inventory of your system and to prioritize your assets. Developing an accurate inventory of your system's assets is important to overall asset management, as all other steps will refer back to the data gathered during this step. It will also help you to establish the relative importance of the equipment and components of your system, and especially to identify the assets that are most critical to operations. A utility's assets include the facilities that make up the water system as well as all the equipment and supplies that are used to operate the plant.

The most significant asset of a water system is the water source. A well-run system is worthless without a reliable water source and delivery system. If you have not assessed the health and sustainability of your water source and you are not maintaining water-availability data, you should complete

Part B of this series: *Source Assessment and Planning* (publication 501b). You may find it necessary to make adjustments to your budget if you need to drill a new well or make an interconnection with another system.

You will need to assess your source to ensure that it is reliable for the long term and that your well field or surface water intake is adequate to provide water to your system. If you have assessed your source and you know your source is reliable for the long-term, you may not need to include expenditures for well drilling or rehabilitation in this year's budget. However, it is a good idea to assess your source annually to ensure that your system maintains an adequate water supply.

Fill Out the System Inventory and Prioritization Worksheet

Before you begin to fill in the columns on the worksheet, fill in the date and check the appropriate box to indicate whether you are making the first inventory of your system or updating an existing inventory. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets changes, or start a new worksheet each year.

1. Identify your assets.

List each of your utility's assets, including pumps, chlorinators, wells, tanks, buildings, vehicles, intake structures, lift stations, water mains, and all other physical assets and the year of installation. Be as specific as possible by providing the location, manufacturer, material composition, horsepower (hp), gallon-per-minute (gpm) capacity, or other identifying characteristics for each asset; or refer to this information if it is included in your operations and maintenance manual. This information will be useful when calculating replacement costs in step 7. For example, you might list a piece of equipment as "Well 1 pump (25 hp, 200 gpm), 2003" or a section of your distribution system as "10-inch PVC on Main St."

2. Describe the redundancy.

Briefly describe the redundancy of each of the system's assets (certain equipment redundancy is required by rule for drinking water systems

in Title 30, Texas Administrative Code, Chapter 290 [30 TAC 290], Subchapter D). Are there backups? Are there different assets that can do the same job?

3. Fill in the expected useful life.

Use the manufacturer's recommendations, if available, or the information in Table 1 to enter the expected useful life for each asset. Table 1 provides the estimated useful life span for many standard pieces of equipment, assuming proper maintenance has been conducted. For new equipment, use the higher end of the expected useful life.

Keep in mind the current condition of each asset as well as routine maintenance activities, repairs and rehabilitation. Refer to the Repair Work Order Worksheet in Part C of this series: *Operations and Maintenance* (RG-501c). Focus on conditions that may affect its useful life (e.g., rust or broken parts). If your asset is in poor condition, has not been maintained according to the manufacturer's recommendations, or operates under challenging circumstances (poor water or soil quality, excessive use, etc.), then the expected useful life is likely to be on the lower end of the range. If the asset is in good condition and has been properly maintained according to the manufacturer's recommendations, use the higher end of the expected useful life. Choosing the lower end of the useful-life range will produce a more conservative estimate, which will help to ensure that you are prepared to replace the asset in a worst-case scenario.

The expected useful life is affected by several factors, such as the quality of the maintenance and the location of the utility. For example, utilities in areas of the state with corrosive environments, such as near the Gulf of Mexico may need to replace their equipment more frequently.

4. Record the age.

For each asset, fill in how long it has been in use. If an asset has been previously used by another system, you should list the total age, not just the length of time your system has used it.

Table 1. Estimated Useful Life Span for Standard Pieces of Equipment

Asset	Expected Useful Life (years)
Backflow prevention	8–15
Blow-off valves	35–40
Buildings	~30
Chlorination equipment	10–15
Computers	5
Distribution pipes	35–40
Electrical systems	7–10
Fencing	10–20
Galleries and tunnels	30–40
Generators	10–20
Hydrants	~40
Intake structures	35–45
Lab and monitoring equipment	5–7
Landscaping and grading equipment	~40
Meters	10–15
Office furniture and supplies	10
Other treatment equipment	10–15
Pumps	10–15
Service lines	~30
Storage tanks	~30
Tools and shop equipment	10–15
Transmission mains	35–40
Transportation equipment	10
Valves	35–40
Wells and springs	25–35

5. Calculate the remaining useful life.

For each asset, calculate the remaining useful life by subtracting its age (column 4) from its adjusted useful life (column 3).

6. Calculate the expected replacement year.

For each asset, calculate the expected replacement year by adding the remaining useful life (column 5) to the current year.

7. Calculate the cost to replace.

You can base your estimate on the cost of buying and installing a new piece of equipment (by contacting vendors, getting bids, etc.), on your system's knowledge from completing similar projects, or on information from a neighboring system that has done similar work.

When estimating the cost of replacing each asset, you want to take into account the expected replacement year because inflation can affect replacement costs. It is a challenge to place a specific value on future costs, since we cannot predict changes in the economy. For assets that have a remaining useful life of more than 10 years, the utility should consider the average inflation rate over a 10-year period, or set aside some reserve funding to account for inflation.

Generally the best way to obtain an estimate of the inflation cost per year is to use a federal, state or locally established inflation rate, if available. Local economic-development corporations, along with local universities, are a good source for local inflation rates. The Texas comptroller's website, at <www.window.texas.gov>, has information on inflation rates, as does the U.S. Bureau of Labor Statistics, on its Consumer Price Index Web page at <www.bls.gov/cpi>.

If you are unable to obtain this information from your local economic-development corporation or those government sources, we suggest you use an average inflation rate of 5 percent per year.

8. Set the priority level.

For each asset, consider how critical it is to the operation of your system, its remaining useful life, the availability of other assets to replace it or be used as a backup for it, its maintenance history, and any other factors

important in evaluating its priority for receiving funding. Rank each asset from "1" to "5," where "1" is the highest priority and "5" is the lowest. Use the information provided in Table 2 to determine how each asset should be rated. Table 2 descriptions on each prioritization rating. Because there are only five priority levels, some assets will have the same priority level.

When ranking assets, keep in mind that assets in the following three categories should be assigned a higher priority:

- Assets with a shorter remaining useful life, because you will need to rehabilitate or replace them relatively soon. How likely is it that the asset will fail? Base this evaluation on the asset's age, condition, and failure history.
- Assets that are *critical* to your operation, because of the system's responsibility for protecting public health.
- Assets for which your system has less redundancy, because the system would have trouble operating without them.

Table 2. Prioritization Rating

Description	Prioritization Rating
Effective life exceeded and/or excessive maintenance cost incurred. A high risk of breakdown or imminent failure with serious impact on performance. No additional life expectancy; immediate replacement or rehabilitation needed. Asset is highly critical to infrastructure of system and in providing safe drinking water and maintaining compliance.	1
Very near end of physical life. Substantial ongoing maintenance with short, recurrent maintenance levels required to keep the asset operational. Unplanned corrective maintenance is common. Renewal (refurbishment or replacement) is expected within the next year or two.	2
Asset functions but requires a sustained high level of maintenance to remain operational. Shows substantial wear and is likely to cause significant performance deterioration. Renewal (refurbishment or replacement) is expected within the next two to three years.	3
Asset is sound and well-maintained but may be showing some signs of wear. Delivers full efficiency with little or no performance deterioration. Virtually all maintenance is planned and preventive. At worst, only minor repair might be needed at this time.	4
Asset is like new, fully operable, and well-maintained, and performs consistently at or above current standards. Little wear shown and no further action required.	5

MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT

Worksheet 1. System Inventory and Prioritization

This worksheet is designed to help you inventory and prioritize your water system's assets.
Make copies if additional pages are needed.

Date _____ ❑ **Initial Inventory** ❑ **Update**

1. Asset and Year Installed	**2. Redundancy**	**3. Expected Useful Life** (years)	**4. Age** (years)	**5. Remaining Useful Life** (years)	**6. Expected Replacement Year**	**7. Cost to Replace** ($)	**8. Priority** (1 to 5, high-low)
Example: *Well 1 pump (25 hp, 200 gpm), 2003*	*Backup pump (25 hp, 200 gpm)*	*15*	*9*	*6*	*2019*	*$35,000*	*4*

1. Asset and Year Installed	**2. Redundancy**	**3. Expected Useful Life** (years)	**4. Age** (years)	**5. Remaining Useful Life** (years)	**6. Expected Replacement Year**	**7. Cost to Replace** ($)	**8. Priority** (1 to 5, high-low)

2. Develop a Comprehensive Plan

Use the Comprehensive Planning Worksheet at the end of this section to generate a cost-management plan for your system's assets.

Adapted from an EPA worksheet, our Comprehensive Planning Worksheet is a tool designed to assist in identifying the funding and other resources required for long-term, continued operation.

Fill Out the Comprehensive Planning Worksheet

Before you begin to fill in the columns on the worksheet, fill in the date, and check the appropriate box to indicate whether you are generating the first comprehensive plan for your utility's assets or updating an earlier plan. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets change, or start a new worksheet each year.

1. List your prioritized assets.

List the assets from the System Inventory and Prioritization Worksheet, as prioritized in column 8. List the assets in order, with the highest-priority assets (lowest number) first. If you plan to drill a new well, include it as an asset (for example, New Well #5).

2. List repair and replacement activities.

For each asset, list the rehabilitation and replacement activities that you expect to perform over the next five years. If you plan to drill a new well, state "drill a new well." Include enough detail for each activity so that you can determine its cost. Be sure to include anticipated employee costs.

3. Estimate years until action is needed.

For each activity, fill in the number of years before you will need to perform it. For annual activities, enter "1." For replacement activities, enter the remaining useful life you estimated in column 5 of the System Inventory and Prioritization Worksheet.

4. Estimate cost.

Fill in the expected cost for each activity. Make sure it's the complete cost, including preparation, cleanup, removal, and disposal of any waste.

If you expect to sell an asset at the end of its useful life, subtract the estimated sale price from the cost of a new item, and enter the difference.

5. Calculate the financial reserve required per year.

For each asset, calculate the reserve required by dividing the cost by the years until the action will be needed. This is the estimated amount of money that your utility needs to set aside per year ("Reserve Required per Year" on the worksheet) for that asset.

6. Calculate the total financial reserve required in the current year.

Add the reserves required per year for each item to calculate the total reserve required in the current year. This is the estimated amount of money that your system needs to set aside, starting this current year, in order to pay for all of the rehabilitation and replacement.

7. Repeat the process for the next four years.

To create a five-year plan, you should complete a separate comprehensive planning worksheet for each of the next four years. This will allow you to compare how much reserve money will be required if the cost is spread out over a longer period of time.

You can then use this information to determine whether a potential rate increase, customer surcharge, state or federal grant or loan, or other source of funding will be required.

MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT

Worksheet 2. Comprehensive Planning

[This worksheet is designed to help you generate a comprehensive plan for maintaining your water system's assets. Make copies if additional pages are needed.]

Date _____ ❑ **Initial Plan** ❑ **Update**

1. Asset (list from highest to lowest priority)	**2. Activity**	**3. Years until Action Is Needed**	**4. Cost** ($)	**5. Reserve Required per Year** ($) (No. 4 / No. 3)
Example: *1. Chlorinator*	*Replace*	*2*	*$6,000*	$3,000
	Purchase redundant unit	*3*	*$6,000*	$2,000

1. Asset (list from highest to lowest priority)	**2. Activity**	**3. Years until Action Is Needed**	**4. Cost** ($)	**5. Reserve Required per Year** ($) (No. 4 / No. 3)
6. Total Reserve Required in the ____* Year: *Fill in the blank as to whether this is the reserve required for the 1st, 2nd, 3rd, 4th, or 5th year of your comprehensive plan				

3. Calculate Your Budget

Use the worksheet at the end of this section to calculate an annual budget for your water system.

Fill Out the Budget Worksheet

Before you begin to fill in the columns on the worksheet, fill in the date, indicate the fiscal year that the budget covers, and check the appropriate box to indicate whether you are generating the first budget for your utility or updating an earlier budget. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets changes, or start a new worksheet each year.

1. List your revenues.

In the "revenues" column provided, list all your water system's revenue sources and the dollar amount each source is expected to provide in the coming fiscal year. In the space labeled "Water Charges," enter the revenue you expect to generate from the sale of water. For "Fees and Service Charges," list all late fees, fees for establishing and transferring service, impact fees, and other fees. In the "Interest" space, enter any interest you expect to accrue on the water system's investments. If your utility has other sources of income not listed on the worksheet, enter them in the blank lines provided (below "Other"). Calculate your total annual revenue by adding all the revenues you listed. Enter this number in the box labeled "1. Total Revenue."

2. List your expenses.

In the "expenses" column, list the sources of your water system's expenses and the dollar amount each source is expected to draw in the coming fiscal year. If your utility has other general expenses not listed on the worksheet, enter them in the blank lines provided (below "Other"). Calculate your total annual expenses by adding all the expenses you listed. Enter this number in the box labeled "2. Total Expenses."

3. Calculate your net income.

Calculate your net income by subtracting your expenses from your revenue. Enter this number in the boxes labeled "3. Net Income."

4. Enter your net income.

Transfer the result of box 3 to the box labeled "4. Net Income."

5. Enter your total required reserves.

In the "Total Required Reserves" (box 5), insert the amount of total reserves in the current year from the Comprehensive Planning Worksheet 2 (line 6).

6. Calculate additional reserves needed now and into the future.

Subtract your total required reserves (box 5) from your net income (box 4). Enter this number in the box labeled "6. Additional Reserves Needed."

If the result is a positive number, you have no shortfall to make up for and can set aside the required funds in a reserve account. If the result is a negative number, you should start planning ways to make up for the shortfall.

To make up for the needed resources, you might increase rates, charge customers a surcharge, or seek state or federal funding through grants or loans. The Texas Water Infrastructure Coordination Committee, described in Part E of this series, can help your system identify appropriate funding options.

7. Plan for the future.

To get a picture of future financial needs, complete the budget worksheet for the next four years—or longer, depending on the system's needs. This will allow you to forecast expenditures for expensive repairs or replacement items, such as storage tanks, utility trucks, or electronics. Therefore, you can avoid drastic increases in rates, surcharges, or loans that the system may have to pay back for many years to come.

MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT

Worksheet 3. Annual Budget

[This worksheet is designed to help you identify your water system's revenues and expenses and calculate your budget. Make copies if additional pages are needed.]

Date _____ **Fiscal Year of Budget** _____

❑ **Initial Budget** ❑ **Update**

Revenues (Operating Income)		**Description**
Water Charges		Revenue from the sale of water—include all customers (actual or projected receipts)
Usage Fees and Service Charges		Include late payments, forfeited deposits, surcharges, impact fees, tap fees, etc.
Reserve Interest Earned		Interest accrued from reserve accounts or other investments
Other Income:		Itemize other income not elsewhere classified
1. Total Annual Revenue	**$**	
Expenses (Operating Costs)		
Regular Maintenance and Repair		Cost of performing regular or routine maintenance and repair on equipment
Utilities, Rent, and Other Overhead		Other overhead may include billing, building maintenance, cleaning, etc.
Salaries and Benefits		Include administrative and operations staff
Operating Supplies		Operating supplies not classified elsewhere
Equipment Leases		Include all equipment leases
Chemicals		Chemicals expensed in prior years, but not used, should be included for initial budgets

Monitoring and Testing		Include laboratory fees for projected monthly and annual sampling requirements
Insurance and Bonds		Costs of insuring buildings, equipment, etc.
Professional Services		Accounting, legal, engineering & other professional (not related to capital projects)
Training and Licenses		Cost of operator training courses and license renewal fee
Security		Cost of maintaining security related items (i.e., fencing, alarms, etc.)
Debt Repayment		Include interest paid on debt
Transfer to Reserved Funds		For Capital Expenditures
Other:		Itemize other expenses not classified elsewhere
2. Total Expenses	**$**	
3. Net Income (Revenue – Expenses)	**$**	

Additional Reserves Needed	
4. Net Income (from 3. Net Income)	**$**
5. Total Required Reserves (from Comprehensive Planning Worksheet 2)	**$**
6. Additional Reserves Needed (Net Income – Total Required Reserves) (-/+)	**$**

4. Implement Your Asset-Management Plan

Congratulations! You have completed the initial three steps of your asset-management plan: inventory development and asset prioritization, comprehensive planning, and budget building. Now you must work with your management team, including council and board members, if appropriate, to complete your identified repairs and maintenance and to make sure that you have the technical and financial means necessary to offer reliable service. Ideally, you should create a plan for at least the next five years.

Hold a Meeting

Arrange a meeting with your management team. Give the following items to each member.

- a map of the system
- a list of current assets, identifying for each the value, or cost to replace, and the remaining useful life (from the System Inventory and Prioritization Worksheet)
- a list of priority asset repairs and replacements (from the System Inventory and Prioritization Worksheet)
- a list of costs associated with the expected repairs or replacements (from the Comprehensive Planning Worksheet)
- the current budget allotment as well as the projected budgetary requirements (from the Budget Worksheet)

Prioritize

You may find that your current budget will cover only one or two of your priority needs. Explain why these items are priorities and the manner in which you plan to take care of them. Discuss each of the items on the priority list and how you plan to address them, creating an action timeline with a projected budget. If the current budget is lower than what you need to take care of priority items, discuss potential funding options for management input and approval, and develop a plan to obtain needed funding.

Communicate Regularly

Keep your management team updated with quarterly progress reports. This will reinforce your dedication to the plan, and help make certain that your system is functioning optimally. It will also ensure that you maintain management support throughout the implementation process.

Update Changes

Keep up with the changes that occur as your plan is implemented, including changes in the system's equipment, finances, and personnel. This will help ensure that you successfully manage your utility's assets.

Conduct a Rate Study

If you determine that your utility is not bringing in enough money to be sustainable or to complete necessary improvements, you may need to raise your rates. The process will depend on what type of utility you are. For example, an investor-owned utility applies for a rate change through the TCEQ, whereas a municipality would change rates through the city council. For assistance with rate application, contact the TCEQ Utilities and Districts Team at 512-239-4691. *As of September 1, 2014, the powers, duties, functions, programs, and activities of the TCEQ relating to economic regulation of water and sewer service will be handled by the Public Utilities Commission of Texas. You will need to contact the PUC at 888-782-8477 or visit its Web site at <www.puc.texas.gov/>.*

Regardless of the process, you will need to conduct a rate study before raising your rates. Rate studies are very complicated and may require professional help. You may decide to hire a consultant; apply for financial, managerial, or technical assistance through the TCEQ; or request the assistance of an EnviroMentor through the TCEQ's SBLGA section.

For More Information

For confidential assistance with environmental compliance, contact the Small Business and Local Government Assistance Hotline at 800-447-2827, or visit <www.TexasEnviroHelp.org>.

TCEQ REGULATORY GUIDANCE
Small Business and Environmental Assistance Division
RG-501b • April 2014

Managing Small Public Water Systems: Part B, Source Assessment and Planning

Contents

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY • PO BOX 13087 • AUSTIN, TX 78711-3087

Introduction

Part B of the series *Managing Small Public Water Systems* will help you:

- identify your water source,
- measure your water level,
- develop best management practices to manage your source,
- identify options for alternative sources, and
- plan for the future.

This guide also includes a list of helpful contacts and worksheets to help you with determining how reliable your source and distribution systems are.

To view or download the complete series go to the Small Business and Local Government Assistance Public Water Supply Compliance Tools website at <www.tceq.texas.gov/goto/help4pws>. If you do not have Internet access, call the SBLGA's hotline number 800-447-2827 for a paper copy of the complete series *Managing Small Public Water Systems* (RG-501).

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at <info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=3&ti=30&pt=1>.

Health and Sustainability: What you must know

To avoid water shortages or outages, it is critical to assess your source and plan for the future. You should develop, implement, and revise your asset-management, water-conservation, and drought contingency plans as necessary. If you determine that your current source is not adequate under current conditions or won't be in the next five years, you should consider budgeting for a new (alternate) source of drinking water. Part A of this

series, *Asset Management* (RG-501a), will help you prepare a comprehensive budget.

Keep these questions in mind as you work through this portion of *Managing Small Public Water Systems*. They will help you focus on assessing the health and sustainability of your water source.

1. What sources of water are currently used for our public water system (PWS)?
2. Considering current demands, how long will each of these sources last?
3. What is the minimum water level elevation or flow rate of my water source needed to maintain an adequate water supply?
4. What are the appropriate water levels to be used as triggers in our drought contingency plan?
5. In the event of a water outage, how will we get water to the system?
6. At what point (trigger level) do we need to seek an alternate source of water?
7. What alternate sources are available?
8. How much would each alternate source cost to develop?
9. How long would it take to bring an alternate source into production?
10. Does my PWS need to increase rates to fund an alternate source or infrastructure improvements?
11. What funding is available?

Where does my water come from?

Raw water treated and used for drinking water usually comes from groundwater, surface water sources or combinations of groundwater and surface water sources. For surface water, it is easy to see the water body that the intake pulls from. The health and long term viability of surface water sources can be clearly identified by streamflow or the measurement of lake and reservoir levels. For groundwater systems, it is more complicated because the source is an underground aquifer. Specialized tools and techniques are used to measure the water available from the groundwater wells.

A PWS can obtain information about its system, including the water source, from the TCEQ Water Supply Division by calling 512-239-4691.

Groundwater: Basics of a groundwater well

When your groundwater well was initially drilled, the licensed driller developed a boring or well log report as required by Texas statute. These reports have been submitted to the Texas Department of Licensing and Regulation and to the TCEQ as part of their review. The Texas Water Development Board hosts an online application for the submission of required well log reports. It also maintains an online mapping application that allows the public access to all information in both the driller's-report database and a TWDB groundwater database.

The well log contains information about the aquifer, the depth and diameter of the well, the depth to the top of the groundwater (before pumping began), and production levels measured after construction.

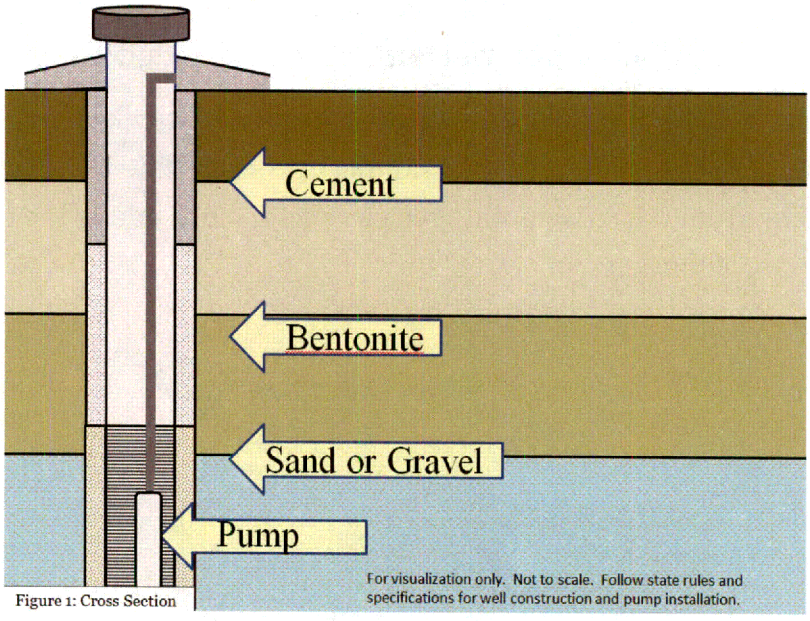

Figure 1: Cross Section

Figure 1 shows a cross-section of a typical well. The construction of the well is regulated, but there may be differences in its completion. Information on well completion is included in the well log, including the amounts of bentonite and cement used during construction. Most wells will have a well screen in the aquifer, which is also known as the saturated zone.

The casing of most wells will stick up above the ground, and that distance is important when you're measuring water levels.

If you do not have the well log information, you can visit the TWDB mapping tool or our Web page for more information: <www.tceq.texas.gov/goto/wells>. You can also contact the Water Supply Division at 512-239-4691 if you do not have Internet access.

You can review aquifer information at the TWDB's website: <wiid.twdb.state.tx.us/index_apps.asp> or, if you do not have internet access, contact the TWDB at 512-463-7847.

How do I measure my groundwater level?

Groundwater level is a direct indicator of the groundwater supply. This information will help determine annual and long-term changes of groundwater storage and estimate recharge rates of the groundwater supply so that you can plan for future needs.

Step 1. Establish a permanent measuring point

When you take well measurements, it is important to take them from the same point in your well casing or sample port each time. To ensure you are measuring from the same point, you can mark the inside of the casing with a water-proof marker.

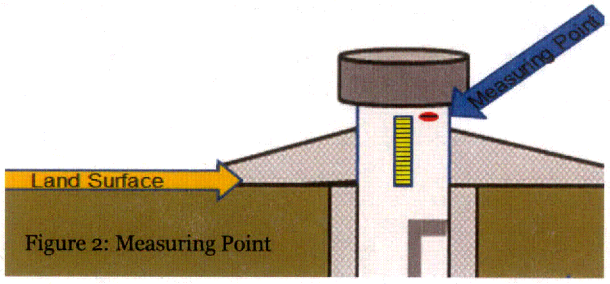

Figure 2: Measuring Point

The permanent measuring point (see **Figure 2**) can be surveyed and designated as elevation above mean sea level (msl). If your measuring point is surveyed, and you know the elevation, then your water level measurements will be in elevation (feet) above msl by subtracting the depth to the water from the elevation of the measuring point.

If your measuring point is not professionally surveyed and you do not have an elevation of the measuring point or the elevation of land at the well head, the distance from the ground to your permanent measuring point can be subtracted from your total depth–to–water level measurement so that your measurement will be depth below the land surface.

If you have not had the well elevation surveyed, then follow the steps below to measure your water source level.

Figure 3 shows a method of calculating the distance to the land surface if you don't know the thickness of the well pad. To calculate the distance, you may need to create a "virtual" triangle and use the Pythagorean equation $A^2 + B^2 = C^2$. "C" is the distance from the measuring point to the land surface.

As shown in Figure 3, you can mark a spot on the ground with spray paint or a flag, shown as a star (☆) in **Figure 3**. Measure the distance from the measuring point in the well to the marker (this distance is A). Take a measurement from the mark inside the well until it is parallel with the marker or flag on the ground (this distance is B). You will calculate C.

For example, if A is 3 ft, B is 2 ft, and $A^2 + B^2 = C^2$ then:

$3^2 + 2^2 = C^2$

$9 + 4 = 13 =$

$C = \sqrt{13} \approx 3.6$ ft

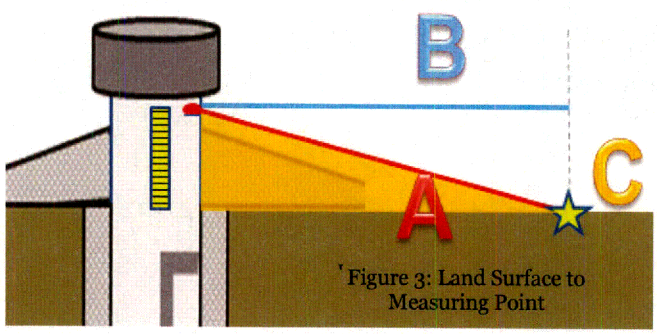

Figure 3: Land Surface to Measuring Point

The distance from the measuring point to the land surface is approximately 3.6 ft (the square root of 13).

To get your depth to water below the land surface, you will subtract your calculated distance to the land surface from your water level measurement taken from your measuring point.

Step 2. Select a method, sanitize equipment, and measure the water level

There are several methods for measuring the depth to water level, including wetted steel tape, an electric water-level indicator, an acoustic well sounder, and the air-line method. Using a steel tape and chalk is the least expensive and offers a reliable reading, although it may not work for your situation.

This guide discusses the most accessible methods for small systems. Regardless of the method you choose, if you measure consistently with the same method and technique each time, your data will show water -evel trends.

Sanitize equipment

It's important that the tape (or line) that you send down your well is clean. To sanitize your equipment, wipe it down with a rag and household (unscented) bleach solution. Allow it to air dry, and avoid contact with soil or unclean surfaces.

The wetted-tape method

This method is typically used for depths up to 300 ft. To use this method, you must already have a good idea of the depth to water in your well (within approximately ten feet).

Materials you will need:

- A steel measuring tape long enough to reach the water. Ideally, the tape will show tenths of inches.
- A weight (a few ounces is usually sufficient).
- Carpenter's chalk.

Steps to take:

1. Coat the lower 3 to 4 ft of the tape with carpenter's chalk.

2. Note the previous depth to water (if this information is available) or consider what you suspect is the depth to water to determine the number of feet you intend to spool off the reel and into the well bore.
3. Securely attach the weight to the end of the measuring tape.
4. Lower the tape into the well until the weighted part of the tape is under water, and then lower the tape a little more until the next foot marker sits at your established measuring point.
5. Record the number of feet indicated at the measuring point.
6. Remove the tape from the well and record the length of tape that was under water. (The chalk that was under water will be wet or washed away.) The difference between these two measurements is the depth to water from the measuring point.

Example:

Feet recorded at measuring point = 130 ft

Amount of tape under water (wet or missing chalk) = 2 ft 6 inches

Depth to water from the measuring point = 130 ft – 2 ft 6 inches

= 127 ft 6 inches below the measuring point

Subtract the distance from the measuring point to ground level to get the depth to water from land surface.

Example:

First convert inches to feet, if needed, by dividing the number of inches by 12), and then add to the number of feet.

For example, 3 ft 6 inches becomes 3 + (6/12) = 3 + (0.50) = 3.50 ft

=127.5 ft – 3.5 ft= 124 ft depth to water below the land surface

The air-line method

The air-line method is useful in areas where wells may be turbulent; once installed, the air line can remain in the well. Piping is placed down the well to a depth of approximately 20 feet below the water level. As air is pumped into the piping, bubbles are forced out by the water pressure, until it comes to equilibrium. From the air pressure gauge reading, you can calculate the

depth to water. The instructions provided here are general; more information is available online through the USGS at <pubs.usgs.gov/tm/1a1/pdf/GWPD13.pdf>. Additionally, you might get help from your local groundwater-conservation district or a well driller to assist with the initial installation.

Materials you will need:

- ⅛- to ¼-inch diameter tubing, preferably seamless copper, brass or galvanized pipe, and tee fitting
- Calibrated pressure gauge, preferably filled with oil or silicone
- Compressed air source with Schrader valve. You can use a bicycle pump for shallow wells or an air compressor where the depth to water is hundreds of feet.
- Small open-end wrench
- Steel tape with measurements in hundredths of feet

Steps to take:

1. Attach the air line to the pump column, making sure it's at least 5 ft above the suction intake of the pump. Make note of the length of pipe required.
2. Use the wrench to fit the upper end of the pipe with a tee fitting, pressure gauge, and valve to attach air supply.
3. Pump air into the pipe until the pressure levels off, indicating that all of the water has been pumped from the line. This will be the pressure-gauge reading used in your calculations. Take water-level measurements with the steel tape at the same time to verify the pressure-gauge reading. If the two readings are not equal, use a correction factor when you take measurements.
4. Deduct the pressure in feet from the known length of air line.

Example:

Length of air line = 150 ft

Air pressure = 26 psi

Convert air pressure to feet by multiplying psi by 2.31. In this case, 26 psi × 2.31 = 60 ft.

Subtract the air pressure in feet from the length of air line. 150 ft – 60 ft = 90 ft. The distance to the water is 90 ft. As with other methods, you also need to subtract the distance from the measuring point to the land surface.

Water-Level-Indicator Measuring Tape

A WLI is a battery-powered electric measuring tape ("e-line") or cable that is double wired, has an electrode probe on the tip, and is marked with feet, tenths and hundredths. Most water-level indicators can be considered accurate to 0.01 foot (0.12 inch) at depths of less than 200 feet. Water-level-indicator tapes require calibration and can be rented from an equipment-supply company.

Steps to take:

1. Check the circuitry of the water-level indicator before lowering the probe into the well by dipping the probe into clean tap water and observing whether the indicator needle, light, and buzzer are functioning properly. If the tape has multiple indicators (some have sound and light), confirm that they are operating simultaneously. If not, determine the most accurate indicator. The strength of the buzzer and light intensity used should be the same on all measurements (be consistent—for example, if you record the measurement as soon as you hear the sound or see the indicator light, continue to do so throughout measuring).
2. Establish a measuring point as previously shown in Figure 2.
3. Lower the electrode probe slowly into the well (use the well port, or take the well cover off) until the indicator shows contact with the water surface. Place the tip of your index finger on the tape at the established measuring point, and read the depth to water.
4. Repeat the measurement until you get consistent results (within 0.02 foot [0.24 inch]).
5. Record the date and time of the measurement.
6. Once you record the water level from your measuring point, subtract the distance to the land surface, so you have the depth to water from the land surface.

Step 3. Track your water levels

The basics of tracking water levels

Water level measurements should be given in feet, with reference to land surface. The elevation of the land surface above sea level should be given in the well description, along with the height of the measuring point above or below land surface.

The measuring point should be described physically (such as top of casing, top of instrument shelf, and so forth), and in relation to the land surface (such as 1.3 feet or 1 foot 4 inches above land surface). The description will help ensure that the same measuring point is used consistently. Marking the measuring point is also a good idea if different people take the measurements.

The static water level of the well is the level of water when the pumps are not operating. This level should have been taken and included in the well log when the well was drilled and before the initial 36-hour pump test. However, if that record cannot be located, you can take the well offline and record the static level once the pump has been off for 24 hours.

The dynamic water level, also known as the pumping level, of the well is the level of water when the pumps are operating. By tracking the dynamic water levels in the well, you can identify any mechanical issues as well as severe drawdown.

Drawdown (see **Figure 4**) is the drop in the water level when the water is pumped at a constant yield for 24 hours. The pumping level minus the static level equals drawdown. Reasons to track drawdown include:

- detecting a slow decline in the water source;
- detecting pump or well screen issues before they become major problems; and
- evaluating efficiency and performance of the well.

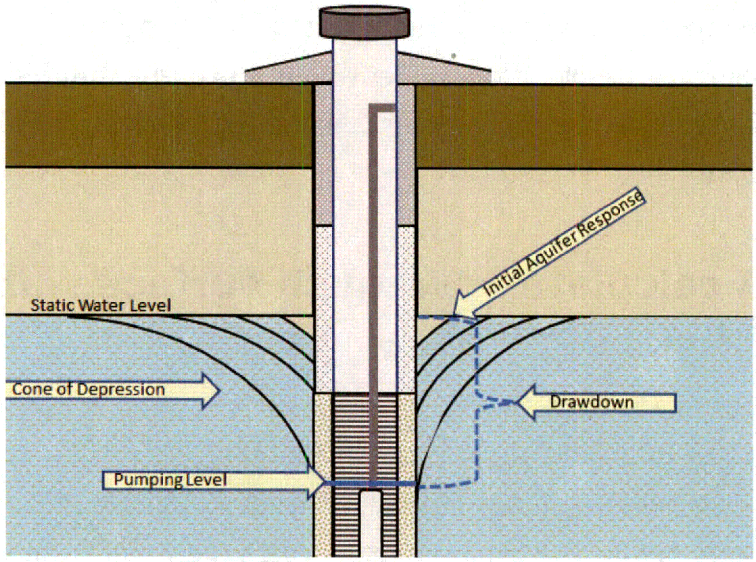

Figure 4: Cross-section Pumping Well

Drawdown may also be influenced by external factors. For instance, if the wells are in an agricultural area, you may find drawdown is faster during periods of crop irrigation. It is also beneficial to track the well recovery rate. This is the time, measured in minutes, that it takes for the well to recover after being lowered to pumping level. A long recovery time coupled with a larger drawdown and greater cone of depression may indicate that the well is located in an area influenced by over-pumping, or that the aquifer is not being recharged.

Another useful way to track the health of your well is by calculating specific capacity. The specific capacity is calculated by dividing the yield (sustainable rate of water flow) in gallons per minute by the drawdown in feet. For example, the specific capacity for a well with a yield of 3,000 gpm and 30 feet of drawdown would be 3,000 gpm/30 ft or 100 gpm/ft. The specific capacity can be calculated from the well driller's log and compared to the current data from your pump test. If there is more than a 25 percent decrease in specific capacity, you should consider rehabilitating the well.

Record and track the water levels

Use Worksheet 1A if the groundwater *elevation* is known or Worksheet 1B if the groundwater *level below land surface* is known to record and track the water levels in your well. This will allow you to determine trends, and to identify potential problems or emergencies, such as extreme drought. For

example, measure and record the information once a week for a month, then review the information to identify trends in the water level. If problems are discovered, use Worksheet 2 to help determine solutions to the problem.

How do I calculate how much surface water is available?

It is important to track the level of your surface water source over time in order to stay informed about water availability. This will help you determine whether you need to secure other sources to meet the needs of your system *before* you can no longer access the water from your intake location.

How much water is in my surface water source?

Various state and federal agencies track surface water levels in Texas. You can access water level data on their websites, or call their phone numbers listed below.

- **Texas Water Development Board:** 512-463-7847; monitors the level of most reservoirs in Texas and provides data on its website at < waterdatafortexas.org/reservoirs/statewide>.
- **The United States Geological Survey:** 888-275-8747; tracks the water levels of most reservoirs in Texas. You can find daily surface water level and streamflow data online at <waterdata.usgs.gov/tx/nwis/current?type=lake> and <waterdata.usgs.gov/tx/nwis/current/?type=flow>, respectively.
- **The United States Department of the Interior:** 202-208-3100; posts water-level data for four minor reservoirs online at <www.usbr.gov/gp-bin/arcweb_sanford.pl>.

Steps to determine how much water is available to your PWS from a reservoir

1. For systems pulling water from a reservoir, once you know how much water is in the reservoir, you can calculate how much water is available by measuring how much is over the top of your raw-water intake. This will determine a reference point for tracking water availability. Remember that the water available to your system may be limited by your water right or water rights of others who use the same reservoir or

river basin. Mere availability of water does not guarantee that it is yours to use; however, tracking available water can be useful in assessing the need for an alternative supply.

2. Look up the amount of water in the reservoir or the source's elevation (msl) recorded at one of the aforementioned agencies' websites for the day of measurement.
3. Calculate the elevation of your intake by subtracting the measurement of the amount of water over the intake from the source's elevation. This is your "critical pumping level," below which you won't be able to pump any more water.
4. Example: On September 27, 2012, you measure 10 ft of water over your intake. The source elevation listed on the TWDB's website for the same day is 200 ft above sea level. You can then find out the intake's elevation as follows:
5. Lake level 200 ft above msl – 10 foot of water over intake = 190 ft msl. This is the intake location above sea level (the critical pumping level).
6. Periodically (at least weekly during drought conditions, or more frequently if needed) check how much water is over the intake by checking the source elevation online, and then subtracting the intake elevation level from the source elevation.
7. Use Worksheet 3 at the end of this document to track the amount of water available.

Determining how much water is available to your PWS from a river or stream

If your water system is diverting from a river or stream, you should be particularly aware of your source, your water right, and other water users upstream and downstream of your intake. You can check for streamflow gauges nearby to assess the available water. You may want to maintain records of the flow to see how it is changing over time. If you have questions about your source or if you need to amend your water right, contact the TCEQ's Water Availability Division at 512-239-4691.

Why should I track the water available to my system?

Tracking available water allows you to notice trends and fluctuations over time. The source may lose a foot or more of water per week due to pumping and evaporation, or levels could drop rapidly as water is released to downstream water right holders. During a drought, tracking the amount of water available will help predict how long the supply will last so you can plan ahead for securing alternative water sources.

Water-Shortage Reporting

As of September 2013, new rules require that you report to the agency when you have less than a 180-day supply of water. If you are experiencing water outages or having issues due to drought, contact the Public Drinking Water Section's drought team at 512-239-4691.

Identify Alternative Sources

Following water conservation measures will help prolong your water supply. However, you need to monitor your source-water levels to determine how reliable your supply is and whether an alternate source is needed. The reliability of your water source is important for long-term planning and when dealing with drought conditions. The TWDB provides leadership for long-term planning and financial assistance for developing new or alternate water sources.

As a part of your drought contingency plan, you should assess the need for additional water *before* the primary water source is showing signs of stress (reduced flow, decreased well recovery, etc.).

You can buy and haul water, obtain additional water rights, drill a new well, construct an emergency interconnection, or convert a non–drinking water well for temporary emergency use as a drinking-water source.

I want to haul potable water; how do I do this?

Water haulers that carry potable water are required to get the water from an approved source and carry the water using equipment approved by the

TCEQ. There are specific requirements for the water truck or trailer, including proper labeling, materials, and construction. The rules for hauling potable water are located in 30 TAC 290.44(i).

To become an approved potable-water hauler, you must send the TCEQ:

- a cover letter describing the purpose of your submission
- an engineering report
- sealed plans and specifications (prepared by a professional engineer licensed in Texas)
- a TCEQ Core Data Form (TCEQ-10400): <www.tceq.texas.gov/goto/coredata>

To find out more about becoming an approved water hauler, contact the TCEQ's Utilities Technical Review Team at 512-239-4691.

To hire an approved water hauler, review the list of approved haulers online at <www.tceq.texas.gov/assets/public/agency/water_haulers.pdf>.

How do I get additional surface water rights?

In Texas, surface water is owned and managed by the state. The TCEQ grants the right to use this water for municipal (e.g., drinking water, domestic, household use), industrial use, farming, ranching, and other activities. The rights to surface water are issued on a first-come, first-served basis. That means that if your water right is older (senior), your rights to use the water come before the rights of someone who received a water right after you (junior). In non-watermaster areas, the TCEQ will limit the water that junior water-right holders can divert by either suspending or adjusting their water right if restrictions are warranted. This will ensure that senior water-right holders — those first in line — will receive water in the river before junior right holders.

If you want to get additional surface water, you will need to fill out an application. Applying for a water right does not ensure that the water will be available to you. You can visit the water-rights Web page <www.tceq.texas.gov/permitting/water_rights> or call a member of the Water Rights Permitting Team at 512-239-4691 for more information.

How do I drill a new well?

After exploring your options, you may choose to drill a new well. Before you drill, check with the groundwater-conservation district (GCD) in the area, if one exists, to determine the amount of water that can be withdrawn from the aquifer. To view a map of the GCDs and to determine what the requirements are for new water wells drilled in their jurisdictional area, visit the TCEQ's GCD Web page at <www.tceq.state.tx.us/goto/gcd>.

PWS wells must be drilled to meet TCEQ standards. The first step to drilling a new well is hiring an engineer to submit plans and specifications to the TCEQ. The TCEQ provides checklists to assist engineers with submitting the appropriate plans and specifications online at <www.tceq.texas.gov/utilities/publist.html>. The Checklist for Proposed Water Supply Well/Spring, form TCEQ-10205, lists components of the plan to be submitted.

PWS wells must be drilled by a licensed water-well driller. Information about licensed drillers is available on the Texas Department of Licensing and Regulation's License Search Web page at <www.license.state.tx.us/licensesearch/>. After the well has been drilled, the engineer must submit well-completion data to the TCEQ. The required data on well completion are listed on the TCEQ's Public Well Completion Data Checklist for Interim Approval, form TCEQ-10234 at <www.tceq.texas.gov/utilities/publist.html>. Based on these data, the TCEQ will evaluate whether to approve use of the well.

What is the process for drilling an emergency well?

If your system needs to drill an emergency well, the owner, contractor, or engineer must contact the appropriate regional TCEQ office, which will verify the emergency and contact the TCEQ's Utilities Technical Review Team.

The TCEQ will send the water system a letter stating whether construction of the emergency well is approved. The letter will include the checklist previously discussed. After drilling the emergency well, you are required to

submit plans and specifications, according to form TCEQ-10234, in order to get approval for use as a PWS well.

For detailed information about the approval process, contact the Public Drinking Water Section's main line at 512-239-4691 and ask to speak with someone about emergency well approvals.

Can I use an irrigation or domestic supply well as a drinking water source?

If you want to use an irrigation or domestic supply well as a PWS source, you first need to send the TCEQ Utilities Technical Review Team information regarding the well's construction, including the well log (if available), as-built plans and specifications, and bacteriological and chemical analyses. Also include a survey of potential sources of pollution within one-fourth mile of the well. For more information, refer to the TCEQ's *Emergency Use of Wells for Public Water Supplies* (publication RG-485) online at <www.tceq.texas.gov/goto/rg-485>.

If you want to convert an existing well in an unconfined aquifer to a PWS well, an engineer will need to perform a well assessment and submit engineering plans.

How do I establish an emergency interconnection?

PWSs should consider securing an emergency interconnection with a nearby water system *before* their source water is depleted. Once a neighboring water system has agreed to provide an emergency interconnection, the receiving system should contact the regional TCEQ office for verification of the emergency. If the interconnection is approved by TCEQ, the applicant will receive a letter authorizing construction. Plans and specifications must be submitted within 30 days of the acceptance letter. A general fact sheet can be found online at <www.tceq.state.tx.us/assets/public/agency/emergency_interconnection.pdf> or you may contact the Water Supply Division at 512-239-4691.

We don't have an alternative source—what should we do?

Planning for emergencies, including taking steps as described in the following section on best management practices (BMPs), will help ensure that the system can afford to take the required steps toward seeking alternative water sources.

If you are at risk of running out of water and have no alternatives, call your local or county emergency-management office while there is still time to plan for your community. Review the PWS drought-assistance directory and emergency-response process on the Texas Department of Public Safety's Web site at <www.txdps.state.tx.us/dem/CouncilsCommittees/droughtCouncil/droughtAssistDir.pdf>.

Develop Best Management Practices for Protecting Your Source

BMP 1: Develop an Asset Management Plan

As described in Part A of this series, along with Attachment 501A, *Expense and Revenue Projections*, you can determine your budgetary needs by comparing your annual revenues to your expenditures. If there is a deficit, the system may need to raise its rates or seek outside funding.

Without taking this step, the system may not be prepared for emergency conditions, such as extreme drought. Rate studies are often required before outside funding can be obtained. We at the TCEQ offer free assistance conducting rate studies though our Financial, Managerial, and Technical Assistance (FMT) program. You can find more information about the FMT program under "Need more help?" towards the end of this document.

BMP 2: Create a Drought Contingency Plan

Most drought contingency plans (DCPs) define three to five drought response stages and include "triggering" criteria for both initiating and

terminating each stage. Triggering criteria are intended to ensure timely action in response to a developing drought and that the response is appropriate to the level of severity. Make sure your DCP is tailored to your system and updated at least annually. The following suggestions will assist you with implementing your DCP:

- The successful implementation of a DCP depends upon how well the public understands the need for the plan. Give the public an opportunity to participate directly in the planning. Schedule field trips to the well or intake structure to show customers and board members where their water comes from and why it is critical to conserve and protect their water source.
- Ensure that your plan's water-use-reduction stages have triggering criteria that correspond to your water source's critical pumping level.
- Create triggering criteria that will give you enough time to respond to the corresponding water shortage. Allow time to notify customers and see a decrease in water usage *before* the source reaches critical pumping levels.
- Create a plan with input from customers and city council members. Sometimes change is easiest to accept in several small steps, instead of one big step.
- Keep a log of what works with your plan and what needs improvement, and update your plan accordingly; it is a living document.
- Coordinate your DCP stages with your neighboring water systems. If you and your neighbor are both pulling from the same source, it's likely that you'll both be in trouble when the water levels start dropping. This will also reduce customer complaints due to comparisons in water restrictions.
- The TCEQ supplies DCP handbooks for different types of water systems. See the section on Helpful Contacts within this guide or contact our Water Availability Section at 512-239-4691. You can also go to the DCP Web page at <www.tceq.texas.gov/goto/drought_plan> to find model plans, requirements, and information on submissions.

BMP 3: Launch a public leak-detection program

On average, 14 percent of the water treated by water systems is lost to leaks; therefore, it is important to conduct a leak-detection survey of all the

equipment in the distribution system. Reducing water loss will extend the water supply and reduce operating costs.

Educate the public about leak detection. Encourage residents to check for leaks in toilets, sinks, irrigation systems and other water-using equipment to prevent waste. Implementing a leak-detection program demonstrates that the water system is making the best use of its resources, is taking care of its assets, and is concerned about saving money.

The TWDB offers leak detection equipment that utilities can borrow, for free, to assist with evaluating their system for water loss. Visit their Web page at <www.twdb.state.tx.us/conservation/municipal/waterloss/leak-detection.asp> for more information.

The TWDB also offers information to help with conducting a water-loss audit, which inventories where and how the system loses water, and how much this loss is costing the system. By using the audit results you can decide where infrastructure improvements should be made. State and federal funding agencies may award funds preferentially to water systems that have conducted a water loss audit. For more information, visit the TWDB's Web page at <www.twdb.state.tx.us/conservation/municipal/waterloss/>.

BMP 4: Review pump conditions and maintenance

We recommend assessing the condition of the well pump or water-intake pump every year. Often, a loss of pumping capacity is actually due to an aging or poorly maintained pump, rather than a drop in the water table. Regular assessments will help you analyze whether the pump's capacity has dropped over time. Knowing this trend will help create a timeline for future repairs and replacements, and will help determine the needed budget for pump maintenance and the funds to set aside for the eventual cost of replacement. Use Part C of this series to help you develop an operation and maintenance program.

BMP 5: Flush water mains wisely

The TCEQ requires public water systems to flush all dead-end mains monthly and as needed to address water quality complaints and inadequate disinfection residual. It is necessary to balance the need to conserve water with the requirement to flush dead-end mains. You can accomplish this by following BMPs while flushing:

- Monitor the water quality during flushing to ensure that you only flush as much water as necessary.
- Capture the flushed water for use in lawn watering or dust suppression.
- Use unidirectional flushing to most efficiently respond to water quality concerns. This involves closing adjacent valves and using a single hydrant per flush to isolate individual sections of the main, intensely scouring the line to quickly flush the water while minimizing water waste.
- The TCEQ may grant an alternative dead-end main flushing routine, case by case, if the drought has reduced the water supply to critical levels. Contact the TCEQ's Water Supply Division at 512-239-4691, and ask to speak to someone on the Technical Review and Oversight Team for more information.

BMP 6: Communicate with your water supplier

If you purchase water from another system, you should contact your water supplier for frequent updates about the status of its source. This will help determine which drought stage has been triggered. You may have to contact several systems to determine which water system actually pulls the water from the lake, reservoir, river, stream, or aquifer.

For example, if you buy water from system C, which buys from system B, which buys from system A, which actually pulls water from the source, only system A will be able to tell you how stable the water source is. Another consideration is that the purchasing systems (B and C) may be limited by how much water they can supply based on their contracts with system A.

Communicating with the other systems that pull from the same source will help you coordinate your drought response in order to reduce water use more effectively.

Need more help?

The TCEQ's Financial, Managerial and Technical Assistance Program offers free contractor on-site assistance to help you analyze your planning options, conduct rate studies, and help you with all aspects of running and funding your water system. For more information about the program, visit the Web page <www.tceq.texas.gov/utilities/fmt> or call the Water Supply Division at 512-239-4691.

Many state and federal funding agencies have grants and loans available for planning and development of new water sources and infrastructure improvements. The Texas Water Infrastructure Coordination Committee (TWICC) is a group of local, state, and federal agencies that collaborate to identify issues with water and wastewater infrastructure and compliance, and to seek affordable, sustainable, and innovative funding strategies for the protection of public health and efficient use of government resources in Texas. Contact TWICC at 512-463-7870, or visit its website <www.twicc.org> for more information or to fill out a Project Profile Form and submit it by e-mail to <TWICC@twdb.state.tx.us> or by fax at 512-475-2086.

Helpful Contacts

TCEQ Office of Water

The TCEQ's Office of Water oversees the design and operational requirements of all public water and wastewater systems.

<www.tceq.texas.gov/goto/water_main>

Water Supply Division	512-239-4691

TCEQ Watermaster Program

The Watermaster Program ensures compliance with water rights by monitoring stream flows, reservoir levels, and water use. It also coordinates diversions and regulates reservoirs as needed to prevent the wasting of water or its use in quantities beyond a user's right.

<www.tceq.texas.gov/permitting/water_rights>

Concho Watermaster	210-490-3096/ 866-314-4894
Rio Grande Watermaster	956-430-6046/ 800-609-1219
South Texas Watermaster	210-490-3096/ 800-733-2733

Small Business and Local Government Assistance 800-447-2827

The Small Business and Local Government Assistance program provides confidential technical assistance without the threat of enforcement.

<www.TexasEnviroHelp.org>

Other Resources

River Authorities

Develop and manage the waters of designated geographic regions of the state through conservation, storage, control, preservation, use, and distribution for the benefit of the public.

<www.tceq.texas.gov/waterquality/clean-rivers/>

Angelina-Neches River Authority	936-632-7795
Bandera County River Authority	830- 796-7260

Brazos River Authority	888-922-6272
Guadalupe-Blanco River Authority	830-379-5822
Lavaca-Navidad River Authority	361-782-5229
Lower Colorado River Authority	512-473-3200
Lower Neches Valley Authority	409-892-4011
Nueces River Authority	830-278-6810
Red River Authority	940-723-2236
Sabine River Authority	409-746-2192
San Antonio River Authority	210-227-1373
Trinity River Authority	817-467-4343
Upper Colorado River Authority	325-655-0565
Upper Guadalupe River Authority	830-896-5445

Texas Alliance of Groundwater Districts 512-522-8243

Membership of underground water conservation districts of Texas with powers and duties to manage groundwater as defined in Chapter 36 of the Texas Water Code (voting members) and other organizations that work in the groundwater arena (associate members).

<www.tgpc.state.tx.us/members/TAGD.htm>

Texas Groundwater Protection Committee 512-239-4691

Identifies areas where new or existing groundwater programs could be enhanced, and improves coordination among agencies involved in groundwater activities.

<www.tgpc.state.tx.us>

Texas Water Conservation Association 512-472-7216

Serves as an advocate for water users and includes interests in groundwater users, irrigators, municipalities, river authorities, navigation and flood

control districts, industrial users, drainage districts, utility districts, and general environmental interests.

Texas Water Development Board

State agency charged with statewide water planning and administration of low-cost financial programs, data collection and dissemination, and technical assistance.

TWDB Financial Assistance Programs	512-239-4691
TWDB Groundwater Resources Division	512-463-7847
TWDB Surface Water Data	512-936-0817
TWDB Water Resources Planning and Information	512-936-0814
TWDB Water Uses and Projections	512-936-0829

Groundwater-Conservation Districts 512-463-0749

Local units of government that develop and implement plans for the effective management of groundwater.

<www.twdb.state.tx.us/groundwater/conservation_districts>

Regional Water Planners 512-936-0814

Guide and support planning of the state's water resources by administering and assisting in the development of the regional and state water plans.

<www.twdb.state.tx.us/waterplanning/rwp>

Regions A, B, F	512-463-1711
Regions C, N, O	512-463-1437
Regions D, H	512-475-2057
Regions E, J, M	512-463-8290
Regions G, I, P	512-936-9439
Region K	512-936-0852
Region L	512-936-3550

Find your region by county at
<www.twdb.texas.gov/waterplanning/rwp/regions/>.

United States Geological Survey—Texas Water Science Center

512-927-3500

This agency works in cooperation with municipalities, river authorities, groundwater districts, and state and federal agencies in Texas to provide reliable, impartial scientific information to resource managers, planners, and other customers by monitoring water, biological, energy, and mineral resources.

<tx.usgs.gov>

WORKSHEET 1A. GROUNDWATER LEVEL MEASUREMENTS: USING GROUNDWATER ELEVATION

This worksheet will help you maintain records of the water levels in your well.

Use one worksheet for each well. Make copies if you need additional pages.

Instructions:

Enter the date the measurements are taken in the first column.

Record the depth to water in feet in column A.

Convert inches to feet, if needed, by dividing the number of inches by 12, and then add to the number of feet.

For example, 3 ft 6 inches becomes 3 + (6/12) = 6 + (0.5) = 3.5 ft

Calculate the groundwater elevation by subtracting the depth to water from the measuring point elevation and enter in column B.

Example (week 1):

Depth to water = 200 ft

Measuring-point elevation = 600 ft

Groundwater elevation = measuring point elevation – depth to water

Groundwater elevation = 600 ft – 200 ft = 400 ft

Example (week 2):

Depth to water = 202 ft (Measuring point is still 600 ft)

Groundwater elevation = 600 ft – 202 ft = 398 ft

Subtract the current week's groundwater elevation from the previous week's groundwater elevation and enter the difference in column C.

B (week 2) – B (week 1) = C (week 2)

398 ft – 400 ft = –2 ft (this means a 2 ft loss in water depth)

Enter the number of days since the last measurement in column D.

Divide column C by column D and enter into column E. This is the change in feet per day.

C (–2 ft) ÷ D (7 days) = –0.29 ft/day loss of water

Note:

If the groundwater elevation shows a continuous trend downward, complete Worksheet 2 to help determine what problems may exist with the well. It could be related to large drawdown, or drought conditions, but other factors can also diminish groundwater levels. Reviewing the trends will help determine the next steps to take when evaluating your water source.

WORKSHEET 1A. MEASURING THE GROUNDWATER LEVEL: USING GROUNDWATER ELEVATION

The elevation of your measuring point will not change unless you physically move the measuring point. If the measuring point changes, you will need to consider this change in your calculation.

Measuring-Point Elevation: _____

Well ID: _____

Date	(A) Depth to Water (ft)	(B) Groundwater Elevation (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)
Example (week 1): 10/11/12	200	400	***Gather 1 week's data to compare to depth next week***		
Example (week 2): 10/18/12	202	398	−2	7	−0.29

Date	(A) Depth to Water (ft)	(B) Groundwater Elevation (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)

WORKSHEET 1B. MEASURING THE GROUNDWATER LEVEL: USING GROUNDWATER LEVEL BELOW LAND SURFACE

This worksheet will help you maintain records of the water levels in your well.

Use one worksheet for each well. Make copies if you need additional pages.

Instructions:

1. Enter the date the measurements are taken in the first column.
2. Record the depth from the measuring point to the water in feet in column A.

   Convert inches to feet, if needed, by dividing the number of inches by 12, and then add to the number of feet.

   For example, 3 ft 6 inches becomes 3 + (6/12) = 6 + (0.5) = 3.5 ft
3. Calculate the depth to water from the land surface by subtracting the distance from the measuring point to the land surface (which does not change, as it is based on your specific measuring point in your well), from the depth to water from the measuring point and enter the result in column B.

   ### Example (week 1):

   Depth to water from measuring point = 200 ft

   Distance from the measuring point to land surface = 3 ft

   Depth to water from land surface = 200 ft – 3 ft = 197 ft

   ### Example (week 2):

   Depth to water from measuring point = 198 ft

   Depth to water from land surface = 198 ft – 3 ft = 195 ft
4. Subtract the current week's depth to water from the land surface from the previous week's depth to water from the land surface and enter the difference in column C.

   B (week 2) – B (week 1) = C (week 2)

   195 ft – 197 ft = –2 ft (This means a 2 ft loss in water depth)
5. Enter the number of days since the last measurement in column D.
6. Divide column C by column D and enter in column E. This is the change in feet per day.

   C (–2 ft) ÷ D (7 days) = –0.29 ft/day loss of water

Note:

If the groundwater elevation shows a continuous trend downward, complete Worksheet 2 to help determine what problems may exist with the well. It could be related to large drawdown, or drought conditions, but other factors can also diminish groundwater levels. Reviewing the trends will help determine the next steps to take when evaluating your water source.

WORKSHEET 1B. MEASURING THE GROUNDWATER LEVEL: USING GROUNDWATER LEVEL BELOW LAND SURFACE

The elevation of your measuring point will not change unless you physically move the measuring point. If the measuring point changes, you will need to consider this change in your calculation.

Distance to the land surface from the measuring point: _____

Well ID: _____

Date	(A) Depth to Water from Measuring Point (ft)	(B) Depth to Water from Land Surface (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)
Example (week 1): 10/11/12	200	197	***Gather 1 week's data to compare to depth next week.***		
Example (week 2): 10/18/12	198	195	−2	7	−0.29

Date	(A) Depth to Water from Measuring Point (ft)	(B) Depth to Water from Land Surface (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)

WORKSHEET 2. TROUBLESHOOTING A GROUNDWATER WELL

It is critical for drinking-water systems to determine the impact of drought on their water source. This worksheet will help small groundwater systems determine if their source water is being affected by drought.

Has your system experienced any of the following conditions?

Condition	**Is the condition present?**		**Notes:** When did you notice the problem? What did you notice?
Pump cavitations	Yes	No	
Pumping sand	Yes	No	
Pump lowered to bottom of well	Yes	No	
Pump lowered within the last year	Yes	No	
Reduced daily well production	Yes	No	
Increased pump run times or pump hours	Yes	No	
Increased electricity usage	Yes	No	

Note:

If you answered "Yes" to any of the above questions, you should consider taking one or more of the actions on the following page—Troubleshooting a Groundwater Well.

WORKSHEET 2. TROUBLESHOOTING A GROUNDWATER WELL

Action	Date	Results
Conduct a well test (measure the time it takes for the well to recover after being pumped)		
Determine current static water level of well and compare to previous levels		
Contact the groundwater-conservation district* for assistance		
Contact a well driller for assistance		

*Information on GCDs can be found in the "Helpful Contacts" section of this document, or on their website at <www.twdb.state.tx.us/groundwater/conservation_districts/>.

Fill in the blanks next to the items listed below to help determine whether your groundwater supply may be affected by drought conditions:

_____ ft Well depth

_____ ft Pump depth when constructed

_____ ft Current pump depth (if moved since construction)

_____ ft Static aquifer level

If you have lowered the pump, or water levels have fluctuated, options to explore include:

- Review and implement your DCP.
- Consider an interconnection with another public water supply.
- Consider drilling another well.
- Consider video logging the well to identify physical problems. This may lead to well rehabilitation.
- Find an alternative source.
- Contact the TCEQ for assistance at 800-447-2827, or visit the drought Web page at <www.tceq.texas.gov/response/drought> for more information.

WORKSHEET 3. MEASURING THE SURFACE WATER LEVEL

This worksheet will help you maintain records of the water levels in your reservoir.

Make copies if you need additional pages.

Instructions:

1. Enter the date in the first column.
2. Record the elevation of your water source in column A in feet (ft) above mean sea level (msl) (published on the TWDB, USGS, or USGI website or by physically measuring the depth).
3. Enter the depth to the intake, in feet, in column B.
4. Determine the depth to the intake by subtracting the elevation of your intake from the water elevation published online (A), or by physically measuring the depth to your intake (recommend weekly measurements).
5. Convert inches to feet, if needed, by dividing the number of inches by 12, and then add to the number of feet.
6. For example, 6 ft 3 inches becomes 6 + (3/12) = 6 + (0.25) = 6.25 ft

Example:

Source water elevation = 200 ft

Depth to intake = 20 ft

7. Subtract the current week's depth to the intake from the previous week's depth to intake and enter the difference in column C.

Example (week 2):

B (week 2) – B (week 1) = C (week 2)

19 ft – 20 ft = –1 ft (This means a loss of 1 foot water depth)

8. Enter the number of days since the last measurement in column D.
9. Divide column C by column D and enter into column E. This is the change in feet per day.

   C (–1 ft) ÷ D (7 days) = –0.14 ft/day loss of water

10. Estimate the number of days remaining by dividing column B by column E and enter the result in column F.

    B (19 ft) ÷ E (0.14 ft) = ~136 days remaining (if no additional water is added via rain or inflows; based on current 7-day calculated water-loss rate)

Note:

If the surface water levels show a continuous trend downward, it could be related to drought conditions or other factors that can impact reservoir or lake levels. Reviewing the trends will help determine the next steps to take when evaluating the water source, and whether alternative sources are needed.

WORKSHEET 3. MEASURING THE SURFACE WATER LEVEL

The elevation of your intake will not change unless you physically move the intake. If the intake has been moved, you will need to consider this change in your calculation.

Calculate: Elevation (feet above mean sea level) of raw water intake

= reservoir elevation – depth (in feet) to the intake on the same day

= _____ Elevation of raw water intake

Date	(A) Source water elevation (ft msl)	(B) Depth to the intake (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)	(F) Estimated Days Remaining = (B/E)
Example (week 1): 10/11/12	200	20	*Gather 1 week's data to compare to depth next week.*			
Example (week 2): 10/18/12	199	19	−1	7	−0.14	136

Date	(A) Source water elevation (ft msl)	(B) Depth to the intake (ft)	(C) Change in the depth from last week (ft)	(D) Number of days since your last measurement	(E) Daily Level Change = (C/D)	(F) Estimated Days Remaining = (B/E)

TCEQ REGULATORY GUIDANCE
Small Business and Environmental Assistance Division
RG-501c • April 2014

Managing Small Public Water Systems: Part C, Operation and Maintenance

Contents

Introduction

Part C contains worksheets that help you create your own operation and maintenance manual for your utility and maps out a program for scheduling and performing preventive and general maintenance.

As you work though Part C, you may find it beneficial to review other parts of the series to help you prepare a comprehensive operation and maintenance plan. To view or download the complete series go to Small Business and Local Government Assistance's Web page with compliance tools for public water supplies at <www.tceq.texas.gov/goto/help4pws>. If you do not have Internet access, call the SBLGA's hotline at 800-447-2827 for a paper copy of the complete series *Managing Small Public Water Systems* (RG-501).

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at <info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=3&ti=30&pt=1>.

Implementing an Operation and Maintenance Program

In RG-501a, *Asset Management* (Part A), you developed an asset management plan for your utility. This document (Part C) is designed to help you—the manager or operator of a small public water system (PWS)—put together an operation and maintenance (O&M) manual to keep the system's infrastructure and equipment (assets) in good working condition, extend their useful life, and avoid some of the common O&M violations.

The Benefits of an O&M Program

An effective O&M program can save you money by reducing the frequency in which expensive assets need to be replaced. It can also help you estimate

the expenses that may be incurred for future repairs and replacement of assets as you execute your asset-management plan. Finally, an O&M program can help keep your system in compliance with state environmental rules. The lack of a proper O&M program can threaten the safety of the drinking-water system.

Common O&M Violations

Frequent O&M violations to the TCEQ's rules for PWSs include failure to:

- Inspect the system's pressure tanks, ground storage tanks, and elevated storage tanks annually [30 TAC 290.46(m)(1)].
- Maintain an accurate and up-to-date map of the distribution system, including valves, hydrants, and mains [30 TAC 290.46(n)(2)].
- Inspect pressure tanks to ensure that they are watertight, that pressure-release valves and pressure gauges are working properly, and that the air-to-water ratio is maintained at the proper level.
- Inspect the interior of all pressure tanks with inspection ports at least every five years [30 TAC 290.46(m)(1)(B)].
- Flush all dead-end mains each month. Dead-end lines and other mains need to be flushed if there are water-quality complaints or if the disinfectant residuals fall below acceptable levels [30 TAC 290.46(l)].
- Post a sign with the name of the water supply and an emergency telephone number of a responsible system official at each of the production, treatment, and storage facilities. The sign must be legible and in plain sight of the public [30 TAC 290.46(t)].

Your O&M Manual

A comprehensive O&M manual will help you keep track of your inspections, equipment, operations, and staff, and the maintenance you've done—or need to do—on your system. The following pages form a basic template for an O&M manual. Please remember to update and revise this manual when changes are made at your PWS.

Public Water Supply Operation and Maintenance Manual

for

PWS ID Number _____

TCEQ Regulated Entity No. (RN) _____

TCEQ Customer Reference No. (CN) _____

Date: _____

1. Facility Description

Describe your facility, making sure you include the following information:

- water source (aquifer, surface water body, or source of purchased water)
- emergency interconnections or backup water sources
- number of connections (or population)
- capacity and locations of all pressure tanks, ground storage tanks, and elevated storage tanks
- well information: identify each well with the water system's well name, TCEQ well identification number (PWS ID number followed by a letter), well depths, a copy of each well driller's log, location of each well and date well was drilled, and well pump capacity
- distribution map: size of mains, type of pipe (if known), valves, hydrants, location of sampling sites, etc.

Maps and Support Documents

Insert the distribution map, driller's logs, and other support documents here.

2. Start-up and Operating Procedures

Describe your daily, weekly, and monthly procedures such as testing water, checking chemical feeds, and washing filters. Describe start-up activities such as the sequence of turning on pumps and equipment. Include a diagram or map of the plant showing details for each piece of equipment.

Daily Procedures

Weekly Procedures

Monthly Procedures

Plant Map

Insert a map of the plant with all equipment identified here.

3. Routine Maintenance

Describe the routine maintenance performed on all equipment, such as wells, flow meters, pumps, pressure tanks, vehicles, and storage tanks.

Housekeeping Schedules and Equipment Suppliers

Insert your housekeeping schedules and contact information for equipment suppliers here.

4. Records and Reporting

Describe daily, weekly, monthly, and annual recordkeeping and reporting requirements.* These requirements should include keeping records of:

- the construction and repairs of the water system facilities (including distribution lines)
- responses to emergencies (such as water outages, major leaks, natural disasters, etc.)
- certifications and permits, if any, associated with the water plant (such as operator licenses, maps, utility easements, etc.)

Track the chlorine residual, disinfectant residual, and water production each week using the following charts.

Daily Records or Reports

Weekly Records or Reports

*A complete table for monitoring, reporting, and record keeping is available in the *Compliance* module of this series (RG-501d).

Monthly Records or Reports

Annual Records or Reports

MANAGING SMALL PUBLIC WATER SYSTEMS: OPERATION AND MAINTENANCE

Tracking Chart 1. Chlorine Residual

This worksheet is intended to help you keep track of the weekly disinfectant monitoring for your utility. Make copies if additional pages are needed.

Instructions:

Use this chart to document the chlorine residual at representative locations in the distribution system weekly. If you have several locations to sample each week, use a separate table for each location, and identify the specific location on each tracking chart used. Transfer the readings to a Disinfectant Level Quarterly Operating Report (DLQOR) form every quarter.

PWS No.: _____ **Week of:** _____ **Year:** _____ **Sample Location:** _____

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Week One												
Week Two												
Week Three												
Week Four												
Week Five												

Reagent Name (for example, *DPD colorimetric reagent*): _____

Date Sampling Kit Purchased: _____

Notes:

MANAGING SMALL PUBLIC WATER SYSTEMS: OPERATION AND MAINTENANCE

Tracking Chart 2. Disinfectant Residual

This worksheet is intended to help you keep track of the weekly disinfectant residual monitoring tasks for your utility. Make copies if additional pages are needed.

Instructions:

Use this chart to record the amount of chemical disinfectant added to the water each week.

Quantity of disinfectant added (gallons, cups, or ounces) per week												
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Week One												
Week Two												
Week Three												
Week Four												
Week Five												

Notes:

MANAGING SMALL PUBLIC WATER SYSTEMS: OPERATION AND MAINTENANCE

Tracking Chart 3. Water Production

This worksheet is intended to help you keep track of the weekly disinfectant residual monitoring tasks for your utility. Make copies if additional pages are needed.

Instructions:

Use this chart to record the number of gallons of water treated each week.

Quantity of water treated (gallons) per week												
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Week One												
Week Two												
Week Three												
Week Four												
Week Five												

Notes:

5. Monitoring Plan (Sampling and Analysis)

Insert your monitoring plan[2] here.

Make sure that your PWS monitoring plan identifies all the sampling locations, describes the sampling frequency, and specifies the analytical procedures and laboratories that the PWS will use.[3] Refer to "Sampling Requirements" in Part D of this series, *Compliance* (RG-501d), for assistance with developing your monitoring plan.

For assistance, see *How to Develop a Monitoring Plan for a Public Water System* (RG-384) at <www.tceq.texas.gov/goto/rg-384>.

[2]The Texas Administrative Code (30 TAC 290.121) requires all public water systems to maintain an up-to-date chemical and microbiological monitoring plan.

[3]These items are required. See 30 TAC 290.121(b).

6. Staffing and Training

List the members of your staff (both regular and backup personnel), with their job titles, duties, licenses and certifications,[4] and training requirements. Note that a list of operators must be submitted to the TCEQ annually.

[4] Information on operator licensing is available in the *Resources* portion of this series (RG-501e).

Licensed Operators

For each licensed operator, list the following information:

Operator Name	License Class	License No.	Expiration

TCEQ REGULATORY GUIDANCE

Small Business and Environmental Assistance Division

RG-501d • April 2014

Managing Small Public Water Systems: Part D, Compliance

Contents

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY • PO BOX 13087 • AUSTIN, TX 78711-3087

Introduction

The State of Texas has numerous regulations regarding the operation of water utilities, primarily to safeguard the health and welfare of the population. To facilitate compliance with these regulations, we, the TCEQ, oversee a comprehensive investigation and enforcement process.

Part D of *Managing Small Public Water Systems* is designed to help you—the manager or operator of a small public water system (PWS)—become familiar with the rules for operating small public water systems, the investigation and enforcement process, and the violations that can lead to fines and enforcement.

This document covers:

- Investigations and the Enforcement Process
- "Category A" Violations for Water Systems
- Enforcement Scenario for a Water System
- Tables showing required sampling, record keeping and reporting for a public water system

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at <info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=3&ti=30&pt=1>.

What does "enforcement" mean?

"Enforcement" is the process TCEQ uses to respond to serious or continuing environmental violations by requiring corrective actions and by assessing monetary penalties against businesses or individuals for those violations. *"Enforcement Action"* is an action taken by TCEQ to obtain a legally binding obligation for an entity to achieve and maintain compliance.

The Enforcement Process

What is the TCEQ's basic enforcement process?

The enforcement process begins when we (the TCEQ) discover a violation during an investigation or through a review of records. For details about the enforcement process, refer to the TCEQ's enforcement-process Web page at <www.tceq.texas.gov/goto/penaltycalc>.

Notice of Violation

Violations are categorized based on the severity of their threat to human health or the environment. Category A violations are the most serious, while category B and C violations pose a less severe threat. A Notice of Violation (NOV) is issued for category B and C violations. You (the regulated entity or "respondent") must respond to the NOV within a set compliance period. If violations issued under a NOV are not resolved with the requested timeframe, you will be issued a Notice of Enforcement (NOE) and assessed a financial penalty.

Notice of Enforcement

If we identify category A or continuing violations during an inspection or a records review, or from monitoring data, we will send you an NOE. Category A violations are discussed in the following section, and are defined by the Enforcement Initiation Criteria, available at <www.tceq.texas.gov/agency/eic.html>. It is important to note that an NOE is associated with a penalty.

The NOE documents the violations and puts you on notice that the case has been referred for enforcement. This notice also lets you know that you may request a meeting to discuss the enforcement case if you believe the violations were cited in error or have new information that was not previously evaluated.

How does TCEQ determine whether an enforcement action is warranted?

Three Types of Investigations

The TCEQ promotes compliance with rules and regulations by conducting three basic types of investigations:

- on-site field investigations, called Comprehensive Compliance Investigations (CCIs)
- investigations based on citizen complaints
- investigations through record reviews

CCIs include detailed surveys of a water system's facilities and operating records. We generally conduct one CCI every three years for community systems, and every five years for non-community systems. We contact the water system prior to the CCI to give its personnel time to prepare for the investigation.

On the other hand, complaint-driven investigations do not involve advance notification. Complaint-driven investigations are also conducted on-site,

but they are prompted by complaints from the public or from customers, often based on observations.

The third type of investigation involves a records review to evaluate compliance. These investigations do not include an on-site investigation.

Violation Categories and Enforcement

If violations are documented during an investigation, an NOV or NOE may be issued. An NOV does not necessarily result in enforcement.

The type of violation issued depends on its severity, as outlined in the Enforcement Initiation Criteria (EIC). The EIC guide TCEQ personnel in deciding whether enforcement should be initiated and the appropriate level of enforcement for all violations. If enforcement is initiated, we will first send the water system an NOE.

Violations are divided into three main categories; we use these categories to determine whether enforcement will be initiated:

- *Category A* violations require automatic initiation of formal enforcement action. They are further explained in this guide under "Summary of Category A Violations for Water Systems."
- *Category B* violations require an NOV at the first occurrence, but may not trigger formal enforcement action unless the violation is not corrected by the deadline established in a NOV. Category B violations can also trigger formal enforcement if they are documented during two consecutive investigations within the most recent five-year period.
- *Category C* violations may require initiation of formal enforcement action if the water system receives a NOV for the same violation three consecutive times within the most recent five-year period, including the notification for the current violation.

The publications *The TCEQ Has Inspected Your Business, What Does This Mean to You?* (RG-344) and *Penalty Policy of the Texas Commission on Environmental Quality* (RG-253) provide an overview of the investigation and enforcement process. See the Introduction to the *Managing Small Public Water Systems* series to find out how to obtain TCEQ publications or call 512-239-0028.

Investigation Checklists

We make investigation checklists for public water systems available to the public as a courtesy so that systems can prepare for an investigation: <www.tceq.texas.gov/goto/wqlists>.

How are penalties calculated?

Numerous factors must be considered in calculating a penalty amount (monetary fine) for a violation. For details about the way penalties are calculated, refer to the TCEQ's most recent penalty policy: <www.tceq.texas.gov/goto/penalty>. The following list is not all-inclusive, but it does represent the first tier of factors:

- the TCEQ's penalty policy
- the actual or potential impact to the environment or human health
- the degree of noncompliance with record-keeping and reporting rules
- the degree of harm that was caused by the number and duration of violations
- the size of the water system

A second tier of factors is also considered, as follows:

- a review of the compliance history and classification,
- a determination as to whether any responsibility is present (this includes a site-specific five-year evaluation of whether the respondent could have reasonably anticipated and avoided the violation),
- the presence of any good-faith efforts to comply, such as adhering to timeliness and quality of the actions taken to bring the facility back into compliance,
- whether the respondent is receiving any economic benefit from being noncompliant with the rules and regulations, and
- other factors, as justice may require.

The final penalty amount will be checked against the minimum and maximum amounts allowed by statute per violation, per day, to obtain the final assessed penalty. A bill for this final penalty amount, along with a copy of the basis of the calculation used, will be sent to you in the form of a penalty calculation worksheet.

What is "inability to pay"?

Inability to pay is an option if you cannot afford the assessed penalty. If you believe you are unable to pay the penalty, you need to discuss this option with your enforcement coordinator. Note that to qualify for inability to pay you must meet certain financial criteria, and you must submit documentation for a review of financial inability to pay by 30 days upon receiving the agreed order.

Are penalty payment plans available?

Yes, payment plans are frequently worked out between you and your enforcement coordinator if you indicate that you cannot pay the entire penalty in one payment. However, the payment period cannot exceed 36 months, and the payments must be at least $100 per month.

What is a Supplemental Environmental Project?

A Supplemental Environmental Project is a project that prevents pollution, reduces the amount of pollution reaching the environment, enhances the quality of the environment, or contributes to public awareness of environmental matters. You may negotiate an agreement to perform a SEP in return for an offset of the administrative penalty. SEPs that have a direct benefit allow you to offset one dollar of the penalty for every dollar spent on the SEP. Local governments can offset 100 percent of the penalty amount with a SEP project. Visit the SEP Web page for more information at <www.tceq.texas.gov/legal/sep>.

When is an agreement made?

The TCEQ has authority to issue administrative orders, as opposed to civil or criminal orders issued in court, in order to enforce compliance with our rules. An agreed order is used when you agree to the terms and conditions of the administrative order, including the penalty. Once you agree with the terms and conditions set forth in the proposed agreed order and the penalty amount, the case is set for approval at either the TCEQ commissioners' or the executive director's agenda meeting, held monthly in our central office. There, the commissioners or the executive director makes a final decision about the penalty the respondent must pay. After agenda, you can settle the case by paying the penalty and signing the order within 60 days of receiving it.

Can I contest the enforcement action?

Yes. If you contest the enforcement action or do not settle the case within 60 days of receiving it, the case will be referred to our Litigation Division. You may request an administrative hearing, which is held in front of an administrative law judge with the State Office of Administrative Hearings. However, a settlement could still occur at any time before a final decision on the enforcement order. You will receive an Executive Director's Preliminary Report and Petition notifying you of the violations and the penalty assessed, and of any corrective actions needed to come into

compliance with the regulations. This document is not an order, but a petition filed with our Chief Clerk's Office to start the administrative-hearing process. After the hearing, the judge makes a recommendation to the TCEQ commissioners about an enforcement order. At an agenda meeting, the commissioners consider this recommendation and then make the final decision whether to issue, deny, or modify the judge's decision.

What is a default order?

If you do not file a timely answer to the EDPRP, the Commissioners may issue a default order. If the respondent fails to comply with the default order, then the Executive Director may refer the case to the Office of the Attorney General for civil enforcement in a court of law.

When does the process end for an enforcement case with an agreed order?

Once the respondent complies with the enforcement order, including payment of any penalty and compliance with all technical requirements of the order, the TCEQ will send a letter to the respondent indicating that the requirements of the enforcement order have been fulfilled. You are responsible for the terms of the agreed order for five years after its effective date.

Summary of Category A Violations for Public Water Systems

What are category A violations?

Category A violations are those that can harm human health and are the most serious violations by public water systems. These violations generally lead to penalties and automatic enforcement.

The following violation list is not all-inclusive, but offers a summary of the category A violations that water systems receive. The Enforcement Initiation Criteria are a system for classifying violations by severity (A, B, or C) so that we can determine the appropriate level of enforcement for each violation. You may review the entire EIC online at <www.tceq.texas.gov/agency/eic.html>.

Which violations can result in automatic enforcement for a water system?

The following category A violations may be discovered during an on-site investigation, or may be discovered during a records review conducted by regional and central office water personnel:

- Failure to:
  - obtain approval for plans and specifications (including well completion data) for a surface water treatment plant or a new groundwater community water system (including existing groundwater systems that meet the definition of a PWS, but have
  - failed to report its active status to TCEQ)
  - provide treatment facilities necessary to meet the minimum surface water treatment requirements of 30 TAC 290.42 and 290.111
  - provide disinfection equipment to maintain the required minimum disinfection residual
  - issue a Boil Water notice within 24 hours
  - treat surface water for a system using groundwater under the influence of surface water within 18 months from the initial date the executive director notified the system that the groundwater source is under the direct influence of surface water
- Second occurrence of an investigator-documented low pressure (< 20 psi) within a period of 12 months when the cause was preventable by proper operation and maintenance
- Second occurrence of an outage for the same cause when the cause was preventable by proper operation and maintenance
- Greater than 50 percent deficiency of supply requirements
- Failure, by the PWS owner that deactivated the PWS under review, to provide immediate, written notification to the Commission of system reactivation
- Refusal to participate in a third-party comprehensive performance evaluation (CPE) or failure to comply with the requirements of a corrective-action plan that resulted from the CPE

Monitoring and reporting violations

Water systems are required to monitor the water quality to make sure it is safe for public consumption. Since some contaminants have a greater potential to make people sick, there are stricter consequences for failing to monitor and report these water quality parameters. We use a point-based system for ranking the severity and frequency of violations, giving more points for more severe violations.

Water systems that exceed the point threshold will escalate to formal enforcement action. The point system weighs the following violations more heavily, making it easier for a water system to reach the point threshold if they experience these violations:

- repeat monitoring violations of the Total Coliform Rule,
- nitrate monitoring and reporting violations, and
- other health-based violations.

You can learn more about the point system on the TCEQ's website: <www.tceq.texas.gov/goto/dwer>. At the end of this document, you can find tables outlining the sampling, reporting, record-keeping, and monitoring requirements that a water system must follow. Use these tables to stay in compliance with the TCEQ's requirements and avoid violations.

Example Drinking-Water Enforcement Scenario

Purpose of this scenario

The purpose of this scenario is to show how a small water system can go to enforcement for reporting violations found during a TCEQ records review, even when no major violations are discovered during an investigation.

Background on the drinking-water system

Coldwater Creek Water Supply Corporation is a fictitious groundwater system which serves 200 customers on the outskirts of Medium City.

Violations found during a comprehensive compliance investigation

The water system received a routine compliance investigation by regional TCEQ staff, which resulted in the following violations:

- The intruder-resistant fence was not high enough.
- The well house had a small hole near the foundation that showed evidence of rodent activity.

Actions taken to resolve the violations

Within a week of the investigation, the water system corrected the violations and documented its compliance in writing by submitting receipts for fencing supplies and labor, as well as photographs of the fencing and the repair to the well house.

Did the water system receive formal notice of these violations?

No. An NOV was not issued to the system since it quickly resolved the violations noted during the investigation.

Was an enforcement action initiated due to the investigation findings?

No. The investigation didn't result in an NOE. However, the water system received an NOE from the TCEQ's Enforcement Division for violating the agency's monitoring requirements, along with not preparing and submitting the certificate of delivery for its Consumer Confidence Report (CCR), which are category A violations. The NOE resulted in an agreed order.

Why did the water system end up in enforcement even though it resolved the violations noted during the investigation?

Enforcement actions can be initiated either as a result of an on-site investigation *or* from a records review conducted by the TCEQ's regional or central office.

During a routine records review, TCEQ discovered that some Disinfectant Level Quarterly Operating Reports (DLQORs) and the CCR certificate were missing.

How were the violations resolved?

The system was issued an agreed order requiring that the water system submit the CCR certificate of delivery and to begin submitting DLQORs to the TCEQ on time. This requirement will be satisfied upon two consecutive quarters of compliant reporting.

Conclusion

A records review conducted by the regional or central office in Austin can generate its own set of enforcement actions.

Table: Groundwater-System Sampling

How will this table assist with the required sampling at my water system?

You can use this table to find out the water quality sampling schedule that your water system is required to follow. Use this chart to check whether you are complying with the sampling requirements. The table applies to community and non-transient non-community public water systems that use groundwater as their only source of drinking water.

How do we determine the cost for required sampling at my water system?

Use our online tool <www.tceq.texas.gov/goto/costestimate> to calculate the expected sampling costs for your water system. The tool takes you through a step-by-step process to first determine which specific samples a water system must collect and analyze, and then you can enter this information into the cost estimate tool to determine total expected cost.

Definitions and Abbreviations

Entry point—Where the finished (treated) water enters the distribution system
NELAC—National Environmental Laboratory Accreditation Conference
Raw water—water before treatment
VOCs—volatile organic compounds

PWS Sampling Requirements

Community and Nontransient Noncommunity Groundwater Systems

Sample Type	Number of Samples, Frequency	NELAC LAB Required?	Who Collects?
Raw-Water Sampling			
Coliform Bacteria[2]	Monthly	Yes	Operator
Entry-Point Sampling			
Bromate (if use ozone)	Monthly	No	Operator
Chlorine Dioxide	1 sample daily	Yes	Operator
Chlorite (if chlorine dioxide is used)	1 sample daily	No	Operator
Disinfectant Level	< 501 people = 1 sample daily 501–1,000 = 2 samples daily 1,001–2,500 = 3 samples daily 2,501–3,300 = 4 samples daily	Yes	Operator
Inorganic Chemicals (arsenic and fluoride as listed in 30 TAC 290.106)	Every 3 years	Yes	TCEQ Contractor
Inorganic Chemicals (nitrate, nitrite)	Annually	Yes	TCEQ Contractor
Metals and Minerals (as listed in 290.118)	Every 3 years	Yes	TCEQ Contractor
Radionuclides (radium, uranium) *(community systems only)*	One time within 90 days of initiating use of the source water. If detected, then required quarterly. If none detected, every 9 years.	Yes	TCEQ Contractor

Sample Type	Number of Samples, Frequency	NELAC LAB Required?	Who Collects?
Entry Point Sampling *(continued)*			
Synthetic Organic Chemicals (including pesticides, herbicides)	Quarterly for 4 quarters, then once every 3 years	Yes	TCEQ Contractor
VOCs (gas, oil)	Quarterly for 4 quarters, then annually for 3 years, then once every 3 years if approved by TCEQ Executive Director	Yes	TCEQ Contractor
Distribution System Sampling			
Asbestos (if there is asbestos cement pipe)	Once during first 3 years of each 9-year cycle	Yes	TCEQ Contractor
Coliform	< 1,001 people = 1 sample monthly 1,001 to 2,500 people = 2 samples monthly	Yes	Operator
Disinfectant Residual at Representative Locations, Free or Total Chlorine	≥ 250 connections or 750 people = 1 sample daily < 250 connections or 750 people = 1 sample weekly	No	Operator
Disinfection By-Products (Chlorite)	1 set monthly (3 samples in a set)	Yes	Operator
Disinfection By-Products (TTHM, HAA5)	< 500 people = 1 sample annually 500 to 9999 people = 1 sample quarterly	Yes	TCEQ Contractor
Lead and Copper	< 101 people = 5 samples per 6-month period (for 2 periods) 101 to 500 people = 10 samples per 6-month period (for 2 periods) 501 to 3000 people = 20 samples per 6-month period (for 2 periods)	Yes	Operator or Homeowner

[1]See 30 TAC 290, Subchapter F, for reduced monitoring of many contaminants.

[2] See 30 TAC 290.109(c)(4) for rules on monitoring raw groundwater sources.

Table: Monitoring and Reporting

How will this chart help me monitor and keep records?

You can use this table to check whether you are performing the required monitoring, reporting, and record-keeping that applies to your water system. This table can also help you schedule the monitoring and reports that are required each year. Use the resources in the column "Assistance Information" to learn more about each type of record.

What abbreviations are used in the table?

ANSI/NSF—American National Standards Institute / National Sanitation Foundation
C—community public water system
DLQOR—Disinfection Level Quarterly Operating Report
GW—source of water is groundwater
MCL—maximum contaminant level
MRDL—maximum residual disinfectant level
N/A—not applicable
NTNC—nontransient noncommunity public water system
PE—professional engineer (licensed in Texas)
PWS—public water system
SW—source of water is surface water
TNC—transient noncommunity public water system
GUI—groundwater under the direct influence of surface water

Monitoring, Reporting, and Record-Keeping Requirements

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW or SW*a*	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?*b*	Guidance
Chlorine Residual Monitoring or DLQORs	Any of these	GW, SW	< 250 connections or < 750 people	Weekly	Quarterly	C, NTNC: Send to TCEQ TNC: Keep on-site	RG-407—*Disinfectant Residual Reporting for Public Water Systems*: <www.tceq.texas.gov/goto/rg-407>
			≥ 250 connections or ≥ 750 people	Daily	Quarterly		
Monthly Operating Reports (Water Production, Disinfectant Residual, pH, Temperature)	Any of these	SW (GW if providing 4-log disinfection per GW rule)	N/A	Daily	Monthly	Send to TCEQ	Fill out the Report here: <www.tceq.texas.gov/goto/swmor-form> Guidance also available: <www.tceq.texas.gov/goto/rg-211>
Accuracy Testing of Electronic Equipment for Monitoring Disinfectant Residual	Any of these	GW, SW	N/A	**Manual analyzers:** every 30 days **Continuous analyzers:** calibrated every 90 days, checked monthly	N/A	Keep on-site	N/A

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW or SW[a]	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?[b]	Guidance
Flushing of Dead-End Mains	Any of these	GW, SW	N/A	Monthly	N/A	Keep on-site	N/A
Bacteriological Monitoring	Any of these	GW, SW	Up to 1,000 people	1 sample Monthly	Monthly	Lab will send results to TCEQ	See model plan: <www.tceq.texas.gov/goto/rg-384>
			1,001–2,500 people	2 Samples monthly			
Storage-Tank Inspection	Any of these	GW, SW	N/A	Annually	N/A	Keep on-site	Storage Tank Inspection Form: <www.tceq.texas.gov/assets/public/assistance/sblga/tankinspectform.pdf>
Well Meter Calibration[c]	Any of these	GW, GUI	N/A	Every 3 years	N/A	Keep on-site	NA
ANSI/NSF 60 Approval of Chemicals	Any of these	GW, SW	N/A	N/A	N/A	Keep on-site	ANSI / NSF Web page: <www.nsf.org/>
Backflow Prevention Assembly (BPA) Tests	Any of these	GW, SW	N/A	N/A	N/A	Keep on-site	Official BPA Test and Maintenance Form: <info.sos.state.tx.us/fids/200706551-5.pdf>

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW or SW[a]	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?[b]	Guidance
Consumer Confidence Report	C	GW, SW	N/A	N/A	Annually	Send to TCEQ and customer	Fill out template: <www.tceq.texas.gov/goto/ccr13> Generate CCR here: <www.tceq.texas.gov/CCR/>
Copies of Exceptions	Any of these	GW, SW	N/A	N/A	N/A	Keep on-site	<www.tceq.texas.gov/goto/pws-exception>
Corrosion-Control Study	Any of these (if exceed Lead/ copper MCL)	GW, SW	N/A	N/A	Within 2 years of MCL violation	Send to TCEQ	Fill out Form 141C: <www.tceq.texas.gov/goto/desktop>
Customer-Service Inspection	Any of these	GW, SW	N/A	N/A	N/A	Keep on-site	Official Customer Service Inspection Form: <info.sos.state.tx.us/fids/200706551-3.html>
Distribution Map	Any of these	GW, SW	N/A	N/A	Update as necessary	Keep on-site	NA

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW or SW*a*	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?*b*	Guidance
Drought Contingency Plan (retail suppliers/ utilities)*c*	C	GW, SW	< 3,300 connections	N/A	N/A	Keep on-site	Follow the appropriate model plan for your system: <www.tceq.texas.gov/goto/drought_plan>
			≥ 3,300 connections	N/A	Submit within 90 days of adoption and revise every 5 years		
Emergency Preparedness Plan (EPP)	C, TNC located in an affected county	GW, SW	N/A	N/A	Once	Send to TCEQ	Fill out this form to create your EPP: <www.tceq.texas.gov/goto/epp-harrisfb>
Monitoring Plan*c*	C, NTNC	GW, SW	N/A	N/A	N/A	GW: Keep on-site; SW/GUI: Send to TCEQ	See model plan: <www.tceq.texas.gov/goto/rg-384>
Operations and Maintenance Manual	Any of these	GW, SW	N/A	N/A	N/A	Keep on-site	See the manual within *Managing Small Public Water Systems: Operations and Maintenance*, RG-501c
Plans and Specifications (Submitted by PE)	Any of these	GW, SW	N/A	N/A	Once for TCEQ Approval	Send to TCEQ	<www.tceq.texas.gov/goto/pws-planreview>

Reports, Manuals, Registrations	Type of PWS: C, TNC, or NTNC	Type of PWS: GW or SW[a]	Population Served	Monitoring Frequency	Reporting Frequency	Keep On-Site or Send to TCEQ?[b]	Guidance
Public Notices	Any of these	GW, SW	N/A	N/A	Post if exceed MCL, or MRDL, or have acute treatment-technique violation	Send a copy to TCEQ	Fill out the appropriate public notice template for the specific type of violation: <www.tceq.texas.gov/goto/swmor-pn>
Sanitary Control Easements for Well(s) (needed for PWS plan approved)	Any of these	GW, GUI	N/A	N/A	N/A	Send to TCEQ with plans	Sample Sanitary Control Easements: <info.sos.state.tx.us/fids/200706551-2.html>
Service Agreements and Plumbing Ordinance	C, NTNC	GW, SW	N/A	N/A	N/A	Keep on-site	Sample Customer Service Agreement/Ordinance: <info.sos.state.tx.us/fids/30_0290_0047-15.html>
Well Completion Data	Any of these	GW, GUI	N/A	N/A	N/A	Keep on-site	View your well report: <www.tceq.texas.gov/goto/waterwellview>

[a]GUI systems follow regulations for SW systems, except as noted in the table above.

[b]Maintain copies on-site of all records that you send to the TCEQ.

[c]Please note that well-meter calibrations, drought contingency plans and monitoring plans may be required by your local groundwater-conservation district.

TCEQ REGULATORY GUIDANCE

Small Business and Environmental Assistance Division

RG-501e • April 2014

Managing Small Public Water Systems: Part E, Resources

Contents

Introduction

Part E of the *Managing Small Public Water Systems* series lists resources that may help you as you create and carry out your asset-management plan and conduct everyday operations at your utility.

To view or download the complete *Managing Small Public Water Systems* series (publication RG-501), go to <www.tceq.texas.gov/goto/help4pws>. If you do not have Internet access, call the SBLGA's hotline number 800-447-2827 for a paper copy.

Note: This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at <info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=3&ti=30&pt=1>.

Resources: I need assistance with ...

Conducting Utility Board and Council Meetings

- Call the Open Government Hotline: 877-673-6839 and request the publication *The 2008 Open Meetings Act Made Easy*.
- Order the *Open Meetings Handbook*, an in-depth publication about the *Act* and its interpretation, by calling 512-936-1730. It is also available in a downloadable PDF format on the Attorney General's website at <www.texasattorneygeneral.gov>.

Drought Contingency Planning

- Use our model drought contingency plans to create your own. Request a copy of the model plan along with the *Handbook for Drought Contingency Planning for Retail Public Water Suppliers* (RG-424) by calling 512-239-4691, or by sending an e-mail to <wras@tceq.texas.gov>.

Reporting and Record Keeping

- Refer to the table on record keeping in *Managing Small Public Water Systems, Part D: Compliance,* for a detailed outline of the records and reports your utility must prepare.

Using Engineering Services

- If you are receiving funding from a state or federal program, contact the funding entity for the specific requirements before hiring an engineer.
- Contact other public water systems in your area and ask them which engineer they use and if they are satisfied with his or her work.
- Look in the phone book for civil engineers. Call and ask them about their experience with public water systems.
- Contact a registered professional engineer listed on the State Board of Registration for Professional Engineers' website at <www.tbpe.state.tx.us/>.
- Look for a firm experienced with the TCEQ's design rules for water systems in 30 TAC 290, Subchapter D.
- Call the TCEQ's Plans and Specifications Review section at 512-239-4691 with engineering questions.

Operator Licensing

- Find out how to become a licensed PWS operator at <www.tceq.texas.gov/goto/waterlic>.
- See what applicants for PWS operator licenses need to know at <www.tceq.texas.gov/goto/pws-ntk>.
- Check how many credit hours you currently have on file online at <www2.tceq.texas.gov/lic_dpa/ >.
- Renew your license using the Texas Online license-renewal Web page at <www.tceq.texas.gov/goto/renew>.
- Renew your license on paper by contacting the TCEQ Licensing Section at <LICENSES@tceq.texas.gov> or phone 512-239-6133 to request a hard copy of the renewal application.
- Find approved water operator courses and training providers at <www.tceq.texas.gov/goto/water-tng>.

Management Training

Running a water or wastewater system requires a varied skill set. Utility managers, including city-council members, mayors, public works directors, and board members can benefit from training to learn how to manage awater system. Use Table 1 to find training specific to water-system operations, finances, and management.

MANAGING SMALL PUBLIC WATER SYSTEMS: RESOURCES

Table 1. Management Training

This worksheet is intended to help managers of water system, including city council members, mayors, public works directors, and board members find training specific to running a utility. *Training and contact information listed in this table is subject to change and may not be available every year. Prices may vary.*

Program	Provider	URL	Phone	Comments
American Management Association	AMA	www.amanet.org/training/live-online-seminars.aspx	877-566-9441	Online communication, management, business, and financial-planning courses
American Water Works Association and Water Environment Federation	AWWA, WEF	www.awwa.org	800-666-0206; 877-WEF-4REG	Annual AWWA/WEF Utility Management Conference; topics include: • Business-practice optimization • Benchmarking • Customer Service • Employee development • Finance, accounting, rates • Leadership and management development • Legal, regulatory, political issues
American Water Works Association	AWWA	www.awwa.org	303-794-7711	Public Officials Program at AWWA's Annual Conference and Exhibition. It educates water and sewer wastewater-board commissioners, mayors, council members. Includes: • Introduction to water and sewer • Planning and funding your capital infrastructure • Water and sewer infrastructure, O&M

Program	Provider	URL	Phone	Comments
American Water Works Association	AWWA	www.awwa.org/Conferences/Content.cfm?ItemNumber=1346&showLogin=N	512-238-9292	Basic Water Utility Management Institute courses for new managers. Management topics: • Environmental issues • Infrastructure • O&M • Utility sustainability • Public involvement and affairs • Security and emergency preparedness • Stakeholder communication • Succession planning
Community Resources Group	CRG	www.crg.org www.rcap.org/commpubs	806-763-9515	Training for managers, board members, decision makers, and utility staff members
Environmental Protection Agency	EPA	water.epa.gov/learn/training/dwatraining/calendar.cfm	800-887-6063	Webinar: Asset Management 101 for Systems (check the Drinking Water Academy training calendar)
TCEQ and Texas Rural Water Association	TCEQ, TRWA	www.tceq.texas.gov	512-239-4691	TCEQ Annual Seminar: Water System Rates and Board training: • Maintaining compliance • Responsibilities of board members
TCEQ and Texas Rural Water Association	TCEQ, TRWA	trwa.org/environmental-services/	512-239-4691	Staff and board training by an FMT contractor

Program	Provider	URL	Phone	Comments
TCEQ	TCEQ	www.tceq.texas.gov	512/239-4691	TCEQ Annual Public Drinking Water Conference—includes exhibits and presentations on funding and other management issues
TCEQ	TCEQ	www.tceq.texas.gov		TCEQ's Environmental Trade Fair—includes exhibits and presentations of interest to regulated entities, including small public water systems
Texas Engineering Extension Service	TEEX	www.teex.org/eu	800-723-3811	Technical assistance for small water and wastewater systems: • On-site assessment of system needs and recommendations on best practices • Mock inspection • Training for managers and leaders • Troubleshooting water-quality, treatment, capacity, and treatment-process issues • Assistance via phone
Texas Engineering Extension Service	TEEX	teex.org/teex.cfm?pageid=EUprog&area=EU&templateid=1268	979-458-2001	Water Utilities Management-Training for managers of water and wastewater utilities: • Management functions • Reporting and regulations • Interacting with governing bodies • Planning for growth, budget, finance • Using engineers • Safety, security, emergency response
Texas Rural Water Association	TRWA	trwa.org/	512-472-8591	On-site training and technical assistance: • Water and wastewater treatment, distribution, and storage • Management and operations • Rate calculations and budget management

Program	Provider	URL	Phone	Comments
Texas Water Infrastructure Coordination Committee	TWICC	www.twicc.org	(512) 463-7870	TWICC holds periodic workshops to provide information on funding for water and wastewater systems along with other subjects
Texas Rural Water Association	TRWA	trwa.org/conferences/training-technical-conference/	512-472-8591	Water Board Directors Governance Conference: • Utility-director responsibilities • Finances • Separation of duties • Building a strong board
Texas Rural Water Association	TRWA	trwa.org/conferences/directors-conference/	512-472-8591	Public Funds Investment Act courses
Texas Rural Water Association	TRWA	trwa.org/publications/trwa-publications/utility-management-certification-study-guide/	512-472-8591	Water University utility-management certification: • Rates, finances, accounting • Capacity • Water operations

Helpful Contacts

Use this list to contact personnel at the Texas Commission on Environmental Quality, and to identify utility trade associations and other state agencies. This list is not intended to be all inclusive.

TCEQ Contacts

TCEQ Central Office Contacts

Small Business and Local Government Assistance	800-447-2827
Public Drinking Water Section	512-239-4691
Wastewater Permitting Section	512-239-4671

TCEQ Regional Contacts

Region 1 Amarillo	806-353-9251
Region 2 Lubbock	806-796-7092
Region 3 Abilene	325-698-9674
Region 4 Dallas–Fort Worth	817-588-5800
Region 5 Tyler	903-535-5100
Region 6 El Paso	915-834-4949
Region 7 Midland	432-570-1359
Region 8 San Angelo	325-655-9479
Region 9 Waco	254-751-0335
Region 10 Beaumont	409-898-3838
Region 11 Austin	512-239-2929
Region 12 Houston	713-767-3500
Region 13 San Antonio	210-490-3096
Region 14 Corpus Christi	361-825-3100
Region 15 Harlingen	956-425-6010
Region 16 Laredo	956-791-6611

Other State Agencies

Texas Department of Agriculture 512-463-7476

A state agency that offers state and federal loans and grants for qualifying utilities.

Texas Water Development Board 512-463-7847

The state agency charged with administration of cost-effective financing programs for water-related infrastructure, state water planning, data collection and dissemination, and technical assistance.

Texas Water Infrastructure Coordination Committee

512-463-7870

The TWICC is a committee of local, state, and federal agencies that collaborate to identify issues with water and wastewater infrastructure and compliance, and to seek affordable, sustainable, and innovative funding strategies for the protection of public health and the efficient use of government resources in Texas.

Trade Associations and Nonprofit Organizations

American Water Works Association 512-238-9292

AWWA promotes a safe and sufficient supply of drinking water for all people through training, professional development, educational publications, consumer education, plus efforts to influence policy. AWWA's Texas Section—or community group—stays current and active on local issues.

Association of State Drinking Water Administrators 703-812-9505

A professional association serving state drinking-water programs that was formed to address a growing need for state administrators to have national representation. It has become a respected voice for state primacy agents with Congress, the U.S. Environmental Protection Agency, and other professional organizations.

Association of Water Board Directors—Texas 281-350-7090

An association dedicated to the betterment of Texas water-district operation and management through education and unification.

Community Resource Group 806-763-9515

A nonprofit corporation providing on-site technical assistance, training, and financial assistance for small towns and rural communities (with populations less than 10,000) with problems or needs of community water-supply and waste-disposal authorities.

Independent Water and Sewer Companies of Texas

512-346-4011

A nonprofit educational trade association of privately owned water and sewer utilities in Texas.

Texas Alliance of Groundwater Districts 512-809-7785

A nonprofit organization that promotes and supports sound management of groundwater based on local conditions and good science. The TAGD provides educational and technical assistance to member districts and the public, serves as a resource on groundwater issues with state officials, assists members in keeping current with state law, and acts as a central point of contact for information on groundwater issues and practices.

Texas Public Works Association 817-410-4065

A not-for-profit educational and professional association of public agencies, private companies, and individuals dedicated to providing high quality public-works goods and services.

Texas Rural Water Association 512-472-8591

A statewide nonprofit educational and trade association dedicated to the improvement of water quality and supply.

Texas Water Utilities Association 888-367-8982

An organization providing training programs, technical publications, and mutual problem-solving opportunities to water utilities.

Texas Water Quality Association 361-573-6707

A trade association for water-quality professionals and suppliers for the water-treatment industry.

Water Environment Association of Texas 512-693-0060

A nonprofit technical and educational organization helping to innovate, design, and implement wastewater technologies and water programs.

For More Information

For confidential assistance with environmental compliance, contact the Small Business and Local Government Assistance Hotline at 800-447-2827, or visit <www.TexasEnviroHelp.org>.