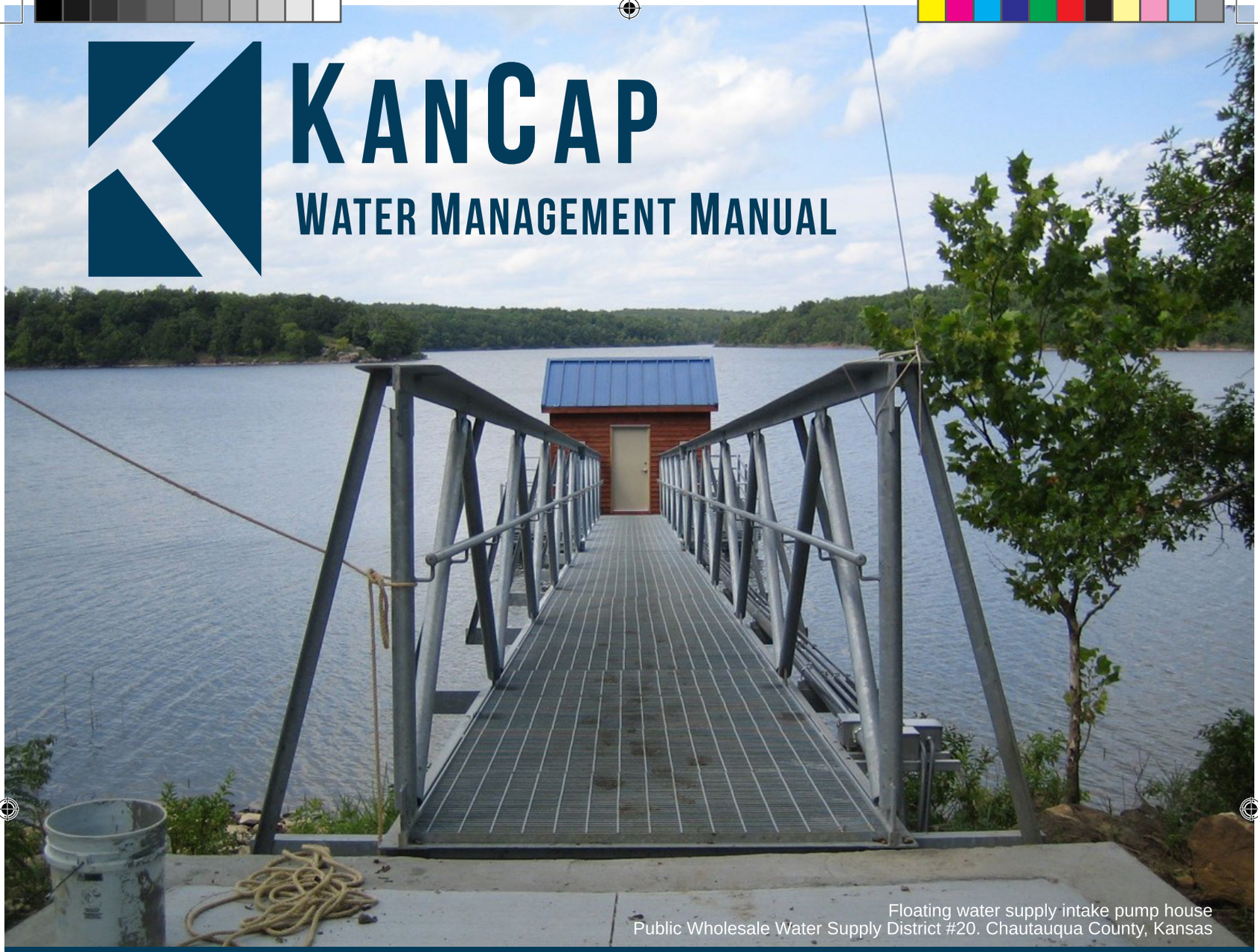
# KanCap
## Water Management Manual



Floating water supply intake pump house
Public Wholesale Water Supply District #20. Chautauqua County, Kansas

# A GUIDE FOR WATER BOARDS

Kansas Municipal Utilities

Kansas Department of Health and Environment

Ranson Financial Consultants L.L.C.

Wichita State University
Hugo Wall School of Public Affairs
Environmental Finance Center

Southwest Environmental Finance Center

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# KanCap

## Water Management Manual

### A guide for water boards

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# INTRODUCTION

This manual is intended for use by any elected official with the responsibility for operating and maintaining a water utility. Elected officials may be members of a city council or county commission or serve on the board of a Rural Water District. In many cases, the board's responsibilities extend far beyond the water utility but the responsibility to provide safe, reliable drinking water should be regarded as a paramount, since it is foundational to the community. Additionally, in small and very small communities, the water infrastructure may constitute the largest investment of the community. While the primary audience for the manual is board members, water utility staff, including operators, bookkeepers and managers will also find portions of the manual useful.

For simplicity the terms "board" and "board member" are used throughout this document, but they are intended to apply to any elected official with responsibility for a water utility or system. While there is a technical difference between a water "utility" and a water "system," these terms are used interchangeably in this manual.

The appendices of this manual  contain additional material that the reader might find useful. In particular, Appendix H contains a list of resources that can be used to supplement the material contained in the manual or to gain additional detail about a particular subject. This appendix also contains a list of references that were used in generating some of the material in the document. The list is not in any particular order. The references are numbered and these numbers are included in parentheses within the document to note when information has been obtained from a particular reference.

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# CHAPTER 1

## BOARD FOUNDATIONS



# CHAPTER 2

## MANAGING A WATER UTILITY (Managerial Capacity)



# CHAPTER 3

## FINANCING A WATER UTILITY (Financial Capacity)





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# CHAPTER 4

## OPERATING A WATER UTILITY (Technical Capacity)



## APPENDICES





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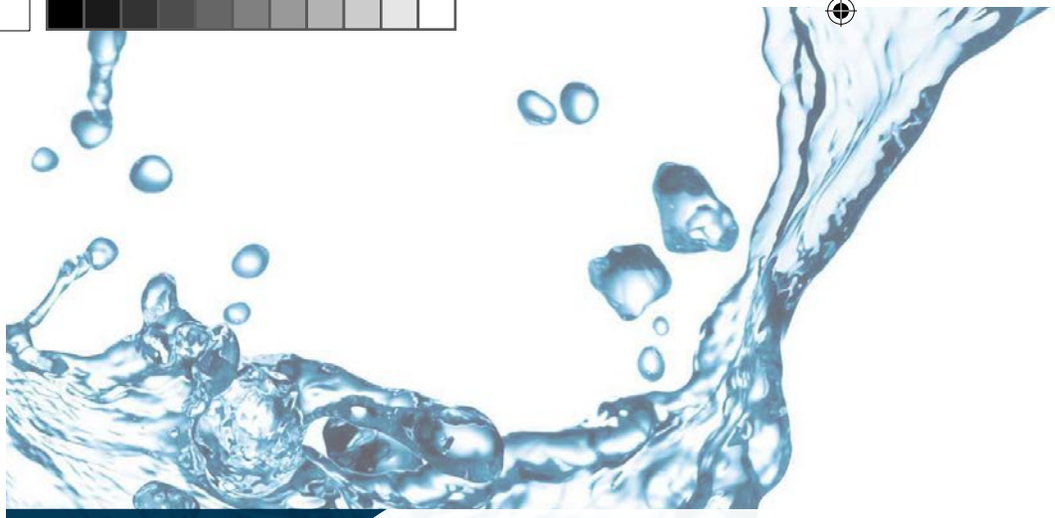


# BOARD FOUNDATIONS

## CHAPTER 1


Capitol Building - Kansas State

### INTRODUCTION

Water utilities form the foundation of any community by protecting public health, providing quality of life, serving as an economic engine and allowing for recreation and entertainment. Without sound drinking water infrastructure and treatment, the community's well-being would be in jeopardy. Keeping the water utility in proper working order requires the dedication and talents of many individuals, including board members. Board members serve a vital role by providing a voice for the utility's customers as well as support for the water utility employees. Despite their importance, board members serve on a voluntary basis, contributing large amounts of their time with little praise or thanks and virtually no compensation. Your willingness to serve in this important position to ensure your water utility remains viable and sustainable is commendable.

We understand that the role you have taken on is one that includes many varied responsibilities, including compliance with regulations, communicating with the public, approving budgets and rates and planning for infrastructure replacement. It is often difficult to understand and navigate your way through all of these requirements so we hope this manual will enable you to better understand your responsibilities and provide you with the knowledge and skills to feel more confident in your role.

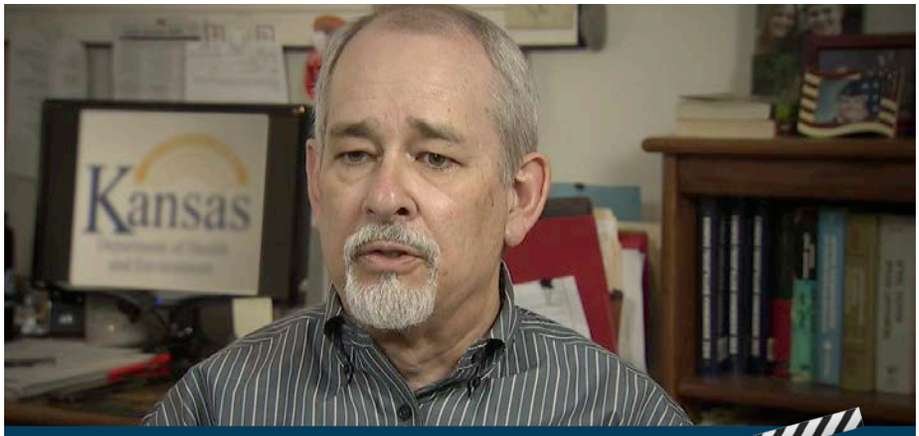
### USING THIS MANUAL

This manual is divided into four sections: Board Foundations, Managing a Water Utility, Financing a Water Utility and Operating a Water Utility. We have structured the manual in this way for two reasons:

1. To focus your immediate attention on the most critical elements affecting board members by placing them at the beginning.

2. To match the Environmental Protection Agency's (EPA's) capacity development program, which is further explained in the next section.

We anticipate that you will use this manual more as a reference guide than a novel. Rather than reading it cover to cover, we anticipate that you will read a few sections at a time, giving yourself time to absorb the material and then return to the manual for a refresher as specific issues arise.




**Mike Tate**
Director of Bureau of Water, KDHE
*"Introduction"*

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We have included videos of your fellow water system personnel in the electronic version of this manual so that you may hear directly from your peers in many of these areas. They will share with you their general experiences, challenges they have faced, successes achieved and words of advice. We encourage you to watch the videos as you go through this manual to reinforce the information you are reading. We also encourage you to share the manual and videos with others, either within your board, your utility or your customers to assist you in explaining requirements and responsibilities. You may also wish to contact the people filmed in the video to learn from their experiences. We have included contact information for this purpose in Appendix I.

The topics covered in this manual provide guidelines you can use as a board member to evaluate the utility's strengths and weaknesses and to increase the system's overall capabilities and sustainability – both financially and operationally. Thank you for your willingness to serve as a board member and for taking time to read this manual. We hope you find this to be a valuable resource.

## CAPACITY DEVELOPMENT

The Safe Drinking Water Act (SDWA) is the major federal law governing water utilities. It has been amended several times and includes an extensive array of requirements that include public health protection, water system operations and management and water system funding. The most recent amendments in 1996 included provisions to holistically improve the overall capacity – or capabilities – of water utilities. Capacity in this case means having the managerial, financial and technical capabilities to plan for, achieve and maintain compliance with applicable drinking water regulations now and into the future.

***Managerial capacity*** refers to the system's institutional and administrative capabilities and is covered in Chapter 2 of this manual. Examples of managerial capacity include:

- The board members and utility staff each have clearly-identified responsibilities and are held accountable for the management of the system.
- The board has established clear policies and procedures for the efficient management of the system.
- The board members and managers are actively involved in capital improvement and financial planning to meet the short and long term needs of the system.
- The board develops and periodically reviews and updates plans, such as asset management plans, source water protection plans and emergency preparedness plans.



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***Financial capacity*** refers to the system's ability to acquire sufficient revenue to cover the full costs of providing services, including reserves for unexpected expenses and funding for needed capital replacement. Financial capacity is covered in Chapter 3 of this manual and examples include:

- Appropriate budgeting, accounting and other financial planning methods are used and revenue is managed effectively.
- The system is managed in a business-like and fiscally responsible manner.
- Sufficient internal controls are in place to prevent financial losses from error and theft.
- The board has made adequate provision for financing repairs and replacement of equipment as it degrades and for necessary capital improvements.
- The system maintains sufficient credit worthiness so that it can access capital through public or private sources.

***Technical capacity*** refers to the system's ability to reliably produce and deliver an adequate supply of water that meets all drinking water standards and is covered in Chapter 4 of this manual. Examples of technical capacity include:

- The system's infrastructure, from source to distribution, is in good condition and has not exceeded its useful life.
- The water source is adequate to meet current and future demands, meets all applicable water quality standards (or is treated to do so) and is appropriately sampled and protected.
- The system is operating within its limitations regarding water rights.
- The system has certified operators who understand the benefits of public health protection, know the applicable drinking water standards, understand the system's technical and operational characteristics, have the proper certification levels and adequate knowledge to manage operations and receive ongoing training to stay current on new regulatory requirements and best practices.

Determining whether a water utility has sufficient capacity is a difficult task. Managerial, financial and technical capacity are interrelated and intertwined. It is not easy to neatly separate elements into these different categories. A water utility may lack one particular element of capacity but excel in other areas, keeping its overall capacity high. Another utility may have moderate capacity in all areas. Others may have extremely high capacity in several areas, moderate in several others and low in a few more. Ranking these utilities in terms of capacity and determining if they have "sufficient" capacity is somewhat more art than science. What is clear, however, is that the duty of a water utility board is to constantly strive to improve the existing capacity in all three areas, particularly in any area that is currently below regulatory standards, such as the lack of a certified operator or failing to meet a water quality standard.

## 10 ATTRIBUTES OF EFFECTIVELY MANAGED UTILITIES

**Product quality**

**Customer satisfaction**

**Employee and leadership development**

**Operational optimization**

**Financial viability**

**Infrastructure stability**

**Operational resiliency**

**Community sustainability**

**Water resource adequacy**

**Stakeholder understanding and support**

http://www.watereum.org/resources/interactive-primer/ten-attributes/



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## BOARD MEMBER DUTIES

***Care***
**Exercising good judgement in making decisions**

***Loyalty***
**Acting in good faith and in the best interest of the utility**

***Obedience***
**Adhering to the missions, bylaws and policies**

To aid water utilities in understanding and assessing their own capacity, the State of Kansas has developed a fact sheet and a questionnaire which can be found in Appendix A. These tools can be used to assess the strengths and weaknesses of the utility and allow the board to develop a plan to build off the strengths to improve the weaknesses. It is highly recommended that board members take the time to go through this exercise and discuss the results with the entire board and utility staff. The board may also want to share the capacity assessment results with the water system customers through meetings, websites or the Consumer Confidence Report (CCR). If the board includes the results in their annual CCR, it is possible to share improvements in capacity over time with customers.

As stated previously, the three components of capacity development (managerial, financial and technical) do not exist in isolation and in order to be successful, a utility will need to blend them. For example, a budget will set the need for a rate which then brings in revenues which can be used to operate and maintain the facility. Many people will argue that one of the elements – managerial, financial, technical – outweighs the others and is "the" element to focus on. However, that type of thinking should be discouraged as they are all equally important and no water utility will truly be sustainable over the long term without all three. Thus, while the three aspects of capacity are being covered separately in this manual, it is important to think of them as a holistic set of interrelated issues.

## LEGAL FRAMEWORK AND FUNDAMENTAL DUTIES

The legal requirements of any type of board member position can be confusing or intimidating and water boards are no exception. Unlike an informal advisory board, a water board is a legal entity that has the ultimate responsibility and accountability for the conduct and performance of the water system. Water boards are responsible for making sure the water system complies with all applicable state and federal laws designed to protect public health. While boards normally delegate the routine operation and management of the utility to employees, a board member cannot delegate or reassign the ultimate responsibility for the water utility. The board makes legally binding decisions for the water utility and both the board and individual board members can be held liable if the water does not meet state and federal requirements. It is a big job!

In fulfilling their roles, board members have three fundamental duties that should be kept in mind when making decisions about the operation and management of the water system. These are the duties of care, loyalty and obedience.

***The Duty of Care*** means taking the care and exercising the judgment that any reasonable person would use in making informed decisions. Duty of Care does not prevent board members from disagreeing with one another or challenging opinions of the board as a whole, but rather requires a board member to fully consider all available information, circumstances and resources when making decisions.

***The Duty of Loyalty*** means acting in good faith and in the best interest of the utility and not in the interests of the individual board member, his/her family or friends. In fact, Kansas state law forbids conflicts of interest by those serving on elected boards. Candidates running for a board position, or those replacing a board member, must submit a personal statement of substantial interest (SSI) form to the utility. The SSI allows board members to outline any potential conflicts of interest they may have and makes this information part of the public record, which protects the system, as well as the board member, in future decision making. The SSI is an on-line form and a link can be found in Appendix H.



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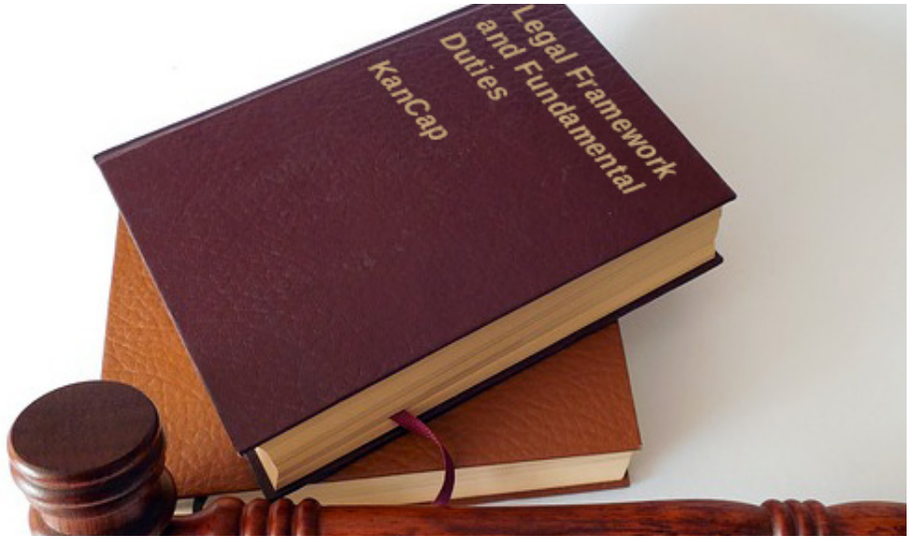


***The Duty of Obedience*** means the board as a whole and individual board members adhere to the mission, bylaws and policies of the utility, as well as all applicable laws, rules and regulations. The board must act within the boundaries of the authority granted by law and the governing policies of the utility. In developing rules and policies, the board must be fair and equitable to all members of the board and staff, as well as the customers. Additionally, the application of the rules and policies should be fair and consistent.

Board decisions should be made in the interest of ensuring that the water utility will be able to supply safe and adequate drinking water to its customers now and into the future.

A water utility is authorized to provide water service to the public and it is important for the board to have a full understanding of the authority and responsibility granted to it as a Public Water System (PWS). Permits and certifications are required for all Kansas PWSs including operating permits and permits for modifications of existing systems. This includes the requirement for review and approval of plans and specifications prior to soliciting bids and the requirement to follow proper construction procedures.

As stated previously, the laws related to protecting water quality and public health are the most important for board members to understand. These laws and regulations are covered in Chapter 4 of this manual. However, there are many other Kansas state laws and regulations that apply to elected boards in general and it is important to know and understand these laws as well. Examples include procedures for purchasing and procuring goods and services, holding open meetings, maintaining open records, financial accounting and auditing financial records. These laws and regulations will be presented in greater detail throughout this manual. It is important to remember, however, that it is ultimately the board's responsibility to determine which laws and regulations apply and how to maintain compliance with them.

## BEING A BOARD MEMBER

### Roles of Elected Officials, Staff and Customers

A well-run, sustainable water utility takes a three-way partnership between the board, the utility staff and water customers. All three have distinct roles to play in the partnership and improper fulfillment of any of these roles may cause problems for the utility. In this partnership, the utility board sets overall policy and direction for the utility and ensures that the utility has adequate funding. The board has the duty to pass water rates that provide a sustainable level of funding and to use the water revenues within the utility. The board should also encourage and support the staff in implementing sustainable practices, including proper training, the purchase

### BOARD MEMBER RESPONSIBILITIES

**To meet the needs of the people by providing safe drinking water at the most appropriate cost**

**To set policies that guide the system to operate effectively and legally**

**To develop long-term goals to protect public health and support economic health**



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of necessary equipment or computer programs and support for comprehensive asset maintenance. The board should act in a transparent manner and clearly communicate both the utility's goals and funding needs to the customers.

Water system personnel provide the day to day operation, maintenance and management of the system. They also are responsible for implementing the sustainability programs of asset management, water loss control and energy efficiency to ensure they are good stewards of the public investment and the environment. These programs are described in more detail in Chapters 2 and 4 of this manual. A further benefit of sustainability programs is that they place the customer at the center of everything the utility does. The utility exists to provide a service to its customers.

At the same time, the customers must do their part to support the utility. Customers need to be wise consumers of the resource by installing water efficient devices such as low flow toilets, low flow showerheads and water efficient washing machines and dishwashers, fixing any household leaks or broken appliances and practicing water conservation with respect to outside landscaping. Instead of viewing the water bill as the last bill they want to pay, customers should understand the importance of the water utility and support the water system board and personnel in their efforts to provide a good service. It is important for customers to voice the level of service they desire and indicate that they are willing to pay for the investment. This support in turn allows the board to raise the rates to a sustainable level.

While not all utilities currently have this type of partnership, it is something to work towards and, if achieved, can greatly enhance the utility operation. Part of the partnership process, especially between the board and utility staff, is to develop a method of regular communication so the board can remain aware of all of the major issues within the utility, particularly before they reach a crisis level. This does not mean that the board should be made aware of every single issue within the utility; it is not the board's job to micro-manage the utility staff. Rather, the board needs to know major concerns, such as the overall financial picture (e.g., how well the actual expenditures match budgeted expenditures), staffing issues, personnel issues, legal issues, regulatory concerns, needed capital improvements and the need for professional contracts. Communication may be handled through regular board meetings where key staff attend and make a presentation to the board or it may be handled through regular written reports presented to the board on a routine basis.

This type of management works best when the board hires well-qualified, trustworthy staff and then allows them to operate independently, but under the overall direction, policies and procedures of the board. The board should check periodically whether the policies and procedures are being properly followed and applied in a uniform, fair and consistent manner. The board should also ensure that there is an adequate staffing level and sufficient funding to pay the staff and to provide for proper training.

Even small utilities with very limited staff have the responsibility to sustainably provide quality water service. Therefore, these roles and responsibilities remain even in very small utilities.

## External Communication

Building the three-way partnership described above requires effective communication with the water utility customers. As the main "voice" of the utility, board members often set the tone for how the water utility is perceived by the "outside world" (e.g., customers, the news media, regulators and funders.) Therefore, the board's actions and communications can paint a positive picture of the utility if the utility is meeting regulations, providing for customer desired level of service, replacing failing infrastructure and properly funding utility operations. It is necessary for the board to share the water utility's successes, explain the utility's challenges and tie the level of service to the overall cost in order to increase public support and build rate capacity within the community.

Prior to developing any external communication, the board should consider the message it wants to send and how that message will be perceived by the different constituencies within the community. The overall message should be crafted to be clear and understandable to the entire community.

External communication should be provided in as many ways as possible to reach the maximum number of customers. Also, communication should reach beyond the vocal minority (the small number of customers who may have expressed interest in a particular topic or who might be complaining about a particular issue). There are a variety of means that can be used to



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communicate with customers that include, but are not limited to, the following:

- Letters
- Announcements
- Broadcasts of meetings
- Websites
- Social media—Facebook, Twitter and others
- Press releases
- Interviews with print media
- Brochures
- Annual customer meetings
- Billing inserts
- CCRs
- Postings in public places in the community

Image credit: elycefeliz | Flickr

In all communications, strive to keep the tone professional, but positive and friendly. Additionally, all staff and board members should be knowledgeable enough to respond to questions that arise from customer communications, either in person or via phone calls, or they should know the right person to direct questions to. For major or consequential announcements, it may be a good idea to hold training sessions with staff members to ensure they are knowledgeable and aware of the message the board would like to send.

Smaller utilities probably do not have sufficient resources to hire outside assistance for external communication, such as marketing firms, but larger utilities may want to consider this option. Water utility personnel are not always well-versed in external communication and major campaigns, such as water conservation, may benefit from some outside help in how to craft and deliver the message. Campaigns of this type by cities such as Denver were highly successful. Positive results may be well worth the investment in marketing. Smaller utilities can rely on the work of others (starting with the work of other utilities and tailoring it to fit their needs), look for volunteer assistance within the community (there may be community members who have this type of expertise and may volunteer a few hours to help the utility) or review campaigns of trade groups, such as the American Water Works Association.

Some communication may be difficult to deliver to the customer – such as the need for a rate increase. However, avoiding the communication and hoping the customers will not notice a rate increase is not a better way to go. Rather, providing communication well in advance of the increase and describing in a clear, effective manner why the increase is needed, the harm if the increase is not implemented and what the increase will be used for is a better way to go.

In addition to communicating with customers, board members also have to communicate effectively with regulators and funding agencies. When dealing with regulators, it is best to be open and honest at all times and to indicate a willingness to work with the regulator to fix any non-compliance issues that may be occurring. Regulators are generally most interested in fixing the issue at hand and will usually work with utilities who are responsibly and proactively trying to address the concern.

Communications with funders should begin well in advance of when the actual money is needed. There are multiple funders with different requirements and deadlines and it can take a very long time to get a project from conception to funding. If there is a need to



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install new infrastructure, it is important for the board to begin discussions as soon as possible to determine the best funding sources and the requirements so there is sufficient time to complete all required paperwork and obtain the money. Depending on the size of the utility, board members may be very actively involved in the discussions with funding agencies or staff members may handle more of the detailed discussions and have the board communications with funders at a higher level. It is up to the utility and the board itself to determine the role of the board in obtaining outside funding.

Occassionally, the need to communicate with the media may arise. In some cases, these may be planned opportunities in which the news media or TV stations want to do a story on the water utility. These opportunities provide a way to get the water utility's message out to customers. In other cases, the news media may be contacting the utility due to an emergency situation or a water quality concern. In these cases, the media interaction may be more stressful. These types of inquiries should be handled as much as possible by someone within the utility designated to address the media. In a large utility, this may be a public affairs manager while in small utilities it may be the board president or other board member. There are several important tips to keep in mind when dealing with the media, including:

**Carl Slaugh**
City Administrator, City of Iola
*"Media Relations"*

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- Keep answers brief and on point.
- Do not guess when the answer is unknown, simply state, "I don't know but I will try to find out."
- Do not say "no comment" or evade the question.
- No statements with a reporter are truly "off the record."
- The person speaking to the media will be representing the utility.
- Do not joke with reporters, especially if it is a televised interview.

Additional media relations tips are contained in Appendix A.

## AN EFFECTIVE MISSION STATEMENT SHOULD BE

***Succinct***
**Preferably brief enough to be printed on the back of a business card**

***Clear***
**Accurately stating who you are and what you do**

***Memorable***
**Simple enough to be recited by all board members and staff**

***Unique***
**Distinctive to your utility**

***Realistic***
**A summary of why the utility exists and what it does**

***Current***
**Reviewed and updated regularly**

### Mission Statement

Mission statements are often underrated and poorly executed. A well-crafted mission statement is clear, concise and specific.



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## EXAMPLES OF CLEAR AND EFFECTIVE MISSION STATEMENTS

***TED:*** Spreading Ideas

***Wounded Warrior Project:*** To honor and empower wounded warriors

***New York Public Library:*** To inspire lifelong learning, advance knowledge and strengthen our communities

***American Diabetes Association:*** To prevent and cure diabetes and to improve the lives of all people affected by diabetes

***Smithsonian:*** The increase and diffusion of knowledge

***WaterOne:*** We provide a safe, reliable, high-quality water supply with superior service and value

***Albuquerque Bernalillo County Water Utility Authority:*** To assure responsive customer service; provide reliable, high quality, affordable and sustainable water supply, wastewater collection treatment and reuse systems; and support a healthy, environmentally-sustainable and economically-viable community

It is easily remembered and understood by all – board members, staff and customers. It sets the overall direction for the utility and allows everyone to share the same overall goal. It is a good idea for the water utility to develop a mission statement if one does not already exist or to replace an outdated or poorly executed mission statement.

Developing a mission statement does not have to be a tedious or disagreeable task. A mission statement can be created in a short work session with staff and interested members of the public included in the process. However, if a work session is used to create a mission statement, it is important to keep in mind the need to follow all open meeting act requirements when setting up the work session. During the work session, an outside facilitator can be used or the group can proceed using only its own personnel. One approach to developing a mission statement is the following:

- Place attendees in small groups (about 3 to 5 people per group).
- Hand out post-it notes to the group.
- Ask each person to brainstorm important words, phrases, or ideas related to the water utility (only one thought or word per sticky note).
- After a few minutes of brainstorming individually, ask the groups to categorize their sticky notes into 3 to 6 categories and then come up with one word or phrase that best names each category
- Each group should take the three to six category names and weave them into a mission statement, adding supplemental words as necessary.
- All members of the group should be satisfied with the small group's mission statement and if not, it should be revised until there is a consensus.
- The small group mission statements should be shared among the entire group.
- The entire group should vote on its favorite mission statement.
- The selected mission statement should then be the starting point for the final mission statement.
- The other mission statements should be examined to see if any key ideas contained in them need to be folded into the selected mission statement.
- If so, the mission statement should be expanded to include these ideas.
- The final mission statement should be agreeable to the entire group.



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This process should take no more than 60 to 90 minutes and can be relatively fun and serve as somewhat of a team building exercise. It is an inclusive process and all should be allowed to participate. The more who do, the more likely the mission statement is to be accepted and understood.

The most important component of the process is to have a mission statement that is agreed upon by all and conveys the intent of the utility. Fortunately, in drinking water there is not an extensive list of what customers want; the list is relatively finite. Furthermore, there are not significant differences between what the board, customers, staff and regulators want, so it should be possible to have a consensus driven mission statement without too much disagreement.

Once the mission statement is written and presented to all it should be used in all communications with customers, including the tops of billing statements, reports, Facebook pages or other social media and Consumer Confidence Reports. Furthermore, the utility operation should be reviewed to see how well it matches the mission statement. If the operation does not effectively match the mission, it may be necessary to review the areas needing improvement. The mission statement should be reviewed periodically, perhaps annually or bi-annually and adjusted as necessary through a consensus process.

## Setting Goals and Measuring Progress

The mission statement sets an overall unified vision for the utility. In order to achieve this vision, utilities set goals that describe how they function. Goals can be external – something that the public will be interested in and have an understanding of – or internal – something related to staff activities that are not of public interest. Both types of goals are important to keep the utility on track and focused on the ultimate mission of providing a quality product to the public.

### GOOD GOALS ARE "SMART"


In all cases, goals should meet the "SMART" standard. They should be specific, measurable, attainable, relevant and time bound. A specific goal is one in which it is clear to everyone what the goal is trying to achieve. For example, a goal that states, "We wish to provide good water" can mean many different things to different people. A goal stating, "We will provide water that meets the Safe Drinking Water Act primary standards 100% of the time" is much clearer and allows all individuals to immediately know what "good water" is defined as by the utility.

Goals need to be measurable so it is possible to tell whether they have been met. A goal of "We will provide excellent customer service" is not measurable because "excellent service" isn't sufficiently defined. If the goal were revised to "We will respond to water quality complaints from customers by the next business day 95% of the time" it can be measured. The type of data required to measure the goal would include a log of customer complaints as well as a log of responses and response times. The two could be compared to see how rapidly responses were made and whether it was within the next business day at least 95% of the time.

It is important that goals be attainable and relevant to the utility. If the utility does not have 6 inch pipe, for example, setting a goal of delivering fire flow to your community would not be possible to meet. The cost of changing the pipe from 4 inch pipe to 6 inch pipe to achieve this goal may be prohibitive so setting such a goal would set up unrealistic expectations in the customers. Similarly, if a utility wished to undertake water conservation in the community



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and set a goal of reducing per household consumption by 15% in one year, but had no customer meters, it would be very difficult to achieve or measure because this particular goal is not very relevant to that type of utility.

Finally, goals should be time bound, where appropriate. For example, goals can include the time frame under which the goal will be met, such as "we will respond to known, non-emergency leaks within 24 hours of reporting the leak 90% of the time." This goal has a 24 hour time element and also has a caveat of 90%. It is important to remember that all water utilities will experience conditions under which specified response times or requirements may not be able to be met. For example, a major water main break that is shooting water into the sky and causing disruption to a large portion of the community will take precedence over responding to a non-emergency break and may delay the response beyond 24 hours. Customer expectations need to match this reality. The exception is meeting compliance, which utilities are expected to do 100% of the time.

The goals included as examples above are external goals. Internal goals tend to be activities that water utility personnel have to do in order to meet these external goals. For example, responding to customer water quality complaints may require employees to be trained in customer interaction or trained in the proper use of water quality sampling and testing equipment. An internal goal may be set that indicates "We will provide all field personnel 8 hours of customer service training in their first 6 months of employment and 2 hours of refresher training annually." Another goal may be, "We will provide all field employees field test kits to analyze for chlorine residual and will provide 8 hours of training on how to use the test kits and interpret results."

Goals can be modified or adjusted over time as the utility's conditions or customer desires or demands change. The most important thing is to set goals and measure progress towards meeting them. The act of examining whether or not a particular goal was met will lead to evaluations of why the utility did or did not meet the goal and what should be done about it. It will change the way the utility does business. For example, if a goal of maintaining a minimum pressure of 50 psi throughout the system is set and it turns out a section of the community has a pressure of only 40 psi any time it is measured, an examination of why this area has low pressure will ensue. Following the examination, the utility may have to make operational changes or design changes to improve the situation. Without measuring this goal, the utility may be completely unaware of the problem.

The board should be heavily involved in setting external goals and examining whether or not they have been met, but may be less involved in setting internal goals. When developing external goals, input from customers is highly encouraged so that these goals can be set to match customer expectations. Customers whose input is valued may be more supportive of the utility and more willing to pay the necessary rates. It is also an opportunity to point out the connection between paying water rates and the ability to meet the goals. Internal goals are best developed by the personnel who have to meet the external goals. In both cases, the board should be open to input from all levels of utility staff regarding the feasibility of different goals and creative options to meet the goals.

The board should request periodic reporting of progress towards meeting both external and internal goals, which may be annually, semi-annually, quarterly, or monthly depending on the goal. Progress towards meeting external goals should also be reported to the public and there are a variety of options regarding how this can be done. The annual Consumer Confidence Report is one possibility, but the utility may also want to use an annual meeting, social media, newspaper articles, bill stuffers, or other means that work well in the community.

Goals are extremely important for the efficient and effective operation of the utility but they do not need to be overwhelming. It is

## EXAMPLES OF TANGIBLE AND MEASURABLE GOALS

**Upgrade treatment plant to meet new arsenic standards by 2020**

**Provide a minimum pressure of 50 psi throughout the system 95% of the time**

**Replace all customer meters with radio-read system by 2025**



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not necessary to have hundreds of goals tracked daily or weekly. Keeping the goal setting process simple and manageable will enable it to serve its function in a long-term, sustainable way. A few key external goals may be all that's necessary for a small utility (perhaps 10 to 12), while a larger utility may have a few more. Goals can also be phased in over time, starting with one or two and then building a few more in every few months or five or six goals can be implemented each year.

## Outside Assistance and Partnerships

Fortunately for water utilities, there is a large network of local, state and federal regulators, funders, universities, trade groups and non-profit organizations who can provide assistance in achieving compliance, improving management and finances, providing capital funding and meeting customer expectations. It is highly recommended that boards and utility staff reach out to these entities and to do so as soon as an issue presents itself, rather than waiting until a crisis occurs. These entities are used to interacting with each other and often work together to assist a utility. The organizations include, but are not limited to, the following: Kansas Department of Health and Environment (KDHE), EPA Region 7, Rural Development, Community Development Block Grant Program, Kansas Municipal Utility Association, Wichita State University Environmental Finance Center and Kansas Rural Water Association. (Appendix G)

As an example, a utility may find that due to a change in regulation, their source water is no longer compliant. The first interaction may be with a KDHE regulator who explains the new regulation and the compliance requirements. An assistance provider can help the utility identify options for compliance. KDHE's State Revolving Fund Program, or another funder, can provide loans for the capital improvements that may be necessary and possibly the up-front engineering work that will be required to design the facilities. Assistance providers may be able to help complete the application for funding. The sooner the utility reaches out to these entities, the more time the utility will have to obtain funding and achieve compliance and the more options that may be available to the utility.

In addition to agencies and assistance providers, utility boards and utility personnel should reach out to other water utilities for assistance. These peer entities may be able to share their own experiences, what techniques they have tried, challenges they faced, successes they achieved and many others. Partnering with other utilities can be totally informal, such as general discussions with other utilities, or they may be formal arrangements to merge entities, or anything in between. Some examples of partnership arrangements are:

- Mutual aid agreements where utilities agree to share equipment, resources, or personnel during times of need
- Buying cooperatives or consortiums in which a group of utilities works together to buy equipment, chemicals, supplies, or other items in order to get better pricing
- Sharing operators between two or more systems
- Sharing a management structure
- Purchase of raw or treated water from another system
- One bookkeeper or accountant that works with multiple systems to reduce cost for all
- Interconnections for emergencies or times of low water supply
- Partnership to provide water supply but independent distribution systems
- Merger of two or more separate water systems into a new consolidated entity

Many water utilities fear the idea of partnering with neighboring systems because they fear losing their autonomy, giving up too much control over water issues, or facing decreases in service levels or increased prices. Because there are so many different styles of collaboration between water systems, it is possible for all utilities to find a method that provides advantages without causing negative consequences.

Partnerships can provide tremendous economic benefits by increasing the economy of scale (it is cheaper per customer for a larger water utility to provide service than a smaller water utility) or reducing costs of operations or management. Partnerships can also help utilities comply with regulations, particularly if the source water is contaminated and another entity can provide compliant water. In other cases, utilities can work together to find a solution to regulatory concerns. If utilities keep an open mind and explore partnerships creatively, any water utility can find a partnering model that will work for them.



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## Regulations for Open Meetings and Open Records

Water boards, similar to other local government boards, are "public entities" and, as such, are required to conduct their business in public to preserve the democratic process. Open meetings and records create transparency and build public trust while providing a platform for well-reasoned decision making by the board. Boards face specific requirements for open meetings and records that are spelled out in the Kansas Open Meetings and Kansas Open Records Acts. These requirements are discussed in more detail in the sections below. Additional materials including in-depth guidelines for both KOMA and KORA can be found on the Kansas Attorney General's website at https://ag.ks.gov/legal-services/open-govt. Both of these acts are enforced by the Attorney General's office and the county and district attorneys have the ability to issue fines for violations of the acts.

### *The Kansas Open Meetings Act*

The Kansas Open Meetings Act (KOMA) applies to state and local public agencies, including city councils, utility boards, commissions, committees and rural water district boards. The Act has two main requirements:

1. Meetings must be open to the public **and**
2. Notice of the meetings must be provided to all board members and to those requesting notice in a reasonable time in advance of the meeting.

For all meetings subject to KOMA, the public must be allowed to listen to the discussion and cameras and tape recorders must be allowed into the meeting.

Although the act is titled "Open Meetings" it is important to note that it is not necessarily a "meeting" that triggers KOMA. KOMA is triggered by board members having discussions whether or not it is in a formal meeting setting or any actual voting takes place. If a majority of board members is involved in conference calls, in person discussions, text messages, or e-mails, (if the board members use the "reply all" feature and copy a majority of members) open meeting requirements will need to be followed. KOMA is also triggered by serial communications "if they collectively involve a majority of the membership of the body or agency, share a common topic of discussion concerning the business or affairs of the body or agency and are intended by any or all of the participants to reach agreement on a matter that would require binding action to be taken by the body or agency." (KSA 75-4318 as amended by 2009 SB 135) KOMA would not apply to water utility internal staff meetings, unless a majority of board members participate in the staff meeting.

For KOMA to apply to board meetings, a majority of the board must be present. For this purpose, a majority is defined as the next whole number greater than one half of the total number of members. Thus, for a three member board, a majority is two ($3 \div 2 = 1.5$, next whole number greater is 2); for a four person board, the majority is 3 ($4 \div 2 = 2$, the next greatest whole number is 3), for a five member board the majority is also 3 ($5 \div 2 = 2.5$, the next greatest whole number is 3). KOMA will not apply if the majority number is not met, meaning that a water utility staff member could speak to 2 members of a 5 member board without triggering KOMA. However, the staff member must be careful about discussing the same issue in two additional separate meetings with the remainder of the board members because the serial communication clause of KOMA may be triggered. If a staff member wishes to discuss an issue with all of the board



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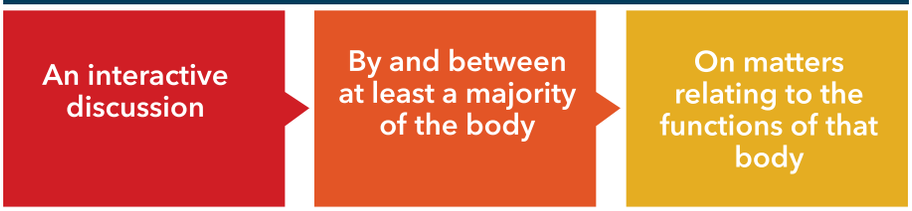
## THREE ELEMENTS THAT TRIGGER KOMA




members, it is best to do so in a regularly scheduled board meeting.

KOMA is triggered by interactive discussions held by a majority of the board as discussed above. There is one other element that triggers KOMA and that is the subject matter of the discussion. Regardless of whether the discussion is formal or informal, scheduled or planned, if the discussion relates to the function of the utility board, KOMA will be triggered. For example, if a majority of board members meet to discuss the installation of a new well to serve the south side of town, KOMA would be triggered. At that point, it would be an interactive discussion, satisfying trigger #1, it would be a majority of board members, satisfying trigger #2 and it would be matters relating to the function of the board, satisfying trigger #3. If the same group of board members met to discuss a private hunting trip they wished to take, KOMA would not be triggered because the matter did not relate to the function of the board. However, the members could NOT discuss any water-related business, especially matters under consideration of the board, before, during or after the hunting trip because it would be a violation of KOMA. It is recommended that board members take KOMA very seriously and avoid even the appearance of a violation of the Act. Keeping the public well-informed is an important board function and KOMA helps ensure that this occurs.

When board members desire to hold an open meeting, timely notice must be provided to both the board members and any member of the public who has specifically requested a meeting notice. The board is not required, under KOMA, to publish a general announcement of the meeting, but it is a good practice to do so. Notice of this type may be in an area of general visibility (city hall bulletin board, library notice board, other community areas), a newspaper announcement, billing notices or electronic media (e.g., Facebook, Twitter, website). For individuals requesting public notice, it is recommended (though not required) that such notice be given in writing to provide proof that the utility provided timely notice of the meeting. Requests for notice of meetings expire at the end of each fiscal year, but the system is required to provide timely notice of the expiration to give the requester an opportunity to renew their request.

Meetings subject to KOMA are open to anyone, whether or not they are customers or reside in the water utility's boundaries. The use of recording devices cannot be prohibited, but reasonable rules regarding recordings are permitted to ensure that the recordings are not disruptive to the meeting in general or to attendees. While the public must be allowed to attend open meetings, it is not strictly required that they be allowed to speak, unless there is a specific legal requirement to do so. Permitting public input is a policy decision for the board, but the board should think very carefully about the benefits of allowing some sort of dialogue with the public. Open communication builds public trust and support and provides an opportunity for the board to develop an understanding of the level of service desired. Furthermore, public dialogue goes a long way to building support for necessary rate increases. The board may wish to designate a time for public comment at the beginning or end of each meeting or have a process in which members of the public can sign up to speak.

While the goal is to have the vast majority of water system business done in a public manner, open to all, there are some topics that will require a "closed door" discussion. These types of sessions are deemed "executive sessions" and KOMA permits them in order for the board to discuss sensitive matters. Examples of topics permitted to be discussed in executive session include (K.S.A. 75-4319):

- Personnel matters of non-elected personnel (independent contractors are not personnel)
- Privileged consultations with attorneys (no other third parties may be present)
- Matters relating to employer-employee negotiations
- Certain confidential data
- Matters related to security measures where open discussion would jeopardize the measure



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The executive session is a tool to discuss sensitive information outside the public view but no binding action may be taken on those matters and executive sessions cannot be used as a means to defeat the purposes of KOMA. While KOMA permits executive sessions, it does not require boards to use them.

To properly hold an executive session, the meeting must first begin in an open session. Then a motion to go into executive session must be made, seconded and approved. The motion must include a statement of justification for the closure, the subject to be discussed and the time and place the open meeting will resume. For example: "Madam Chairwoman, I move we recess into executive session to discuss disciplinary action against an employee in order to protect the privacy of the parties involved. We will reconvene the open meeting in the conference room at 8:30 p.m." The motion must be recorded in the meeting minutes.

KOMA does not address meeting agendas, meeting minutes or other associated records except to say that motions that go into executive sessions must be entered into meeting minutes. Under KOMA all other recording is discretionary.

### *The Kansas Open Records Act*

The Kansas Open Records Act (KORA) is a state law requiring all public organizations to make certain records open to the public. In this case, the records that are part of the organization's "public record" include "any recorded information, regardless of form or characteristics, which is made, maintained or kept by or is in the possession of any public agency." (K.S.A. 42-215 et.seq.) This public record must be available for review and copying by any member of the public, but the utility does not have to provide paper copies free of charge. Fees can be charged at a reasonable rate based on the cost of the labor and supplies needed to fill the request.

Records can be paper or electronic and can include emails, text messages and spreadsheets. However, some records are not subject to KORA. These include:

- Personnel and performance records
- Employment applications and letters of reference
- Preliminary drafts or memoranda
- Attorney work products

Water utilities are not required to produce records related to their residential customers, except when an individual customer requests their specific information. Also, KORA does not require utilities to create documents that do not currently exist. Therefore, when a request for information is made, it is important to examine whether or not the utility currently has that information. Additionally, standing requests to receive records "when they become available" are not permitted. A member of the public requesting information in person should not be allowed to remove that information from the premises, unless written permission is obtained and there is a compelling reason to allow the information to be removed.

KORA requires a public agency to "act upon" a records request within three business days (or provide a detailed explanation for the delay), so the board should appoint a member of the utility staff to serve as the Freedom of Information Officer. This person can assist the public with any KORA requests or disputes and ensure that the board is following KORA policies. If there are any records the board wishes to exclude from KORA, the burden is on the board to establish the basis for the exemption. If a KORA request from the public is denied by the water utility, a written statement detailing the legal grounds for the denial must be given upon request.

### PROCEDURES TO INCLUDE IN WRITTEN POLICIES FOR BOARD MEETINGS

**The procedure for notifying board members of meetings**

**The procedure for notifying the public of the meetings**

**The procedure for proposing agenda items**

**The procedure for taking, filing and distributing/posting minutes**

**The procedure for making and voting on motions**

**The procedure for holding an executive session**



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### *Board Orientation and Training*

To assist board members in understanding the responsibilities of KOMA and KORA, as well as many other aspects of being a board member, training is offered by Kansas Municipal Utilities (KMU), in partnership with Wichita State University Environmental Finance Center and Ranson Financial Consultants, L.L.C. This free, one-day training covers board foundations as well as managerial, financial and technical aspects of managing and operating a water system and is provided under the Kansas Capacity Development Program. To find training locations and dates visit the KMU website. http://www.kmunet.org/events/event_list.asp

In addition to this outside training, the board may wish to consider implementing an internal board orientation and training for new board members. The training can familiarize new board members with the utility operations and management. An orientation manual can also be developed to assist with the training and to provide a reference guide for the board member afterwards. In addition to the orientation, the board may wish to set up a session between new board members and the utility manager, administrator and/or lead operator to allow the board member to meet the key personnel and to ask any questions he/she may have about the system. A tour of the treatment facilities can supplement the orientation and allow new board members to understand the facilities they will be overseeing.

**Randy Frasher**
City Administrator, City of Moundridge
*"Board Training"*

BF-3

## Board Meetings

In order to conduct the business of overseeing a water utility, the water board will require regular board meetings and regular generally means monthly. It is equally important that board members maintain attendance at all or almost all board meetings. It is understandable that illness, outside business or family emergency may occasionally make attendance at a board meeting impossible. However, holding board meetings on consistent days and times (e.g., the third Thursday of the month, the second Wednesday of the month, etc.) should make it possible for board members to schedule optional plans, such as vacations or evenings out, without impacting meeting attendance. Although a board can technically function with a majority in attendance, so that one missing member does not prevent board action, any time a member is missing, the quality of the discussions and decision-making will be diminished. Having diverse perspectives is a benefit of a multi-person water board. Furthermore, when one board member misses a meeting, it puts undue burden on the rest of the board. Board members should also keep in mind that even when they are absent, important decisions will be made by the board and these decisions will be made without the absent member's input.

It is a good idea for the board to adopt a policy regarding the acceptable number of meetings that may be missed and what actions will be taken if a board member misses that number. The board may consider an escalation policy, such as Action A happens if you miss 2 meetings, Action B happens if you miss 3 meetings, etc. The policy may be for the number of successive meetings missed or for the number missed per year. The board should allow at least one missed meeting per year without penalty.

If a situation arises that makes it impossible for a board member to be present at meetings, but he/she would be able to participate remotely through a webinar or conference call, the board may consider this option as an alternative. This may allow the



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board member to remain active in the board even if he/she cannot attend meetings. If this option is not possible, the board will have to implement its policy regarding missed meetings as described above.

In addition to holding regular board meetings on the same day of the month and at a consistent time, it is recommended that the meetings be held in the same location. The simplicity of this practice will provide improved attendance by both board members and the public. The board meeting time, day and place can also be specified in the utility's by-laws or ordinances so that everyone is aware of the particulars of the meeting schedule. If there is a need to change any of these details, the by-laws or ordinance can be revised. The time, day, place and agenda are typically advertised to both the board and the public well in advance of the meeting to encourage and facilitate public involvement, particularly on issues of great concern to the public.

To the extent possible, the board should confine all of its business to the regularly scheduled meetings. Board members often have many other obligations and regular meetings are already a significant time commitment, so keeping additional meetings, including special meetings, to the absolute bare minimum is advisable. If an emergency arises or a serious condition occurs that requires immediate action before a regularly scheduled meeting, a special meeting should be scheduled, but otherwise additional meetings should be avoided.

To ensure that the meetings are conducted in a fair, equitable and organized way, the board should adopt a set of rules regarding how business is to be conducted. Most organizations follow Robert's Rules of Order which is a long-standing method of conducting business that is often used by governmental entities, but the board can develop its own rules for meetings if it prefers. The set of rules that govern board meetings should be specified in the utility by-laws.

*Robert's Rules of Order* is the best-known model for parliamentary procedures. Simply put, parliamentary procedure is the means by which organizations make decisions and the rules are meant to help a deliberative body be productive and efficient. Robert's Rules are intended to protect the rights of everyone, both the majority and the minority. If the board adopts Robert's Rules, it is worthwhile for every board member to become familiar with these procedures.

The keys to effective board meetings include knowledge of the bylaws, a properly prepared agenda, establishment of realistic time frames for agenda items and knowledge of established rules for conducting business. The chair (or president) of the board has the major responsibility for conducting meetings, but if the chair is unavailable, the chair's designated replacement should follow the same rules and procedures.

## A STANDARD AGENDA OUTLINE

- Call to Order
- Proof of quorum
- Reading and approval of previous meeting minutes
- Financial reports
- Operations and maintenance report
- Committee reports
- Old business
- New business
- Announcements
- Adjournment

**Gary Fisher**
Mayor, City of Moundridge
*"Effective Meetings"*

BF-4



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The meeting agenda and any background materials that would aid in understanding the agenda items should be prepared ahead of time and sent to each board member. A good rule of thumb is to provide the agenda and supplemental materials a week ahead of time and, if that is not possible, at least two days in advance in order to give members a chance to review materials and prepare for the meeting. While the agenda does not need to be overly detailed, it should include enough information for the board members to know the nature of the business to be discussed at the meeting. Any staff member or outside professional who can provide supplemental information to the board to aid in decision making should be invited to the meeting and given the opportunity to speak and answer the board's questions. The agenda can also include a time for public comment.

## BENEFITS OF USING ROBERT'S RULES OF ORDER

***For the Board***

**Facilitates faster and more efficient meetings**
**Increases leadership credibility**
**Prevents illegal actions**
**Improves communication**
**Establishes and preserves order in meetings**
**Provides guidance for who may speak and when**

***For the Public***

**Ensures that the will of the majority prevails**
**Ensures that the minority will be heard**
**Protects the rights of everyone**
**Makes meetings easier to follow and understand**

Minutes serve as the official record of the board meeting so it is important that meeting minutes accurately reflect what has taken place at the meeting. Minutes confirm precisely what business was conducted by the board and should also provide clear descriptions of board decisions. Minutes should be detailed enough to convey the important aspects of the meeting, but should not be a verbatim copy of the entire meeting's discussion. Copies of the minutes should be sent to board members for their review before the next meeting. Typically, the board approves minutes of the previous meeting at the next meeting.

## WHAT TO INCLUDE IN THE MINUTES

**Nature of the meeting (regular, special or emergency)**

**Time, date and location of the meeting**

**Names of board members present and absent**

**Items discussed, actions taken and votes on the actions listed in order of occurrence**

**Precise wording of motions made, who made the motions, who seconded and the votes on the motions by each board member**

**Time, date and place of the next scheduled meeting**

**Time the meeting was adjourned**

In the past, minutes were typically taken by a member of the staff skilled in dictation and transcription, but most boards now record the meetings for later transcription. Many boards make meeting minutes available to the public online and some boards make the recordings available, either on request or on-line. The board can decide which method is best for preparation of meeting minutes. The important aspect is that the board has the minutes and that they are accurate. Board minutes are often a great place to review decisions over time and contain a wealth of information regarding decision-making so their importance should not be underestimated.



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Often the most confusing, and potentially divisive, task a board must manage in a meeting is the procedure for making and acting on motions. This action is the "meat" of the decision-making process.To ensure motions are made consistently and fairly, it is essential that the rules of order – either Robert's Rules or another set of rules adopted by the board – be followed. The chair is responsible for presiding over the meeting, including ensuring motions are made and acted upon properly. It is worth noting that only board members can make motions; members of the public or staff cannot.

### THE PROCESS FOR MAKING MOTIONS

**Any board member can make a motion when there is no other business before the board**

**The member must be recognized by the chair before making a motion**

**The motion must be seconded by another board member or it dies**

**A seconded motion should be read aloud to ensure accuracy**

**The chair then calls for discussion, which should be limited to prevent overly long meetings**

**Any member can make a motion to amend the original motion, after being recognized by the chair**

**The amendment must be seconded by another member or it dies**

**After adequate time has been allowed for discussion, the chair calls for a vote**

**Amendments are voted on first, followed by a vote on the original motion**

**The exact motion, as approved, and the vote of each member should be recorded in the minutes**

### *Documents and Recordkeeping*

The hallmark of a well-run utility is the maintenance of an organized set of documents and records. The utility keeps records of its day-to-day financial and technical operations, as well as personnel records, planning documents and a host of other documents pertaining to its operations. The board needs to maintain records of its activities as well. At a minimum, the utility should keep, either in print, electronically or both, the following:

- Board Meeting Agendas
- Board Meeting Minutes
- Bylaws
- Resolutions
- Policies and Procedures

KORA requires the utility to make these records available to the public upon request, so keeping the records in a format that makes it easy to provide the records will save the utility considerable time and effort.

Many water utilities now post their agendas and meeting minutes on their websites to make it easier for these records to be accessed by interested individuals. However, some people may not be able to access the website and may still request records in another format.

## Code of Ethics and Conflict of Interest

Holding a public office is no easy task; being responsive to citizens while at the same time meeting all legal, regulatory and financial responsibilities can be daunting. In fulfilling these duties, board members also need to be mindful of actual or perceived conflicts of interest and ethics violations as it is vital that board members maintain public trust. For example, board members cannot make decisions that will provide personal or financial gain. Most often, if board members use good judgment and common sense in their service on the board, they will easily maintain ethical standards. However, to ensure there are no misunderstandings regarding what constitutes ethical behavior and conduct on the board, the board should develop



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and adopt a formal code of ethics to avoid the appearance of impropriety and encourage transparency in board decision making. The formal code of ethics should reflect the board's values (such as integrity, transparency, fairness, equality) and should provide board members and employees with guidelines for making ethical choices and ensuring accountability for those choices. A code of ethics helps an organization become transparent and demonstrates to the public a commitment to accountability.

An example of a code of ethics can be found in Appendix A and additional resources for developing a code of ethics are located in Appendix H. *(10, 11)*

In addition to the code of ethics, the board should adopt a conflict of interest policy that helps ensure that board decisions are free from influence and consistent with the public interest and community needs. The policy should require those who have, or think they have, a conflict to disclose that information. A conflict of interest is any situation that might cause an impartial observer to reasonably question whether the person's actions are influenced by considerations of private interest. "Private interest" can include financial interests, interests related to personal relationships or interests related to other outside activities, such as a business. There are two Kansas laws (K.S.A 75-4304 and 75-4305) that apply to councils, commissions and boards related to ethics and conflict of interest. These laws prevent a local officer or employee from discussing, influencing or participating in any negotiated contract in which the person has a substantial personal interest or in which they are a party to the contract.

## EXAMPLES OF CONFLICT OF INTEREST

**Ms. Smith recently retired from an accounting firm and has decided to take up public service by running for the local water utility board. Her former firm bids on the auditing contract with the utility board. She should disclose the conflict of interest and must exclude herself from any involvement in the choosing of the auditing firm and from any oversight of the contract, if her former firm is selected.**

**Mr. Davis, the board president, has a brother-in-law in the construction business. The brother-in-law bids on a project put out to bid by the water utility. Mr. Davis should disclose the relationship and must not be involved in the selection of the contractor nor should he influence other board members or be involved in any subsequent contract negotiations if his brother-in-law is selected.**

**Ms. Wilson and her family own a small office supply company and she also serves on the water utility board. Ms. Wilson should disclose the conflict and the utility must not buy supplies from her company, even though her company may offer the best price, because Ms. Wilson profits directly from the relationship.**

**Mr. Long has been on the local utility board for over 20 years. His wife's family owns a large auto dealership in a neighboring city. The utility is considering replacing its entire fleet of service trucks. Mr. Long offers to get the board a discounted price for the vehicles. This is a conflict of interest since Mr. Long's wife will profit from the arrangement. Even though the dealership may offer a great price, the board should not take the deal.**

The conflict of interest policy can be incorporated into the code of ethics, if desired. The conflict of interest policy should include the provision for board members to reveal potential conflicts at the beginning of their term in office, such as the personal statement of substantial interest described earlier in this chapter. Disclosures may also be required each time a board member is reelected and any time a board member's situation changes and that change results in a potential conflict (e.g., new job in a business that might bid on work with the utility or new marriage to someone who does, or could do, business with the utility.) In addition to these up front disclosures, the policy should have a provision that requires board members to disclose any conflict that might impact on a particular matter before the board. It is preferable to create an environment in which board members are encouraged to bring up even small potential conflicts and let the board as a whole decide on whether it actually is a conflict, rather than having the individual board



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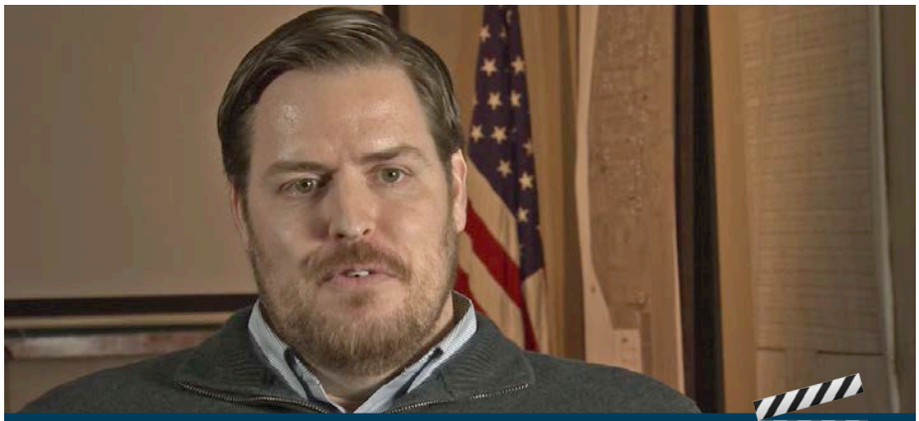
member make that call on his/her own. In this way, the board can maintain high ethical standards and public transparency in its operations, especially since perceived conflicts can be just as problematic as actual conflicts if not properly explained. If the board believes there is a conflict of interest with a particular board member, that member should recuse him/herself from any discussion or voting on the matter pertaining to the conflict.



**Nathan Law**
City Administrator, City of Kiowa
*"Effective Teams"*

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## Effective Teams

Running a water utility takes a lot of different kinds of talents and expertise; it would be very difficult for any one person in the organization to possess all of the qualities necessary to fully manage, operate and finance the utility. The best way to address this situation is to form teams, particularly teams of diverse talents and skill sets. Teams can be formed as standing committees or they may be ad hoc when needed to solve a particular issue the utility is facing. Teams may have a few members or many depending on the nature of the issue, the needed skills and expertise and the size of the utility staff. Teams may include outside individuals other than board members or utility staff, especially in very small communities with large retirement populations.

Everyone has been a part of a team at one time or another, whether a sports team, a work project team or a volunteer position such as serving on a council or board. These past experiences may have been positive for some and quite negative for others and these successes and failures may cloud the working environment of teams within the water utility. To work through some of these issues, team members should take time at the beginning of the team formation, or as new team members are added, to work through the purpose and goal of the team, the talents and attributes of team members and the resources available to complete the work. It is important that team members have an opportunity to get to know one another, so building in times for unstructured communication, not just at the beginning of the process but throughout, is important. There are a variety of ways to do this, such as meals or light refreshments before, during or after a meeting, break time during the meeting or events that are strictly for team building, such as an off-site lunch or a picnic or a retreat. The selected method should match the needs of the group.

### CHARACTERISTICS OF A GOOD TEAM

**Mission and objectives are clearly defined and understood by all**

**Time commitments are explained up front**

**Available resources are known**

**Team includes a diversity of skills and expertise and an appropriate number of members**

**All team members fulfill their responsibilities**

**Communication is open and honest**

**Team has a process of resolving conflicts**

**Members are free to share opinions**



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Teamwork should begin with a clear definition of what the goal of the team is and it should be shared by all team members. The team should also have a unified understanding of the time constraints, the desired end product(s), the resources available (staff, money, equipment, supplies), expected duration of the overall task, time commitment required and time/location of meetings. The team should be made up of sufficient individuals to cover all the necessary expertise and to ensure that no team member faces an undue burden, but should not have so many individuals that it becomes unwieldy to complete work or make decisions. The group should decide on a process for decision making, such as majority rules or consensus, to ensure that decisions are made in a fair manner using a process understood and accepted by the group.

There are many activities for which a standing committee might be desirable, such as: capital improvements planning, rate setting, asset management, water loss reduction and energy efficiency. An ad hoc committee may be formed to deal with a particular regulation or review a project design. When setting up these committees, board members need to be mindful of the KOMA requirements and if a majority of board members serves on any one team, the team meetings will most likely fall under KOMA.

## UNDERSTANDING A PUBLIC DRINKING WATER SYSTEM

Millions of Americans receive high quality drinking water every day from public water supply systems. Nonetheless, the safety of drinking water should never be taken for granted. There are far too many potential sources of contamination to be complacent about providing safe drinking water to the public. Improper disposal of chemicals, animal wastes, pesticides, human wastes and waste from underground injection wells can all contaminate drinking water. Water can also become contaminated from naturally occurring substances, such as arsenic or uranium. Operating a water system improperly or neglecting maintenance can also pose a major public health risk.

The Safe Drinking Water Act (SDWA), the major federal law governing water utilities, regulates all public drinking water systems, regardless of who owns and operates the system or where it is located. As part of the SDWA, Congress gave EPA the authority to delegate the primary responsibility for enforcing drinking water regulations to states, territories or tribes as long as they meet requirements specified by the SDWA in 40CFR 142, Subpart B. If any of these entities meets these requirements and they adopt regulations that are at least as stringent, if not more stringent, than the federal regulations, they are granted primacy and are responsible for enforcing the SDWA. *(41)* In Kansas, EPA has granted the role of administering the SDWA to KDHE. KDHE is responsible for administering all of the provisions necessary to ensure that public water systems comply fully with the SDWA, including permitting as well as monitoring and reporting. KDHE also has the power to enforce compliance with regulations. *(42)*

KDHE provides training, technical assistance and other resources to assist water utilities in building their internal managerial, financial and technical capacity in order to comply with the SDWA regulations. Some of these resources are discussed in later chapters.

It is critical for board members to understand the basic requirements of the SDWA and to ensure that the system is in compliance with all federal, state and local laws. As board members go about their work, they are protecting public health and the environment through proper utility oversight.

Under the SDWA, a public water system (PWS) is defined as a system for the provision to the public of piped water for human consumption if such system has:

1. At least fifteen (15) service connections **OR**

2. Regularly services an average of at least twenty-five (25) individuals at least (60) days out of the year

The state of Kansas has chosen to adopt a more stringent definition of a public water system as part of its primacy package with EPA. In Kansas, a public water supply system is defined by Kansas Statute (K.S.A.) 65-162a (b) and Kansas Administrative Regulation (K.A.R.) 28-15a-2(1) (A) as a system for delivery to the public of piped water for human consumption that has:

1. At least 10 service connections **OR**

2. Regularly serves at least 25 individuals daily at least 60 days out of the year

In Kansas, a public water system consists of all of the sources, treatment, piping and appurtenances up to and including the service



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line connection at the curb. Anything after the curb, including the remaining portion of the service line, is considered the responsibility of the property owner.

Public Water Systems in the State of Kansas are classified and regulated based on two different factors: the source of the water and the type of population served. It is important for the board to understand the source of the utility's water and the population served in order to understand how the water utility will be regulated.

## Sources of Water

Public Water Systems primarily get their water from one or more of the following sources: groundwater, surface water, or groundwater under the direct influence of surface water. Systems in eastern Kansas generally rely more heavily on surface water and systems in western Kansas generally rely on groundwater. These source types are described in more detail in the paragraphs below.

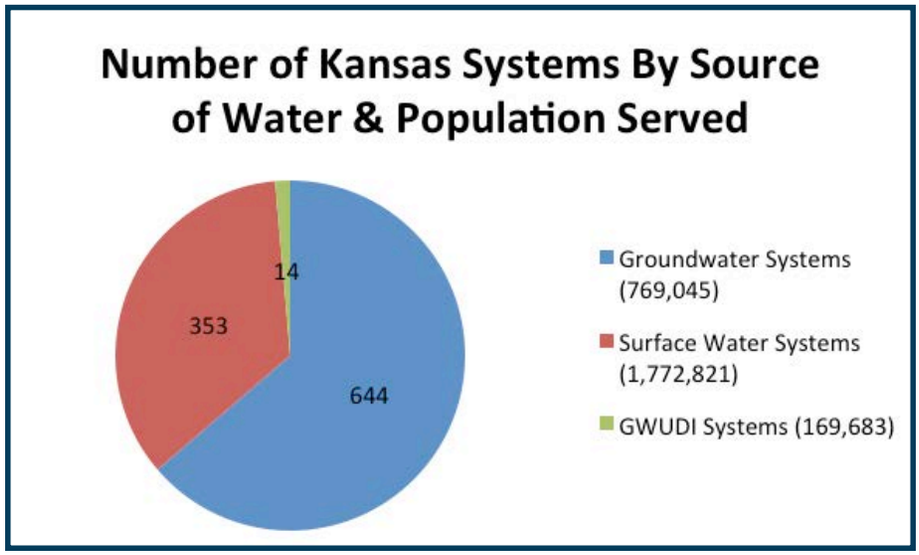
Water that seeps through cracks and crevices in the ground filling the porous spaces between the soil, sediment and rocks is referred to as groundwater and is found in underground geological systems called aquifers. An aquifer is any geologic material such as sand, gravel or fractured bedrock that is filled with water and can yield that water through a well. Natural filtration through the earth removes most of the biological contaminants found in surface water. Groundwater typically will have more inorganic contaminants, such as minerals and metals, than surface water because the water is in contact with the surrounding rock which is composed of these materials.

Water found in bodies of water such as streams, rivers and lakes make up what is referred to as surface water. Surface water is open to the atmosphere and run-off and is subject to more biological contaminants than other sources of water. When a PWS utilizes surface water as one of its sources, the system is subject to more requirements under the SDWA related to treatment and contaminant monitoring.

The third type of water source is Groundwater Under the Direct Influence of Surface Water (GWUDI). The SDWA defines GWUDI as, "any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface water conditions." More simply put, with GWUDI, the groundwater is affected by surface water and the natural ground filtration described above is not sufficient to remove surface contaminants. For this reason, systems that utilize a GWUDI source are subject to the same regulatory requirements as systems that utilize surface water sources. Systems that get some or all of their water from either surface water sources or GWUDI sources are termed Subpart H systems under the SDWA.

There is a fourth type of system that does not actually produce and treat all of its own water but buys some or all of it instead. These types of systems are called consecutive systems. A consecutive system is a public water system that buys or otherwise receives some or all of its finished water from a wholesale system. A wholesale system is a public water system that supplies finished water to one or more other public water systems. Consecutive systems fall into 3 categories:

- Groundwater Purchased (GWP) system: a consecutive system that purchases some or all of its finished water from a wholesaler that uses groundwater as a source
- Surface Water Purchased (SWP) system: a consecutive system that purchases some or all of its finished water from a wholesaler that uses surface water as a source



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- Groundwater Under the Influence Purchased (GUIP) system : a consecutive system that purchases some or all of its finished water from a wholesaler that uses GWUDI as a source

## Population Served

The regulations vary depending on which source of water is used, but they also vary based on the type of population served. Systems are classified as either Community Water Systems (CWS) or Non-Community Water Systems (NCWS) based on whether the populations served is residential (community) or non-residential (non-community.) NCWSs are further classified as either Non-Transient Non-Community (NTNC) water systems or Transient Non-Community (TNC) water systems depending on whether the system routinely serves the same people (NTNC) or different people (TNC). A more complete description of the types of water systems is provided in Chapter 4.

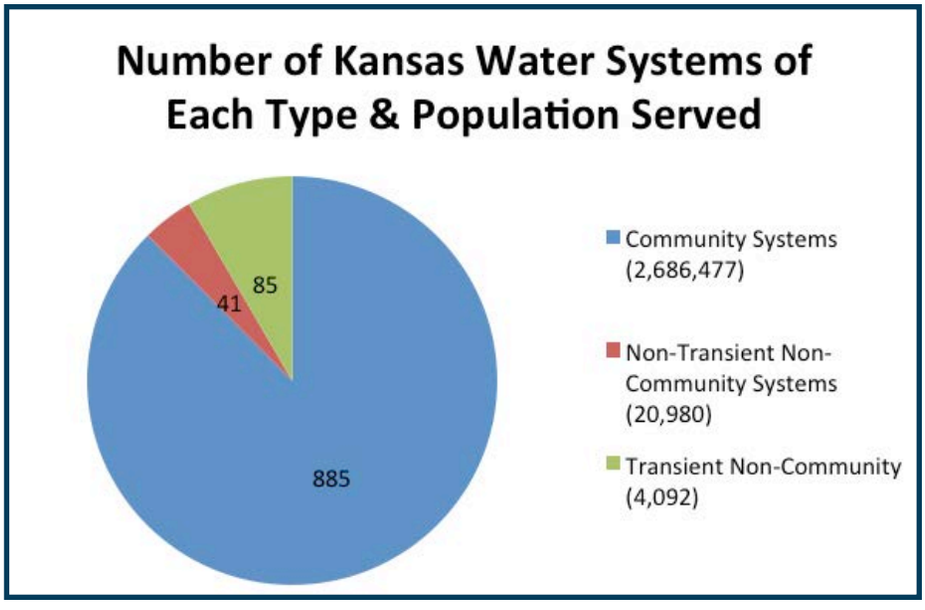
In 2014, the State of Kansas had 1,003 PWSs serving a total population of 2,720,777 people.

The charts show the breakdown of the water systems in Kansas in 2014 by system classification and water source. (From KDHE Water Supply Annual Report for Calendar Year 2014)

## Regulatory Compliance Requirements

Water utilities are subject to numerous regulations and the board must understand all of the regulations that apply to its particular utility. None of these regulations are more important than those protecting the public health and welfare of its customers. These regulations are primarily included in the SDWA and enforced by KDHE. KDHE also has additional requirements that are not in the SDWA that water utilities must meet such as maintaining a minimum pressure in the distribution system.

The SDWA was originally passed by Congress in 1974 in order to ensure a safe and healthy public drinking water supply and requires EPA to regulate contaminants that are known or likely to be present in drinking water supplies and that may cause a risk to public health.




To meet these requirements, the EPA created drinking water regulations that include establishing Maximum Contaminant Levels (MCLs) for primary contaminants, the monitoring and analyses of these contaminants, record keeping and providing public notification if a water system fails to meet any of the standards. The SDWA has been revised, amended and updated several times over the last 40 years and EPA continues to consider evidence to determine if there is a need for new regulations or stricter regulations in order to protect the public.

While EPA has the overall responsibility for updating the SDWA and KDHE is charged with enforcing the SDWA regulations in Kansas, it is ultimately up to the water system board to ensure that it is following all regulations. Specifics regarding primary and secondary drinking water regulations as well as compliance and monitoring requirements can be found in Chapter 4 of this manual.

## Water Rights

All utilities require a source of water to provide service to their customers and it is necessary to have the legal right to use that source and quantity of water. These water rights can be obtained for either groundwater or surface water or both.

Like many western states, Kansas follows a “first in time, first in right” principle in administering water rights. First in time, first in right means that the earliest rights holders have the highest priority for water. The main criteria are: when the user began using the water, how much they use and what they use it for. The physical location of the user is not considered



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a factor. Any new water rights cannot impact existing rights, desired stream flow minimums or the public interest. In simpler terms, if user A has an existing senior water right (for a specific quantity of water for a specific use), prospective user B cannot later obtain water rights that will reduce the first user's allocation – even if they are upstream of the first user. Further, in times of shortage, the earliest water right holders have first rights to use water and those with later rights may have their withdrawals limited. This protects downstream users of surface water from upstream depletion by junior water rights holders in times of water shortage. However, this relationship does not currently hold for most groundwater supplies and several court cases are currently pending regarding the depletion of regional aquifers—an issue impacting several cities' water supplies in western Kansas.

There are two water rights categories: vested rights (those rights obtained prior to June 28, 1945) and appropriation rights (everything else). An appropriation right is the right to take a specific quantity of water, from a specific supply for a beneficial use (e.g. domestic use, agriculture, livestock watering, industry, etc.) and is granted by permit. In this context domestic use refers to use by a single household, its farm animals and no more than two acres of orchards, gardens and lawns. Though a utility provides water to households, its water rights are not considered domestic use.

Domestic use aside, new water rights can only be legally obtained through the Kansas Department of Agriculture, Division of Water Resources (DWR). Developing a water right is a multi-year process that involves filing and receiving approval for an application, designing and constructing the withdrawal, having an inspection of the withdrawal and having the right perfected through use over a period of no more than 5 years for agricultural purposes and 20 years for municipal purposes. Standard annual water use reports must be filed with the DWR by March 1 of each year. In addition, staff from the DWR conduct frequent field inspections to ensure that water users are correctly monitoring and reporting their water use.

Due to water scarcity and water quality problems in many areas of Kansas, developing new water rights can sometimes be very difficult, if not impossible. Additionally, new water rights often come with greater operational restriction than older water rights (for example, limitations on well usage based upon static water level elevation). In locations with limited options for new water rights, purchase of existing water rights, most likely irrigation rights, is the only practical way to obtain new water supplies. However, it is important to understand that when agricultural water rights are purchased, converting the water's use from irrigation to municipal use will result in a loss of annual volume for the water right. With certain restrictions, water rights may also be moved. Many municipalities facing water quality issues have been able to move their well from one location with contaminated water to a location with better water quality.

Generally, water rights are for a specific use and that use cannot be changed without working with the Kansas Chief Engineer's Office. Water rights can also be lost. Water rights held for agricultural use and deliberately not used for 5 years without sufficient cause can be lost through "abandonment." The period for non-use for public water supply purposes is 20 years. Water rights may also be voluntarily given up through a "forfeiture" procedure.

Systems considering obtaining additional water rights or with questions about rights that are already in place should contact The Kansas Department of Agriculture to get the most current information. The Department also has information on legal requirements and application procedures available on its website at http://agriculture.ks.gov/divisions-programs/dwr/water-appropriation. A more detailed explanation of Kansas water rights can be found in the Chapter 4 of this manual.

## CONCLUSION

This chapter has focused on the legal and administrative issues important to water utility boards and its members. It also introduced the basics of water system regulation and water rights. The next three chapters provide more in-depth information on managerial capacity, the institutional and planning functions of the water utility; financial capacity, the processes to generate sufficient revenue to maintain service now and into the future; and technical capacity, the system's operational ability to produce and deliver water that meets all drinking water standards. As stated previously, these three elements are interrelated and topics in one chapter are likely to have elements that fit one or both of the other chapters.



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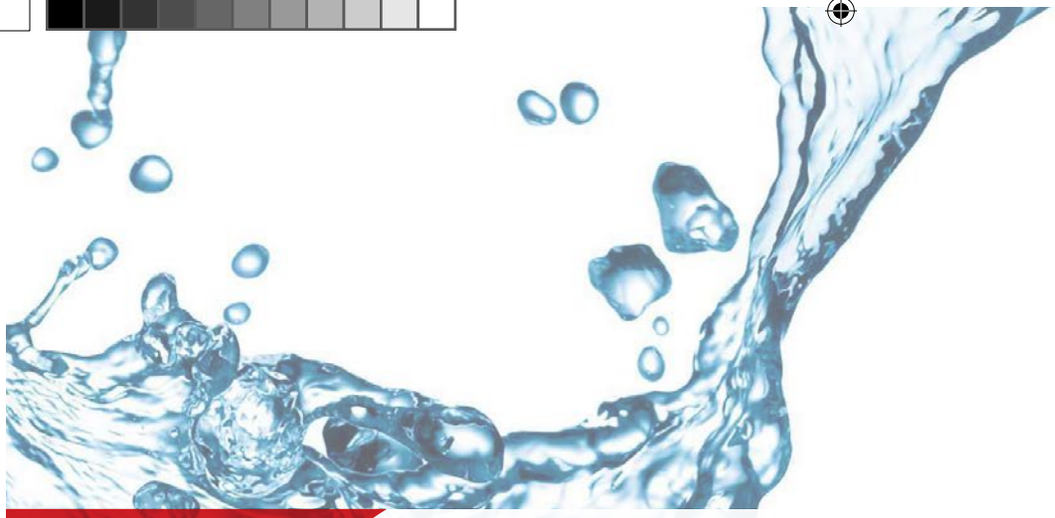

# MANAGING A WATER UTILITY (MANAGERIAL CAPACITY)

CHAPTER 2


## INTRODUCTION

Capacity development means having the managerial, financial and technical capabilities to plan for, achieve and maintain compliance with applicable drinking water regulations now and into the future. Managerial capacity refers to the system's institutional and administrative capabilities and encompasses all of the planning and oversight functions of the system. Utilities with sufficient managerial capacity are organized, well-run, efficient and responsive to customers.

There are many indicators of managerial capacity, including those listed below.

- Accountability and transparency in conducting the affairs of the utility
- Clearly defined roles and responsibilities
- Written and implemented policies and procedures, including those related to customer service
- Short and long term planning processes and implementation of the plans
- Well managed contracts for professional services, such as engineering, financial and legal

Board members are responsible for providing effective leadership to allow the water utility staff to develop and implement the necessary managerial programs, policies, procedures and plans. The board's support needs to include providing resources for staff (training, equipment and software), adequate financing and oversight of the activities.

## EFFECTIVE POLICIES AND PROCEDURES

Policies and procedures establish how the utility will be managed on a day-to-day basis and establish the expectations for staff at all levels. The policies and procedures should be written by a combination of staff and board members (the exact nature of the personnel who create the policies may vary from utility to utility depending on the number of staff available and their expertise) and then be approved and adopted by the board. A copy of the written manual should be provided to all employees and all board members as a reference guide. New board members should be provided with an overview of all the policies and procedures establish that how the utility should be managed on a day-to-day basis and the expectations for staff at all levels.

New employees will benefit from an orientation that includes a review of the pertinent policies and procedures for their position. These orientations are necessary to ensure all employees are aware of the policies and procedures, have received a copy of them and have a chance to read the policies for themselves. One utility had written policies and procedures but had never notified lower level staff of their existence. Therefore, when personnel were asked, "Does this utility have written policies and procedures?" during an on-site capacity assessment,



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they answered “no” even though the policies existed. If utility staff are not made aware of the existence of written policies, they will rely solely on what they are told regarding policies. This is a dangerous practice as verbal instructions have a tendency to shift over time and employees may, unintentionally, not be following what is expected of them.

Written policies anchor practices to a standard that can be reviewed as necessary and serve as the basis for accepted practice if a dispute arises. For example, consider a utility that has a written policy stating, “Vacation must be approved in writing three days in advance or it may be denied.” But the generally accepted practice is for employees to e-mail their supervisor the day before they want to take off or even that morning. A situation arises in which an employee wishes to take a day off and e-mails his supervisor to let him know he will not be in tomorrow. The supervisor believes there is critical work that needs to be done and tells the employee he cannot take the day off and must come into work. The employee believes the supervisor to be wrong and files a complaint. In this case, the supervisor is acting within the approved policy to deny the vacation and that policy should take precedence over generally accepted practices. As long as the utility has provided the written policies to the employees and explained the policies, it is the employee’s responsibility to understand and follow them.

Although there may be slight deviations from the way policies are written and practiced, as described in the example above, it is important that policies be applied uniformly and fairly to all employees and that the practices match the written word as closely as possible. In cases where the policies and procedures are outdated or do not serve the best interests of the utility or its customers, it is best to rewrite the policies rather than changing the manner in which they are applied. If a particular policy causes numerous issues, it may be time to review that policy and determine if revisions are in order or whether a different action, such as additional training, should be taken to resolve the concern.

**Jacob Wood**
City Administrator, City of Oakley
*“Personnel”*

MC-1

Even if there are no specific issues that have arisen regarding the policies and procedures, it is a good idea for the board to review them periodically every five to ten years. This regular review allows the board to make sure that what is in place is still relevant and appropriate; that nothing needs to be changed or added; that the policies and procedures reflect the mission and vision of the board; and that the policies and procedures are being implemented properly, fairly and consistently.

No matter how many employees a water utility has, even if it is only one, it is still important to have written policies and procedures. Well-defined policies that are administered fairly and consistently help the utility attract qualified employees and contractors, decreases the likelihood of disturbance during staff changes and instills customers and staff with confidence and trust in the utility’s service and leadership. Specific types of policies are described in more detail in the sections below.

## Personnel Policies

Personnel policies are workplace rules and guidelines setting the standard for day-to-day workplace behavior by employees. As described above, it is critical that employees be provided a written document describing the personnel policies that will be followed by the utility. In addition, new employees should be provided with a verbal orientation on the policies by a supervisor or a human resources staff member. In a very small utility, a board member may have to provide this orientation as there may be only one employee.



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Well-developed workplace policies and procedures let employees know what is expected of them. When these policies are administered fairly and consistently they instill confidence and trust and help the utility attract and retain qualified employees. Treating each employee equitably is essential for a healthy work environment and positive morale.

Personnel policies can include, but are not limited to, the following:

- Hiring procedures, conditions of employment and non-discrimination policy
- Employee conduct: attendance, use of equipment and/or vehicles, dress code, non-violence, etc.
- Internet and email policies
- Protection of personal information: explaining how employee records are handled
- Organizational chart showing functional areas within the organization in relationship to one another
- Compensation plan (grade and pay steps) or policy (for example, stating new hire compensation will be based on reasonable market value and existing employees' compensation will be reviewed for equity once every X years)
- Payroll procedures: exempt/nonexempt employees, timesheets, overtime payment, etc.
- Benefits: insurance, retirement, paid leave, etc.
- Unpaid leave
- Overtime
- Promotions
- Customer service policy: detailing how employees interact with customers
- Sexual harassment policy
- Workplace safety
- Workplace accessibility
- Drug and smoking policy
- Employee development and training
- Work-related travel
- Employee evaluation procedure
- Complaint/grievance procedure
- Discipline/termination procedure

## PERSONNEL POLICIES AND PROCEDURES

**Communicate information to new employees**

**Set rules and guidelines for decision-making so employees and managers know what to do**

**Demonstrate good faith that employees will be treated fairly and equally**

**Provide a consistent and clear response across the utility**

**Define a uniform approach to employee interaction**

**Establish a uniform and acceptable method of dealing with complaints and misunderstandings in the workplace**

**Prevent favoritism in addressing personnel issues or disputes**

**Set a framework for delegation of decision making or work tasks**

Clearly, the extent of these policies and whether or not a particular one is necessary for a utility varies with the size, type and complexity of the utility; the number and type of utility staff and past history with personnel issues. Some policies may be required by local, state or federal laws, such as non-discrimination, accessibility for persons with disabilities and smoking.

To ensure personnel policies are being properly implemented, the board will need to make periodic checks. If they are not being implemented fairly and consistently, staff may need to receive training in how to implement the policies or personnel action may be required. Periodic checks should also include a review of whether the policies are generally acceptable to the employees to help ensure job satisfaction and



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employee retention. If the policies are not generally regarded as fair and positive by the employees, a review of the policies should be undertaken and depending on the results of the review, the policies may need to be revised. If the utility contracts with operators or other personnel, the working conditions should be as consistent as possible with the personnel policies for existing staff to prevent workplace disharmony or other problems.

## Purchasing Policies

Water utilities make numerous purchases, from spare parts to treatment chemicals to office supplies. It would not be practical or efficient for the water board to oversee each and every purchase made. Rather, the board's job is to establish purchasing policies and procedures that the utility can follow when procuring goods and services. These procedures establish the basic parameters of the purchasing process, including, but not limited to, the following:

- Who or what department is responsible for requisitions and purchasing
- How purchase requests are made, processed and paid
- The levels of purchasing authority different individuals or positions may have
- What type of approval is required at different dollar amounts
- The amount under which a purchase order or requisition is not necessary
- The items or dollar thresholds that require formal notice and invitations for bid, for example
  - Under $100 – no requisition required
  - Under $500 – ok to purchase without competitive bidding
  - $500 - $10,000 – lowest bidder, two written quotes, advertising not necessary
  - Over $10,000 – lowest bidder, two bids, advertising required
- When to require a Request for Proposal or Request for Qualifications
- The items that must have a formal contract
- Whether sole source procurement is permitted and under what conditions
- A local, veteran, woman or minority-owned business preference standard
- Emergency procurement procedures to use when threats to public health and welfare may dictate deviation from normal purchasing practices
- How purchased items are reconciled with the budget
- How excess property is disposed of
- How purchasing records are managed
- The number of signatures required and by whom (staff and/or board member) on checks
- Standards based on different dollar amounts (i.e., if higher dollar amounts require more stringent controls than lower dollar amounts)
- When credit cards should be used as a preferential means of payment
- Which employees are allowed to use credit cards, spending limits for credit cards and restrictions on the type of purchases allowed on credit cards

### PURCHASING: VENDOR AND BUSINESS RELATIONSHIPS

**Develop and maintain goodwill with suppliers by building a relationship of mutual understanding**

**Make sure all specifications are fair, accurate and clear**

**Avoid any obligation to vendors**

**Create and adhere to consistent buying policies and principles**

The level of detail in the purchasing policy will vary greatly between large, medium and small utilities, but all utilities should develop and implement purchasing policies. Setting these



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standards enables the board to optimize price savings and quality of products, make sure public funds are used efficiently, create positive relationships with vendors and comply with all state and federal regulations and audit standards. *(27, 28, 29)*

Checks and balances should be included in the purchasing policies, even for small utilities, to reduce the potential for fraud, abuse or improper purchases. The checks and balances will also protect employees from accusations of impropriety. At a minimum, the person requisitioning a purchase should not be responsible for approving and paying the bill. The person responsible for payment of invoices (Accounts Payable) should only pay after satisfactory completion or delivery of goods or services has been made.

Policies and procedures do not need to be complicated, but if the utility wishes to develop a more in-depth policy, there are a few options for assistance in this endeavor. One option is to use a preexisting municipal purchasing policy as a guideline. For example, the City of Pittsburg, Kansas has an easy to understand procurement policy, which may provide a useful starting point for a utility. It can be found at http://www.pittks.org/DocumentCenter/View/1462. Alternatively, there are handbooks available for municipal governments that may assist in purchasing policy and procedure creation. *(28)*

Similar to the personnel policies and procedures, the purchasing policies and procedures should be written and distributed among all employees involved in purchasing. Training should be provided to the applicable employees so they understand what is expected of them.

## PURCHASING: RULES AND ETHICS

**When purchasing goods and services, it is important to avoid both conflicts of interest and the appearance of impropriety. In small communities, this may be difficult as local vendor options can be limited, but, if possible, avoid purchasing from or hiring family members of board members, managers or employees. If this becomes necessary, there should be full disclosure and the related board member or employee should be removed from any decision-making authority for that purchase. If there is any doubt about the propriety of a purchase, consult with the system's legal counsel. See the section regarding Code of Ethics and Conflict of Interest in Chapter 1.**

The board should review the purchasing actions of the utility on a periodic basis to ensure that the policies are being followed. Policies and procedures should be updated as needed to make sure the policies continue to address the needs of the utility.

## PURCHASING: POLICIES AND PROCEDURES

**Whether or not your utility is bound by legal requirements may depend on what type of entity it is and what type of funding it uses. Municipalities should have formal procurement regulations and policies in place. A rural utility may have less formal policies or a basic written procedure. It is worth noting, however, that local policies may, in some circumstances, be overridden by more restrictive policies or regulations. For example, because capital project funding often comes from state and federal sources, special attention must be paid to purchasing rules that may accompany those funds. Entities using Kansas State appropriations or federal funds may have specific bidding/spending requirements they must fulfill. For example, the utility may have a $50,000 threshold for requiring bids, but for projects using federal American Recovery and Reinvestment Act funds, anything in excess of $25,000 must be bid and must follow very detailed bid procedure requirements.**



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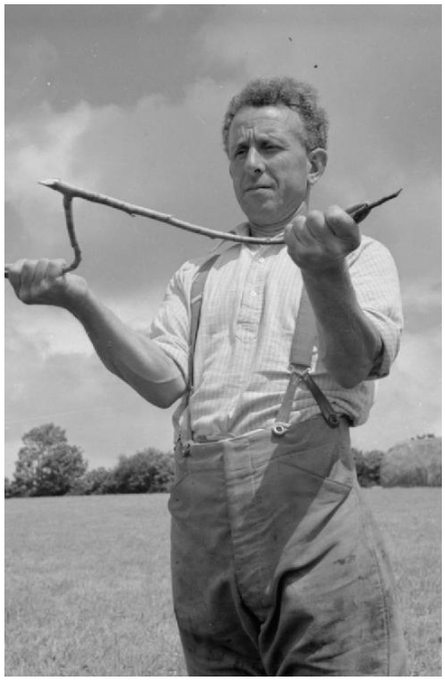
## CONTRACTING FOR SERVICES

It is inevitable, given the nature of the water business, that the board will eventually encounter the need for professional services. These services may be engineering, construction, legal, financial, operational or managerial in nature. Which types of services are contracted depends substantially on the size of the utility and the skill set of the personnel. However, some situations will almost always require the use of an outside entity, even for very large utilities. For example, when utilities are required to design or construct new or upgraded facilities, a licensed professional engineer will almost certainly be required as well as a construction contractor. Utilities may also have to contract with professionals when they have inadequate knowledge in a given area (such as legal or financial) or insufficient personnel (such as operators or managers).

Regardless of the type of professional services being contracted, the most important aspect is to define the relationship clearly and thoroughly. The contract should explicitly state the roles, responsibilities and liabilities of each party. The better defined the relationship, the fewer problems that will arise later and the greater the chance the utility will receive the service it was expecting.

While it may be tempting to base the selection of all contracts on cost alone, it is not advisable to do so. It is very important that the board consider other factors, besides cost, in the selection process. The factors include, but are not limited to, the following:

- Service they will provide
- Ability to do the work
- Past performance on similar contracts
- Willingness and ability to meet the specific needs of the utility
- Willingness to consider the input of the board and utility personnel
- Previous experience with this particular contractor on other projects
- Review of references



In most cases, the utility will use a proposal process – either a Request for Proposals (RFPs) or Request of Qualifications (RFQs) – to select the professional services contractor. While these processes are similar, they have some very important distinctions and it is essential to select the right process for the situation. In either case, RFP or RFQ, the best place to start is to form a selection committee who will be responsible for the preparation of the RFP or RFQ as well as the selection process once the bids come in.

The selection committee can be made up of a combination of staff and board members, although the board must ensure that the number of board members included does not trigger the need for an open meeting. There is no specific number of people who should serve on the selection committee, but 3 to 6 is a reasonable number. For very large or complex procurements, the larger number is preferred to make sure that a variety of perspectives are presented during the selection process.

Professional services may also be obtained through sole source contracting, which is a non-competitive process used only in limited circumstances. In other cases professional services may be obtained through a procurement process soliciting price bids. This process is used when the service is essentially the same between vendors, with the only difference being price.

### Request for Proposals

A Request for Proposals (RFP) is the more involved of the two competitive processes. RFPs will describe in as much detail as possible the work the utility would like to receive and the conditions under which the work will be performed. In some cases, supplemental technical documents may be required to further explain the nature of the work. The RFP will specify all required elements of the response, including any required page limits, number of copies, type of response (electronic or paper) and it will include the date the responses are due. Generally



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responses will be required 30 to 60 days after issuance of the RFP/RFQ.

The board should consider the time frame of the response to maximize the quality and number of responses. For example issuing an RFP on December 20th and asking for responses by January 5th will greatly limit the responses. It would be much better to issue the RFP on January 5th and allow the respondents to submit on February 5th. The goal is to provide a process that will give the board several good responses to pick from, which will result in a well-qualified professional to perform the work.

The response to the RFP will include the respondent's proposed scope of work, qualifications, past experience and a proposed price. The price may be in a separate document to be opened later if the board uses a qualifications-based selection process. In this case, the contractor is selected first, then the price is negotiated.

The evaluation criteria should be clearly spelled out in the RFP document as well as the way in which the criteria will be used to select the contractor. The selection committee should use the criteria when evaluating the proposals to ensure that the process is as objective and fair as possible. The committee's work should be well-documented to protect the utility in the event of a protest of the selection process by a respondent who was not chosen.

The committee will evaluate the proposals very carefully using the criteria specified in the RFP and rank the proposals from highest to lowest. When the top 2 or 3 respondents are determined, based on the committee's rankings, it is highly recommended that the utility conduct in-person interviews with the top candidates. This process will help ensure that the selected professional will best meet the needs of the utility.

During the interview, the selection committee can ask any questions that were not clear from the proposal. The ability of the respondent to successfully answer these questions can be part of the selection process. The interview can also be used to establish who the prospective contractor intends to use to complete the work. Will it be a highly experienced person or a lower level staff member? Will the contractor employ a sub-contractor? Are the personnel intended for the work actually qualified to do that particular work?

Another important step in the selection process is to check the proposed consultants' references prior to entering into a relationship with them. It is important to ask detailed questions regarding the type of work, how it was performed, any problems encountered, successes achieved, whether or not they would hire that consultant again and any other pertinent information. Following the interviews, reference checks and further discussion by the selection committee, the top candidate can be selected. The utility can then begin the process of negotiating an agreement with the consultant. The Kansas Department of Commerce has handbooks through KAN STEP that will give boards an overview of the RFP process and provide some sample documents. *(27)*

## Request for Qualifications

Professional services can also be obtained through a Request for Qualifications (RFQ) process. An RFQ is the simpler of the two options and focuses on the qualifications of the respondent rather than the scope of the services they would provide. The response includes detailed information about the respondents past work

### WHEN CREATING AN RFP OR RFQ

**Form an evaluation committee**

**Specify qualifications, expected services and deliverables**

**Determine evaluation criteria**

**Create an evaluation scale**

**Outline the scope of services needed (RFP only)**

**Include a description of the work to be performed (RFP only)**

**Summarize the available project information (RFP only)**



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experiences, expertise, ability to perform particular types of work and usually a pricing schedule but it does not include a detailed scope of work. This approach is often used when part of the professional's task will be helping the water system define the scope of the project.

Similar to the RFP described above, the responses to the RFQ should be reviewed by the selection committee and evaluated according to the selection criteria described in the RFQ. The top two or three respondents should be determined and then interviews should be held and references should be checked, including talking to previous clients.

Following the interviews and reference checks as well as further discussion by the committee, the committee should select its preferred candidate. Negotiations should commence with the top candidate, but if the utility is not able to reach an acceptable agreement, the utility should be prepared to move onto the second choice candidate. If the utility cannot reach agreement with any of the top candidates, it may be necessary to reconsider the RFQ and whether it properly describes what the utility desires in terms of services. The RFQ should be revised as necessary and then reissued.

The RFQ process is commonly used in the process of hiring engineers and lawyers. The Kansas Department of Commerce has a primer on Procurement of Professional Services through the Kansas Small Towns Environmental Program (KAN STEP) that is an excellent resource for those unfamiliar with the RFQ process. http://www.kansascommerce.com

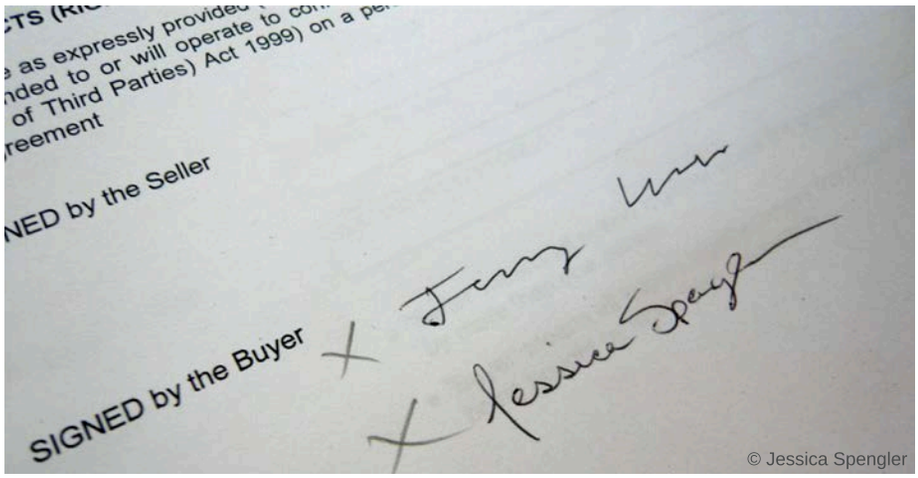
## Sole Source Contracting

A sole source process may be used if the total dollar amount of work is less than a specified threshold. This value may be set by state procurement rules, local governmental policy or board policy. This process should not be used, however, to avoid the procurement process by issuing multiple, successive, small-dollar contracts. For example, if the total project cost is $25,000 and the threshold is $5,000, the utility should not issue 5 contracts for $5,000 each to avoid issuing a competitive $25,000 contract.

In case of small dollar contracts, the expense of issuing Requests for Proposals or Qualifications is not justified, so a simpler process is used. However, when professionals are selected through this non-competitive process, the credentials of the individual or company, as well as any subcontractors they will use, should be thoroughly reviewed. References should be requested for utilities close in size and type to the utility hiring the professional or for projects similar in size and scope. The utility should carefully check several references to ensure they feel confortable contracting with an individual or company.

There are other cases in which a sole source process may be justified. In these cases, only one company or individual can perform the work or it is extremely cost-advantageous for one particular contractor, above all others, to do the work. This type of contract may occur if the utility purchases a particular software package and there is only one individual or company familiar enough with the product to provide training in the use of the software or maintenance of the software. It may also occur if the utility has automatic meter reading equipment that is supported by only one company.

In other cases, there may be more than one individual who could possibly do the work, but hiring a different person may require considerable additional cost because the new individual would have to learn the system. For example, if the utility has a supervisory control and data acquisition (SCADA) system and one individual has done all the control programming and updating for the last 10 years, it may be very advantageous to continue this relationship rather than hiring someone who does not know the system and would take considerable time to learn. The justification for the use of the sole source process



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should be clearly documented so that everyone understands why a competitive bid was not undertaken.

Sole source contracting should be limited to very specialized cases and care must be taken to ensure that the process is completed within the boundaries of all state and local rules and regulations, including the utility's own policies. Special care should also be taken to ensure no sole source contracts are issued to family members of board members or employees. This type of contracting can lead to questions of ethics or conflicts of interest.


## Procurement for Professional Services

Some types of professional services may not require such a formal process as a Request for Proposal or Request for Qualifications. Some procurements can be done using a simpler procurement process in which bids are solicited from qualified individuals or companies (usually at least three) and the lowest cost bidder is selected. This type of procurement is usually used for services in which many individuals or companies are providing pretty much the same service and the main difference is price. For example, sample analyses can be done by any certified laboratory capable of meeting the minimum standards required by the utility (e.g., proximity to the utility, hours of operation, ability to perform all required tests). The choice for the utility then becomes one of price.

In these procurements, the utility lists the minimum requirements that must be met and solicits cost bids from companies or individuals capable of meeting the requirements. The utility reviews the bids to ensure they meet the requirements and then generally selects the least cost bidder. Examples of other activities that may be selected in this manner include: tank inspection or cleaning, pump maintenance or repair, well drilling, line repair or meter reading. In determining whether to use a full proposal process versus a procurement process, the utility should consider whether the main determinant between the companies or individuals is price or service. If the service is pretty much the same, and the price varies, a procurement process can work. If the level of service is different from company to company and based in large part on past experience (e.g., engineering, design, architecture, construction, legal, financial), a formal proposal process would be better.

## Summary

No matter which selection process is used, the most important aspect is to be sure that the person/firm hired is competent, qualified and has the appropriate experience for the job they are being asked to do. It is equally important to proactively manage the contract once in place, including reviewing work products, carefully checking invoices to ensure they reflect the work completed, paying invoices on time, making appropriate staff available to the contractor as needed and holding periodic status meetings.

While each type of contractual relationship will have its own nuances and legal requirements, there are several similarities all contracts share:

- The utility needs to get the maximum benefit for the money spent.
- The consultant or contractor works for the utility (not the other way around).
- Recommendations made by hired experts may not always be the right ones for the utility; the utility should always consider the long-term impacts from the recommendation(s).

The system's needs and circumstances need to be fully considered by the consultant/contractor. While the consultant or contractor is providing professional advice to the utility, it is important to remember that the board will ultimately be responsible for the resulting work and will have to manage the utility during and after the



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project. If it appears that incorrect decisions are being made or that the selected alternative is not the right one for the utility, it is extremely important that the board seek a second opinion rather than continuing with the work. There may be a better alternative for the utility and reasonable professionals will not resent the request. Ultimately, a better alternative may be found.

This section is meant to provide information to aid board members in seeking professional contractors or consultants but it is not meant to be a substitute for sound legal advice regarding proper contracting procedures. The board should particularly seek legal counsel in cases where the contracting mechanism will be complex.

## WORKING WITH LICENSED PROFESSIONALS

Utilities often need to contract with licensed professionals, such as engineers, construction contractors, attorneys, contract operators, financial advisors and others. Unlike procurements for supplies, materials or services that are uniform in nature (e.g. testing laboratories), contracts with licensed professionals establish a working relationship between the utility and the professional. Some of these relationships might be relatively short term, such as a small contract for construction, while others can exist for years, as with attorneys, financial advisors or contract operators. For this reason, it is important that the board carefully match the needs of the utility with the qualifications and expertise of the professional individuals or firms it hires to ensure that a good working relationship is established.

### Working with Engineers

Water utilities can seek engineers for a wide variety of projects, such as water treatment plant upgrades or replacements, source water expansion, hydraulic design or hydraulic modeling, capital improvement planning, design of new systems, capital asset replacement and energy efficiency. The various projects may require different kinds of engineers or engineers with particular specialties. It is important to ensure that the selected engineer has the right experience and expertise and holds any required licenses.

The selected engineer will be thoroughly involved in every stage of the project he/she is hired for. The engineer will identify alternatives; estimate costs and charges; prepare plans; answer questions; and may be involved in the project financing, bidding and construction. It is very important that the engineer be willing and able to work with the board as part of a team and that the engineer be open to ideas and concerns expressed by the board. The board should also request that the engineer work with operation and management staff so that their input can be incorporated into the project. These personnel have a much more intimate knowledge of a utility's assets and particular problems and may even have ideas regarding possible solutions. However, it is important not to take this input process too far. While the input should be taken seriously and be fully considered, the board and staff should remember that the engineer is the experienced professional and the board should allow him/her to do his/her job.


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Engineers are often hired to complete designs of new or upgraded facilities. In this work, the engineer will be following KDHE's Minimum Design Standards to ensure that the resulting facilities meet regulatory requirements. (If the board wishes to view these standards, they are available at the following website: http://www.kdheks.gov/PWSS/peu.html). During this design process, one of the most important tasks the engineer will perform is the development and review of alternatives. The engineer will need to examine the various ways in which the



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goals of the project can be met. The alternatives will be evaluated based on capital cost, technology, expertise required to operate equipment, long-term operation and maintenance, life expectancy, ability to meet the utility's needs and goals and other factors. It is important that the engineer treat this task with the importance that it deserves. The identification of alternatives should not be perfunctory, in which the preferred alternative is a foregone conclusion and the rest of the alternatives are given only a cursory review. The board should make clear to the engineer that it expects a complete, comprehensive alternatives analysis, including a review of alternatives identified by the board or utility staff. If this type of analysis is not provided, the board should ask the engineer to make revisions. Ultimately, the selected alternative should be the most feasible solution for the utility and it should be acceptable to both the board and utility staff.

The relationship between the engineer and the utility can be successful and mutually beneficial if the expectations are clearly defined at the beginning of the project and the board and engineer maintain good communication throughout. The engineer should attend board meetings at set intervals during the project to make sure progress is reviewed and that the expectations are being met. If the board is concerned about the project, it is best to voice these concerns early on while there is still time and budget to address them, rather than waiting until the end. However, the board should recognize that asking the engineer to complete activities that are outside the scope of the original contract may require an additional cost.

## Working with Construction Contractors

At some point in the life of the utility, it will be necessary to rehabilitate or replace assets or expand the water utility treatment or distribution system, which will likely require a construction contractor. There are two common construction processes that can be used: design-bid-build and design-build.

Design-bid-build is the traditional construction process in which a designer (i.e., the engineer) is hired to complete a project design, including developing plans and specifications. The design is then put out for competitive bids and a construction contract is awarded to the "lowest responsible" bidder (i.e., the least cost bidder). In design-bid-build projects three parties are involved – the owner (e.g., the board), the design engineer and the contractor. The design engineer and construction contractor both have separate contracts with the water utility.

Usually, the design engineer works on behalf of the water utility to oversee the construction and ensure it meets specifications. While it is hoped that all parties will understand that it is in everyone's best interest to work well together, conflicts, miscommunication and confusion can happen. Disputes can arise in which the design engineer believes the construction contractor did not properly follow the design or specifications or the construction contractor believes the design or specifications were incorrect or inadequate. While the issue is disputed, costs and delays can occur. Furthermore, the resolution may require a change order (a written agreement to make a change in the way the project is being built) which can result in a cost increase, sometimes a substantial one.

### TO SUCCEED: COORDINATE, COMMUNICATE, DOCUMENT AND EVALUATE

**Infrastructure projects typically have three phases: planning, pre-construction and construction. The Kansas Department of Commerce has sample bids and contract specifications available through KAN STEP. (http://www.kansascommerce.com)**

**Technical assistance is available from a variety of sources:**

**US Department of Agriculture Rural Community Assistance Partnership (RCAP) (http://www.rcap.org)**

**KDHE, Public Water Supply Section and Engineering and Permits Unit (http://www.kdheks.gov)**

**Kansas Rural Water Association (http://www.krwa.net)**



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## BEWARE OF THE CHANGE ORDER

**Change orders are on-the-fly deviations from the written specifications that happen during construction. Some change orders are inevitable on every project and many lead to savings. However, change orders can lead to drastic cost increases. More than one contractor has bid lower on a project, confident that he/she could make up profit from change orders later.**

The potential for cost overruns from change orders or design/construction contractor disputes, led to a different type of contracting arrangement, called design-build. Design-build contracts include the designer and construction contractor on the same project team and only one contract is issued, rather than two separate ones. With the designer and construction contractor on the same team and contractually obligated to work together, it is hoped that the working relationship will be less adversarial and that fewer delays, change orders and cost-overruns will occur.

While this type of arrangement can reduce friction between the designer and the construction contractor, it also changes the relationship between the engineer and the board. In a design-bid-build arrangement, the designer functions as the board's agent and oversees the construction contractor to protect the board's interests. In a design-build arrangement, the designer is the contractor and therefore is not acting as the board's agent in the same way. In these arrangements, the board may wish to contract a third-party construction manager to protect its interests, particularly if the project is extremely high dollar or very complex. While hiring a construction manager may add to project costs, it may result in long-term savings over the life of the facility.

There is no "perfect" solution to construction contracting and no matter what mechanism is used, cost overruns may occur. One way to protect the utility from excessive overruns is to include a Guaranteed Maximum Price provision in the contract which puts a ceiling on costs. Another way is to actively manage the contract to ensure that the best interests of the utility and the customers are protected. To assist with contract management, the board should familiarize itself with K.S.A. Chapter 16, Article 19 (Kansas Fairness in Public Construction Contract Act), which covers competitive bid requirements, payment terms for contractors, damages and a host of other issues. Its terms cannot be waived.

### Working with Lawyers or other Legal Services

Issues are likely to come up that require legal advice or legal services. One example is the preparation or review of contracts. If the document is not prepared properly, legal challenges may ensue, costing the utility considerable dollars. Legal review or preparation of the contract by a lawyer can reduce liabilities and help protect the utility and board members from liability. It is important to remember, however, that lawyers tend to be specialists and the board should seek an attorney focusing on contract law for this purpose. Other projects may require an attorney specialized in water rights or employment/labor law. It may be difficult to find an attorney (or law firm) with expertise in all of the areas needed by the board. Therefore, it may be necessary to contract with more than one attorney to cover all the utility's needs.

A board needs to carefully consider its system's needs before making a decision regarding the best legal counsel and the best way to retain the counsel. A board may choose to hire an attorney or a law firm (or a few attorneys or law firms) on an ad hoc basis when legal counsel is required. The board may also choose to retain one attorney or law firm to address day-to-day legal issues that arise and have them partner with specialists for specific projects. Another option is a hybrid of these two where the utility retains one law firm or lawyer to address most of their routine legal issues and then hires other law firms on an ad hoc basis as specialized situations arise.

In the retainer type relationship described in the preceding paragraph, the water system pays a fee or "retainer" to the lawyer (or law firm) to secure the lawyer's availability. The amount of the retainer should be proportionate to the needs of the utility. For example, if the system's regular needs are about 1-2 hours per month (one or two questions, with some minor research and discussion of the



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answer), the monthly retainer will be approximately equivalent to 1-2 hours of the lawyer's hourly fee. The goal is to have a retainer that realistically reflects the utility's needs. Retainers may be adjusted periodically to better address the system's needs; greater legal needs would necessitate a higher retainer, while reduced legal needs may allow for a lower retainer or elimination of the retainer relationship altogether. If the board decides to hire counsel on retainer, it is a negotiated agreement. The board needs to make sure the agreement fits the needs of the utility and outlines the expectations. The retainer arrangement allows for quick response time for legal issues and may be less expensive over the long term if legal issues pop up regularly throughout the year. However, if the board finds very few legal issues arise over the course of the year, an ad hoc arrangement may be better for the utility.

## SHOULD THE UTILITY HIRE AN ATTORNEY ON RETAINER

### Pros

Establishes an ongoing relationship with an attorney

Helps with forecasting cost

Prompt service with response times that can be stipulated

Allows the board to consult the attorney whenever advice is needed

Specific law firm personnel can be specified

Hourly rates can be fixed

Can be less expensive than hiring on case-by-case basis

### Cons

The system pays whether or not it uses the services

May not cover every service needed

Could be more expensive than hiring on case-by-case basis

Legal advice can save the utility money by preventing actions that could cause harm or lead to a law suit and by ensuring the utility is operating within the bounds of laws and regulations. However, legal advice is not inexpensive. The board may be tempted to hire a lawyer at a much lower rate who is inexperienced. However, it may take this individual considerably longer to address the same issue than a higher priced attorney who specializes in the field. For example, it may take a $200/hour attorney 5 hours to answer a question that a $400/hour attorney could answer in 2 hours. The best way to select a qualified attorney is to use the Request for Qualification process described previously in this chapter and thoroughly check the attorneys' credentials and references. If at any point the relationship does not seem to be working, the board should consider hiring a different attorney. However, the board must make sure to properly follow the contract provisions specifying how to terminate the contract.

While the board wants to ensure that it has proper legal representation, it must guard against excessive legal representation. In one case, a utility that was concerned that it might be sued, hired all the prominent lawyers in the community under the misguided notion that if the attorneys were all on retainer with the system, they could not or would not sue the utility. This practice caused the utility to have constant legal bills of approximately $20,000/month with bills being much higher if there were legal matters requiring review. Clearly, the board needs to find a balance between protecting the utility and becoming excessively reliant on legal assistance.



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## Working with Contract Operators

Due to the complexity of water operations and regulations, the State of Kansas requires water supply systems to be operated and maintained by properly trained operators certified by KDHE. The statutes and regulations covering water facility operation can be found at K.S.A. 65-4501 et seq. and K.A.R. 28-15-18 and operator certification requirements are discussed in more detail in Chapter 4 of this manual.

A water operator can be hired as an employee of the system or can be engaged through a services contract; it is entirely up to the water system. Factors to consider in choosing whether to employ or contract an operator include the size and complexity of the system, budgeted funds, level of operator needed, need for full time or part-time operator and availability of operators that can serve as employees or contractors. Regardless of the employment relationship, each system must have an operator who is certified at the appropriate level.

Boards may believe that contracting with a water operator (rather than hiring one as an employee) relieves them of the liability for complying with regulations. This is not the case. The liability for complying with regulations remains with the board.

The duties of a contract operator can vary from system to system, depending on whether the contract operator will be the sole operator of the system or will work with operators employed by the utility as a supplemental operator. KDHE recommends that at a minimum the operator be required to:

- Routinely inspect the system and pumping station(s) (exact frequency depends on system complexity)
- Be on call for emergency situations
- Verify routine asset maintenance schedules are followed
- Have clear authority to make necessary operational changes
- Inspect any records and reports submitted to KDHE for regulatory compliance
- Review reports and determine discrepancies with permit conditions
- Have clear authority to direct non-certified staff

The operator's duties may also include some or all of the following:

- Maintain records and emergency operating procedures
- Mark water mains for customers
- Conduct leak testing
- Issue public notices, such as boil orders, when required
- Respond to state requests for information

The exact nature of the operator's duties should be written into the contract between the operator and the utility to ensure there is no confusion or disagreement regarding what is expected. In addition to spelling out these duties, contracts typically cover a variety of components including: the operator's minimum time on site; pay rates; certification maintenance; contract expiration date; termination clauses; and, of course, the utility's responsibilities regarding labor, materials, supplies, equipment and transportation. Additional responsibilities can be found in the RCAP Big Guide for Small Systems (for boards), available online at http://www.rcap.org/boardguide. This guide details typical requirements and responsibilities of operators and boards. If the board decides to hire operators as employees, similar provisions should be detailed in the employee's job description and in the personnel policy manual.

Whether the board decides to hire or contract an operator, the choice need not be permanent. If a system loses its only certified operator (for example, an employee operator leaves, is terminated or an operator



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contract expires), the board can hire a new operator or contract with one that holds the required certifications.

When considering contracts for operators, it is a good idea to consult with the KDHE Bureau of Water Technical Services Section for assistance. The board may also wish to consult with an attorney to ensure that contract is crafted properly. Other water systems can also serve as an excellent source of information.

The KDHE Water and Wastewater Operator Certification Program maintains a list of available contract operators. For more information, call 785-296-5511 or visit http://www.kdheks.gov/water/www.html.

### Working with Financial Advisors

Financial advisors typically provide recommendations on debt, reserve funding, investments and securing funding for capital projects. They also help a water system with structuring and marketing bonds and preparing related documents. This second type of financial advice is bound by specific Securities and Exchange Commission (SEC) registration requirements. Some financial advisors must be registered with the SEC while others are not required to do so. Financial advisors are described in more detail in Chapter 3.

### Working with Other Professionals

Water utilities may, from time to time, have to contract with other types of professionals, such as geologists, hydrologists, soil scientists, architects or


environmental scientists. Working with these companies or individuals is very similar to working with engineers. The utility should strive to communicate the needs of the project clearly and effectively to the company or individual and should maintain good communication throughout the completion of the project.

If the utility has not contracted with this type of professional before, it extremely important that the board or utility staff reach out to other utilities to seek advice regarding how to hire and interact with these professionals. It is also extremely important to check the qualifications of the individuals prior to entering into a contract with them.

## WORKING WITH OTHER WATER SYSTEMS

As described in Chapter 1, water utilities can partner with others to assist with compliance, reduce costs or aid in emergencies in ways that are mutually beneficial. These relationships can be informal or formal and can be designed to meet the terms and conditions desired by the water utility.

A utility can contract with other water systems, cities, counties or other entities for:

- Joint purchasing
- Management
- Operations
- Water storage
- Services such as meter reading, billing, emergency aid, staff coverage and sampllig
- Water supply
- Water Treatment

Water systems can also:

- Form partnerships to jointly oversee, manage and operate facilities (like the Tri-District agreement between Osage RWD 5, Douglas RWD 3 and Shawnee RWD 8)
- Form Public Wholesale Water Supply Districts by following a specific statutory process
- Enter into cooperation or consolidation agreements under the Kansas Interlocal Cooperation Act (K.S.A. 12-2901 et seq.)

The board should identify the system's needs, explore available options and consider the specific legal requirements that may be associated with the partnering arrangements. Refer to Chapter 1 for more information regarding partnership opportunities.



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## CUSTOMER SERVICE

Customers are not just an important part of a water utility's business, they are the water utility's business. Without customers the utility would have no reason to exist. Not only does the system need its customers, it needs customers who are willing to pay a sustainable price to enable the system to provide quality service over the long term.

Ensuring customer needs and concerns are fully considered generally takes the form of a clear customer service policy including a Level of Service (LOS) Agreement. This policy should spell out the procedure for customer complaints and employees who deal with customers should be trained to handle both questions and complaints.

It is important for new board members to familiarize themselves with customer levels of service, policies, and communication and complaint procedures.

### THE LEVEL OF SERVICE AGREEMENT

**Communicates how a utility operates to its customers**

**Assists in identifying critical assets**

**Provides a means of assessing overall utility performance**

**Provides a direct link between costs and service**

**Serves as an internal guide for utility management and operations staff**

**Communicates energy efficiency and water conservation goals**

### Level of Service Agreement

Water utilities are in the business of providing safe, reliable drinking water at an acceptable pressure and sustainable cost. Within this broad mission, utilities must determine specifically how they will operate and maintain the assets to meet customer expectations, which is termed Level of Service (LOS). LOS is an integral part of the Asset Management Plan, as discussed later in this chapter. The Level of Service Agreement tells the system and its customers what its assets will provide and how they will perform. The agreement can include any components the utility and its customers decide to include, as long as all regulatory requirements are met and the components are within the capabilities of the assets.

Level of Service Agreements are a relatively new concept to the water industry so many utilities may not currently have these agreements in place. Furthermore, they are not legally required documents. Rather they provide an excellent way to communicate the goals of the utility to its customers and define the relationship between the water utility and the customers.

The basic question a utility should ask itself when setting LOS goals is "What do my customers

**Carl Slaugh**
City Administrator, City of Iola
*"Customer Service"*

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want?" This question can be most effectively answered by talking with the customers. This type of conversation can be conducted in a variety of ways that are practical for both the utility and the customers. For example, a small utility with less than 100 customers may be able to go door to door and ask for feedback. A utility that holds annual meetings may be able to get feedback at the meetings. A larger utility may wish to hold focus groups with randomly selected customers. Surveys can be included with utility bills or mailed out. Communities may wish to use technology and seek customer feedback through internet-based polls or on a social networking website. If a customer call/complaint log is kept at the utility, the information obtained from these phone calls can be examined. The main objective is to avoid adversarial customer communication and encourage customers to be engaged as partners and collaborators.

The LOS Agreement will also allow the utility to track its performance and determine how well it is meeting its goals. This performance can be communicated to the customers to reinforce the relationship between the fees they pay and the service they receive.

An example Level of Service Agreement is contained in Appendix B.

## Customer Policies

The purpose of customer policies (sometimes included in an ordinance) is to establish the way in which service will be provided to customers. The policies should explain the procedures for obtaining and keeping utility service and for ensuring that all


customers are treated equally and fairly. The policies can also provide guidance to utility personnel regarding how customer relations should be handled.

The customer policies and a current rate and fee schedule should be provided to prospective customers no later than when they apply for service. Customer policies and procedures should be easy for the general public to understand and follow. They should assist customers in understanding how services are provided, such as how to obtain service, how to transfer service to a new address or how to discontinue service if the customer is leaving for an extended period or moving. They should also clearly document what will happen if a customer does not follow the rules, such as failing to pay a bill or illegally connecting service.

The customer policies should also contain contingency plans for emergencies and describe the actions customers will be expected to take during water shortages, (e.g. no outside watering or no car washing). The more the customers understand what is expected of them and what the utility will provide, the greater the potential for customers to trust and support the utility. Customer policies and regulations should address the following concerns:

- Applying for service (or membership)
- Security deposits (if required)
- Paying water bills (where, when, how)
- Conditions of service (e.g. prohibition on cross-connections or water transfers to non-customers; any permanent water use restrictions on landscape/ irrigation or livestock watering)
- Meter reading (when and how)
- Utility's right of access
- Change in occupancy (particularly for commercial and industrial customers for adequate fire protection)
- Late fees or penalties
- Other fees or charges
- Delinquent account and cut-off policy
- Collection policy
- Restoring service



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- Report problems and emergencies
- Rate structure
- Where the responsibilities for assets begins and ends (typically utilities are responsible for all piping up to the meter and customer responsibilities begin past the meter connection)

Customer policies must be revised whenever applicable state or federal laws or rules change. However, other than changes in utility rates or the level of service the utility wants to provide, customer policies are not likely to change more than once every three to five years.

## Communicating with Customers

Water utilities may seem like a community's best kept secret. Often the functions of the utility are invisible to the public. Turn the tap and water comes out. Flush the toilet and water goes away. Most citizens know very little about what keeps these processes going. Although they may want to understand, they often have very little opportunity to learn.

Simply informing customers about what the utility does and what it provides for them can go a long way toward gaining support for programs. In many communities, people have responded in overwhelming numbers to campaigns to inform them about their utilities. In other areas, large numbers of community members have participated in drafting master plans and sustainability plans for their communities. Such involvement gives people a sense of belonging and pride in their communities. Community involvement is vital to gaining support for rate increases and capital improvement plans that might require voter approval.

Communications with customers should be a two-way street, with the board indicating what services are being provided and customers indicating what services they desire and are willing to pay for. This two-way communication can build support for the utility. Thinking of customers as allies and collaborators can reap significant benefits. Customers who understand the services they receive are more likely to approve essential rate increases and understand planned outages.

It is important to select customer communication methods that work best for your community and to use a variety of methods to reach as many customers as possible. Some communities may respond best to mailings while others may prefer social media interactions. It is also important to periodically review the type and style of communication, as community dynamics and demographics change and technologies evolve. It may be a good idea to poll customers periodically to determine which forms of communication are most effective and then focus on those. Communication opportunities are limited only by imagination and creativity. Many utility managers

### COMMUNICATING WITH CUSTOMERS

**Bill stuffers**

**Telephone surveys**

**Mailed surveys**

**Newspaper articles and announcements**

**Websites**

**Social media (Facebook, Twitter, Instagram, etc.)**

**Televised meetings and/or announcements**

**Radio or TV**

**Posters in public places**

**Special information meetings**

**Billboards**

**Plant tours**

**Special classes (e.g. landscaping and water conservation techniques)**

**Consumer Confidence Report**



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feel that their customers ignore announcements and bill stuffers, but studies have shown that the more often information is made available, the more likely customers will pay attention to it.

### Customer Complaints

Even with clear policies and regulation, as well as the best communication plan, customer complaints are a reality for every utility. No matter how complete the utility's policies, how well-communicated the Level of Service Agreement or how efficient the system's operation, there are always circumstances where the utility will need to deal with customer complaints. The utility should provide phone numbers, mailing addresses and e-mails that can be used to voice concerns and complaints. Customers should also be made aware of when and how they might expect a response.

The key to dealing with customer complaints is to have specific policies and procedures on how to handle complaints. Employees should receive training on receiving and addressing complaints in a courteous and respectful manner. When staff is well trained, the interactions between the employees and the public will be more positive, and frustration and dissatisfaction can be lessened. When employees remain calm, respectful and professional in interactions with the public, stressful situations can be diffused.

Although it is important for staff to act as professionally as possible at all times, there will be some situations that may be unsafe for the employee. There should be procedures and/or training in what to do if the situation escalates. Employees may need to immediately leave the area, alert security or police or follow other safety protocols. If a dangerous situation is anticipated, the employee may want to ask police to accompany them.

Customer complaints are often viewed in a negative light. The utility should understand that sometimes customer complaints alert the utility to a problem with the system or the water. If several customers in the same side of town suddenly complain about low water pressure, maybe there is a leak in the system or a problem with a storage tank. If customers suddenly complain about the look or taste of the water, perhaps there is a problem at the treatment plant or there is a cross connection issue.

## PLANNING FOR SHORT-TERM AND LONG-TERM NEEDS

### Asset Management

Asset management is defined as maintaining the desired level of service at the lowest life cycle cost. Asset management is a business process that helps utilities decide how to spend their limited dollars to achieve the maximum impact. There is no way to achieve everything the system wants with a limited budget, but it is possible, with Asset Management techniques, to achieve the maximum result within the available funding. Asset management provides a framework to make data-driven decisions about how to operate, maintain, repair, rehabilitate and replace assets.

To be effective, asset management must become the way of doing business and cannot be viewed as just a side activity practiced every once in a while. The job of an asset management program is to reduce the burden of running a water utility by allowing operators, managers and board members to make better decisions about where, how, when and on what to spend their money.

Successful asset management programs have "buy-in" at all levels, but most importantly, from the utility's board members. Without board support, it is difficult for the operators and managers to implement the

#### BENEFITS OF ASSET MANAGEMENT

- Better customer communication
- More efficient operation
- Increased acceptance of rates
- Capital improvement projects that meet the true needs of utility
- Improved emergency response



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**Larry Paine**
City Administrator, City of Hillsboro
*"Asset Management"*
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various components of asset management. It is also important for every employee's input to be taken seriously and incorporated into the program.

Asset management is a way of thinking about assets. Although computer programs can be used to assist personnel in implementing asset management, it is not the computer program that is the asset management, it is the thinking around the information. The asset management process has five core components – current state of the assets, level of service, criticality, life cycle costing and long term funding – which are described in more detail below.


*Current State of the Assets*

The current state of the assets is the most straight forward part of asset management. This component involves inventorying the system's physical components. The basic questions are:

1. What assets make up the system?
2. Where are they located?
3. What condition are they in?
4. What are their remaining useful lives (i.e., how long will the assets last)?
5. What are their replacement values?

This step of the process involves completing an inventory of all of the assets in the system with associated data for each asset, including, but not limited to, the following: condition, location, remaining useful life, replacement value, installation date, serial number, manufacturer, past history of O&M, other assets connected to this asset, type of material and size. To make sure each asset is unique in the inventory, each one should be given an asset identification (ID) number. This ID number can be a computer generated, random number or it can be a "smart ID" number meaning that it has information regarding type of asset and location.

The data entered into the inventory should be of the highest quality possible. It is okay to leave fields blank if they do not apply or the information is not known. It is also okay to make educated guesses about the information, but wild, unrealistic guesses should be avoided (a blank is better). The focus on information gathering should be



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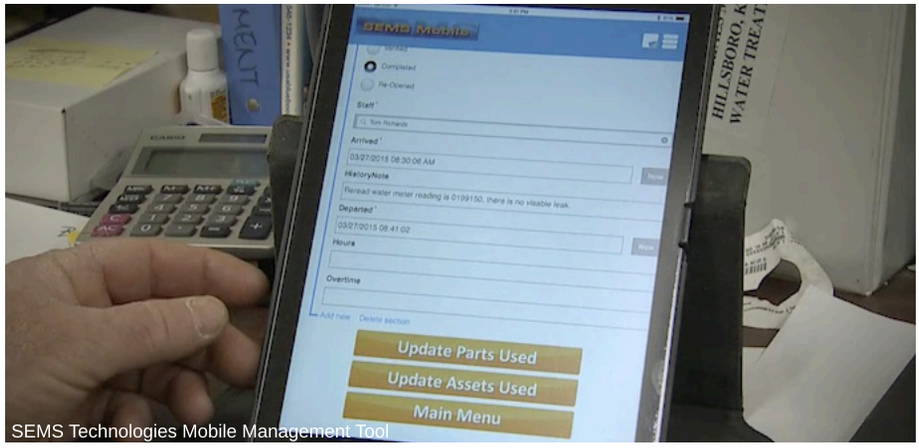
on what the utility personnel and board members need to make better decisions. The information should be kept up to date and any inaccurate information should be revised as soon as the errors are discovered.

A method of storing the inventory data must be determined. Many options are available from paper based inventories (acceptable for a very small utility), to generic databases or spreadsheets, to personalized spreadsheets or databases, to a commercial product. There are so many commercial products on the market, in all price ranges, that a utility will be able to find one that meets its needs and budget if it decides to go that route. The key to choosing what option is best for the utility to store inventory data is to determine what the utility wants to do with the inventory program, including what information it wants to store, what reports it wants to receive and whether it wants to tie the inventory program to other electronic programs, such as billing. Once the utility knows what it wants the program to do, it is possible to determine the best option for the available budget.

***TIP:*** *When conducting an asset inventory, take digital pictures of the assets that are visible. It helps in the data collection process and creates a permanent record of the assets. In addition, taking pictures will allow managers to look at trends in the asset conditions over time.*

## *Level of Service*

The level of service (LOS) defines what the system wants its assets to provide and how it wants them to perform and is the most underappreciated part of asset management. Many utilities believe that it is not necessary to write performance goals or measure progress towards meeting them. However, setting goals and measuring progress can open up conversations regarding budgets, staffing, asset replacement, operation, maintenance and many other topics which are beneficial to the overall management of the utility.



SEMS Technologies Mobile Management Tool

The LOS outlines the major goals of the utility in order to provide the customers what they want. Goals can be defined in several different areas, such as water quality, water loss, water conservation and customer service, and should be “SMART” (specific, measurable, attainable, realistic or relevant and time bound). As an example, the water utility could set the following goal: “The water utility will provide water at a minimum pressure of 50 psi 95% of the time.” This goal is specific: anyone can tell exactly what the utility is trying to do. It is measurable because pressures can be checked at various points around the system to determine if the system meets that minimum standard. It is attainable if the facility has the pumping facilities or storage tank elevation to meet that pressure. It is realistic or relevant if this is the level that customers want. It is time bound in that it says the utility will meet the level 95% of the time. This goal allows for periods when the system may be undergoing repairs and the pressure may drop below the minimum of 50 psi.

LOS goals can include both external goals (goals shared with the public or decision-makers) and internal goals (goals that would be shared only within the utility). Internal goals are generally items that are specific to operations, such as the ratio of corrective to preventative work orders, that would probably not be well-understood by customers. It is important to measure how well the utility meets its LOS goals periodically (monthly, quarterly, semi-annually or annually) and to report the results to the public or decision-makers at least annually.

## *Criticality*

Understanding criticality or risk is the heart and soul of asset management. Criticality relates to determining which assets are most critical for the sustained operation of the facility. Examining the number and type of critical assets helps the utility determine its overall risk. Understanding criticality allows a manager to make informed



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decisions about the best way to use limited financial and personnel resources by focusing them on critical assets in order to reduce overall risk of operating the utility.

Determining the criticality of an asset involves investigating the following questions:

- What is the probability that this particular asset will fail?
- What are the consequences if it does fail?

The highest risk assets will be those that are likely to fail, and the consequences are really bad if they do. The lowest risk assets are those that are unlikely to fail and if they do, the consequences are minimal. Medium risk assets are those that are unlikely to fail, but it is really bad if they do or those that are highly likely to fail but the consequences are minimal if they do.

Assets can fail in four different ways, and all four failure modes should be considered when deciding the probability of failure:

- Mortality: the asset is physically unable to perform due to breakage, degradation, collapse or other event
- Capacity: the asset is sized improperly for the required performance (e.g., a 4 inch pipe when a 6 inch pipe is needed; a 30,000 gallon storage tank when a 60,000 gallon tank is needed)
- Level of Service: the asset does not meet the level of service required by the customers
- Financial Inefficiency: the asset is more expensive to maintain than a purchase of the new asset

Three different types of consequences should be considered, which are often termed the triple bottom line:

- Financial: all the costs associated with the failure, including legal, repair, damage to other assets and replacement
- Environmental: the environmental damage or harm that may occur as the result of the failure (generally more of an issue with wastewater than drinking water)
- Social: the consequences to the water utility customers (e.g., blocked roadways, disrupted service)

Some of the consequences are monetary and some are not. Therefore an analysis of the three factors may have to be both qualitative and quantitative.

A visual representation of the criticality of the assets can be very helpful to show board members or the utility customers what the overall risk to the utility is and how different assets compare in terms of criticality.

### *Life Cycle Costing*

Life cycle costing uses the information from the first three components (current state of the assets, level of service and criticality) to make informed decisions regarding the best way to operate and maintain assets as well as the optimal approach to repairing, replacing, or rehabilitating assets when they fail. This component is the most complex portion of asset management but it is where the utility has the most opportunity to spend their money in a better way to achieve greater results. Knowing how much and what type of maintenance to do on an asset during its life and identifying the right time to replace an asset optimizes operational and capital expenditures. In order to improve decisions regarding the management of assets, the system needs to know the costs of each phase of the life cycle, including initial installation, operation and maintenance, repair, rehabilitation and disposal.




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Balancing how much maintenance to do and specifically which maintenance activities to perform based on resources available, involves thinking about criticality. More maintenance should be practiced on highly critical assets than less critical assets. Similarly, decisions about asset replacement also involve criticality. A highly critical asset might be replaced sooner because of its importance to the operation, while an asset that is less critical can be run until it fails or is no longer cost-effective to repair.

Life cycle costing also relies on asking questions about operations and maintenance and then using data to drive the answers to the questions. For example, a utility might ask itself, "Why do we inspect our pump stations every day when we have a supervisory control and data acquisition (SCADA) system monitoring the operational data and relaying the information to a central location?" The utility could investigate what benefits it receives from sending a person to the pump stations every day and determine whether or not the benefits outweigh the costs, given that data will be available through SCADA. A utility may ask questions about particular maintenance activities, such as, "Why do we change the lubrication in our pumps twice a year?" The utility can use data from oil and pump analysis to determine if it is actually necessary to perform this task twice every year.

When replacing assets, particularly when a complex and expensive project is being contemplated, the utility can ask itself, "Is this the best option to meet the needs of the utility or is there an alternative that costs less that will achieve the same result?" The utility needs to assure itself that they are completing the right project, at the right time, for the right reason, at the right cost before proceeding.


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*Long-Term Funding Strategy*

The final component is the long term funding strategy, which is the portion of the process where desired action meets reality. In this component, utility managers relay budgetary needs for both short-term operation and long-term capital replacement projects to the board and the board must make decisions regarding which projects or activities will be funded and how much funding they will receive. This process requires thorough and effective communication between the utility staff and the board and it is absolutely critical that the board has the best information possible when making these funding decisions.

In addition to determining how to spend the revenue available, the board must determine how it wants to generate the revenue. The most common way to generate revenue from customers is through rates and fees. These approaches are covered in detail in Chapter 3. Funding for capital improvements projects can also come from outside sources such as funding agencies. These funding mechanisms are also covered in Chapter 3.

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## ASSET MANAGEMENT EXAMPLE

**A utility believes that their pipe infrastructure is getting old and deteriorating and that they will need to replace all of the pipe. The cost of pipe replacement is estimated to be 8 million dollars, which is way more than the system can afford. Furthermore, there are other priorities in the system demanding money. The system knows it needs another approach.**

***Step 1:*** **Evaluate the pipe assets. This includes determining the pipe types, sizes, location and condition. The best way to complete the asset inventory of pipes is to generate a map of the pipes.**

***Step 2:*** **Determine the level of service for pipe reliability. For example, there might be a level of service goal that says "Pipes will be replaced when the break rate reaches 1 break per year per mile." With this level of service goal in mind, one can determine which pipe segments exceed the break rate, which are close to it and which are well below.**

***Step 3:*** **Evaluate each pipe segment (as defined by the system) to see which are likely to fail and which will cause a serious consequence if they do fail. For instance, main lines are more critical than a smaller line serving only 6 homes. When pipes are evaluated on the basis of probability of failure and consequence of failure it is possible to rank the pipes in terms of risk to the system.**

***Step 4:*** **Develop a phased approach to pipe replacement. This might include replacing some sections each year with the most critical being given priority.**

***Step 5:*** **Identify how to fund critical pipe replacement.**

**In this example, suppose the system has a total of $500,000 to spend on pipe replacement. This would allow the system to select roughly one mile of the riskiest pipe in the system. By replacing this pipe first and leaving in the less critical pieces of pipe, the system would achieve the greatest benefit for the money expended and buy time to plan for acquiring funds to phase in further needed replacements.**

### *Implementation Process*

The best way to implement Asset Management is to "just do it." Asset Management is a way of thinking about managing assets in a more efficient and customer-centric way. There is no one "right" implementation approach as long as the five core concepts are included and all levels of the organization are involved. The more buy-in at all levels, particularly by the board, the more successful the Asset Management program will be and the more benefits that will be received.

### *Asset Management Training and Resources*

Through funding provided by the Kansas Department of Health and Environment's Capacity Development Program, the Wichita State University Environmental Finance Center (EFC) and Kansas Municipal Utilities (KMU) provide training on Asset Management titled *A.M.Kan Work!* This one day training course incorporates presentation materials with real world classroom exercises to give the participant a good foundation for getting started in asset management or building on an existing asset management program. Free follow-up on-site technical assistance is also available for systems that need help with implementation. For more information or to register contact KMU at (620) 241-1423. The *A.M. KAN Work!* guide is also available by request as a reference for utilities.



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## Capital Improvement Planning

A capital improvement plan (CIP) specifies which projects a water utility will need, when the utility anticipates needing these projects and how much they are expected to cost. The CIP should ideally cover at least 10 years' worth of projects, but, for small systems, a 3-or 5-year CIP is not uncommon. A longer time frame gives planners more time to plan and investigate funding opportunities and allows them to develop strategies that coordinate all of the utility's needs. For example, it might be possible to combine projects or to phase the funding to ensure that the most critical projects are given priority without jeopardizing other needs. (See the Asset Management section on critical assets in this chapter). The specific components of a capital improvement plan are discussed thoroughly in Chapter 3.

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## Emergency Response Plan

A practice of visual inspections as well as general routine and preventative maintenance can help ensure the water utility is in proper working condition. However, situations such as natural disasters, accidents and intentional acts will likely occur at one time or another for every utility. The impact that an emergency has on the community and the water utility is directly related to its preparedness and response plan. This emergency response plan (ERP) is intended to protect the safety of the water supply, customers' health and the community's economic vitality. It will also help to minimize the duration of any water outages, particularly to high risk customers (e.g., hospitals, nursing homes, dialysis centers). The ERP should describe the plans, personnel, procedures, actions and equipment that can be implemented or used in the event of an emergency.

To ensure that the plan is thorough, addresses all contingencies and will be operational in times of an emergency, the utility should partner with other organizations, such as governmental agencies, emergency responders (e.g., fire department, police department) and non-profit groups. These outside groups will likely be needed to assist during the emergency and the sooner they are brought into the process, the better. They will also need information regarding the utility in order to properly respond. This information should be developed *well before* any emergency and procedures should be established to make it readily available to all necessary parties (emergency responders, maintenance personnel or contractors, the media) during the emergency.

In addition to the basic information described above, the ERP should also contain operational information for emergency responders to use if the utility operator is unavailable, incapacitated or just needs


**Greg Dumars**
City Administrator, City of Lindsborg
*"Emergency Planning"*

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## ELEMENTS OF AN EMERGENCY RESPONSE PLAN

Introduction

Key references

System specific information

Roles and responsibilities

Notification procedures

Personnel safety plan

Identification of emergency water sources

Equipment and materials

Property protection

Action plans

Audit plan

Reference to the record of emergency plan adoption, if required

additional help. The operational instructions can be taken from the utility's O&M plan described in Chapter 4. If it is prepared separately, the operational information should be compatible with that contained in the O&M plan. The operational instructions should be written in easy to understand language and contain clear instructions that emergency responders who are not well-versed in operating a water utility can understand.

## PRIMARY CONCERNS WHEN DISASTER STRIKES

Protecting public health, safety and welfare

Securing utility assets and property

Assessing damage

Determining priorities for recovery

Restoration and clean-up

To assist in both the development and review of ERPs for utilities, the State of Kansas has developed an Emergency Response Planning Guidance which is available at: http://www.kdheks.gov/water/download/Emergency_Response_Planning_Guidance_01_11_2005.pdf. It is quite detailed, covering pre-and post-emergency planning, and outlines the basic requirements for an ERP including:

- Pre-emergency planning
- Emergency organization
- Communications planning
- Mutual aid agreements with other utilities
- Vulnerability assessment
- Asset inventories (material and personnel, including an inventory of available emergency equipment)
- Emergency water requirements
- Physical protection systems
- Personnel safety
- Testing, training and updating
- Disaster response
- Post emergency planning
- Plan security

A sample emergency response plan for water emergencies is included in Appendix B. Additional resources available through the US Department of Homeland Security, the EPA and the Kansas Adjutant General are also listed in the State of Kansas guidance document.



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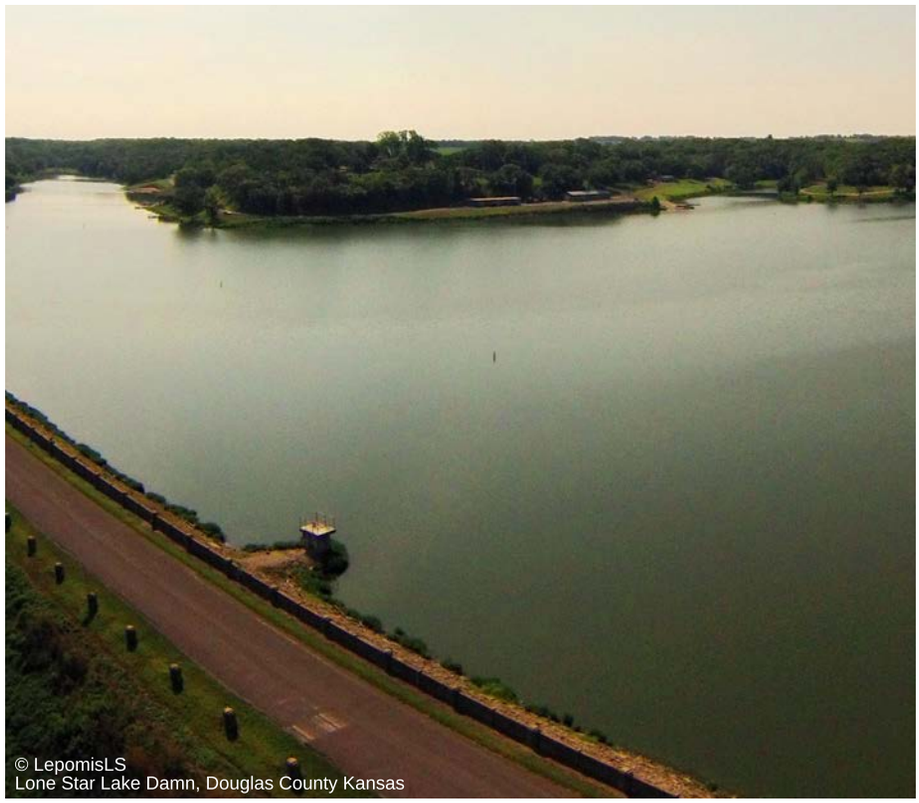
A water utility may also be covered by a municipal or regional multi-hazard plan. If so, the water utility should make sure its vulnerabilities are adequately addressed or it should develop supplemental plans as needed. The Federal Emergency Management Agency provides free online training on the National Incident Management System/Incident Command System tailored for public works professionals. A three-hour interactive web based course is available through: http://training.fema.gov/is/courseoverview.aspx?code=IS-100.pwb.

### *Kansas Mutual Aid Program for Utilities*

Kansas Mutual Aid Program for Utilities (KSMAP) is a cooperative effort of state utility associations and state government agencies including:

- Kansas Municipal Utilities
- Kansas Rural Water Association
- Kansas Section - American Water Works Association
- Kansas Municipal Energy Agency
- Kansas Power Pool
- Kansas Corporation Commission
- Kansas Department of Health and Environment

Recognizing that assistance needs to be better coordinated, particularly in large-scale emergencies, these groups work collectively to develop an emergency response effort for



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Lone Star Lake Damn, Douglas County Kansas

Kansas utilities. The KSMAP program provides an organized structure for requesting and responding with help for utilities including water, wastewater, natural gas and electric systems.

To become a part of KSMAP, a participating utility needs to do the following:

- Adopt a resolution approving the program agreement
- Compile and update personnel, inventory and equipment available for assisting other utilities
- Agree to assist other utilities when the utility has the capability to do so
- Be prepared to reimburse assisting utilities for personnel costs and FEMA equipment rates
- Submit information to the KSMAP program
- Provide appropriate training to personnel

For more information on the KSMAP can be found at their website: www.ksmap.org or contact Kansas Municipal Utilities or Kansas Rural Water Association.

## CONCLUSION

This chapter has provided the basics of water utility management. Setting policies, as well as directing and approving planning activities, are an important part of the utility board's responsibilities. These are the foundations upon which everything else rests. With clear policies and strong planning, water utilities can achieve the managerial capacity to provide safe, reliable water to their customers, now and well into the future.



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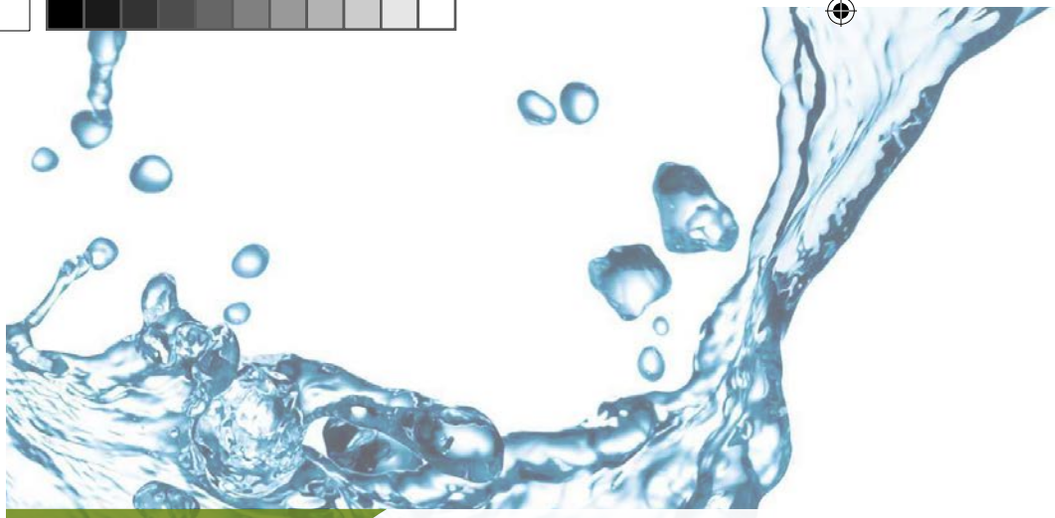



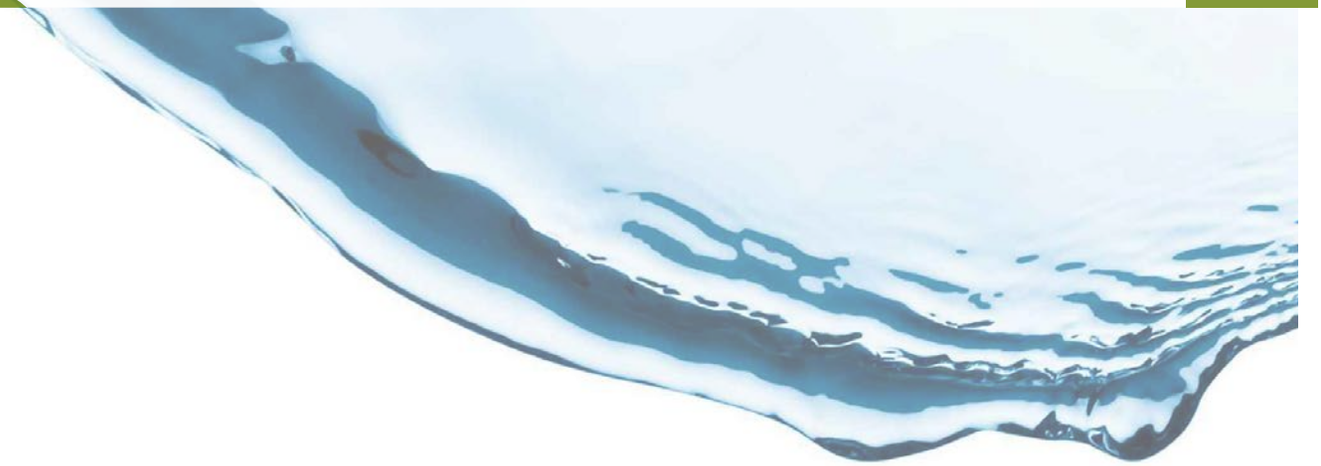

# FINANCING A WATER UTILITY (FINANCIAL CAPACITY)

CHAPTER 3


## INTRODUCTION

Financial capacity means having the financial resources needed to supply customers with safe drinking water for both the short and long term and is fundamental to the utility's ability to sustain the operations of the water system. Without sufficient revenues and adequate control of finances, it is very difficult to ensure continued delivery of safe and reliable water service to customers. The main indicators of adequate financial capacity include:

- Adequate budgets with associated cost tracking
- Reserves sufficient for emergencies, debt service, repairs and replacements and capital improvements
- Financial statements and acceptable financial indicators
- Adequate internal financial control systems
- Completed and acceptable financial audits
- An adequate rate structure
- Ability to access credit regularly available to similar water systems

Having adequate financial capacity means knowing, with reasonable certainty, that the utility will be able to meet all of its current expenses, including those foreseeable in the next year, and is well situated to collect sufficient revenue to meet long term expenses. The board meets its financial responsibility, also sometimes referred to as fiduciary duty, by managing finances such that customers have confidence that their drinking water will be safe and reliable far into the future. Because the financial considerations vary somewhat depending on the time period, this chapter examines financial capacity in terms of the various time periods that need to be considered:

*Short term* (the next year): annual budgeting and tracking of revenues and expenses, importance of comparisons between actual expenses and budget estimates, and balancing revenues and expenses

*Medium term* (the next 5 to 10 years): equipment repair and replacement schedules and maintaining reserves to meet those needs

*Long term* (more than 10 years): long-term needs for expansion and replacement

FINANCIAL CAPACITY

**Adequate revenues**

**Credit worthiness**

**Fiscal management and controls**



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**Randall Oliver**
City Administrator, City of Cheney
*"Financial Management Principles"*

FC-1

of major facilities and capital equipment and planning for the financial resources necessary to allow the water utility to meet its customers' needs well into the future

## OPERATING AS AN ENTERPRISE FUND

Ideally, water utilities should be operated as stand-alone enterprises with a dedicated enterprise fund. This type of accounting provides information about rates, revenues and expenses to the board to enable it to make appropriate decisions. Enterprise funds allow the board to determine the true cost of providing water service and allow it to run the water utility more effectively and efficiently. The enterprise fund helps ensure revenues generated by the water utility are used solely for water-related projects and activities. Despite these advantages, a number of cities commingle funds from all city activities, including water, into a single account. This accounting may be done for a variety of reasons, including a desire for an improved city bond rating or difficulties in maintaining separate accounts. With commingled funds, it is much more difficult to establish water rates accurately reflecting true costs, meaning water rates may become somewhat arbitrary and difficult to justify. Whenever possible, it is recommended that the board have an enterprise fund for drinking water.

Even with an enterprise fund, there may be times that city officials and/or the board believe some transfers between the drinking water fund and other city funds are in the best interest of both the city and the water utility. Transfers may be made from the utility fund to the general fund to pay for services rendered by other city departments. These expenses might include salaries for the city manager or city clerk, engineering reviews, road repair following a water main break or maintenance of spare parts inventories at a city yard. In such cases, a systematic and proportionate allocation of these expenses is justified. Another basis for transfers from the utility fund to the general fund would be a franchise fee, similar to those paid by cable, telephone, gas and electric companies for the use of the public rights-of-way. If franchise fees are expected, the transfers should be more or less equal to the franchise fees paid by others. Some larger utilities include a portion of these fees as a separate line item in their rates.

Although there is a reasonable basis for some transfers from the water fund to the general fund, it is not recommended to simply transfer a set percentage of the fund, as this practice will tend to create a misstatement of net income. Similarly, it is not good business practice to simply transfer the net income from the water utility to the general fund. The utility's net income should be kept in reserve for debt service, emergencies, repairs and replacements and capital improvements. If these reserves are building up beyond the system's actual needs (an unlikely event) then a rate review may be needed.

It is a good idea for the board to periodically review the revenue transfer policies, procedures and practices to determine if they are reasonable. Based on the results of the review, the board may wish to revise its practice of revenue transfer from the water utility. However, consideration must be given to the short-term consequences that may occur in other city services if the revenue transfers are abruptly halted. In the case of severe hardship elsewhere in the city, transfers may be reduced slowly over time.

It is also possible for cities to make transfers from general funds to the water enterprise fund. This type of transfer may be done to allocate a portion of sales tax revenue for water utility improvements. Note, however, that the levying and use of additional sales tax revenues requires voter approval. All



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transfers out of the general fund to the water fund should have a documented and reasonable basis. Transfers may occasionally be made at year end to "cover" a loss in the water utility fund, especially if some unusual condition occurred, like a natural disaster or unusual weather pattern. An infrequent occurrence of this type might best be regarded as a loan to be repaid in the following year(s). If the need for such transfers occurs on a regular basis, however, it should be regarded as a very strong indication that rates are too low for sustained utility operations.

**John Sweet**
City Administrator, City of Lyons
*"Budget Planning"*

FC-2

## THE MECHANICS OF WATER UTILITY FINANCE

### Short Term Considerations: Current Revenues and Costs

#### *The Operating Budget*

Most water systems in the State of Kansas are required to have a formal budget, which is the process of forecasting revenues and expenses for the coming year. Budgets also help water utilities plan for appropriate levels of spending on their highest priority needs. Whether required or not, a budget should be approved and formally adopted by the board as it is a crucial element in the effective management of water system finances. Budgeting, as well as regular reporting from staff regarding whether expenses match budget forecasts, helps the board maintain adequate control of finances.

Budgets can be developed based on the previous years' expenses and revenues or built from scratch based on an agreed upon level of service. The budget process will include any data or other information relevant to understanding the amount of money needed for next year's operations, as well as information regarding where that revenue will come from. When formulating the operating budget, it is helpful to look back at the annual expenses for the last several years to determine trends and averages, especially if there have been major system changes or unusual weather patterns, such as drought or excessive rainfall.

Budgeting is a powerful process providing the board greater knowledge and control of the water utility. While the budget provides answers to key questions, such as how much money will be needed during the next year and how the utility will get that money, it also addresses medium- and long-term events, including repairs and replacements, large capital improvements and the impact of existing and proposed regulations. These anticipated costs need to be included in the budget every year so the utility can, in effect, "save up" for future needs through reserve accounts (discussed later in this chapter).

#### *Developing the Budget*

Only in very small utilities are board members likely to be involved in developing the draft budget. Typically, this process is undertaken by water utility staff. Depending on the system size, a utility manager may develop the budget or the accounting staff may develop the budget with input from the operations staff. In any case, it is important for board members to have a basic understanding of the budgeting process in order to evaluate the draft budget prior to review and approval.

An operating budget is the utility's plan for generating revenue and then spending that money for the daily operations of the system over the coming year. It is a detailed listing of all projected revenue and expenses. In order to be able to compare budgeted amounts with actual expenditures, it is important that the budget contain all the same categories as the system of accounts contained in the financial reports. If there is not currently a system in place that records revenue and expenses and is able to total them into



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meaningful categories (e.g. operations payroll, administrative payroll, supplies, repairs, utilities, etc.), the utility should work towards establishing one as soon as possible. There are numerous bookkeeping and accounting systems and software packages on the market that are inexpensive and easy to use. The board should choose a software package that best fits the needs of the individual system; a system with a million users will have quite different requirements from one serving 1500 customers. Given all the options available, it is not necessary to hire expensive consultants to create a unique system. It might be helpful to talk to other utilities of similar size regarding the program they use or to consult with assistance providers (e.g., Kansas Rural Water Association). The chosen bookkeeping and accounting system should:

- Be affordable
- Be consistent with the technical abilities of the staff
- Allow financial staff to specify meaningful categories to track expenses
- Enable a comparison between budgeted amounts and actual expenditures

The process of developing next year's budget starts with last year's financial records which show the amount of money spent and how it was spent. It is helpful to have a comparison of last year's budget to last year's actual expenses, as this information reveals categories that need closer scrutiny as well as possible adjustment in the coming year. The needed information should be contained in the end-of-year financial statements. However, even if the system does not have a budget or financial reports from the previous year, a meaningful budget can still be created, using records of expenses from last year. Utilities need to remember that Kansas municipalities must certify their budget by August 25th, so the process must be started well in advance of this date to allow plenty of time to analyze different strategies and complete the budget process for final adoption.

Computer spreadsheets have made the budgeting process powerful and easy. Spreadsheets make it easy to see how changes in rate structure, salaries, customer changes, commodity costs and other factors will impact operations.

## BUDGET CONSIDERATIONS

**Past annual expenses from financial records**

**Current debt and debt repayment terms**

**Past annual revenues from financial records such as customer billings, collection of fees, penalties, etc. and other revenue sources**

**Number of water users, divided into existing billing classifications (e.g., residential, commercial, industrial)**

**Amount of water produced and/or purchased**

**Amount of water sold**

**The rate structure in place**

**Reserve accounts (e.g. debt service, repairs and replacements, capital improvements, emergencies)**

Revenues

Revenues consist of all the money taken in by the utility, including payments for water used, base fees, hookup fees, late fees, interest and bulk water sales. Loan proceeds are not considered revenue. In projecting revenues for budgeting purposes, it is important to consider how many users the utility has, how much water they use and whether the number of users or their usage is forecast to increase. Any data available from past years regarding water usage across rate categories (assuming the utility charges for water based on metered water usage) is very helpful in the process of forecasting revenues. The budgeting process should also consider the total volume of water produced or purchased last year, the volume of water sold and information about water losses or other non-revenue water.

It is important to be cautious about predicting revenue growth for the coming year. The ability to sell more water, and thus increase revenue, must



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## FACTORS TO CONSIDER WHEN FORECASTING REVENUES:

**Anticipated changes due to fluctuations in number of customers (up or down)**

**Long-range weather forecasts**

**Rate changes**

**Demographics of current or anticipated customers**

**Types of customers (large commercial users vs. typical household users)**

**Limitations on water sources**

be tempered with information regarding maximum water rights and production capacity. Consideration should also be given to expected rainfall during the coming year. Customers might use more water during a drought, thus increasing revenue (assuming the utility has the available water resources to meet that demand) or use less water if there is a significant increase in rainfall, decreasing revenues. Although revenues are going to be estimates based on the best available information, it is never appropriate to estimate revenue based on expected expenses.

Expenses

Last year's expenses provide the starting point for forecasting next year's expenses. An inflation factor can be applied to the expenses as an initial estimate for increases, but input from managers, administrators, operators and suppliers regarding actual or expected increases by category or item will provide a better prediction. Factors such as anticipated pay raises, training expenses, re-certification fees, increased staffing requirements, price increases for commodities, supplies and utilities and any unusual circumstances should also be considered in the forecast.

The budget must adjust for the differences between last year's budget and actual expenses. If last year's budget was inaccurate in some categories, this year's budget may need to adjust for that plus include any new expenses that are anticipated. While it is not unusual for actual expenses to differ from budgeted amounts, if the difference is large (15% or more) the board should probably ask for an explanation. It is important to know whether these differences were caused by unique or unusual events or if they were incorrectly budgeted in the first place. If there are many categories with large differences in budgeted versus actual expenses, it could be an indication of the lack of adequate fiscal management.

## FACTORS TO CONSIDER WHEN FORECASTING EXPENSES:

**Inflation**

**Compensation (wage raises or new employees)**

**Employee training requirements**

**Cost of purchased water (if the system purchases water, it is essential that the system negotiate next year's contract before completing the budget process)**

**Anticipated professional fees (architects, engineers, attorneys, accountants) and memberships**

**Insurance coverage changes**

**Interest costs**

**Debt payment initiation or increase**

**Routine repairs and maintenance, including any service contracts on plant and equipment**



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Balancing Revenues and Expenses

The last step in the budgeting process is balancing revenues and expenses. A "balanced budget" is one in which the anticipated yearly expenditures plus the amount set aside in reserve accounts matches the anticipated yearly revenues. As a public entity, a water utility does not make a profit, so in the final budget; revenues should equal expenses, including other projected uses of revenues. The term "other projected uses," generally refers to funding reserves for debt service, repairs and replacements and capital projects, as well as fund transfers. These items are not operating expenses, per se, but are important components of the budget for sustainability. Later sections of this chapter will discuss how to determine the amounts for reserve funds.

If there was a budget shortfall in the previous year (defined as an excess of expenses over revenues), it will need to be addressed in the coming year, if possible, by building the shortfall amount into the coming year's budget. If projections indicate revenues are unlikely to cover expenses again next year, the utility has three choices: cut expenses, raise rates or a combination of both. Cutting expenses is an ongoing process and worthwhile in its own right as long as it does not affect the safety of the water supply, the proper maintenance of equipment, the ability to hire certified operators or the ability to meet the water demands of the public. Rates will be discussed thoroughly in later sections of this chapter, but the most important consideration here is that raising rates will take time so it may not be possible to cover shortfalls immediately with rate increases. Rate increases need careful study, a public input period and board approval. Smaller systems may be able to conduct a rate study and implement new rates in a few months, but larger utilities may need a year or more to complete the process.

If the utility experienced a budget surplus (excess of revenues over expenses), that must also be addressed. A surplus does not automatically mean that rates should be lowered. Utilities can use the surplus revenues to increase the amounts set aside in reserve accounts, pay down existing debt or address unmet needs within the system (e.g. inadequate maintenance or the need to replace assets). While customers may like rate reductions, they will not like rate volatility, having rates lowered, then raised every time some contingency arises. It is better to operate conservatively and build reserves to take care of long-term needs. Furthermore, if

## THE IMPORTANCE OF DEPRICIATION EXPENSE

**Depreciation is a method for allocating the cost of an asset over time. It is based on an estimate of the useful life of the asset and accounts for the portion of that useful life that is "used up" every year. For example if the utility buys a piece of equipment that costs $100,000 and estimates that it will last 20 years, there will be a depreciation expense of $5,000 each year.**

**Not all assets should be depreciated. Two factors are considered in determining which assets are depreciated: life expectancy and cost. Assets that last less than a year would not be depreciated, and assets lasting only a few years (less than 5) would probably only be depreciated if they have a high cost. Similarly, low dollar value assets are generally not depreciated regardless of their useful life expectancy.**

**However, what constitutes "low value" varies by utility. It might be $2,500 for a small system or $25,000 for a larger one. Assets costing less than the set amount will typically be regarded as operating expenses in the year they are purchased, and those above the threshold will be depreciated. The practice of depreciating assets provides a "leveling" effect that presents a more realistic picture of annual revenues and expenses.**

**It is extremely important to include depreciation in the annual budgeting process. Even though it might not represent a cash expense for the coming year, it is a real cost to the system, because at some point the assets will need to be replaced. Including depreciation in each year's budget recovers the cost of expensive assets and provides for at least some of the cost of their replacement.**



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the utility has not been keeping up with asset maintenance and replacement, the “surplus” is not really a surplus; the money should go toward the unmet needs.

## The Final Budget

The following page provides an example of a simple budget for a very small system. It includes all the components discussed: revenues, operating expenses and provision for reserve accounts. It might be helpful to study this example to understand all the components of a budget. Please note that this is a made-up example; it does not represent a real system. Most adopted budgets, except those for very small utilities, will include subsidiary schedules that show the details of each category. The expense categories used in this example are meant as examples of those a system might use and are not meant to be definitive. The utility’s budget should use the categories that make sense for the specific needs of the system and should match exactly the categories that are used in the expense tracking system, to allow for comparison of budget amounts to actual expenditures. Most expense tracking software packages contain standard categories and will also allow the user to customize. Most also contain a provision for entering budget figures for comparison. Board members should be aware of the processes used to prepare the budget and should have access to the details of the information that goes into the budget. New board members should not hesitate to ask questions of the staff involved in the budgeting process so that they understand both the process and the final figures before approving the final budget. See the State of Kansas, Department of Administration, Division of Accounts and Reports’ Budgeting for Kansas Municipalities Manual (https://www.da.ks.gov/ar/muniserv/Complete%20manual.pdf) for more information about budgeting requirements in Kansas.


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| SAMPLE BUDGET FOR A SMALL UTILITY | | | |
|---|---|---|---|
| | **2014 Actual** | **2015 Estimated** | **2016 Proposed Budget** |
| **Operating Revenues** | | | |
| Water Sales | 475,000 | 492,000 | 495,000 |
| New Hookup Fees | 16,000 | 18,500 | 20,000 |
| Late Charges | 4,000 | 3,600 | 5,000 |
| Other | 1,200 | 1,500 | 2,000 |
| Miscellaneous | 0 | 0 | 1,500 |
| *Total Revenues* | *$496,200* | *$515,600* | *$523,500* |
| | | | |
| **Operating Expenses** | | | |
| Salaries and Wages-operations | 75,000 | 77,250 | 80,000 |
| Salaries and Wages—administrative | 31,000 | 32,960 | 34,000 |
| Payroll Taxes | 10,600 | 11,021 | 11,400 |
| Contract Services | 10,900 | 12,000 | 15,000 |
| Other Personnel Expense | 6,350 | 6,515 | 7,000 |
| Insurance—Plant and Equipment | 9,850 | 10,300 | 10,500 |
| Insurance—General | 2,400 | 3,708 | 3,800 |
| Chemicals | 9,600 | 12,154 | 12,000 |
| Supplies | 6,000 | 5,974 | 6,000 |
| Lab Fees | 8,600 | 9,270 | 9,300 |
| Utilities (power) | 31,700 | 33,990 | 34,000 |
| Utilities (other) | 5,500 | 5,845 | 6,000 |
| Office Supplies | 5,000 | 5,356 | 6,000 |
| Vehicle Expenses | 7,500 | 9,064 | 9,500 |
| Travel Expenses | 1,200 | 1,473 | 1,700 |
| Professional Fees (legal, accounting) | 1,800 | 1,854 | 2,900 |
| Repairs and Maintenance | 5,500 | 6,798 | 8,500 |
| Engineering | 1,000 | 1,236 | 2,200 |
| Training/Conferences | 2,000 | 1,957 | 2,200 |
| Dues | 1,000 | 1,030 | 1,000 |
| Fees | 6,000 | 6,695 | 7,000 |
| Leases | 8,000 | 8,000 | 8,000 |
| Debt Service—principle and interest | 35,000 | 35,000 | 35,000 |
| Depreciation | 140,000 | 140,000 | 140,000 |
| *Total Operating Expenses* | *$421,500* | *$439,810* | *$453,000* |
| **NET INCOME** | **$54,700** | **$75,790** | **$70,500** |



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| SAMPLE BUDGET FOR A SMALL UTILITY (CONT.) | | | |
|---|---|---|---|
| | **2014 Actual** | **2015 Estimated** | **2016 Proposed Budget** |
| **Income Available for Debt Service and Reserves** | | | |
| Net Income | 54,700 | 75,790 | 70,500 |
| Depreciation | 140,000 | 140,000 | 140,000 |
| *Total Available for Debt Service and Reserves* | *$194,700* | *$215,790* | *$210,500* |
| | | | |
| **Transfers to Reserves** | | | |
| Debt Service—Principle & Interest | 35,000 | 35,000 | 35,000 |
| Repairs and Replacements | 20,000 | 20,000 | 17,072 |
| Capital Improvement Fund | 62,500 | 62,500 | 83,750 |
| Operating/ Emergency Reserve | 77,200 | 98,290 | 74,678 |
| *Total Transfers to Reserves* | *$194,700* | *$215,790* | *$210,500* |

Reserve Accounts

Reserve accounts are set up to save money for specified future uses. The number of reserve accounts, as well as their purposes, will vary from system to system. At a minimum, utilities should have a reserve account for operating cash to allow the utility to pay its bills in times of low revenue and for emergencies to cover unexpected expenses. If the system has long-term debt, a debt service reserve is essential to assure lenders that the system will be able to meet its debt obligations. In fact, many lenders require a dedicated reserve for debt service. Rural Development, a program of the United States Department of Agriculture (USDA), which provides funding to small systems, requires a debt service reserve equal to the annual principal and interest payment. This is accumulated by setting aside an amount equal to 10% of the debt service over a ten-year period. Other common purposes for reserve accounts include short-term repair and replacement and long-term capital improvements.

Reserves should be maintained in separate accounts and should be tracked as part of normal accounting procedures. It is a good idea to review the accounts at least quarterly and the goals of the accounts annually, as well as whenever the board undertakes a rate analysis. The goals of the reserve accounts can be revised as necessary to meet the needs of the utility. The board should approve expenditures or transfers from the reserve accounts to make sure they are being used for the intended purpose. Although it is important to have healthy reserve accounts, it is equally important to remember that they exist to protect the utility in times of emergency or need and they are intended to be used only when necessary. For example, a utility that was in desperate need of a vehicle was trying to obtain grant funding to pay for it, even though they had a reserve account with sufficient funding to buy the truck. They were unable to receive outside funding and had to be convinced it was in the utility's best interest to spend the funds in the reserve account. The table below presents different types of reserve accounts that might be used by water utilities and the purpose of these reserves.

**Mike Gilliland**
Utilites Director, Osage City
*"Financial Reserves"*

FC-3



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| TYPES OF RESERVE ACCOUNTS | | | |
|---|---|---|---|
| **Reserve Account** | **Purpose** | **Reserve Goal** | **Reserve Minimum** |
| **Operating cash reserve** | Provide a cushion for day-to-day expenses | Three to six months' worth of operating and preventative maintenance expenses | Two months' worth of operating and preventative maintenance expenses |
| **Unscheduled/ reactive maintenance "Emergency" reserve** | Provide funds for unforeseen repairs or replacement | Average expenditure for the past five years' unscheduled/reactive repairs<br>PLUS an additional ten percent (10%) of that figure<br>PLUS the current cost of the most expensive capital item that is not in the spare parts inventory | An amount equal to the most recent typical years' expenditure for unscheduled/reactive repairs<br>PLUS, the greater of 1) an additional five percent (5%) of that figure<br>OR 2) the current cost of the most expensive capital item not included in the spare parts inventory |
| **Planned repair/ replacement reserve** | Purchase, repair or rehabilitate items with typically a one- to ten-year life span | The amount will be guided by the future asset repair and replacement costs predicted as part of the asset management program or the repair and replacement schedule | If you do not have an asset management program or repair and replacement schedule, reserve an amount equal to five percent (5%) of total system replacement cost<br>OR reserve an amount equal to three months of operating expenses |
| **Planned capital improvements reserve** | Construct or upgrade facilities in response to growth or change, including new regulations; Minimize debt accumulation; Provide matching or leveraging funds to help get grants or loans;<br>Pay for pre-construction costs such as planning, environmental assessments or preliminary engineering reports | The amount will be guided by the future capital improvement costs that have been predicted as part of the asset management program or capital improvement plan | Ten to thirty percent (10% - 30%) of the future cost of anticipated capital projects |
| **Debt service reserve** | Ensure funds are available to meet debt repayment terms | Minimum debt service reserve or debt coverage ratio will likely be specified by a loan or bond agency | Level required by debt covenants or funding agency |



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Matthew Robey

## Medium Term Considerations: Repair and Replacement Schedule

One of the realities of operating a water utility is that some assets will fail unexpectedly and eventually all of the assets that make up the system will need to be repaired and/or replaced. The best way to handle this situation is to predict, to the extent possible, when the repairs and replacements are going to occur and prepare for them. Asset Management, described in Chapter 2, can help utilities with this process.

A repair and replacement schedule is a list of planned repairs and replacements that cover the next five to twenty years. How soon assets will need to be replaced will depend on many factors, one of which is whether the utility has a good routine and preventative maintenance program. Assets that are not properly maintained will wear out more quickly and will need more frequent replacement. The repair and replacement program focuses on shorter-lived assets and those that will not be part of a larger capital project funded with outside sources (e.g., state or federal loans).

The key with a repair and replacement schedule is to estimate when an asset is going to need to be replaced in order to save enough money over time to pay for the replacement. For example, if a pump is expected to last 10 years and cost $10,000, the utility would need to set aside $1,000 per year in the reserve account to pay for the pump at the end of the 10 year period. This reserve account is not intended to anticipate emergencies (that is the emergency reserve), but rather to build a reserve to take care of repairs and replacements that are predictable.

The repair and replacement schedule does not dictate when to replace assets. Rather, it is a planning document that serves as a guide for determining how much money should be set aside. Ultimately, some assets may last longer than anticipated, others may fail before the predicted date and others may be replaced early because the consequence of the failure is too risky for the utility. Because there is no way to predict with absolute certainty when a given asset will fail, the utility will need to rely on its best judgment and information from manufacturers, past experience, other utilities, as well as actual operating conditions, such as water quality, weather conditions, soil type, etc. to make its best estimate of an asset's useful life. If the utility finds that it is not setting aside enough money for the quantity of repairs and replacements required, it should consider increasing the amount of money set aside.

Depending on the size, age and complexity of the system, the repair and replacement schedule could be quite short or very long. The schedule may contain anywhere from 5 to 20 years of projects, depending on how far into the future the utility wishes to plan. Longer planning horizons are preferable as they provide more information to the board regarding upcoming expenditures.

The following page shows a partial sample repair and replacement schedule. This is a very simple example that is designed to point out several features of this type of schedule:

- Even though there may be years when the system will not have any scheduled repairs or replacements, it is a good idea to "level" the schedule as much as possible –spread the expenses equally across the years – to make budgeting and rate setting easier.
- Cost estimates can be obtained from suppliers, previous purchases or other similar utilities, but an inflation factor should be built in to cover future years.
- The repair and replacement schedule should be considered dynamic – a work in progress that is revised at least every year or two or as new information becomes available.



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| REPAIR AND REPLACEMENT SCHEDULE EXAMPLE | | | | | | |
|---|---|---|---|---|---|---|
| **Year** | **Item** | **Brief Description** | **Estimated Cost** | **Method of Estimation** | **One Time or Recurring** | **Time Period of Recurrence** |
| **2017** | Chlorine Pump | Replace chlorine pump | $2,000 | Based on previous purchase | Recurring | Every 5 years based on past experience |
| **2018** | Replace Well #1 | Drill a new well to replace well #1 | $15,000 | Driller's estimate | One Time | |
| **2019** | | | | | | |
| **2020** | Meters | Replace 1/5 of meters | $10,000 | Knowledge of meter costs from previous purchases | Recurring | Every 5 years |
| **2021** | | | | | | |
| **2022** | Chlorine Pump | Replace chlorine pump | $2,040 | Based on previous purchase | Recurring | Every 5 years based on past experience |
| | Tank #1 Repair | Re-paint tank #1(tank cleaning and inspection should be noted on O&M schedule) | $10,000 | Cost for neighboring system with similar tank | Recurring | Every 10 years |
| **2023** | | | | | | |
| **2024** | | | | | | |
| **2025** | Meters | Replace 1/5 of meters | $10,200 | Knowledge of meter costs from previous purchases (increased by 2% inflation) | Recurring | Every 5 years |
| **2026** | | | | | | |
| **2027** | Chlorine Pump | Replace chlorine pump | $2,080 | Based on previous purchase | Recurring | Every 5 years based on past experience |
| **2028** | Tank #2 Repair | Re-paint tank #2(tank cleaning and inspection should be noted on O&M schedule) | $12,000 | Cost for tank #1 increased by 20% for larger tank | Recurring | Every 10 years |
| **2029** | | | | | | |
| **2030** | Meters | Replace 1/5 of meters | $10,405 | Knowledge of meter costs from previous purchases (increased by 2% inflation) | Recurring | Every 5 years |



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The Repair and Replacement Schedule needs to be part of the current budgeting process, so a supplemental schedule showing the amount of reserves needed each year is extremely helpful. The table here presents an example of a supplemental schedule.

The examples presented here are necessarily simplified. In the utility's actual schedule, there are several things to note:

- The schedule will not "end" and costs are unlikely to decrease over time. Schedules should be reviewed and updated periodically (annually or bi-annually), so that the schedules are constantly "rolling" forward. Costs will likely increase over time as assets age and deteriorate.
- Items that appear at the beginning of the schedule (e.g., the chlorine pump replacement in 2017 in the example above) will have to be funded rather quickly. Therefore, it is helpful to project out as far as possible so that the utility has time to make the annual investments into the repair and replacement reserve to pay for major expenditures.
- The accumulation of funds to pay for any given item should be complete the year before the scheduled repair or replacement. In the example above, the funding for the 2030 meter replacement ends in 2029.
- There are a number of assets that may appear on the schedule perpetually, such as pumps, meters and tanks.

**REPAIR AND REPLACEMENT RESERVE FUND NEEDS PER YEAR**

| Year | Project | Amount Needed to be Added to Reserves This Year |
|---|---|---|
| 2016 | Replace Chorine Pump 2017 | 2,000 |
| | Replace Well #1 2018 | 7,500 |
| | Meter Replacement 2020 | 2,500 |
| | Chlorine Pump 2022 | 339 |
| | Tank Repair 2022 | 1,667 |
| | Meter Replacement 2025 | 1,133 |
| | Chlorine Pump 2027 | 190 |
| | Tank Repair 2028 | 1,000 |
| | Meter Replacement 2030 | 743 |
| | *Total for R&R Reserve 2016* | *$17,072* |
| | | |
| 2017 | Replace Well #1 2018 | 7,500 |
| | Meter Replacement 2020 | 2,500 |
| | Chlorine Pump 2022 | 339 |
| | Tank Repair 2022 | 1,667 |
| | Meter Replacement 2025 | 1,133 |
| | Chlorine Pump 2027 | 190 |
| | Tank Repair 2028 | 1,000 |
| | Meter Replacement 2030 | 743 |
| | *Yearly R&R Reserve 2017* | *$15,072* |
| | | |
| 2018 to 2019 | Meter Replacement 2020 | 2,500 |
| | Chlorine Pump 2022 | 339 |
| | Tank Repair 2022 | 1,667 |
| | Meter Replacement 2025 | 1,133 |
| | Chlorine Pump 2027 | 190 |
| | Tank Repair 2028 | 1,000 |
| | Meter Replacement 2030 | 743 |
| | *Yearly R&R Reserve 2018-2019* | *$ 7,572* |
| | | |
| 2020 to 2021 | Chlorine Pump 2022 | 339 |
| | Tank Repair 2022 | 1,667 |
| | Meter Replacement 2025 | 1,133 |
| | Chlorine Pump 2027 | 190 |
| | Tank Repair 2028 | 1,000 |
| | Meter Replacement 2030 | 743 |
| | *Yearly R&R Reserve 2022-2021* | *$5,072* |

* *Table continued on page 78*



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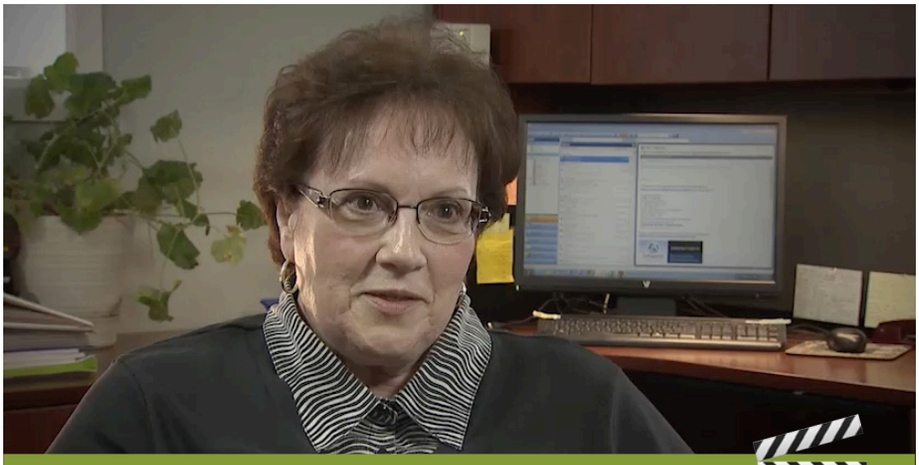
| REPAIR AND REPLACEMENT RESERVE FUND NEEDS PER YEAR | | |
|---|---|---|
| **Year** | **Project** | **Amount Needed to be Added to Reserves This Year** |
| **2022-2024** | Meter Replacement 2025 | 1,133 |
| | Chlorine Pump 2027 | 190 |
| | Tank Repair 2028 | 1,000 |
| | Meter Replacement 2030 | 743 |
| | *Yearly R&R Reserve 2022-2024* | *$3,066* |
| | | |
| **2025-2026** | Chlorine Pump 2027 | 190 |
| | Tank Repair 2028 | 1,000 |
| | Meter Replacement 2030 | 743 |
| | *Yearly R&R Reserve 2025-2026* | *$1,933* |
| | | |
| **2027** | Tank Repair 2028 | 1,000 |
| | Meter Replacement 2030 | 743 |
| | *Yearly R&R Reserve 2027* | *$1,743* |
| | | |
| **2028-2029** | Meter Replacement 2030 | 743 |
| | *Yearly R&R Reserve 2028-2029* | *$743* |

## Long Term Considerations: Capital Improvement Plan (CIP)

A Capital Improvement Plan (CIP) specifies which large-scale projects the water utility will need, when the system anticipates needing these projects and how much they are expected to cost. Some of these projects will be funded entirely by the utility with reserve funds and others will require the utility to seek outside funding (most likely in the form of low interest loans or bonds). The capital improvement schedule will become a document that "feeds" the annual budget so that the system accumulates reserves to cover expenses not covered by outside funding sources.



**Patty Schlesener**
Manager, Dickonson Co. RWD2
*"Capital Improvement Planning"*

FC-4

As described above, some assets will be replaced with the repair and replacement reserves while others will be replaced using the capital improvements process. There is no specific cut-off that defines projects as either repair and replacement or capital expenditures. Whether to place an item on the repair and replacement schedule or the capital improvement schedule is system specific and very dependent on system size. A small utility may place a $20,000 pump on its CIP, as this would be a large expenditure for them, while a large utility will consider this same expense to be repair and replacement. It is important for each system to have a minimum dollar figure for placing items on the CIP and the board



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## OFTEN OVERLOOKED CIP ITEMS

**While the major focus of the CIP is assets related to the production, treatment and delivery of water, there are ancillary assets that are also important to the utility and need to be considered. These assets include: vehicles (both operational and heavy equipment), mobile equipment, computers, Supervisory Control and Data Acquisition equipment and testing and monitoring instruments. It is important to account for these items in either the CIP or the repair and replacement schedule.**

## THE IMPORTANCE OF THE CIP

**Planning for replacement, rehabilitation or repair of major equipment and facilities**

**Planning for new equipment and facilities**

**Identifying capital projects several years in advance of their actual need**

**Consideration of less costly alternatives**

**Planning the optimal timing of capital projects**

**Estimating the point in time when the window for repair and rebuild has passed**

**Providing timely application for grants, loans and permits**

**Providing decision-makers information upon which to base decisions affecting revenues, expenditures, debts and customer rates**

should set this policy based on input from both financial and operations staff.

Projects on the CIP should be consistent with the utility's vision for the future and with any planning documents that have been adopted by the board. Because it is not always possible to fund every project on the CIP list, it is necessary to set project priorities. Priority may be based on:

- Criticality of the asset(s)
- Importance of the project
- Benefits to the system and customers
- Cost and available funding
- Regulatory requirements including enforcement orders

## FACTORS TO CONSIDER FOR THE CIP

**Enforcement actions against the water utility**

**Water quality violations and any future/upcoming regulations**

**The need for system expansion: how is the community changing and how quickly?**

**Age and condition of current facilities**

**System optimization and efficiency: adjusting to minimize or eliminate the need for new infrastructure**

**Potential improvement in water quality or customer service**

**Whether or not the utility meets level of service goals (see Asset Management in Chapter 2)**

**Planned replacements based on the Asset Management Plan**



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Each project added to the CIP should receive careful consideration. A CIP project evaluation sheet can be used for this purpose. This sheet includes information regarding the need for the project, alternatives considered, project costs and several other factors. This information will be helpful if funding changes or other obstacles are encountered that require the utility to reevaluate a project and examine other alternatives. A sample Project Evaluation Worksheet is included in Appendix C.

An example of a Capital Improvement Plan is presented on the following page. This is a sample CIP that summarizes some of the important considerations of several possible water system projects. For simplicity's sake, it does not include all of the information that is considered in the project evaluation process, but many systems might want to construct a similar table summarizing all the elements considered.

As with the repair and replacement schedule, the CIP needs to be part of the current budgeting process. A supplemental schedule showing the amount of money needed each year is extremely helpful. The table on the next page presents an example of a supplemental schedule for the CIP.

As is the case with the repair and replacement schedule, only a few items are presented here, making it look as if the schedules "end," or that costs become less over time. However, the schedules are constantly "rolling" forward with new projects being added during the annual review. Actual annual costs would probably remain fairly constant or increase over time as the assets age.

## ELEMENTS TO INCLUDE IN A CIP PROJECT EVALUATION

**Description of the project**

**Brief statement regarding the need for the project**

**Year the project is needed and whether the date is flexible**

**Benefits as a result of the project**

**Risk of not doing the project**

**Existing asset condition (if replacement)**

**Estimated useful life of the existing asset**

**Probability of failure**

**Consequence of failure**

**Current O&M cost of existing asset (if replacement)**

**Estimate of the project cost, including related costs such as land acquisition, design services, permits, disposal of discarded assets, etc. (for no less than the first five years of the CIP)**

**Potential or available funding source(s) for the project**

**Documentation of the source or method used for cost estimation**

**Changes in overall operations or maintenance cost that may occur as a result of the project (e.g., operator requirements, additional operation and maintenance costs, regulatory changes, efficiencies that may be gained, etc.)**

**Expected useful life of the asset**

**Options for increased O&M to be used to delay the need for the project**

**Consequence of not completing the project**

**Alternatives evaluated**

Long term capital planning not only provides information regarding the needed funds for projects, but provides adequate time to investigate available funding sources, choose the most appropriate one and complete all application requirements.



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| CAPITAL IMPROVEMENT PLAN EXAMPLE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Year** | **Project Name** | **Description** | **Project Need** | **Date Flexible (Y or N)** | **Estimate of Cost** | **Method of Estimation** | **Potential Funding Source** | **Changes in Operation** | **Amount of Cost From Revenues** |
| **2017** | Arsenic Removal Facility | Add arsenic adsorption system with building and all needed equipment | Source water does not meet new regulatory requirements | No. Must meet date for new regulation | $300,000 | Engineer's estimate | Requesting legislative grant; SRF Loan | Higher level operator; replacement and disposal of media; higher O&M costs | None ($10,000 per year increased operating costs starting in 2019 |
| **2018** | 2nd St. Line Replacement | Replacement of 2nd St. line with new pipe | Line failures numerous, level of service not met | Yes, but needs to be replaced within 1-2 yrs. | $250,000 | Based on previous costs | 30% reserves; USDA RD loan/grant | None | $75,000 |
| | Main Line Replacement | Replacement of 4 miles of 80-yr-oldpipe due to condition assessment and estimated life | Needed to keep the system in good operating order | Yes | $1.5 million | Engineer's estimate | SRF Loan or RD loan/ grant | None | None |
| **2019** | None | | | | | | | | |
| **2020** | Replace Storage Tank 3 | Replace Storage Tank 3 with a new, larger tank | Reaching end of useful life; further rehab not feasible; size needs to be increased | Yes | $500,000 | Cost paid by several neighboring utilities for similar tank | 50% grant; 25% from revenues; 25% loan | May require some changes in pumping times for wells | $125,000 |
| **2021** | Elm St. Main Line Replacement | Replace Elm St. 6" main line with a PVC line to address degradation issues | The Elm St. main line is showing significant degradation with increased leak frequency | Yes, could be delayed up to 2 years | $150,000 | Previous main line replacement cost + 5% inflation | 50% CDBG; 50% from revenues | | $75,000 |





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| CIP RESERVE FUND NEEDS PER YEAR | | |
|---|---|---|
| **Year** | **Project** | **Amount Needed to be Added to Reserves This Year** |
| 2016-2017 | 2nd St. Line Replacement 2018 | 37,500* |
| | Replace Storage Tank 3 2020 | 31.250 |
| | Elm St. Line Replacement 2020 | 15,000 |
| | *Total for CIP Reserve 2016-2017* | *$83,750* |
| | | |
| 2018-2019 | Replace Storage Tank 3 2020 | 31,250 |
| | Elm St. Line Replacement 2021 | 15,000 |
| | *Total for CIP Reserve 2018-2020* | *$46,250* |
| | | |
| 2020 | Elm St. Line Replacement 2021 | 15,000 |
| | *Total for CIP Reserve 2021* | *$15,000* |
| * $75,000 needed by 2018 (from CIP example table); two years to obtain funding; $75,000 / 2 = $37,500 | | |

Long term planning also allows the utility to build additional operational expenses related to new capital projects into its regular budget. For example, the arsenic treatment facility in the CIP example includes an increase of $10,000 in the annual operation and maintenance budget. Often times, these recurring expenses are not thoroughly considered when CIP projects are being placed on the list. It is absolutely critical that the board thoroughly consider how it will pay for the on-going operation and maintenance before projects are built.

## UNDERSTANDING WATER UTILITY FINANCIAL STATEMENTS AND RATIOS

Board members are responsible not only for financial planning but for financial oversight of the utility. Effective financial oversight means not only monitoring and, if necessary, adjusting the current operating budget; it also means reviewing and understanding the financial statements provided by the accounting staff and auditors and making informed decisions based on the information these statements provide. The two main financial statements that should be reviewed on a regular basis are the Balance Sheet and the Income Statement. *(6, 7, 8, 60, 61)*

### FINANCIAL STATEMENT TO BE REVIEWED

***Balance Sheet:*** **A snapshot of the utility's financial position as of the date of the balance sheet that shows the utility's assets, liabilities and equity at a point in time**

***Income Statement:*** **A summary of revenues and expenses over a period of time that shows the results of operations**

### KEY FINANCIAL INDICATORS

***The liquidity ratio (or current ratio):*** **current assets divided by current liabilities**

***The leverage ratio (or debt ratio):*** **total liabilities divided by total assets**

***The operating ratio:*** **operating revenues divided by operating expenses**

***The debt service coverage ratio:*** **net operating income plus depreciation divided by total debt service**



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## Reading and Interpreting a Balance Sheet

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A balance sheet is a snapshot in time that shows the utility's financial position as of that date; it does not reveal how things are going this month or even this year or whether revenues are meeting expenses. It shows the assets, liabilities and equity (net worth) of the utility at a moment in time. It is called a "balance sheet" because the numbers must be in balance according to the basic accounting formula:

*Total Assets = Liabilities + Equity*

This could also be expressed as:

*Total Assets – Liabilities = Equity*

This last arrangement may be easier to understand. Equity is what is left when liabilities are subtracted from assets and is the net worth of the system. Although it may be helpful to think of the equation in this way, a balance sheet will always be arranged according to the first version of this basic relationship: assets = liabilities + equity.

### *Assets*

The first half of the balance sheet is a listing of the assets of the utility. Assets are the total economic resources of the utility and are listed in liquidity order, defined by how easy they are to convert to cash. Therefore, the first item listed is almost always cash and cash equivalents. Assets are typically broken down into the following categories.

- Current Assets: Current assets are items that can be converted into cash within one year of the date of the balance sheet. This category often includes sub-categories as listed below. Each of these sub-categories is included in aggregate under the heading "current assets" and then a total of all current assets is shown on the balance sheet.

- Cash and cash equivalents include money currently available in the bank and money market accounts that are available to meet current expenses. Cash equivalents include any security that has a maturity date of less than 90 days.

- Accounts receivable is money owed to the utility in the normal course of business. This might include water bills, connection fees and other items that would be found on the customers' water bills. Since the system has a reasonable expectation that the amounts owed will be paid and thus turned into cash within the next few months, they are an asset. Although these payments are not quite the same as cash, they are close. Sometimes accounts receivable are "discounted" for amounts that turn out to be uncollectible and one might see this on a balance sheet as "bad debt allowance" or "reserve for bad debt."

- Prepaid expenses are expenses paid in advance, such as an insurance premium paid on an annual basis. It may not be immediately obvious how a payment for an expense becomes an asset. The basic principle is that the system has paid for something that it has not yet received (e.g., insurance coverage over the next year). Thus it is considered similar to something owed to the utility.

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- Short-term investments include investments and security instruments with maturities of more than 90 days, but less than one year, from the date of the balance sheet. These might include certificates of deposit.

- Inventory includes the value of products that are available for use or sale within the next year. For a water utility, this could include uninstalled meters, pipe, and some types of equipment and replacement parts.

- Fixed Assets: The term "fixed assets" refers to the land, buildings, equipment, furniture and fixtures that is owned by a utility and that it uses in its day-to-day operations. Most accountants prefer to use the term "plant and equipment" or "property and equipment" because these terms better describe the types of assets included in this portion of the balance sheet. The term "capital assets" is also used to describe this category. These assets are typically aggregated on the balance sheet according to type (land, buildings, equipment, etc.). In addition, a line showing accumulated depreciation for each class of equipment or a total for the entire category is usually included.

- Depreciation is a method for allocating the cost of a fixed asset over time. It is based on an estimate of the useful lifespan of the asset. The depreciation amount allocated for each year is charged against that year's income and this amount is accumulated from year to year and shown on the balance sheet. As an example, suppose the utility buys a piece of equipment that costs $100,000 and estimates that it will last 20 years. If the system is depreciating based on the straight-line method (there are many others) there will be a charge to each year's expenses of $5,000 and the accumulation will be tracked in the accumulated depreciation account. Each year's charge represents the amount of that equipment that is, in essence, "used up" each year. All tangible property depreciates over time but land does not. Accumulated depreciation is usually separated on the balance sheet from the original cost so that readers of the balance sheet can see what was paid originally and how much of it has been "used up." The net value (original cost minus accumulated depreciation) of fixed assets is a reasonable estimate of the current value of the property. Some entities may choose to show only the current (or book) value of equipment – i.e., cost minus depreciation – instead of showing the depreciation. Either method is acceptable.

- Other Long Term Assets: Other long-term assets include those that cannot be converted into cash within one year of the date of the balance sheet, such as bonds and investments with maturity dates longer than one year. They are often aggregated on the balance sheet simply as "other assets."

The balance sheet will show a total for each of the asset categories (current assets, fixed assets and other long-term assets) and then a total for all assets. This represents the left half of the "balance" equation and this amount will be double underlined.

## FIXED ASSETS AND DEPRICATION

**Fixed assets are always recorded in the books at their original cost.**

**Depreciation is recorded in a separate related account known as a contra account, meaning simply that the balance of that account "goes against" the balance of the fixed asset account.**

**This accounting method makes it easy to see the investment that has been made in long-term assets, as well as how much of that cost has been expensed.**

**Showing the two accounts separately in the balance sheet gives a useful picture of how old the assets are, as well as their approximate current value.**



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### *Liabilities*

Liabilities are the amounts owed by your utility to others. This section of the balance sheet is divided into two components – current liabilities and long-term liabilities.

1. Current liabilities are amounts due within one year of the date of the balance sheet and are often broken down on the balance sheet into the following sub-categories:

- Accounts Payable: these are amounts the system owes for normal operations, usually to vendors and suppliers.

- Accrued Liabilities: like accounts payable, these are amounts owed to others. Accrued liabilities usually refer to items that are owed to employees (e.g., salaries and accrued but unused vacation and sick leave) or to taxing agencies that are not yet due. For a water utility, this category will also often include refundable security or meter deposits from customers. These are considered liabilities because they will have to be returned at some point in the future. However, current liabilities only include the portion of such obligations that would be due within the next year.

- Accrued Interest: the amount of interest that has accrued on loans or bonds but is not yet due. Suppose that the system pays annual interest on a loan. Even though the interest may not be due for several months, the obligation is still "building up" throughout the year. It is this "built up" obligation that is represented by the accrued interest category.

- Current portion of long-term debt: This category refers to the amount of principle that is due on long-term loans during the next year. This amount can be determined by referring to the loan amortization schedule that details when payments are due and divides the payment into principle and interest. The amounts due to principle in the next year would be included here and the interest amount is included as accrued interest.

2. Long-term liabilities are amounts owed that are not due within the next year. They might include the portion of installment loans or bond payments not due within the current year, as well as term loans or balloon payments with a due date more than one year from the date of the balance sheet.

### *Equity*

Equity is the net value of the utility as of the date of the balance sheet. Depending on the legal structure of a utility, this section might have various names, including fund balance, owner's equity or member's equity. It might even be called "net assets." A corporation would list equity as shareholder shares. The utility increases its equity each year it earns a net income (has more revenue than expenses) and decreases its equity each year it has a net loss (more expenses than revenue). Equity can also be increased by new investment (e.g., new memberships) or by the acquisition of assets not paid out of utility revenues, such as those purchased with grant funds. Because of these factors, it is important to understand that increased equity is not always an indication of improved financial condition. However, decreased equity is almost always an indication of a poorer financial condition, as it usually points to insufficient revenue.

Retained earnings is the current year net income to date. It is typically shown on the balance sheet throughout the year as a separate line in the equity section and then is taken into the owner's equity section when the books are closed at the end of the year. Thus, its total for the year represents an increase (or decrease if there is a loss) in the owners' stake in the utility. This makes sense if equity is thought of as the net worth left when liabilities are subtracted from assets.

The balance sheet will show a total of current liabilities, long-term liabilities and a total of all liabilities. It will also total different types of equity (if there is more than one). The last line of the balance sheet is a total of all liabilities and equity. This amount will be double underlined and must always equal exactly the amount of total assets on the first half of the balance sheet.

The following page shows a very simple balance sheet for a fictional water utility showing some of the more common components discussed here. Balance sheets for large utilities can get very long and complex, but a smaller utility's balance sheet may look similar to this one. If different terms are used from the ones presented here, ask the accounting staff or auditor to explain them. The important thing is to have a thorough understanding of the financial picture presented by the balance sheet.



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| XYZ WATER UTILITY<br>BALANCE SHEET<br>FOR THE YEAR ENDED DECEMBER 31, 2015 | |
|---|---|
| **ASSETS** | |
| Current Assets | |
| Cash and Cash Equivalents | 100,000 |
| Accounts Receivable | 18,000 |
| Certificates of Deposit | 265,000 |
| Inventory | 16,500 |
| Prepaid Expenses | 5,000 |
| Total Current Assets | $404,500 |
| | |
| Property and Equipment | |
| Land | 750,000 |
| Property, Plant and Equipment (at cost) | 950,000 |
| Vehicles | 150,000 |
| Less: Accumulated Depreciation | -500,000 |
| Total Fixed Assets | $1,350,000 |
| | |
| Other Long-Term Assets | |
| Certificates of Deposit (maturity > 1 year) | 45,500 |
| Total Other Assets | $45,500 |
| | |
| **TOTAL ASSETS** | **$1,800,000** |
| | |
| **LIABILITIES AND EQUITY** | |
| Current Liabilities | |
| Accounts Payable | 10,000 |
| Accrued Interest | 6,000 |
| Current Portion of Long-Term Debt | 50,000 |
| Taxes Payable | 3,500 |
| Meter Deposits | 3,500 |
| Other Accrued Liabilities | 2,000 |
| Total Current Liabilities | $75,000 |
| | |
| Long-Term Liabilities | |
| Loans payable | 225,000 |
| Total Non-current Liabilities | $225,000 |
| | |
| Equity | |
| Contributed Capital (memberships) | 1,000,000 |
| Retained Earnings | 500,000 |
| Total Equity | $1,500,000 |
| | |
| **TOTAL LIABILITIES AND EQUITY** | **$1,800,000** |



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### *Reviewing and Understanding the Balance Sheet*

End of year balance sheets are often shown with two columns, one for the year just ended and one for the previous year. This is known as a comparative balance sheet and it can be very informative. Once the board has reviewed the basic information on the current balance sheet (which indicates the utility's financial position) it is important to look carefully for any changes from the previous year to the current year. A water utility is a dynamic enterprise, so changes are expected. Board members should carefully examine any big changes, seeking to understand the nature of the change and whether any corrective active might be required to keep the utility running smoothly and in the black (i.e., revenues greater than expenses). Important questions to ask when reviewing the comparative balance sheet include:

- Did the value of fixed assets increase or decrease? Why? Perhaps new equipment was purchased or old equipment sold or otherwise disposed of. These are normal activities that are reflected in the balance sheet, but board members should be aware of their impact.

- Did accounts receivable increase or decrease? What is the reason for this? A sharp increase in accounts receivable could be the result of more customers being added or it could result from a breakdown in collections. A decrease in accounts receivable could result if customers leave the system or if water usage has decreased, perhaps due to conservation efforts or an extremely rainy year.

- Is inventory up or down? Increased inventory could be the result of a "gearing up" for new projects, but it could also result from over-ordering supplies or parts. Decreased inventory might reflect a big project that was recently completed, but insufficient inventory can also be a warning sign of decreased cash flow or inefficient management that could place reliable service at risk.

- Have liabilities increased or decreased? While an increase in long-term liabilities could result from a new loan, the value of fixed assets should have increased from this action as well. Decreases are most likely the result of loans being paid off. Increases in current liabilities might result from growth in operations or they could be a result of the utility not being up to date with its bills. Similarly a decrease

#### HOW MUCH INVENTORY IS ENOUGH? TOO MUCH?

**While a good spare parts inventory should be adequate for normal maintenance and for emergency repairs, there is such a thing as too much inventory that can tie up cash that might be needed for other uses. For instance, while it is a good idea to have one of every size of valve the system uses, having a large stock of extra meters is not a good idea (unless a major replacement program is coming up). The system does not want to be stuck with a lot of old meters when the decision is made to upgrade to a more advanced type. Likewise, there is a risk of being stuck with obsolete inventory as new projects are implemented and items are replaced with newer versions. This can be a particular problem with electrical items and those with moving parts.**

**It is also a good idea to share inventory information with neighboring utilities, as one system might need to borrow or lend equipment or supplies in a pinch. Neighboring utilities with similar equipment can also combine inventory for cost savings. A simple system can be set up for each utility to use items from the shared inventory, when needed, and to then replenish the stock.**

**Some utilities share inventory informally: if they use inventory from another utility, they replace like with like, rather than attempting to reimburse each other. Sometimes rare or expensive inventory (e.g., a large gate valve or sections of large pipe) is kept at the larger utility. Or sometimes each utility stocks what is most common in their system (e.g., system A stocks 12" pipe, clamps and valves, while system B stocks the 16"). This operation prevents excessive inventory and allows for reasonable repair times.**



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in current liabilities could mean the utility is meeting its obligations well, or it could indicate a contraction in sales.

## Reading and Interpreting an Income/Expense Statement

While the balance sheet is a snapshot of the utility's financial position on a given date, the income statement is a summary of operations over a period of time. The income statement shows the quantity of revenue earned and expenses incurred during a given period of time. The income statement can be thought of as a "scorecard" that recaps the financial activities of the utility. Just as a scorecard is cleared at the end of a game, the income statement starts over at the beginning of each fiscal year. The balance sheet, by contrast, continues forward each year, with net income (the final total from the income statement) for the year being recorded on the balance sheet in the equity section.

Sometimes called a statement of activities, the income statement is often presented to the board as a monthly report. Revenues and expenses are broken down into categories to give the reader an idea of how the revenue was generated and what the expenses are related to. The categories used on the income statement should match those in the budget and in the account tracking system.

Most financial packages allow the user to choose among several different types of income statements. Some types of statements will show the budget in one column, the actual results of activity in a second column and the percentage difference between the two in a third column. This comparison provides an awareness of how well expenditures match the planned budget expenditures and provides a sense of how well the budgeting process is actually working. Other types of income statements show the current monthly expenses, year-to-date totals and the current month's percentage of the year-to-date totals. This type of statement provides an overview of the accumulation of revenue and expenses throughout the year. Year-end income statements, like the example statement shown below, often show both this year's expenses and last year's to provide a comparison of revenues and expenses from year to year. Each of these types of reports provides slightly different information and each is useful. The type of report chosen depends on the needs of the financial staff and the board. The board may also want to see more than one type of income statement.

The income statement is composed of five basic sections:

1. Revenue: all of the money that comes into the utility as a result of its operations. Included in revenue are water sales, fees, service charges and late charges and any other customer-related income.

2. Operating expenses: all of the money paid out in the normal course of operations. These expenses include salaries, fringe benefits, parts and supplies, utility bills, insurance, professional fees and anything else that must be paid to keep the utility operating.

3. Net operating income (or loss): the remainder when total operating expenses are subtracted from total revenues. More revenue than expenses results in net operating income (positive number). More expenses than revenue results in a net operating loss (negative number). Net operating income is an important number to track as it reveals whether the utility is charging enough to cover the full cost of providing water service to its customers.

4. Other income and expenses: revenue and expenses that are not included as part of a utility's regular operations. This category might include interest income, interest expenses and gains or losses on sales of equipment. These types of expenses are not related to the day-to-day operations of the utility and are unusual expenses or income. It is important not to use this category as a "catch all," as this might obscure the true nature of the system's revenues and expenses.

5. Final net income (or loss): the combination of the net amount of the "other income and expenses" and the net operating income (or loss).

On the following page is a sample comparative income statement showing figures for the previous year along with the current year's revenues and expenses. When reading income statements, consider the following:

- Negative numbers are often shown in parentheses. Thus, the $5,000 shown for "sale of equipment" on the example above represents a loss. Likewise the $1,215 shown as the total non-operating income is a loss − i.e., an excess of expenses over income.



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| XYZ WATER UTILITY<br>STATEMENT OF REVENUE AND EXPENDITURES<br>FISCAL YEARS ENDED DECEMBER 31, 2014 AND DECEMBER 31, 2015 | | |
|---|---|---|
| | **2013** | **2014** |
| **Operating Revenues** | | |
| Water Sales | 250,000 | 263,000 |
| Connection Fees | 7,500 | 10,500 |
| Late Fees | 2,500 | 1,575 |
| *Total Operating Revenues* | *$265,000* | *$275,075* |
| | | |
| **Operating Expenses** | | |
| Administrative Expenses | | |
| Administrative Salaries | 30,000 | 45,000 |
| Office Supplies | 8,000 | 8,700 |
| Utilities | 3,000 | 3,300 |
| Payroll taxes | 3,000 | 4,500 |
| Insurance | 1,500 | 1,500 |
| Depreciation of Office Equipment | 4,500 | 4,500 |
| *Total Administrative Expenses* | *$50,000* | *$67,500* |
| | | |
| Plant Expenses | | |
| Operator Salaries | 40,000 | 60,000 |
| Repairs and Maintenance | 30,000 | 35,750 |
| Chemicals | 5,000 | 6,300 |
| Plant Supplies | 4,300 | 5,584 |
| Payroll Taxes | 6,700 | 8,000 |
| Machine Hire | 9,000 | 9,775 |
| Contract Labor | 12,000 | 9,500 |
| Vehicle Expenses | 5,325 | 6,695 |
| Depreciation of Plant Equipment | 40,750 | 40,750 |
| *Total Plant Expenses* | *$153,075* | *$182,354* |
| *Total Operating Expenses* | *$203,075* | *$249,854* |
| | | |
| *Net Operating Income (loss)* | *$61,925* | *$25,221* |
| | | |
| Other Income (Expenses) | | |
| Interest Income | 4,350 | 5,785 |
| Bulk Water Sale | 10,000 | 0 |
| Sale of Equipment | (5,000) | 0 |
| Interest Expense | | (7,000) |
| *Total Non-operating Income (Expense)* | *$9,350* | *($1,215)* |
| | | |
| **Total Net Income (Loss)** | **$71,275** | **$24,006** |



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- When the total of the "Other Income and Expenses" category is a negative number, representing a net loss, it is not generally a big concern for the utility because these expenses represent atypical, one-time events. The exception is if the number is very large and will cause the overall net income to be a loss.

- A negative value for net income represents a real loss in terms of utility operations and the board should take this result seriously and investigate the cause. If this is an isolated occurrence, the actions may be less drastic, perhaps transferring money from the operating reserves to cover the loss. If this is a routine or frequent occurrence, particularly if it occurs several years in a row, the board should be prepared to take significant action to address the issue that may include raising rates, adding or increasing fees, changing rate structures or reducing expenses.

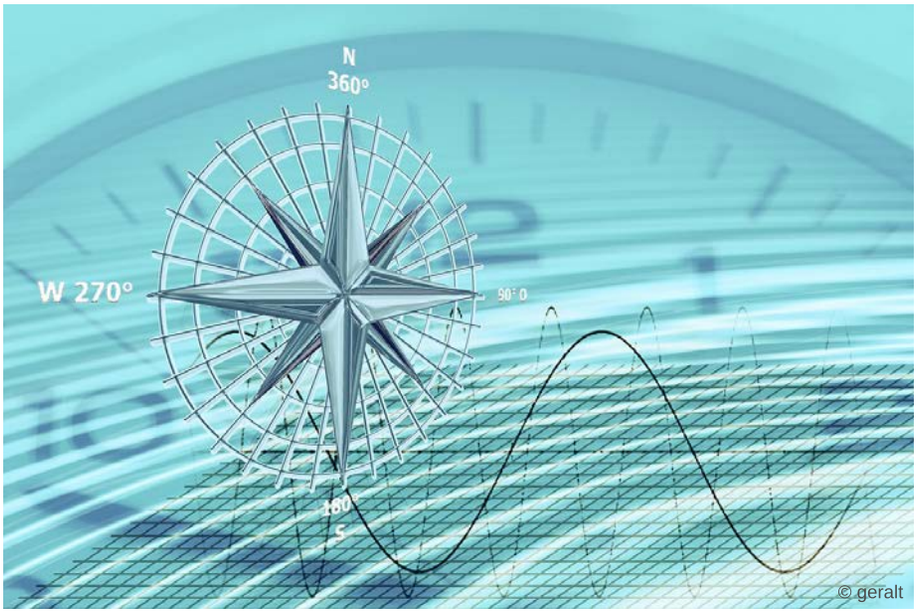
- Changes in the income statement from one year to the next should be reviewed to see if there is a logical explanation as to why the change occurred. For example, in the sample income statement above, revenues increased slightly, but operating expenses increased a lot. Possible explanations on the expense side could include: increased salaries or benefits for staff, a much-needed second operator was finally hired, or energy costs increased significantly. Alternatively, it is possible that the utility had unusually high revenue in 2013 due to a one-time event and the revenue is just returning to normal. For example, the system could have sold bulk water to a neighboring facility whose well went dry and those sales added income for a one year period. Then in 2014, the utility that purchased the water was able to put in a new well and is no longer purchasing bulk water. The main point is to understand why the changes occur from one year to the next and to determine whether the reasons for the change are of concern to the utility.

- It is vitally important to understand the values on the income statement. If the numbers do not make sense or it is unclear what the results are saying, it is important to ask questions of managers and employees (bookkeeper, accountant, operators, etc.) until a clearer financial picture emerges.

## Understanding Financial Indicators

There are a few common ratios that help assess a utility's overall financial health. Two of these can be easily calculated from the information contained on the balance sheet. These are the liquidity ratio and the leverage ratio. The third (the operating ratio) can be calculated from the income statement and the fourth (the debt service coverage ratio) uses both the balance sheet and the income statement.

The table on the following page provides an explanation of the various financial ratios, how to calculate them and what they mean for the utility.



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| FINANCIAL RATIOS | | | | |
|---|---|---|---|---|
| **Financial Ratio** | **What the Ratio Measures** | **Method of Calculation** | **Meaning of the Ratio** | **Example Calculation[1]** |
| Liquidity Ratio | Ability to pay current liabilities | Current assets divided by current liabilities | Lesss than 1.25: Cause for concern<br><br>Less than 1: A major cash liquidity problem | Liquidity Ratio = $404,500/$75,000 = 5.39<br><br>*This utility is doing well.* |
| Leverage Ratio (or Debt Ratio) | How much a utility relies on debt | Total liabilities divided by total assets | 0.5 or less: Ideal | Leverage Ratio = $300,000/ $1,800,000 = 0.17<br><br>*Utility is in good shape* |
| Operating Ratio | The utility's profitability or stability | Operating revenues divided by operating expenses | Less than 1: Financial distress<br><br>1.25 to 1.5: Required by many lenders | Operating Ratio in 2013 = $265,000/ $203,075 = 1.3<br>Operating Ratio in 2014 = $275,075/ $249,854 = 1.1<br><br>*Possibly a concern due to downward trend* |
| Debt Service Coverage Ratio | The utility's ability to pay its debt | Net operating income plus current depreciation divided by total debt service | 1: Just enough revenue to cover debt<br><br>1.15 or greater: Required by many lenders | Debt Service Coverage Ratio = $70,471/ $57,000 = 1.24<br><br>*May be sufficient for some lenders, but not others (see box on following page for more detailed debt service calculation)* |

[1]Calculations based on the sample balance sheets and income statements provided above



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| EXAMPLE DEBT SERVICE COVERAGE RATIO | |
|---|---|
| 2014 net operating income (from Income Statement) | $25,221 |
| Total depreciation (from Income Statement) | $45,250 |
| | $70,471 |
| Current interest expense (from Income Statement) | $ 7,000 |
| Current portion of long-term debt (from Balance Sheet) | $50,000 |
| | $57,000 |

Debt service coverage ratio: $70,471 ÷ $57,000 = 1.24

Note: Depreciation is added back into income because it does not represent actual cash flow out of the utility and therefore does not impact the utility's ability to meet its debt service requirements.

## FINANCIAL CONTROLS

One indicator of good financial capacity is the establishment and adherence to sound internal financial controls. Internal controls are defined as systems, policies, procedures and practices used to detect or prevent errors of commission and omission. Internal controls should be designed to protect assets, streamline operations and promote adherence to policies, laws, rules and regulations. Many adverse audit findings are due to a lack of adequate internal controls or lack of adherence to established controls. Since a utility's audit report is often used by lending and bond rating agencies as an indication of sound management, it is important that adequate internal controls be written into the utility's policies and that the board and utility management ensure that they are followed. Even boards of very small utilities should establish control policies and adhere to them.

A solid internal financial control environment is an outgrowth of the attitude and integrity of the board. When board members and senior management set an example of high ethical conduct, employees follow their lead. When boards establish well-defined and written procedures for handling everyday transactions, employees find it easy to understand their roles and responsibilities.

Most utilities currently operate with an internal financial control system already in place, which may or may not be adequate. The best place for the board to start is to examine its internal control policies and procedures to determine what is working well and what is problematic. During this review, the suggestions and concerns of employees should be solicited and considered. The review should also consider whether or not the control system meets all applicable rules and regulations and whether the control system measures meet the goals of the board. If the board decides new measures should be put in place, because existing measures are inadequate, outdated or do not meet the board's goals, it should consider both the costs of the measures they would like to implement and the benefits they would provide.

In all cases, the financial control procedures should be easy to follow and the board should include compliance with the control measures as one part of the annual employee reviews. Additionally, the board should conduct periodic reviews of the utility's financial control system. *(53, 57, 58, 63)*

### Designing an Internal Control System

It is often the case that a utility may need different financial controls for different levels of the same type of transaction. For example, high dollar transactions are inherently more risky and should be subject to more stringent controls. Because there is always a possibility of human error, a good internal control system may need redundant and/or compensating controls. It is not possible to eliminate all errors and determined thieves can find ways of circumventing controls, but well-designed and enforced internal controls will minimize the probability of both.

Complex utilities typically need complex internal control systems while smaller systems can function quite well with only a few simple controls. Listed below are basic principles to consider in designing an internal control program:

- Segregate the duties of authorization, custody and record keeping to prevent fraud or error caused by one person having control of the entire process.



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- Authorize transactions at the supervisory or board level (depending on system size).
- Retain records to document transactions.
- Supervise or review operations.
- Protect property using physical controls, such as cameras, locks and physical barriers such as fences.
- Secure electronic data using passwords with required periodic password changes.
- Periodically review access logs and restrict system access to personnel appropriate for the given task.

Internal controls are especially necessary for a few particular areas that tend to be more vulnerable to error or fraud:

- Cash receipts
- Check receipts
- Writing checks
- Purchasing and accounts payable
- Credit cards
- Payroll
- Inventory

Specific control measures appropriate for each of these areas are presented in Appendix C.

Depending on the size of the utility, it may not be necessary to have procedures for all of these areas. A careful study of vulnerabilities will show which control measures are appropriate. A system should be designed to achieve the necessary level of control without being too cumbersome. For very small utilities, some of the control measure requirements may be difficult to meet. One of the most difficult measures to implement with small utilities is the segregation of duties as there are so few employees. If, for instance, there is only one person working in the office and that person opens mail, deposits money and makes entries into the accounting records, the situation has many possibilities for problems. If the situation cannot be remedied with an additional employee or by having board members fill in for some of the oversight, the hiring process must be very rigorous. In addition, there should be periodic monitoring by someone of a supervisory nature, and management should be alert to any signs of increased stress in employees as well as a sudden increase in spending or lifestyle, as these could be indicators of fraud or theft from utility funds.

### BASIC PRINCIPLES OF INTERNAL CONTROL

**Segregation of duties**

**Authorization of transactions**

**Retention of records**

**Supervision of operations**

**Physical safeguards**

## AUDITS AND AUDIT REQUIREMENTS IN KANSAS

Sound financial policy dictates an independent, annual financial audit. An audit provides assurance to the board that the financial management of the utility is rigorous. It also assures outside entities (e.g., funding agencies, bond companies and regulators) that the financial position of the utility is correctly represented. The annual audit provides the board and management an opportunity to have an independent, neutral person look at the financial operations of the utility and make suggestions for improvement. It also helps the board understand the financial processes of the utility.

A financial audit is an independent, objective evaluation of an organization's financial reports and financial reporting processes. The primary purpose of financial audits is to give regulators, investors, directors, managers and others reasonable assurance that financial statements are accurate and complete. Auditors use a variety of techniques and procedures such as interviews, observations and test work to determine if the controls and processes needed to produce accurate financial statements are in place.



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**Brenda Chance**
City Clerk, City of Phillipsburg
*"Audits"*

FC-5

Audits are often misunderstood and confused with personal tax audits by the IRS (annual audits are nothing like tax audits). While the audit may reveal errors or fraud that could possibly compromise the accuracy of the financial statements, this is not their primary purpose. Routine financial audits are meant to ensure that proper accounting procedures are being used by the utility, but they only provide reasonable assurance, not absolute guarantees.

## Audit Requirements in Kansas

Kansas municipalities with aggregate annual gross receipts in excess of $275,000 or with outstanding general obligation or revenue bonds in excess of $275,000 are required to have an annual audit by an accountant licensed to practice in the state of Kansas. Rural water districts are not required to have audits, but they are strongly recommended. Many funding programs require at least three years of audited financial statements to qualify for funding and annual audits are usually required by loan and bond covenants. For very small utilities, the audit should not be unduly expensive. If good financial conditions are detected, it will provide the board some measure of confidence in the financial management. If poor financial conditions are observed, it will serve as a warning that actions need to be taken to correct the situation.

### WHAT AN AUDIT DOES

**It expresses an opinion on whether a company's financial statements are presented fairly, in all material respects, in accordance with financial reporting standards.**

**It reviews internal controls to identify problems and concerns that could result in "material" misstatements in the financial statements.**

**It reports financial information in a standardized format that can be used for comparison with other similar systems.**

**It provides users such as lenders and members or investors with an enhanced degree of confidence in the financial statements.**

## Selecting an Auditor

It is critical that the board choose an experienced auditor with the appropriate qualifications who has neither a financial interest in the utility nor a relation with the utility or municipality. Relationships include employees, board members and officials of the municipality (e.g. mayor, council members, etc.). The auditing firm should NOT be the same firm that handles the utility's routine accounting or the firm that sold or supports the software the utility uses.

An audit committee can be set up to manage the selection process. The procedures described previously in Chapter 2 for contracting with professionals should be followed to select the auditor. The process will include developing a request for proposal (RFP) or request for qualification (RFQ) followed by a ranking of the top proposals, interviews with the top candidates and ultimately



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## WHAT AN AUDIT DOES *NOT* DO

**An audit is not designed to detect fraud. However, the auditor may report unusual or suspicious information. If fraud is suspected, it is up to the board to take appropriate action to investigate and remedy the situation. This could include calling for a special audit.**

**The audit does not evaluate the financial condition of the utility, per se. Rather, it demonstrates that compliance has or has not met certain legal requirements, such as bond covenants or security requirements.**

**The audit does not state that financial information is completely accurate in all respects. Rather, the auditor will express an opinion that the financial statements are "fairly presented in all material aspects."**

the selection of the auditor. A detailed procedure that can be used for selecting an auditor can be found in Appendix C.

### During and After the Audit

The audit process should be viewed as a benefit to the utility, not as a negative activity. The board should make it clear that it expects the full cooperation of all staff members during the audit. During the audit, the auditors will want to review:

- Samples of transactions, including cash receipts logs, deposit slips, cancelled checks, bank statements and payroll records
- Other financial records, including financial statements
- Lender agreements or bond covenants

The auditors will most likely want to interview some employees, so employees should be made aware of the date of the audit so they can be available and prepared. The interviews should not be viewed as adversarial and will most likely be informal and friendly in nature. Board members are often interviewed as part of the audit process.

Following completion of the audit, the auditor will provide an audit report. The report will include the auditor's opinion, financial statements and any "findings" (items of concern that should be addressed). Typically, a meeting is scheduled during which the auditor will go over the report with the audit committee or the board. If one has not been suggested, the board should request such a meeting as it can be a very informative process and represents an opportunity to learn how the system's financial processes might be improved. The auditor is required to submit a copy of the audit report to the underwriter of any outstanding bonds.

## QUESTIONS TO ASK THE AUDITOR AFTER THE AUDIT

**Was the staff cooperative?**

**Was there good communication between the staff and auditors?**

**Were there any legal and regulatory issues that would impact the utility's financial statements?**

**Were there any significant changes to the audit plan that occurred during the course of the audit?**

**Were there any serious disputes or difficulties encountered by the auditors during the audit?**

**Did management follow suggestions from auditors in previous years to correct weaknesses in the accounting or internal control system?**

**Are there any suggestions for improvements in accounting, reporting or operating procedures?**



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## FINANCIAL STABILITY FOR WATER UTILITY REVENUE

### Developing an Appropriate Water Rate Structure

Water utility revenues are primarily generated from customer charges, fees, special assessments and fines or penalties. Utilities can also generate additional revenues from other sources such as interest earnings, one-time sales of surplus equipment or property or bulk water sales. Rates can be simple and straight-forward in which a uniform base fee plus a uniform charge per volume of water used is charged. Or they can be highly complex with different types of base fees depending on the customer class and several different "blocks" with differing rates for different volumes of water used. Rates can include penalties for excess usage to encourage conservation or they can differ based on the season. Rates should be tailored to meet the revenue, financial and usage goals of the utility.

At its most basic, a water rate is an allocation of the costs of producing, treating and delivering water to utility customers. A sustainable rate is one that covers the full costs of operating the utility including operations, maintenance, repairs and infrastructure rehabilitation or replacement. Other factors that may be considered in setting rates include affordability and conservation. *(30-40, 59, 63)*

#### *The Rate Review Process*

The first step in setting water rates is a review of the current rates. The rate review process should look closely at the different classes of customers and how much water they use. For example, suppose a system has 1,000 total customers and their water usage is broken down like this:

- 200 customers use less than 3000 gallons per month
- 150 customers use 3000 - 5000 gallons per month
- 350 customers use 5000 - 6000 gallons per month
- 200 customers use 6000 - 8000 gallons per month
- 100 customers use over 8000 gallons per month

This detailed information will enable an analysis of which customer classes generate the most revenue. It also facilitates the ability to forecast how much revenue will be generated by customers under a number of different rate structure scenarios.

Policy decisions regarding which classes of customers will fund the bulk of the utility operation will help determine how rates are structured. Considerations in making these policy decisions include:

- Which customer classes purchase the bulk of the water sold? Are they residential customers, commercial, industrial or institutional?
- Does the community want to encourage economic growth? Maintain stability of population? Promote tourism?
- How will a rate increase affect each of the customer classes? Who can most afford to pay higher rates or who can least afford them?
- What is the median household income? What is the poverty rate?
- Should all customers be charged the same rate or will different rates apply to residential, wholesale, commercial, industrial and/or institutional (schools, universities, public buildings)? Will differences be based on general descriptions or on meter size?
- How will costs of providing water be allocated to the different customer classes, if the same rate is not charged for all types of users?

**Mike Todd**
Public Works Director, Soctt City
*"Rates"*

FC-6



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- Should rates vary based on seasons?
- How many future years will be modeled in the rate study? Typically rate studies will model no less than the next five years including input from the capital improvement plan and repair/replacement schedule.
- What type of rate structure will be used (e.g., uniform charge per volume of water used, increasing block rate or customized)?
- How will the utility separate costs into fixed and variable charges?
- Will the utility adopt an incremental rate increase for a specified number of years (for example, X% each year for the next Y years) or make rate adjustments during annual rate reviews or rate studies?

The rate review process does not separate neatly from the rate setting process. Determining a reasonable rate structure is an iterative process. It starts with information from previous years and adds assumptions about future service and cost. It also checks possible rate structures against the system's policies and priorities and considers issues such as "rate shock," affordability, debt coverage ratio, operating ratio and the need for conservation. Most importantly, the rate structure should be fair and equitable and cover all of the costs associated with running a water utility.

Rates should be justifiable and easily explained to the water utility's board and customers. The rate structure does not need to be unnecessarily complex; a simple rate structure that is fair to customers may be best for smaller systems. A public education campaign can be used to help communicate the need to raise revenues and to indicate what the revenues will be used for, such as installation of new pipe, replacement of a storage tank, addition of treatment to meet regulatory compliance or protect public health. The more customers are involved in the process of rate setting, the more likely they are to support the resulting rates.

Rate structures have inherent policy choices and goals built into them; choosing a particular structure will include these policy choices. It is much better for the board to actively consider the actual policy choices that underlie various rate structures and to rank the underlying goals in priority order. This process will aid in selecting a rate structure that meets both the revenue needs and policy goals of the utility. Policy choices include: stability of income, social equity, intergenerational equity, affordability, environmental soundness and how well the rate structure can be administratively managed. Some of these policy choices are at odds, so it is not possible to develop a rate structure that will maximize all factors. Choices must be made regarding which are the most important. Following development of the rate structure and a public comment period, the board should formally adopt the rate and fee schedule.

### COMMUNITY FACTORS TO CONSIDER WHEN REVIEWING RATES

**Customer demographics (e.g., how many residential vs. commercial customers)**

**Customer use profiles – heavy irrigation users, cooling towers, water intensive industry, etc.**

**Anticipated population growth (or decline) in the community**

**Median household income**

**Income distribution and poverty rate**

**Other anticipated factors (e.g., new businesses, long-range weather forecasts)**

### *The Rate Setting Process*

The price of water can effect the value that consumers place on that water and can help determine whether customers use water efficiently. It is essential that the pricing of water services covers the costs of providing service, for both operations and maintenance and capital expenses. "Full cost pricing" is usually interpreted to mean factoring all costs – operations, maintenance, asset repair, replacement and rehabilitation, capital improvements and debt – into prices. However, it is generally impractical, even for large utilities, to fund all of their



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capital costs out of revenues. Therefore, utilities should generally strive for "modified full cost pricing" that covers all of the expenses associated with operating the utility and some of the capital costs.

## ON THE IMPORTANCE OF ALLOCATING FIXED AND VARIABLE COSTS

**A medium-sized water utility in Texas did not charge a fixed base charge, but rather relied entirely on variable charges (based on water use) for all their revenue. When the area experienced an unusually rainy year, customer water use declined dramatically, leaving the utility without enough revenue to meet its fixed costs.**

### Fixed and Variable Costs

It is necessary to separate the costs of operating the system between those costs that are fixed and those that are variable. Fixed costs do not vary with water use, while variable costs do. For example, if demand for water were suddenly cut in half, the system would still have to make debt payments, pay mortgages or rent, buy insurance and maintain some essential operations and administrative staff. Variable expenses change based on how much water is produced, purchased and delivered. These might include plant utilities, supplies, operator salaries and fuel expenses.

In reality, many costs consist of both a fixed and a variable portion. A single cost category (such as operator salaries and benefits) may be divided between fixed and variable charges. It is not necessary to divide all costs in the same way, but it is important that rate designers think carefully about how to allocate costs between fixed and variable. For example, operator salaries might be divided between 90% fixed and 10% variable, but the electric bill for the plant may be 50% each.

### Fixed and Variable Revenues

Revenues are often generated in two components: a fixed (or base) charge and a variable (or usage) charge based on water consumption. The fixed charge generates revenues for the system regardless of how much water is delivered while the variable charge generates fluctuating revenues based on overall usage. The fluctuations may be quite large depending on the season and the weather.

If fixed expenses were fully covered by fixed revenues (i.e., the base charge) and variable expenses were fully covered by variable revenues (i.e., the volumetric use charges) the utility would experience a high degree of financial stability and there would be little impact on the utility when customers used less water, due to water conservation or changes in rainfall. However, structuring a rate in this manner is easier said than done. There are many complexities, including the difficulties in determining exactly how to allocate costs between the categories of fixed and variable. Furthermore, structuring a rate in this way may impact the utility's ability to meet other goals, such as affordability. In general, the majority of costs are fixed, so a high base rate would need to be set to fully recover these costs. This type of structure will have a disproportionate impact on low income customers. So, while it solves one major problem for the utility (rate stability) it creates another for its customers (lack of affordability).

Setting an adequate and workable water rate is a bit of a clash between base fees and volumetric charges. High base rates tend to place a higher burden on those who use very small amounts of water and who may very well be those who can least afford to pay. If the base rate is too high, the system may experience an increasing number of non-payments. This can be expensive for the system and traumatic for customers. On the other hand, if the system has a large number of large water users (e.g., industry), increasing the volumetric charges through an increasing block rate, especially for high volume users, will increase revenue while placing the burden on those who use the most and can probably afford to pay. There is a limit to this strategy, however, as most communities want to encourage economic development and do not want to place undue burdens on industry.

There is no single right or wrong answer regarding how to structure base bills and volumetric charges. Each utility must develop its own strategy for



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generating the revenue it needs while also meeting the needs of the community. Because it may take many attempts to determine an acceptable split between fixed and variable charges, spreadsheets can be very useful tools. They allow the user to test different combinations of base rates and variable charges almost endlessly. It is worth the effort to set up a spreadsheet that can then be used to test different scenarios and the impact of different combinations of base rates and variable charges.

Block Structures

The variable charge is often tiered, so that a higher price per unit of water is paid in each tier of increasing water use. This is known as an increasing block rate. The blocks or tiers should be reasonable and understandable. Well-structured tiers will provide adequate revenue while encouraging water conservation. Some water utilities allow customers a base volume of water that is included in the fixed charge. After a customer uses this base volume in the billing period, the variable charges begin.

Affordability and Equity

It is often stated that water rate structures should consider the issues of affordability and equity. Unfortunately, there is no clear answer as to how these factors should be incorporated. One option is to set very low rates that are affordable to all. The downside is that the utility may not receive sufficient revenue to cover its expenses, and higher income customers may not be paying their fair share of the costs. Another option is to set rates that recover adequate revenue and then provide some type of financial support for lower income customers. A further option is to set what is called "lifeline rates." These rate structures set a very low cost for the amount of water that is considered necessary for minimum, indoor, sanitary use only and charge higher rates for usage above this amount.

In determining affordability, many people rely on one demographic factor of the community's economic well-being – the median household income or MHI. This factor is preferred because it is readily accessible from the U.S. Census Bureau (http://www.census.gov/hhes/www/income/data/statemedian/), is updated regularly and is easy to use. Often a water rate is considered affordable if it is less than 2% of MHI (some use 1% or 1.5% of MHI). However, MHI is not necessarily the best measure of a community's overall financial health. Two communities can have exactly the same MHI and wildly different economic conditions. One can have much higher unemployment and poverty levels than the other even though the housing values put the MHI in the same range. A better option is to consider other demographic factors in decisions of affordability, such as: poverty rate, unemployment, number of families on some type of government assistance program, number of elderly residents and population declines or increases. The trends in these factors over the last several years are also instructive.

One option a board has to try to assist lower income customers is to work with local, state and federal social services agencies to make sure the customers are able to take advantage of all the assistance available to them. These agencies may be able to provide support for heating, electricity, food or medications. Assisting with these other essential needs may leave sufficient funds for the customers to be able to pay their full water bill.

If the assistance of social service agencies is insufficient to address the affordability issue, a board may choose to subsidize water rates in some way. Whether or not the board decides to provide subsidies for low income customers, or any others, is a matter for the board to decide. However, it is critically important the board understand the community demographics when making this decision and be completely transparent in applying the subsidy. The board must understand the cost of the program and how the costs will

EXAMPLE OF INCREASING BLOCK RATE

| Tier | Charge per 1000 gallons |
|---|---|
| 0-3,000 gallons | Included in base rate |
| 3,001-6,000 gallons | $3.50 |
| 6,001-10,000 gallons | $4.50 |
| Over 10,000 gallons | $6.00 |



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be spread around to other water users; if some customers do not pay, other customers will have to pay more to make up the difference.

The question of equity or fairness in rates is up to the discretion of the board. No rate will be considered "fair" by every single customer. Some will always complain about what they are being charged. The board's job is to design a rate structure that they believe is as fair as possible to the majority of customers. Fair and equitable generally means that the customers using the most water or costing the most to the utility generate most of the revenue and those using the least generate the least amount of revenue.

Designing a Water Rate

Setting water rates is an iterative process. The first pass might create a rate that covers the costs of operations, but is not affordable to many of the users. So perhaps the second pass decreases the base charge and rearranges or increases the tiers but the resulting rate structure does not generate sufficient revenues. So the third pass increases the base bill slightly and adjusts the tiered rates a little further. The process continues until the utility is satisfied with the resulting structure and feels it meets the financial needs and goals of the utility.

There are many resources available to assist with the rate setting process and there are also technical assistance providers who can help, potentially for free. Some of the resources for water rate setting are listed in Appendix H. Additionally, the basic steps involved in the rate setting process are described in Appendix C.

## STEPS IN RATE-SETTING

1. Determine projected costs
2. Determine projected revenue
3. Determine reserve needs
4. Determine current financial position
5. Gather customer information
6. Gather information about production and use
7. Design a rate
8. Test the rate on different scenarios
9. Educate the public
10. Get approval for the rate
11. Implement the new rate

## TRIED EVERYTHING AND STILL HAVING TROUBLE MEETING COSTS? CONSIDER CONSOLIDATION AND REGIONALIZATION

Share operator(s) with another system

Share bookkeeper(s) with another system

Share large equipment with another system

Purchase water (rather than building or maintaining a own treatment plant), either 100% or a lesser amount to blend with water produced by the utility

Bulk water sales to another system

Consolidate with one or more other systems

Other cost-saving measures achieved through mutual aid



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## CAPITAL FUNDING OPPORTUNITIES

When a utility needs to construct major system upgrades or install extensive asset replacements, it is likely they will seek funding from outside sources, such as state and federal grants or loans, bonds or leases. The type of funding a utility chooses will depend on system size, financial capacity, bond rating and the availability of funding.

Federal or state loans are one of the most common ways utilities of all sizes fund major water projects. Loans are generally paid back over 20 to 40 years, depending on the funding source, and vary in interest from 0% to market rate. The most common sources of loan funds are the State Revolving Loan Fund (SRF) administered by KDHE and the Rural Utilities Service (RUS) administered by the U.S. Department of Agriculture Rural Development. The SRF is able to fund systems of all sizes, with some restrictions, and focuses on addressing public health concerns. The RUS funding is limited to systems less than 10,000 in population and focuses on providing services to rural communities. The total quantity of funding available in these programs, as well as the interest rates for the loans, can vary from year to year. The application deadlines and procedures for applying, as well as the current interest rates, should be examined by the board well in advance of applying. Appendix C contains a list of state and federal drinking water funding sources for both cities and rural water districts in Kansas.

In very limited cases, a utility may be able to receive a grant or some loan forgiveness. These funds do not have to be paid back. The most common grant funding program is the Community Development Block Grant (CDBG) program administered by the Kansas Department of Commerce. This program usually has very limited funding and is extremely competitive. Often, these grant funds must be used in conjunction with the loan funds described above.

Rural Water Districts may be able to obtain a loan from a commercial bank. These loans will have varying rates and amortization schedules. Governmental utilities (municipalities, counties) falling under the requirements of the cash basis accounting laws/ statutes for the State of Kansas cannot enter into private loans with local banks. Rather, these entities may be able to secure a lease with a bank, but not a direct loan.

Larger utilities also commonly use bonds to fund projects. A bond is a debt instrument through which an investor or group of investors loan money to a public entity for



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a definite period of time at a fixed or variable interest rate. For a typical bond issue, there will be a number of maturities over a stated period of time. Normally, the coupon rate will increase the further out the maturity is for a fixed rate of financing. The municipality or utility pays the interest periodically (most commonly twice a year). Bonds carry a maturity date (or due date), at which time the principle (or original loan amount) must be paid in full. In practice, principle payments are generally made annually or semiannually throughout the term of the loan, so that the principle is paid in full by the maturity date.

Rural Water Districts can issue some types of bonds, but not others (e.g. general obligation bonds). The system's attorney, bond counsel or financial advisor should be able to answer questions regarding whether or not the utility is able to issue bonds and what type can be issued. *(4, 5)*

## Bonding

The world of bond issuance is large and complex. While having a competent financial advisor is essential, it is still important for board members to understand as much as they can about the specific type of bonds they are considering. Some issues to consider regarding bonds include:

- Effective rate of interest: This is the actual cost of borrowing and consists of the interest cost plus the total cost of issuance. The cost of issuance depends largely on the size of the bond issue and the risk level of the credit rating of the borrower.

- Optional call dates or optional call feature (also referred to as redemption date): A call date is the date when the bonds can be paid off prior to their stated maturity date at the option of the issuer. Bonds typically have a five to ten year call feature and utilities should specify a call date. Not doing so could cost the utility considerable sums of money if interest rates drop dramatically. When bonds are called, they are typically re-funded and replaced with similar bonds at a lower rate of interest.

- Bond ratings and bond insurance: An investment grade bond rating or bond insurance allows municipal bonds to be sold at a lower interest rate. A rating from one of the rating agencies (e.g., Moody's, Standard and Poor's or Fitch) is a measure of how secure the utility's debt is and is based on financial capacity. Most local governments and water utilities in Kansas are too small to have an independent bond rating or to be eligible for bond insurance. However, because of the cash basis budget requirement for Kansas municipalities, most bonds are sold at an average interest rate that is equivalent to having an A rating or better for general obligation bonds. Revenue bonds would sell at a slightly higher rate of interest.

The most commonly used bonds by water utilities are discussed below. Summaries of other types of bonds can be found in the EPA's Guidebook of Financial Tools at http://www2.epa.gov/envirofinance.

### BOND TERMINOLOGY

***Face value:*** **the amount borrowed and that must be repaid**

***Maturity date:*** **the date on which the final principle payment is made**

***Coupon rate:*** **the rate of interest the bond issuer will pay on the face value of the bond, expressed as a percentage**

***Coupon dates:*** **the dates on which the bond issuer makes interest payments**

***Issue price:*** **the price at which the bond issuer originally sells the bonds**

### *General Obligation Bonds*

General Obligation (GO) Bonds are backed by the guarantee that the issuing entity will use its taxing power to repay them if required. Kansas Statute K.S.A. 65-163u authorizes the issuance of GO bonds by cities and some wholesale water supply districts for the purpose of paying the costs of any improvement to a public water system operated by such a municipality. The security



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for the bonds is the ability to levy ad valorem property taxes. A city might issue GO bonds specifically for the water utility and then use the water revenues to make the debt payment. In the event water revenues are not sufficient to cover the payment, the balance is made up by taxes collected via a mill levy. GO bonds sold for water utilities are not subject to notice and protest or election. Rural Water Districts cannot issue general obligation bonds because they do not have the required ad valorem taxing authority.

The bonds must be issued, registered, sold, delivered and retired in accordance with the general bond law. GO bonds are regarded as safer than bonds backed by a single revenue source and generally command lower interest rates and lower reserve fund requirements if any. GO bonds can be used to finance water and sewer projects that require large amounts of up-front capital and do not count against a city's bond indebtedness (K.S.A. 10-308).


### *Utility System Revenue Bonds or Sales Tax GO Bonds*

Revenue bonds are bonds on which the debt service is payable mainly from system revenues or other non-property tax sources. Kansas statutes authorize any municipality to issue revenue bonds to finance construction or improvements to a revenue producing utility. Because these bonds are not backed by ad valorem property taxes both cities and rural water districts may issue them. Revenue bonds are usually tax-exempt for public water supply projects. Interest rates may be higher for revenue bonds compared to GO bonds and even higher for taxable revenue bonds. Revenue bonds do not count against debt ceilings, but the national rating agencies take them into account in financial capability analyses. Typically, revenue bonds require the utility maintain a debt service coverage ratio of at least 1.25. Market conditions often dictate the municipalities establish a bond reserve account equal to 10% of the issue amount or maximum annual debt service or 110% of average annual debt service (whichever is less according to federal tax law). Additionally, the utility may need to increase utility rates such that net revenues are available to pay not less than 100 to 140 percent of the current year's debt service. Utility system revenue bonds may have a term up to 40 years, but the typical maturity is 25 years or less.



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### *Special Tax Revenue Bonds*

Special tax bonds are backed by pledges of proceeds from specific tax sources. They are usually issued by local governments to finance specific types of facilities. (K.S.A. 12-187 et.seq.) authorizes cities that receive proceeds of a local option sales tax to issue revenue bonds to construct non-commercial government facilities that could be financed by general obligation bonds. Only revenues generated from the sales tax are dedicated to the repayment of the bonds and the local sales tax must be authorized by referendum. A resolution or ordinance is required to impose the tax and issue the bonds.

### *Funds and Accounts Used With Bonds*

When a utility issues bonds, the bond resolution should describe the funds and accounts that need to be established. Typically there will be an account that accumulates principle and interest for each bond issue. The utility will make monthly deposits to the account and interest will be paid from the account every six months. Principle is paid once a year. If the project being financed involves new construction, bond proceeds will be deposited into a project account, to be disbursed to engineers, contractors, etc. as the project progresses.

## Taxes

Utilities raise most of their revenue directly through water charges, but in some cases municipalities use their taxing authority to partially fund the water utility. This is often done through sales taxes. These local sales taxes are often add-ons to state general sales and use taxes and require voter approval to levy.

## Fees

Many utilities use fees, charged in addition to regular base and volumetric charges, to fund specific projects or offset specific utility costs. Common fees include:

- Connection fees: (also called hookup fees) charged to property owners at the time they connect to municipal drinking water facilities
- Source water protection fees: used to procure property for source water protection or to build facilities to protect water sources
- Surcharges: “pass-throughs” from the state for various services or costs
- Facility rehab fees: used either to directly finance projects or to repay debt
- Franchise fees: paid to the city or state for use of public resources
- Disconnect or reconnect fees: charged to disconnect customers when accounts are delinquent and to reconnect after past due payments are made

## FINANCIAL ADVISORS AND BASICS OF THE DODD-FRANK ACT

In an effort to more closely regulate the municipal securities market, The Dodd-Frank Wall Street Reform and Consumer Protection Act was passed in 2010. It created a new class of financial advisors deemed to be “municipal advisors.” Municipal advisors are any individuals who provide advice to state or local governments or other borrowers (such as public water systems) regarding the issuance of municipal securities. The law now requires these individuals to be registered with the Securities and Exchange Commission (SEC). In fact, the final rules adopted by the SEC on January 13, 2014 make



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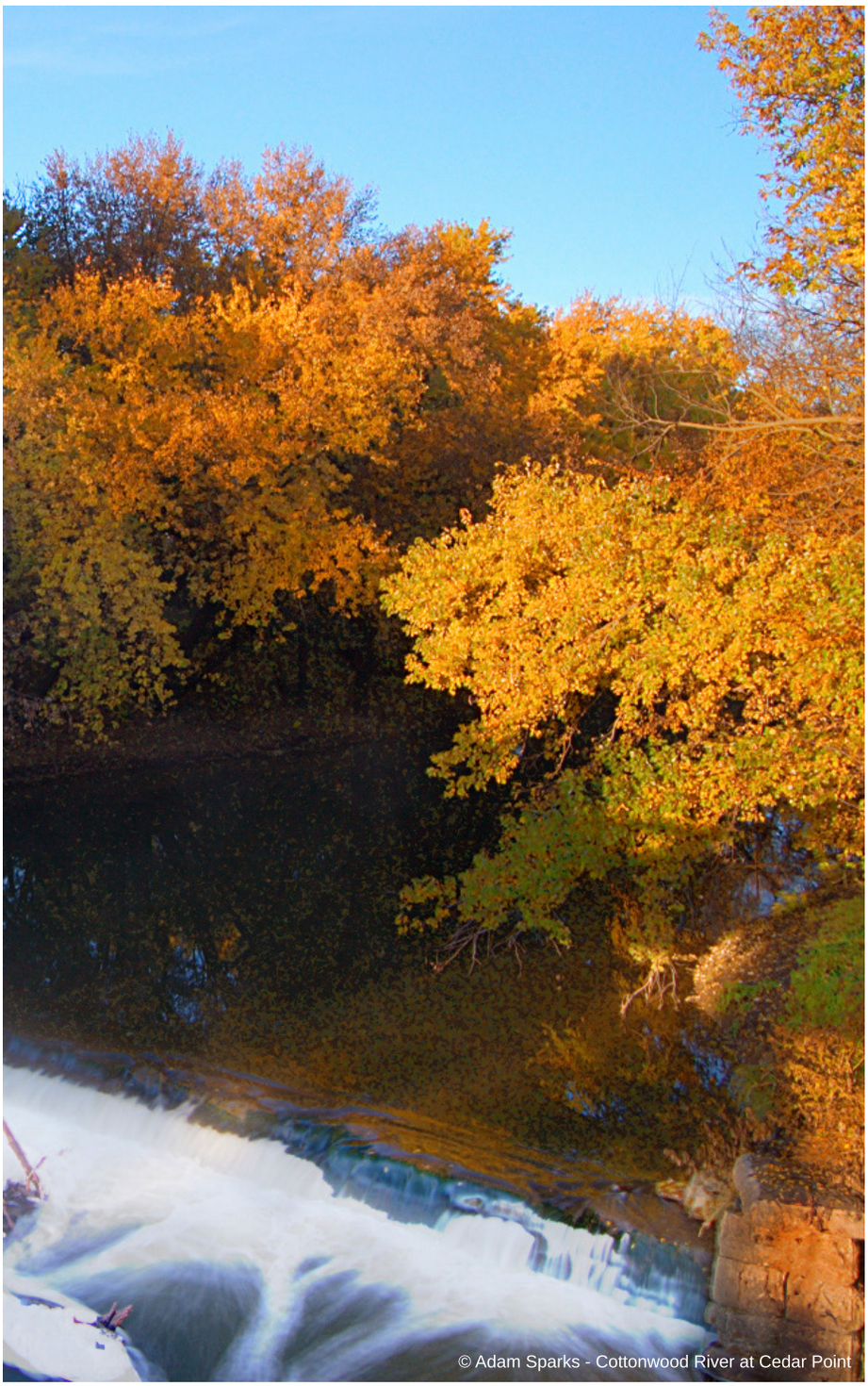
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it illegal for anyone with statutory fiduciary duty to a municipal entity to advise them on certain subjects without first registering with the SEC. The regulations cover individuals giving advice about financial products or the issuance of municipal securities – including advice about their structure, timing, terms, issuance and similar matters – as well as those who advise on the investment of the proceeds of municipal securities.

In other words, financial advisors who either solicit or work with a public water system on bond issuances or other financial instruments not specifically exempted, should be registered with the SEC as municipal advisors.

Regular utility employees, appointed officials and board members are explicitly excluded from the registration requirements, as are banks advising on typical issues such as deposits held by the bank, letters of credit, direct loans, sweep accounts and the like. Accountants, attorneys and engineers are also specifically excluded provided they are giving advice typical of their professions.

## CONCLUSION

This chapter has covered the various aspects of financial capacity including budgeting; interpreting financial statements; internal financial controls; audits and audit requirements; water rate setting; capital funding; and legal requirements for financial advisors. Using this chapter as a reference will help new board members become familiar with basic principles of financial management and understand their role in creating and implementing policies that will make the utility more efficient and sustainable.

Asset Management (covered more fully in Chapter 2) can be extremely helpful in ensuring that the utility's financial resources are used effectively and efficiently. In addition, there are many resources available to assist with financial capacity development and the board should take advantage of the opportunities for training and assistance in financial management, particularly the training sponsored by KDHE. Appendix H in this manual includes a list of available resources.



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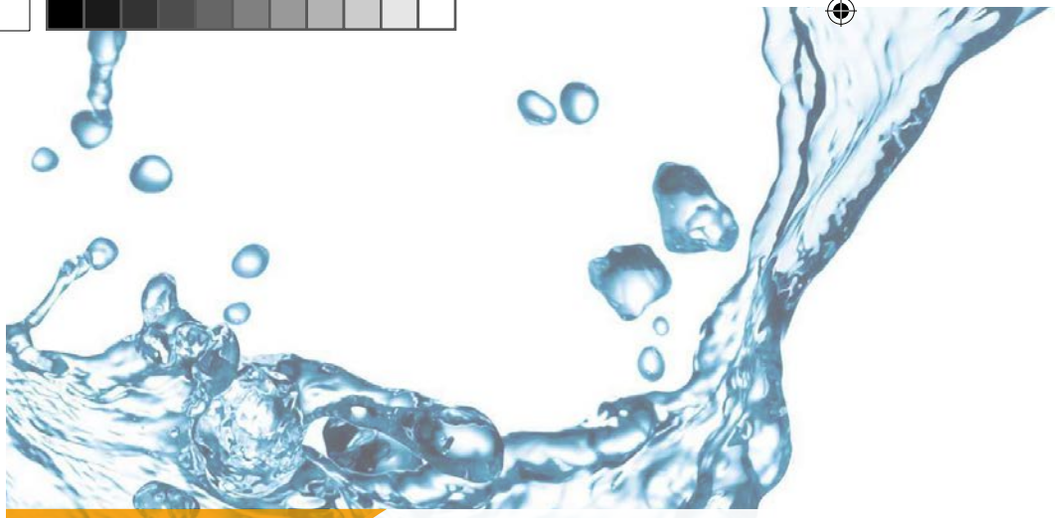
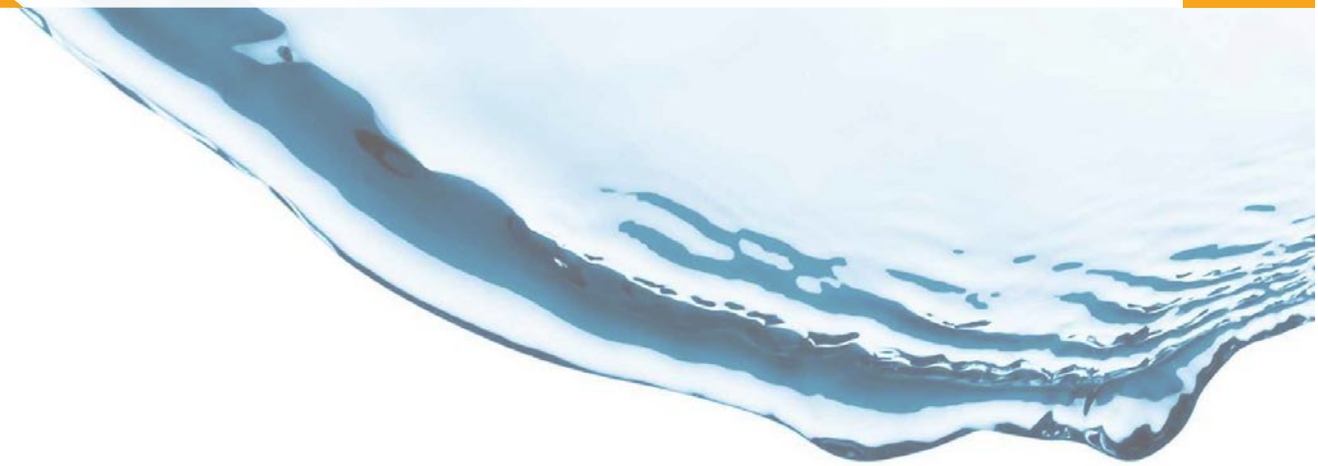
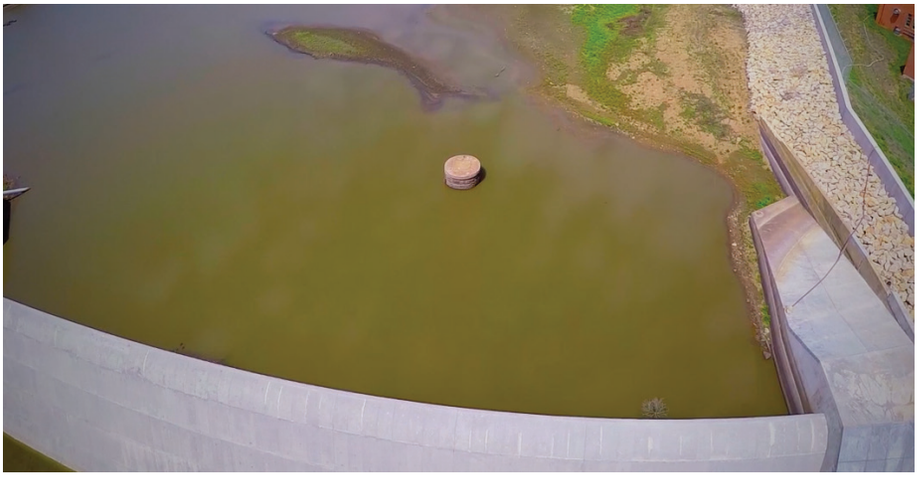






# OPERATING A WATER UTILITY (TECHNICAL CAPACITY)

CHAPTER 4



## INTRODUCTION

This chapter focuses on technical capacity, which is defined as the system's ability to reliably produce and deliver an adequate supply of water that meets all drinking water standards. Meeting this goal requires:

- Understanding regulations
- Properly operating and maintaining assets
- Understanding the treatment process and how to make adjustments
- Implementing programs to protect water sources and the distribution system from contamination
- Developing and implementing utility sustainability programs
- Securing sufficient water rights
- Keeping good records
- Ensuring proper operator certification and training

Achieving adequate technical capacity requires the integration of managerial and financial capacity; technical capacity cannot be achieved without support from the other two. For example, meeting regulatory compliance takes operators who understand the requirements of the regulations; know how to operate treatment units through varying water demands, seasons and changing water quality and have the ability to take regulatory samples using approved procedures and at the appropriate locations. Regulatory compliance also means that management is providing: data to the regulators on a timely basis, adequate staffing to operate the utility, and continuing education and training. Regulatory compliance also takes adequate financing so that operators can purchase chemicals for treatment or spare parts for repairs and that all bills are being paid, including laboratory and electricity.


**Mike Tate**
Director of Bureau of Water, KDHE
*"Regulations"*

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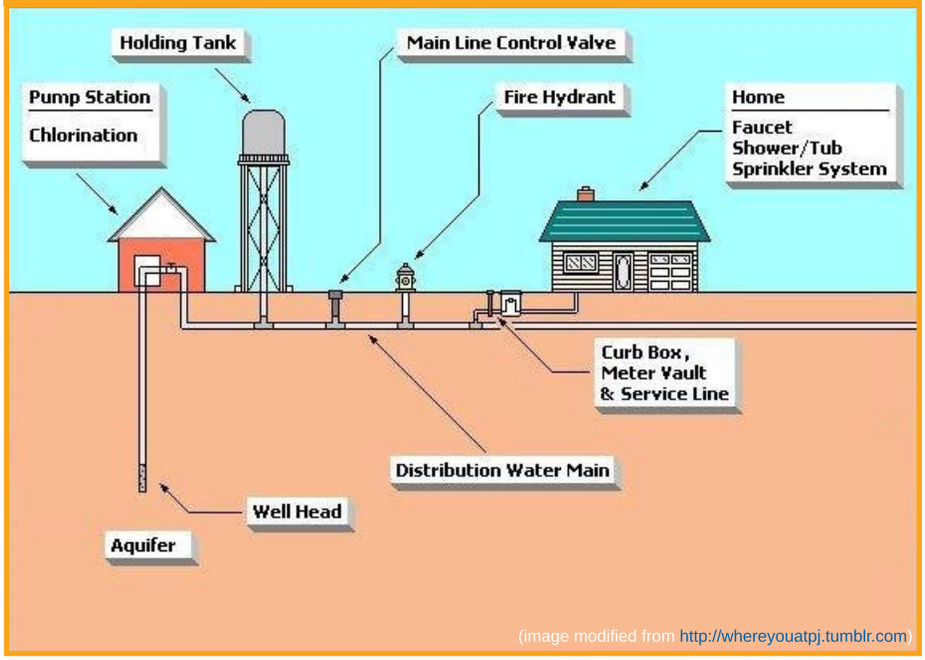
## DIAGRAM OF A GROUNDWATER SYSTEM




(image modified from http://whereyouatpj.tumblr.com)

While the board relies on the operations staff to perform the daily, weekly and monthly tasks of maintaining technical capacity, the ultimate responsibility for this important area of capacity rests with the board. It is important for the board to have an understanding of the tasks involved in operating a water utility and in achieving and maintaining compliance in order to provide the appropriate support.

## BASICS OF A WATER SYSTEM

### Groundwater System

There are two main types of water systems: groundwater and surface water. A basic groundwater system involves a well with a pump to withdraw the water. The pump may be located in the well or it may be visible above ground. The pump will generally run a few hours a day and is often triggered by the water level in the associated storage tank. When the water level reaches a low level, as set by the utility, the pump turns on. The pump turns off when the water reaches the desired level in the tank. The system may have only one well or may have many wells, depending on the population, the characteristics of the wells and the desire for back-up sources.

As the surface layers of the earth protect groundwater from most biological contamination, many groundwater sources only disinfect the water prior to entering the distribution system. Groundwater systems with water quality concerns, some regulated, some not, treat the water to remove contaminants and then disinfect it, usually with some type of chlorine. Treatment of contaminants may involve adsorption (e.g., to remove arsenic), reverse osmosis (e.g., to remove fluoride, nitrate or a host of other constituents), filtration (e.g., to remove iron and manganese or surface water contaminants in the case of groundwater under the direct influence of surface water (GWUDI) systems), softening or any number of other processes. The addition of chlorine inactivates most microbial contaminants, such as bacteria and viruses, that may be in the water to prevent water borne illness. Chlorine also provides for protection from contamination that may occur in the distribution system. Following disinfection, the water flows into the distribution system that is described later in this section.

### Surface Water System

A surface water system is one that relies on water above the ground. This water might come from a lake, a river, a large stream or a reservoir. An intake structure will move the water from the surface water source to the treatment works. Because this water is open to the atmosphere, there is the potential for more biological contamination in the water, so much more extensive treatment is required than for groundwater systems. A surface water treatment plant generally starts with a screen to remove any large debris or particles that could damage the treatment components. Following the screen, substances may be added to the water to adjust the pH or to oxidize or disinfect the water. A coagulant will then be added and rapidly mixed with the water in order to make the particles in the water “sticky.” That water will pass into a flocculation tank with a slow mix process where the now “sticky” particles will gather together and form floc particles. The particles get bigger and bigger until they are heavy enough to settle out of the water, taking contaminants with them. The particles settle to



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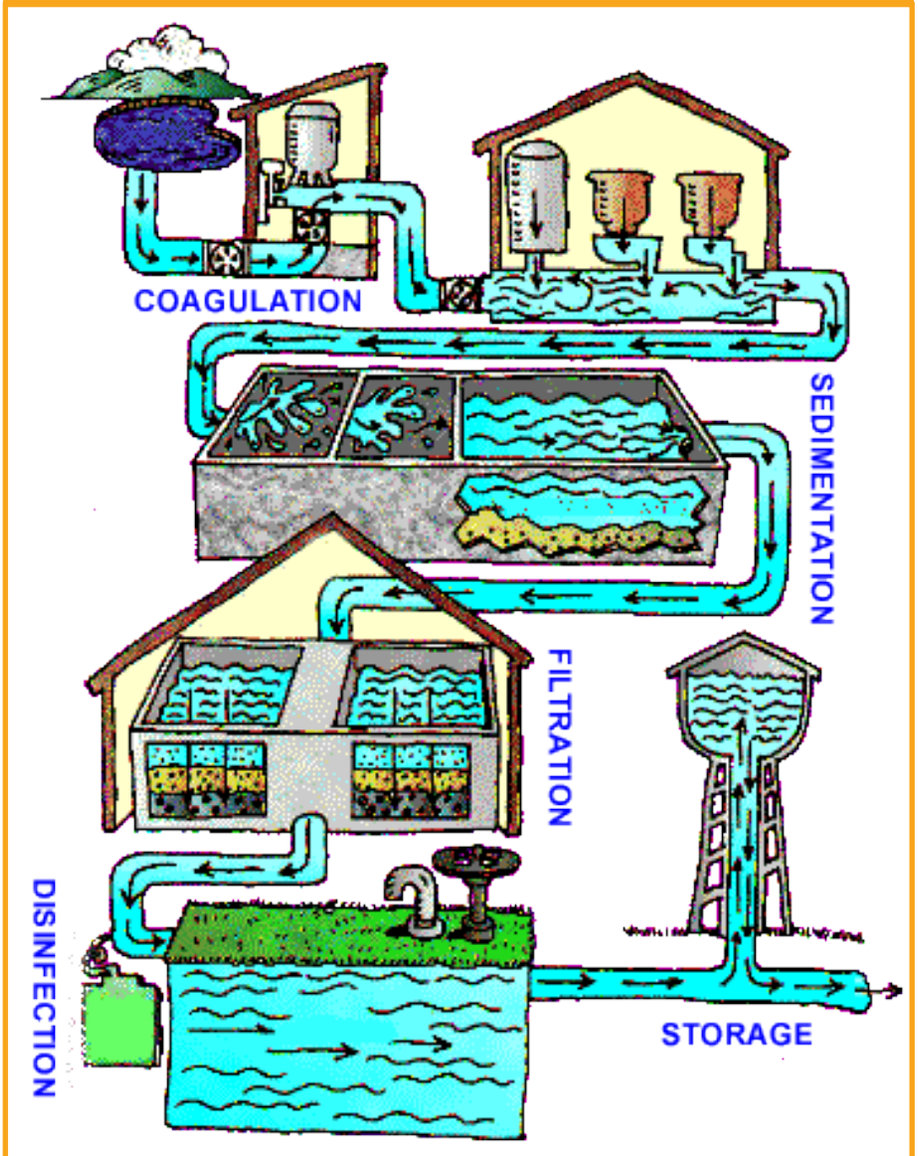
the bottom of the sedimentation tank where the solids can be removed, dewatered and disposed of. The clearer water at the top flows to the filter. The filter may be a mixed media type where the water flows through a combination of anthracite, sand, gravel and possibly other media. The filtration is intended to remove very small particles and some microbiological contaminants, particularly *Giardia* and *Cryptosporidium*. These organisms will not be killed by normal disinfection, so they must be physically removed from the system through filtration. Removal is extremely important because these organisms have the potential to cause serious gastrointestinal diseases.

Following filtration, the clean water flows to disinfection where any remaining bacteria, viruses and other microorganisms will be deactivated. This process typically uses some type of chlorine, but other processes can be used, such as ozone or ultraviolet light.

The filter will contain contaminants and particles which can clog the filter over time if they are not removed. Therefore, some of the finished water will be recycled back through the filter from the bottom up to remove the material in a process called backwashing. The backwash water (the water used to clean the filter) will be collected and recycled back to the front of the treatment works for reprocessing.

The process described above is a traditional or conventional surface water treatment facility. There are many other types of filtration, so not all plants are going to be exactly as described here, but the basic premise is the same – to physically remove particles from the water. Additional treatment steps can be included along with filtration if other processes are required to remove chemical contaminants. Many surface water plants in Kansas include softening steps and/or activated carbon to improve water quality for customers. After treatment and disinfection, the clean water is pumped into the distribution system.

SURFACE WATER TREATMENT PROCESS

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## Purchased Water System

If the utility does not own its own source, but instead purchases water from another utility or wholesaler, the system would only be responsible for operating the distribution portion of the system, not the treatment and disinfection portion. While the lack of a treatment system simplifies the overall operation, the lack of treatment can create some unique challenges. One challenge is that purchased



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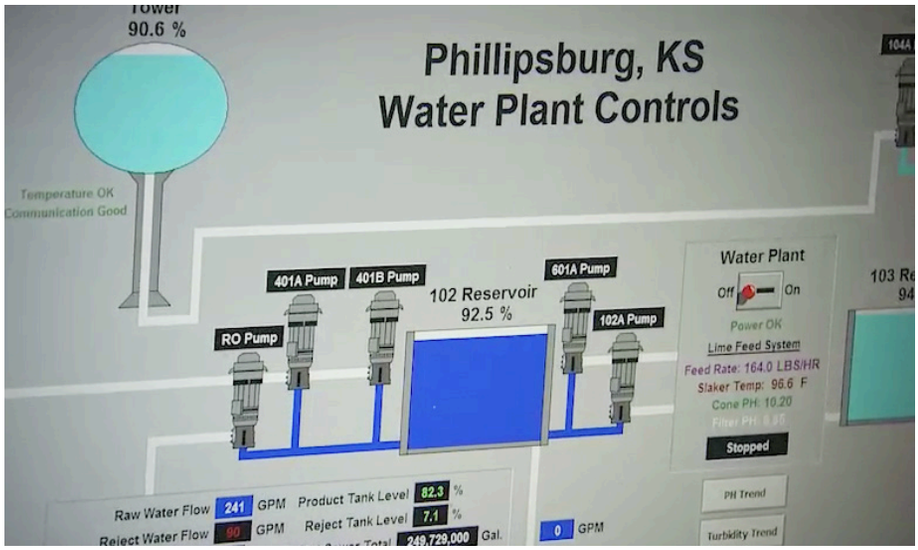
water systems may be far away from the treatment facility that is providing the water. This distance means that water reaching the purchased water system may be older which may allow for several undesirable effects:

- Formation of disinfection byproducts (DBPs) may increase because the chlorine has had a longer time to be in contact with organics in the water.
- Decay of the chlorine remaining in the pipe after disinfection may cause biological re-growth in the pipes or nitrification which can increase the concentration of nitrates.
- Corrosion control measures implemented at the treating facility (if the treating facility uses such measures to control lead and copper concentrations in the water) may have a reduced effectiveness, creating the potential for higher lead and copper levels in the purchased water system.
- Taste and odor may be negatively affected.

If any of these problems occur within the distribution system of the purchased water system, it will be necessary for the purchasing system to work with the water supplier (treating utility) to develop a plan of action for how to control the issues. Some control measures may have to be completed by the water supplier while others can be implemented by the system purchasing water. In some cases, the purchasing system may have to install some sort of treatment solution to increase water quality to meet regulatory standards and/or level of service goals.




## Distribution System

Following treatment and/or disinfection in a groundwater or surface water system or following the master meter in a purchased water system, the water flows into the piping that makes up the distribution system in order to serve customers and fill up elevated storage tanks (commonly known as water towers in the flat plains). The storage tanks serve several purposes, including providing pressure to move water around the system, providing extra water in times of high usage, allowing sufficient water for fire-fighting activities and providing water when the well pump is not running. While most systems in Kansas have elevated storage tanks, some do not, having sufficient pumping capacity to meet high demands.

The distribution system consists of an extensive network of underground pipes of various sizes and materials that are usually connected in a looping pattern. The loops allow the water to flow in different directions so that if a portion of the system needs to be shut down for maintenance or repair the water can move in another direction and provide flow to the customers. Looping also keeps the water moving in the pipes to prevent stagnation. Stagnant or old water, which can happen when there are dead ends, can lead to water quality complaints or violations of regulatory standards. If dead ends cannot be avoided, the lines usually have a fire or flush hydrant to allow the water operator to open the hydrant and flush water out of the system. This will enable the water to move and reduces stagnation. How often and how long the system has to be flushed is determined by the results of water quality testing.

The number of miles of distribution pipe, even for a small system, can be quite staggering. The total number of miles of water pipe in the U.S. is estimated to be over 1 million! (64) Each customer is connected to the system through a service line that is tapped into the water system's mainline piping. Service lines for residential customers are generally ¾ inch in diameter, but larger customers or multi-family units (duplexes, triplexes) may have 1 inch service lines or larger. Service lines for commercial, institutional, industrial and fire protection customers can range from ¾ inch to 8 inches or more. Each



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service line should have a meter to register the amount of water used by the customer, and certain service lines will also include a cross connection control device to prevent water from flowing backwards from the customer back into the utility's water main. The meters are usually read monthly, although some systems prefer to read meters quarterly. Customers receive a bill from the water utility that is usually based partly on the volume of water they used that month or quarter.

The distribution network will also include a variety of appurtenances, such as isolation valves to stop the flow of water, elbows and tees to change the direction of pipes, pressure reducing valves to reduce the pressure in the line, air release valves to allow air to leave the pipe and fire hydrants to allow for firefighting. A distribution system can have hundreds or even thousands of meters, valves and other appurtenances to serve its customers.

### Understanding the Drinking Water System

The best way to understand the drinking water system is to take a tour. Follow the water from source to treatment to distribution. If it is a surface water plant, consider whether it is similar or different from the traditional plant described above and examine samples of the water at various stages to see the change in color and clarity. Watch a backwash cycle to see the filter being cleaned. In distribution, examine the storage tank, open a meter box lid, open a valve lid and look at a fire hydrant. Get a feel for the number of miles of pipe, the distance that must be traveled to reach all the wells, tanks, pipes, customers, etc. and the complexity of the system itself. Visually seeing the system will aid in understanding the role of the operator and the responsibilities he/she has. It will also help board members explain to customers what is involved in getting water from source to tap and why paying for the water is so important.

The board may want to consider offering tours to the public or school groups, especially science classes. Some systems that have offered tours have had a tremendous response, and customers have walked away with a renewed appreciation of tap water. Additionally, the board can reach out to local interest groups, such as the Rotary Club, Lions Club, Kiwanis, League of Women Voters, Girl Scouts, Boy Scouts or environmental groups such as the Sierra Club, Ducks Unlimited or Audubon Society to deliver presentations on drinking water or to offer tours specifically for these groups. The utility may also be able to support school kids who want to do a science fair project on drinking water. Encouraging kids to take an interest in drinking water early may have the added side benefit of having them join the profession when they graduate from high school or college.

## ROLE OF A WATER OPERATOR

The operators are valuable members of the water utility. In large utilities, there may be many operators working on the facility with one, or a few, operators serving in the lead capacity and others serving in specialized roles to share job duties. In small utilities, all of the work described below may be completed by one or two operators. Each utility will have evolved over time and it is important to know what these job functions are and who is carrying them out in the utility the board oversees.

Operators ensure that water is flowing from the source, adequate treatment and disinfection are being achieved, equipment is operating properly and customers are receiving water in all parts of the community. The operators must understand how each treatment unit works, how to adjust treatment when water conditions change or monitoring results indicate a concern, and how to adjust the chlorine dosage. In addition to ensuring that treatment and disinfection are functioning properly, the operator must perform routine and preventative maintenance to keep the assets working and to prevent failures. When failures do occur, the operator has to repair the asset or replace it.

An operator must also have a thorough understanding of the complex regulatory requirements that affect their systems. They have to understand the monitoring and reporting requirements for collecting regulatory compliance samples to ensure the correct samples are collected at the right time and at the right location using the proper containers. They have to ensure the samples are deliverred to a lab that uses approved methods of analysis and is certified to perform that analysis.

Operators read the water meters to determine how much water customers have used and replace meters that no longer operate efficiently. When customers fail to pay their bill, the operator will have to go to the property and shut off the service. Operators also perform routine activities in the field, such as flushing of hydrants or exercising valves.



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Most utilities also have several internal meters that are often read on a daily basis. These generally include intake meters, well meters and master meters serving different pressure zones and wholesale customers.

Ensuring assets are in good operational order requires operators to travel to pump stations, well heads, storage tanks and treatment units to make routine inspections and to gather operational data. Operators also have a role in handling customer complaints. When water quality complaints are received, it is usually the operator who has to investigate the situation. Because operators spend a lot of time in the field, they often interact with customers who have questions or concerns about the system.

Operators have to investigate reports of leaks and make repairs when necessary. Repairs are complicated by having water lines located in roadways where pavement has to be removed. Digging up water lines has to be done carefully to avoid damaging other pipes and/or utilities in the area (e.g., fiber optic cables). Leaks or other emergencies often occur at night, on weekends, during holidays or during weather extremes (hot, cold or stormy). Operators need to be prepared for all kinds of conditions and have to sacrifice some of their free time to be on call. An important matter for public perception is that crews repairing water leaks will often appear to be sitting around while water is running on the ground. However, for the safety of employees and the general public, all underground utilities must first be located prior to digging, so operators sometimes have to wait before undertaking a repair.

The operator's job is quite extensive. For their willingness to serve in this capacity, operators often receive relatively low pay, long hours and little gratitude or recognition. When operators are asked why they do their job, they are generally very passionate about their responsibility to protect the public health of the residents, who often include friends and family members. They also indicate that the job comes with a lot of satisfaction and they enjoy being outdoors and using their ingenuity to solve problems that arise. Operators are very good at developing unique ways to solve problems.

Operators are often willing to put the job above other responsibilities. In one extreme example, a water utility was located in a community that was devastated by a tornado. Many homes were destroyed including one owned by one of the operators. Despite his personal loss, the operator remained on the job to repair damage and make sure residents continued to have a safe and reliable source of drinking water.

## Board Support for Operators

The board does not need to manage the day-to-day operational issues, but it does need to support the operator in his/her role. Support can take many forms, including but not limited to:

- Funding maintenance and spare parts
- Providing funding and time off for continuing education and operator training
- Acknowledging the operators when they have gone above and beyond their normal duties or have done a particularly good job
- Acknowledging accomplishments such as obtaining certification, achieving a higher level of certification or obtaining an associates or advanced degree
- Supporting the operators if customers complain to the board or react in a belligerent way to shut offs


**Dave Grimm**
Public Works Director, City of Hiawatha
*"Operations and Maintenance"*

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- Providing an appropriate salary for the work being done
- Providing the tools, equipment and software needed
- Providing safety equipment and safety training for the operators to protect their health and well-being

The most important type of support is to listen to the concerns and suggestions of the operator. Given that the operator is out in the field all the time, he/she has an excellent perspective regarding the problems the system is facing and may even have creative ideas for how the problems can be fixed. Operators are key to implementing programs such as asset management, since they serve as the eyes and ears of the utility and have the ability to collect the data needed for an asset management program.

A positive, healthy relationship between the board and the operators is essential to a well-functioning utility and excellent customer service. If this type of relationship is not currently in existence in the utility, steps should be taken to improve it. The utility will benefit greatly. One sign of trouble in the relationship between the board and the water operator(s) is high turnover of operators. If the utility is experiencing operators quitting frequently, something is probably amiss in the system and the board should investigate the possibilities, which may include operator compensation, benefits, working conditions, lack of support, lack of funding for operations and maintenance or inadequate staffing. The board should interview past and current operators to investigate the cause of the departures and then take measures to remedy the situation.

## OPERATION AND MAINTENANCE

One of the fundamental duties of a water operator is to operate and maintain the assets that make up the water utility. The operation of the utility will include turning pumps on and off, operating treatment facilities, filling up chlorine supplies, opening and closing valves, filling storage tanks and any other activity to keep the water flowing from source to customers. Operation of the utility requires sufficient funding to pay for the electricity, tools, parts and supplies to keep the assets in proper working order.

Maintenance is practiced to prevent asset failures and to prolong the life of the assets. There are many maintenance tasks that can be performed, so it is vitally important to determine which tasks to perform on which assets and the optimal time to perform them.

There are three basic kinds of maintenance: routine, preventative and predictive. Routine maintenance encompasses the basic tasks that should be performed to keep the assets in proper operating order. Examples include: lubrication, cleaning chlorine injectors, exercising valves and flushing pipes. Preventative maintenance involves interventions with the assets to try to prevent failures. Examples can include repairing a hole in a distribution pipe to try to prevent the pipe from having a catastrophic failure or the repair of a small hole in the roof of a pump house to prevent a larger failure of the roof and damage to the facilities inside the building. Predictive maintenance involves monitoring to try to predict or estimate when a failure will actually occur. Examples include placing a device inside a water pipe to assess its wall thickness, conducting an analysis of the oil lubricant in a pump, conducting a vibration analysis or placing a video camera in a well to determine the condition and assess remaining life.

The quantity and type of maintenance performed on given assets should directly relate to the criticality of the assets. Criticality of assets is related to the probability that an asset will fail and the consequence if the asset does fail. Highly critical assets are those that are likely to fail, and the consequence is really bad if they do. Lower criticality assets are those that are unlikely to fail and the consequences of such failure are very low. The moderate category of assets includes assets for which the probability of failure is high, but the consequence is low and assets for which the consequence of failure is high, but the probability is low. It is important to note that the criticality of an asset is unique to each utility's specific situation and local knowledge is necessary to determine risk related to asset failure.

Highly critical assets should receive higher levels of intervention, including routine, preventative and predictive maintenance to protect them from failure. One exception is that if a high risk asset is already scheduled for replacement, maintenance should be kept to bare minimum and no expensive interventions should be conducted. The asset should receive only what is necessary to keep it running until replacement. When assets are lower risk, less maintenance may be required. In some cases, these assets can be "run to failure", meaning that it is okay to do nothing at all and let the asset go until it no longer performs. At that point



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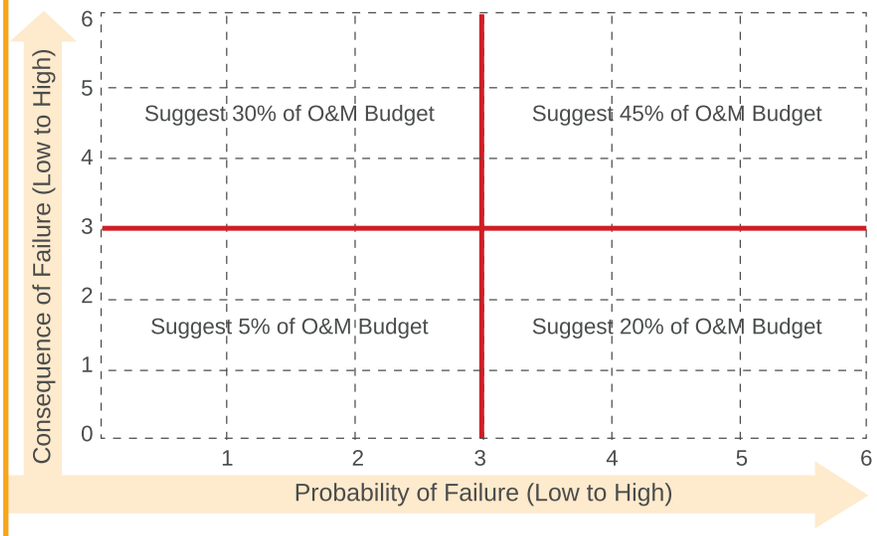
**RELATIONSHIP BETWEEN PROBABILITY OF FAILURE AND CONSEQUENCE OF FAILURE**




The following table summarizes the information regarding expenditures on O&M and related expenditures for condition assessment or monitoring.

it can be replaced. An example of a run to failure asset would be a small pipe in a residential area. The pipe may receive no interventions at all until it "fails." The failure in this case may be a leak or rupture in the pipe. At that point, the utility would repair the pipe or replace it. The run to failure option does not mean no consideration has been given to the asset. Rather, it means that a conscious decision was made, using the best information available, to manage the asset in this way.

Having a good preventative maintenance program has been proven to save considerable amounts of money over operating without one. Despite this evidence, many organizations, both public and private, believe maintenance can be cut out of a budget with no consequences. It appears to be "extra" or "a nice thing to have if you have extra money", but in reality it is absolutely essential to have a well-thought-out maintenance program to keep the assets in good operating order and to serve the needs of the customers in the most cost effective way possible. Cutting the maintenance budget may at first appear to save money. However money will have to be spent later, and the likelihood is that it will be more expensive. Dr. Howard Penrose, an expert in maintenance as it relates to asset management, suggests that board members ask themselves the question: If an elevator were maintained the way we maintain our water system, would I ride it? If an airplane were maintained that way, would I fly in it? *(65)*

The board should encourage and support the development of a comprehensive maintenance program which can be outlined in an Operation and Maintenance Plan (O&M Plan) or built into the utility's asset management plan. The plan outlines the way in which the utility should be operated, including which asset maintenance tasks to perform on a daily, weekly, monthly, quarterly, annual and longer basis. Examples of maintenance tasks that can be done on different classes of assets are contained in Appendix D. The maintenance schedule should be customized by the utility based on previous experience with operation and maintenance, manufacturer's recommendations and results of special studies conducted by the utility regarding maintenance tasks and how well they work to extend the life of the assets.

The most important support for the program, however, is financial support. The board needs to make funding the maintenance program a priority and support

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TC-3



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operator training in maintenance and maintenance management. Additionally, the board should provide funds to develop a spare parts inventory so that parts are available immediately for the repair of assets, particularly critical assets.

Another important element of a maintenance program is effective record keeping. Records on assets will help the utility determine which maintenance activities are able to keep the assets running properly and for how long. The records need to be of high quality and in an easily accessible format.

## MULTIPLE BARRIER APPROACH TO PUBLIC HEALTH PROTECTION

The main goal of a drinking water utility is the protection of public health. To help ensure this protection, drinking water utilities need to operate using the multiple barrier approach. The first barrier is the protection of source water from contamination. The second barrier is treatment, in which contaminants are inactivated or removed from the water. The third barrier is the distribution system, which is operated and maintained to prevent contamination from entering after treatment. In addition to these main barriers, there are a few additional barriers, such as system security. Under normal operating conditions, all of these barriers would be intact and operating properly. The idea behind multiple barrier approach is that if one barrier is compromised, the others will still be there to protect public health.

### POINT SOURCE CONTAMINATION

Discharge pipes from factories

Confined animal feeding operations

Wastewater treatment plants

Landfills

Motor pools

Fleet maintenance facilities

Gas stations

Dry cleaning facilities

Leaking underground storage tanks

Storage, handling, mixing and cleaning areas for pesticides, fertilizers and petroleum

### NON-POINT SOURCE CONTAMINATION

Runoff of fertilizers, herbicides and insecticides from agricultural lands and residential areas

Oil, grease and toxic chemicals from urban runoff and energy production

Sediment from improperly managed construction sites, crop and forest lands and eroding stream banks

Salt from irrigation practices and acid drainage from abandoned mines

Bacteria and nutrients from livestock, pet wastes and faulty septic systems



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## Source Barrier

The main program designed to protect source water from contamination is the Source Water Assessment and Protection Program. This is a two part program in which the state first assesses the vulnerability of the source water to contamination and develops an assessment report for the water utility. This portion of the program is mandatory; the Safe Drinking Water Act (SDWA) requires all states to complete these assessments for the water utilities. The water utility can then use the results of the assessments to develop a protection plan to prevent contamination from entering the source. This portion of the program is voluntary, but highly recommended. It is much less expensive to prevent contaminants from entering the water than it is to treat them once they have entered.

The SDWA requires each state to develop a Source Water Protection Plan (SWPP) for the state and perform a Source Water Assessment (SWA) for each public water supply involved in treating and delivering water. The assessments must include a delineation of the source water assessment area, which is a boundary around the source of water. In Kansas, three different boundaries were considered, Zones A, B and C, based on their distance from the well or surface water intake and the potential of the contaminants in this zone to actually reach or enter the drinking water source. Zone A is an area close to the source water, Zone B is slightly further out and Zone C is far out from the well or intake. The contaminants in Zone A would be of most concern to a water utility. As an example, if the water utility uses a well as its source, the delineation of Zone A would be a circle around the well with a radius of 100 feet, meaning that the well would be in the center and the assessment would look out in all directions 100 feet. Zone B would be a circle of radius 2000 feet and Zone C would be a circle of radius two miles.

Following the delineation, the Kansas Department of Health and Environment (KDHE) must conduct an inventory of potential contamination sources. The inventory is completed by zone and considers both point source contamination, where the source of contamination can be tied to a single location (such as the discharge from a leaking underground storage tank), and non-point source contamination, where the contamination is diffuse (such as runoff from an agricultural field). Contamination sources in Zone A are the most critical because these sources are the closest to the water well or intake and generally represent the most immediate hazard.

The final step is to conduct a susceptibility analysis to determine how vulnerable the source water is to the potential contamination sources. This information will guide recommendations in the system's source water protection plan. All of the information is included in the Source Water Assessment (SWA) report that is provided to the system and made available to

### ELEMENTS OF A SOURCE WATER ASSESSMENT

**Identification and map(s) of the area(s) of influence around the water source(s). These are the source water protection areas. Resources may include previous studies; Geographic Information System (GIS) data; hydrologic studies of the area, hydrologists; zoning maps; aerial photography; satellite imagery; topographic maps; soil maps; and geologic maps.**

**Inventory of documented and potential contamination sources within the protection area, including current and future commercial, industrial, residential, waste management, development activities, agriculture, etc. that may be potential threats to drinking water supplies.**

**Analysis of likelihood that contamination could occur. This includes a determination of whether there are already zoning or best management practices in place to protect wells, waterways, floodplains, wetlands, etc. from livestock, erosion, runoff, etc.**

**Prioritization of contamination threats and vulnerabilities based on analysis of the severity of the impact of various types of contamination.**



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the public online or upon request. KDHE has completed SWAs on all of the public water systems in the state. Further information about the KDHE SWA program is available at: http://www.kdheks.gov/nps/swap/.

Source water assessments only identify the potential sources of contamination. It takes a source water protection plan developed and implemented by the utility to actually protect the source water from contamination sources. The development of the plan will likely take a team of individuals, both inside and outside the utility, because controlling the sources of contamination is likely to involve actions that must be taken by others. It is unlikely that a water utility will have all the regulatory powers necessary to protect its source water completely on its own. One notable exception is if the utility owns all of the land around its sources, such that it controls the land use and access. An example of this type of situation is New York City, which owns and controls the use of the land surrounding their drinking water reservoirs in order to ensure they are protected from contamination. It is important to remember, however, that it takes both owning the land and controlling the use of the land to protect source water. One very small utility was extremely proud of the fact that they were able to purchase the land around their wellhead. Unfortunately, they decided that they could bring in extra revenue to the system by leasing out the land around the wellhead to a farmer for cattle grazing. There was no fence around the wellhead to keep the cows away, which allowed for the potential for contaminants to enter the well.

## ELEMENTS OF A SOURCE WATER PROTECTION PLAN

***Source Water Assessment:*** **Delineate, analyze and prioritize protection area(s), potential contaminants and threats.**

***Management measures to prevent, reduce or eliminate threats:*** **Use the information gathered and analyzed in the assessment to formulate and implement measures that address each threat or array of risks specific to each system. The use of both non-regulatory and regulatory management practices is encouraged.**

***Public education:*** **Notify and involve the public about threats identified in the contaminant source inventory and how they affect the water system. Ensure that the public has information necessary to control and modify their own actions to prevent contamination and to participate effectively in community activities to protect drinking water.**

***Monitoring:*** **Test for water quality and ensure that management measures are properly implemented, followed and maintained.**

***Contingency planning:*** **Refer to the utility's emergency water supply plan or the emergency response plan, if it incorporates the emergency water supply plan. (*41*)**

In the vast majority of cases, the utility will need to work with a variety of individuals in order to implement a plan. The best option is to involve these people from the outset during the plan development. Depending on the situation, individuals may come from agriculture; commercial enterprises; industrial facilities; developers; parks and recreation entities; local, state, federal or tribal entities with the authority to make regulatory or land use decisions in the source water protection areas; other water providers; conservation/environmental/watershed groups or teachers, school groups and local citizens. It is a good idea to document public and stakeholder involvement in the final written document, including who participated in the plan development.

The utility should evaluate the source water susceptibility as identified in the SWA to determine potential protection measures. Some measures may be quite simple, such as installing barriers to prevent runoff, while others may be quite complex. Regulatory tools such as zoning and permits, health regulations and performance standards may be used to protect water



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sources if the utility is located within jurisdictional boundaries where the governing body is willing and able to enact and enforce regulations, building or zoning codes. If a water utility is in an unincorporated area, where no zoning or similar regulation can be applied, the utility needs to employ other tools. Non-regulatory management tools include public education; citizen involvement; best management practices (often applicable to agricultural land); land or conservation easement acquisition and protection (such as fences); and water conservation (to minimize the intrusion of contaminants or saltwater that migrate into the space left by removing groundwater).

A source water protection plan should be amended or revised any time the source changes. Otherwise, source water protection plans and implementation should be reviewed annually if possible, but no less than once every five years.

If the utility has a SWPP, new board members should become familiar with it. If there is no SWPP, the board should seriously consider developing one. Although development is voluntary, protecting the source from contamination can reap considerable benefits over time by protecting public health and reducing or eliminating the need for expensive treatment down the road. Technical assistance providers in Kansas may be able to assist in the development of a source water protection plan, possibly at no cost, if the board decides to pursue plan development. One notable example of a utility that paid a price for inadequate source water protection is the chemical spill into the Elk River in West Virginia in January of 2014. The contaminants spilled from a chemical storage tank into the river and caused the contamination of drinking water supplies for approximately 300,000 people. The monetary and social cost of the spill was several orders of magnitude greater than what it would have cost to install or maintain adequate spill containment measures around the tank.

Utilities who share a source of drinking water can work together to complete a unified source water protection plan. This type of plan was done for a lake in Texas that supplied water to 11 different communities. The water utilities in these communities got together to develop one plan to protect the lake. While none of them had the resources or ability to protect the lake on their own, working together allowed them to implement protection measures. As just one example, they were able to work with the boat marina located near the intake to install protection measures around the gasoline fueling station and they were able to remove batteries that had been thrown in the lake many years before.

In addition to the Source Water Protection Program, Kansas has the Watershed Restoration and Protection Strategy (WRAPS) Program, which is run by KDHE with guidance and backing from EPA. The program seeks to restore watersheds that have become polluted or otherwise degraded in quality and then to maintain and protect these watersheds from future problems. The complete program is described at www.kswraps.org. This program may be a viable tool for a community that has a degraded watershed serving as a drinking water source. If the board is interested in exploring this option, it should examine the WRAPS website to determine if there is currently any funding for the program and to determine how and when to apply.

### THE WRAPS PROCESS

***Development:*** **Recruiting stakeholders, educating the public and compiling information about the watershed**

***Assessment:*** **Determining pollutant levels and modeling the watershed**

***Planning:*** **Formulating goals and an action plan**

***Implementation:*** **Carrying out the action plan and measuring progress toward the goals**

## Treatment Barrier

Treating water to remove contaminants is a major barrier to protect public health, as long as the correct treatment technologies are employed and they are being operated as intended. Treatment includes disinfection, filtration, groundwater under the direct influence of surface water (GWUDI), removal of contaminants and any other processes intended to improve



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## GROUNDWATER UNDER THE DIRECT INFLUENCE OF SURFACE WATER - GWUDI

**GWUDI is "any water beneath the surface or ground with: a) significant occurrence of insects or other macroorganisms, algae, organic debris or large-diameter pathogens such as *Giardia lamblia or Crytosporidium*; or b) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions." *(40CFR 141.2)***

**GWUDI sources may not have received adequate natural filtration to remove disease causing organisms.**

**Systems that use a source that is determined to be a GWUDI must follow the regulatory requirements that surface water systems follow.**

**Adequate filtration and disinfection must be provided for GWUDI sources.**

**GWUDI systems must provide monthly operating reports to the state including turbidity and chlorine residual readings.**

the water quality, such as the addition of corrosion inhibitors to reduce lead and copper levels.

Disinfection is the process of inactivating microorganisms in the water by adding an oxidizing agent, most commonly chlorine, or by using a physical process such as ultraviolet light. The amount of chlorine necessary to provide public health protection is determined by examining CT at the first customer. CT refers to the concentration of chlorine in the water and the amount of time the water is in contact with the chlorine. The first customer – the first person to receive the water after it leaves the treatment facility – is the most vulnerable. Therefore, if the first customer is protected, all other customers should be protected as well. In order to have an adequate CT to protect the first customer, the system must have a free chlorine residual at the first customer that is high enough and is in contact with the water long enough to effectively remove or inactivate 99.99% (4-log) of viruses. The relationship between chlorine and contact time is inverse, meaning that when there is more time for the reactions to take place, less chlorine is needed and when there is less time for reactions, more chlorine is needed. CT is specific for each water system, as it is based on water quality parameters, such as temperature and pH, and physical parameters such as length and diameter of pipe and flow rates to the first customer. The time it takes for the water to reach the first customer is generally fixed based on the system design and construction. To change CT, therefore, the amount of chlorine must be adjusted to reach the required amount of deactivation of microorganisms.

Disinfection by itself can render groundwater safe from microbial contamination, but in the case of surface water or GWUDI, this process must be combined with filtration.

About one third of the drinking water systems in Kansas have surface water as their source and these systems serve almost two thirds of the population. The requirement for filtration is included in Kansas Administrative Regulations 28-15a-70, 28-15a-72 through 28-15a-75, which states that surface water systems, "shall provide filtration and disinfection treatment of source water.... Systems which do not meet the requirements ... are in violation...and shall issue public notice as required...." In addition to filtering the water, this regulation requires systems to take and record turbidity readings of the finished water entering the distribution system. Water with a high turbidity (cloudiness) level adversely affects the efficiency of the disinfection process and may cause the undesirable formation of trihalomethanes (THMs) and haloacetic acids (HAA5s). For these reasons, turbidity limits are set depending on the type of filtration used. A maximum of 1.0 nephelometric turbidity units (NTU) is set for any single reading. The filtration process, in conjunction with the disinfection process described earlier, must remove or inactivate 99.99% of viruses and 99.9% of *Giardia lamblia* cysts in the finished water.

Filtration and disinfection are primarily aimed at removing microbial-related contaminants from the water. If there are other constituents in the water, such as arsenic or nitrate, additional treatment units may be required. Working in combination, all the treatment units, including disinfection, are designed to



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ensure that the finished water is safe for all customers to drink, even those with the most vulnerabilities to waterborne disease – the elderly, babies, children, the sick and those with compromised immune systems.

## Distribution Barrier

There are several ways that water utilities prevent contamination from entering the water distribution system or causing harm to the public, including maintenance of a chlorine residual, maintaining adequate pressure, ensuring the integrity of the system, properly operating and maintaining storage tanks and implementing a cross connection control program.

Most water utilities use some form of chlorination to disinfect the water. Following disinfection, utilities maintain a low level of chlorine in the water, called a chlorine residual, to prevent re-growth of microorganisms in the distribution piping. KDHE requires the residual to be 0.2 milligrams per liter (mg/L) if free chlorine is used or 1.0 mg/L if combined chlorine is used. The maximum level of chlorine residual allowed in the distribution system is 4.0 mg/L with compliance based on a running annual average.

Water distribution piping is operated as a pressurized system for several reasons, one of which is to ensure water flows out of any break in a pipe rather than contaminants flowing in. KDHE requires a minimum pressure of 20 pounds per square inch (psi) in all distribution piping to ensure the system is protected from the entry of contamination. Most utilities operate well in excess of this minimum pressure, which will provide a factor of safety if something goes wrong in the system.

When water distribution piping is first installed, there are no openings into the pipe that would allow contaminants to enter. Over time, the action of the soil around the pipe and the water within the pipe may degrade the pipe material and cause holes to occur. Disturbances of the soil from traffic, road construction, earthquakes or other events can cause pipes to separate or crack. Furthermore, long runs of pipe are constructed by connecting short segments of pipe together. Fittings, such as elbows, tees and valves, are also placed between pipes. The pipes can separate at any of these joints. Any time there is an opening in a pipe there is some potential for contamination to enter the system. Maintaining adequate pressure will reduce this concern as described above, but utilities can also actively look for holes or breaks in pipes that are hidden from view, through leak detection, and repair them. When utilities complete major pipeline repairs or replacements they also disinfect the pipe to try to eliminate any contamination that might have entered the system.

In the past, storage tanks were the biggest source of distribution-related waterborne disease outbreaks. The problems generally occurred from openings in the storage tanks that allowed contaminants, such as animal droppings, to flow into the tanks. Inspecting the tanks to ensure that they are completely intact (i.e., no openings) and making repairs if needed is one important barrier for public health protection. Other related activities include: ensuring that overflows and vents are properly screened and cleaning and rehabilitating tanks as necessary.

Distribution systems have the potential for contamination from connections with water that is not safe to drink. These connections are called cross connections. Cross connections are defined as actual or potential connections between potable and non-potable supplies and can pose a serious public health hazard. In order to protect customers, they must either be eliminated or controlled using a suitable cross connection control device. A water utility should have a cross connection control program that identifies real or potential cross connections in the system and specifies how they should be controlled. The program must be adaptable because cross-connections pose a dynamic problem for water utilities, since piping systems are continually being installed, extended and altered by a variety of groups. Even those experienced in plumbing and pipe installation do not always recognize potential cross connections, so along with actual controls, education is a key component of any program.

In order for contaminated water to enter a potable water supply through a cross connection two things need to occur:

1. There must be a physical link between a non-potable source and the potable water supply ***and***

2. The net force (or pressure) in the system must be towards the potable water supply from the non-potable supply

When contaminated water or liquid flows from the non-potable system into the drinking water distribution system, it is termed backflow. Backflow can occur due to the conditions of backpressure or backsiphonage.



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Backflow due to backpressure occurs when the downstream water pressure is greater than the water supply pressure. This can happen with any pressurized system such as chemical feed pumps, boilers, elevated tanks or recirculating systems. Backflow due to backsiphonage is caused by negative pressure from a vacuum (or partial vacuum) in the supply piping. Backsiphonage can be created when there is a stoppage in the water supply due to repairs or breaks in the distribution main; an increased demand at one location, such as firefighting; or even undersized piping. Backsiphonage reverses normal flow in the system and can pull contaminants into the drinking water.

The best way to protect public health is to eliminate all cross connections, but this is often not possible. In these cases, a cross connection device should be used to control the connection. The type of device used depends on the degree of hazard posed by the cross connection. The greater the hazard, the more substantial the cross-connection control device must be. The hose bibs at each house are a potential cross connection, but these can easily be controlled with simple devices such as hose bib vacuum breakers. Industrial type cross-connections would require a substantial device, such as a reduced pressure zone backflow preventer. The seven types of devices that can be used to control cross connections include: air gaps; barometric loops; atmospheric vacuum breakers; pressure vacuum breakers; double check valves; double check valves with an intermediate atmospheric vent; and reduced pressure zone backflow preventers. The table in Appendix D summarizes these devices. More information regarding cross connection control devices can be found in EPA's Cross Connection Control Manual at: http://water.epa.gov/infrastructure/drinkingwater/pws/crossconnectioncontrol/.

Any water utility with cross connections or the potential for cross connections needs to develop a cross connection control program. Some considerations in establishing an effective program include:

- Establishing a cross connection control ordinance that is legally enforceable (or service rules, for systems that cannot pass ordinances)
- Conducting public information meetings that define the program and answer questions
- Utilizing local media, including newspapers and radio, to announce the program to the public
- Educating water utility employees on the testing and repair of cross connection control devices (courses for water operators are readily available in Kansas)
- Purchasing backflow device test kits
- Conducting meetings with local plumbing and building inspectors and other groups that will be active in the installation, inspection and repair of the backflow devices
- Conducting a survey of industrial and commercial customers that may require backflow devices, and prioritizing the degree of hazard that these customers represent, so that high hazard facilities are inspected first
- Reviewing all plans for new construction to ensure that the correct type of backflow device is used (depending on the hazard represented)
- Starting a residential backflow prevention program so that new residences will have a residential double check valve installed
- Installing residential double check valves at existing residences as water mains are repaired or replaced
- Creating a list of all testable backflow devices that are being used in the system and ensuring that they are tested at the interval defined by the ordinance

Protecting drinking water from both known and unknown hazards is a responsibility that extends to everyone using the water. While it is the water utility's responsibility to administer the Cross Connection

## TYPES OF BACKFLOW

***Backpressure:*** **downstream water pressure greater than water supply pressure**

***Backsiphonage:*** **negative pressure from a vacuum in supply piping**



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Control Program, the success of the program depends on the water utility board, water utility employees, public health officials, plumbing and building inspectors, building owners and managers, plumbing installers, maintenance workers and the general public. Working together, all of these groups can protect public health by minimizing the hazards posed by cross connections. *(13, 14)*

## Additional Barriers

Although source, treatment and distribution are the main barriers to public health protection, there are other barriers that are involved, including security measures, staff expertise and regulatory oversight. After the events of 9/11, the vulnerability of water utilities to deliberate contamination became a much larger concern. In fact, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (PHS&BPR) required systems serving more than 3,300 persons to conduct a vulnerability assessment to determine how susceptible the system would be to a potential terrorist attack. Although terrorism received much attention, utilities also face the potential of contamination from vandalism. In order to protect the utility, it is necessary to install reasonable security measures. "Reasonable" is very system specific based on the size of the system, the vulnerabilities, the likelihood of an event and the system budget. All systems should install passive strategies, such as fences around tanks and wells and locks on facility access points, while larger systems may also employ active strategies such as guards and video monitoring.

The ability of passive security devices to benefit a water utility should not be underestimated. One utility was completing a construction project and removed a segment of the fence around their storage tank to permit access by heavy equipment. The construction company failed to properly secure the site over the weekend and vandals came into the area and climbed the storage tank, leaving graffiti the entire way up the tank ladder. It was clear the vandals had made it to the top of the tank, but it was unclear whether they entered the tank or put anything in the water. Unfortunately, the utility had not secured the hatch on top of the tank with a lock so there was no way to know whether the tank had been breached or not. In consultation with regulatory agencies and the Center for Disease Control, the decision was made to drain the entire tank and disinfect it prior to refilling the tank. This action cost the utility a considerable amount of time and money and subjected customers to potential contamination. An inexpensive lock could have protected the utility from potential problems and, at the least, would have made it known whether or not the vandals opened the hatch to the tank.

The expertise and training of water operators is another public health protection barrier. Knowledgeable and experienced operators have the skills and abilities to operate the water utility in compliance with regulations and to deal appropriately with emergency situations that arise.

Regulatory agencies provide oversight to ensure water utilities provide high quality, safe drinking water, including conducting sanitary surveys to check how well the multiple barriers are working. The knowledge that regulatory compliance is required and will be enforced helps to keep water operators and managers focused on the importance of meeting regulatory standards.

### SANITARY SURVEYS: A CHECK ON MULTIPLE BARRIER CONTROLS

**Required for all public water supply systems**

**Performed by the state every 3 or 5 years depending on system type**

**Evaluate the source, treatment and distribution barriers to contamination**

**Identify deficiencies that might affect a system's ability to provide safe drinking water**

**Require a system to correct any deficiencies identified**

## OPERATOR CERTIFICATION

In the State of Kansas, all public water treatment facilities are required by state law K.S.A. 65-4516 and regulation K.A.R. 28-15-18(a) to be operated and maintained by personnel that are properly trained and certified. The operator certification program



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| TABLE 4-1: STATE OF KANSAS PUBLIC WATER SUPPLY OPERATOR CERTIFICATION LEVELS | | |
|---|---|---|
| **Class** | **Description** | **Population Served** |
| Small System | 1. Distribution System Only<br>2. Chlorination of Groundwater Only | All<br><501 |
| I | 1. Chlorination of Groundwater Only<br>2. Treatment of Groundwater* | 501 – 1,500<br><501 |
| II | 1. Chlorination of Groundwater Only<br>2. Treatment of Groundwater*<br>3. Treatment of Surface Water | 1,501 – 5,000<br>501 – 2,500<br><2,501 |
| III | 1. Chlorination of Groundwater Only<br>2. Treatment of Ground Water or Surface Water | 5,001 – 20,000<br>2,501 – 10,000 |
| IV | 1. Chlorination of Groundwater Only<br>2. Treatment of Groundwater or Surface Water | >20,000<br>>10,000 |
| *Treatment of groundwater includes iron & manganese removal; softening; membrane filtration; coagulation, sedimentation and filtration; re-carbonation; and any chemical addition other than chlorine | | |

began in 1975 with the realization that properly trained operators are a critical component in ensuring safe drinking water. The operator certification program is administered by KDHE and provides five levels of certification. The levels are defined by the source of water, treatment methods and population served, and are presented in Table 4-1. Each public water supply system must be under the operational control of an operator certified at the appropriate level for that system. It is important for the board to understand which class of operator is required for its system and to make sure the system operator is certified at the appropriate level.

To become certified, operators must meet several criteria and pass a certification exam. The criteria that must be met before taking the exam include:

- Currently own or are employed by a water supply system
- Have a high school diploma or GED
- Have acquired the minimum number of years of experience for the class of examination desired (see Appendix D)
- Have acquired the minimum number of points for the class of examination desired (points are awarded based on experience, education and training as defined in the table in Appendix D)

Once the minimum requirements for certification are met, the operator must submit an exam application and fee to KDHE. Exam dates and locations can be determined by calling KDHE at 785-296-5511 or by looking online at www.kdheks.gov/water/www.html.

Water certifications are valid for a two year period, after which they must be renewed. Continuing education or training hours must be gained during the two year period in order to renew the license. A Small Systems Certificate requires a total of five hours of training while Class I-IV Certificates require a total of ten hours of training. Continuing education hours earned prior to certification will not count toward certificate renewal.

If a Small System or Class I or Class II system loses its only certified operator, it may hire another operator or contract with an operator certified at or above the required level. If this option is not available to the utility, another option is to hire a non-certified individual who would then be classified as an Operator-in-Training (OIT). KDHE must be notified within 30 days of hiring the OIT and will issue an OIT Certificate. An OIT has



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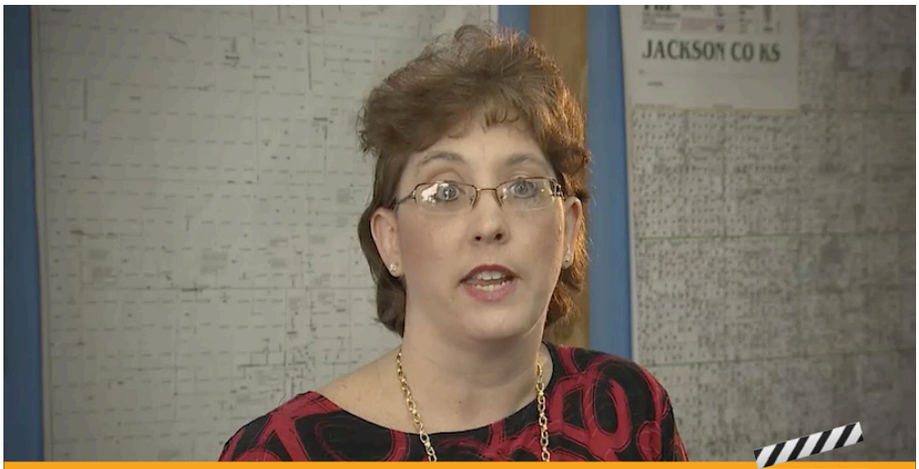
18 months after the issuance of the certificate to meet the certification requirements and to take the appropriate exam. If the OIT does not obtain certification within the specified time period, but is making progress towards certification, KDHE has the discretion to renew the OIT Certificate for an additional year.

When hiring an operator, whether as an employee or as a contractor, the system manager or board should check the operator's credentials to ensure that he/she is certified at the appropriate level and is currently in good standing. The board or manager should ensure that the operator maintains the certification by fulfilling the renewal requirements which include additional training.

The board should support operators in pursuing certification or higher levels of certification and may wish to tie additional compensation to certification levels. For example, a system may give a salary increase when an operator receives the next highest certification level. Financial incentives will help to encourage continuing education and training and enhance employee retention. If financial incentives are not possible or desirable, the board may wish to consider non-monetary compensation, such as a day off or some other kind of award. At the very least, the operator should receive a letter of recognition from the board acknowledging the accomplishment. The board may also wish to have a ceremony in which the operator is given his/her certificate or acknowledgement letter at a board meeting. Members of the operator's family can be invited to the event. Everyone likes to be appreciated and acknowledged so this action will go a long way towards showing strong board support for water operators.

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General Manager, Jackson Co. RWD #3
*"Operator Training"*
TC-4

## Importance of Training

Training is an extremely important part of being a water operator. Training is required to obtain or renew certification, but more importantly, it provides the operator with current information on regulations, techniques to operate and maintain equipment and how to implement the various public health and sustainability programs (e.g., asset management, water loss control, cross connection control, source water protection). Training permits the exchange of knowledge and skills enabling operators to grow in their jobs and provide a higher level of service to the customers. Training also allows the operator to keep up with the rapid pace of technology changes in the water industry.

Supporting an operator's professional development by emphasizing training is a key responsibility of a utility board. The board should allocate money for training related expenses, including travel and registration fees and provide staffing coverage to allow the operator to attend professional training. It is reasonable for the utility to request the operator to seek out trainings that are most relevant to the utility, close by and low cost or free, to the extent possible. However, the board should understand that in order to receive specific types of training, especially highly specialized training, it may be necessary for the operator to travel to another state or to pay higher registration fees. The board may indicate the number of days that are allocated each year for operator training.

If the system has multiple operators, it may consider rotating which operator(s) are attending training, such that one of the operators remains at the facility to handle normal operations and any emergency situations that arise. Smaller systems may not have anyone who is able to cover for the operator when he/she leaves for training. If the operator's absence is considered to be a problem, the board may consider hiring an operator on a contract basis who will agree to be paid



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on an intermittent hourly basis to cover for the operator during training. Alternatively, the board may select one of its members or another community member to obtain certification so that the system can have a fill-in certified operator. Additionally, there are times when a technical assistance provider may be used to provide temporary coverage.

## UTILITY SUSTAINABILITY PROGRAMS

Water operators, in concert with other water system personnel, should be actively involved in the implementation of the sustainability programs of asset management, water loss control and energy efficiency to ensure the utility is a good steward of the public investment in the system and the environment. Asset management allows the utility to provide the desired level of service (what the customers want) at the lowest life cycle cost. This does not mean at no cost, but rather the best appropriate cost to meet the needs of the community now and into the future. This program is described in detail in Chapter 2 of this manual. Implementing a water loss control program allows the utility to increase revenues and water efficiency while at the same time reducing water waste. Controlling water loss is particularly important where resources are scarce or energy costs are high. Decreasing or reducing water losses may also forestall needed infrastructure, saving the utility money. Often, the largest operational cost a utility faces is energy and it is also one of the few controllable costs. When energy efficiency is practiced, the utility will save money as well as energy. Energy efficiency and water loss control are interrelated; saving water saves the energy it would have taken to produce and deliver the water. A further benefit to sustainability programs is that they place the customer at the center of everything the utility does. The utility exists to provide a service to its customers, and this provides context for the operations of the utility.

### Water Loss Control

When a water system subtracts the quantity of water it sells from the quantity of water it produces for a given period of time (say a month or year), the resulting number is considered non-revenue water. This is all the water that the utility produces that does not generate any revenue for the system. There are several types of non-revenue water:Meter inaccuracies

- Authorized uses of the water that are unbilled (e.g. treatment plant uses, city offices, parks, etc.)
- Unauthorized water uses (i.e., water theft)
- Data handling errors
- Water leaking from the system (known as “real water losses”)

In the past, systems may have referred to all or part of this non-revenue water as “unaccounted for” water. This terminology is now considered outdated by water loss control professionals because the goal is to account for all of the water the utility produces and place it into categories of non-revenue water.

It is important to view water loss control as an overall process and not as a single event. The process starts with establishing the nature of the problem. This is done by conducting a water audit to account for all of the inputs into the system and all of the uses of the water. The next step is to establish goals regarding what the system wants to achieve with a water loss control program. This is a very important step because it will determine where to invest the most time and effort and will

### BENEFITS OF CONTROLLING WATER LOSSES

**Protect water resources**

**Reduce or eliminate the need for additional sources, such as wells**

**Minimize disruptions to customers**

**Increase revenues**

**Provide greater equity between customers**

**Water conservation**

**Minimize public health threats from contamination resulting from line breaks**



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also provide a way to assess progress towards achieving the system's goals. This allows the utility to focus in the right direction. Next it is important to choose appropriate strategies to address the system's particular water loss issues. Without the right strategies, money, time and resources are wasted, and goals may not be achieved. Most water utilities have insufficient funds to implement all the projects and activities they would like and water loss control is no exception. Systems often have to make choices to prioritize strategies, as well as how to phase activities over time. This prioritization is very important for implementation. Finally, it is necessary to determine how to pay for the water loss control program. However, unlike many other activities within a water utility, water loss control programs have the potential to generate revenue to pay for some of the cost of the program.

The water loss control process is not a "one and done" activity; it repeats and cycles. After strategies have been implemented, the water loss audit should be repeated. Generally, it should be repeated every year. Goals should be measured to determine progress, and they should be adjusted as necessary to adapt to changing situations. Strategies to address the problems experienced by the utility should be reassessed and prioritized. Finally, the financial situation should be reviewed to determine the funding availability. This process is very similar to the asset management process presented earlier in Chapter 2 and will provide the best means of ensuring a well-conceived, well-executed and appropriately funded program.

Before a utility embarks on a water loss control program there are a few things to consider. First, the board needs to be supportive of the program and recognize the need for investment in order to make it successful. When utilities underestimate the time, resources and difficulties associated with implementation, they often end up with a partially implemented program which will not achieve the desired goals. It should be recognized at the outset that a water loss control program is not an exciting or interesting endeavor and probably will not lead to ribbon cutting or other public-event worthy opportunities. Finally, the utility should be very careful not to base the selection of control strategies on preconceived ideas about what is happening in the utility but rather base the selection on actual data provided by the water audit. A detailed description of a water loss control program is provided in Appendix D of this manual.

### *A Word About Meters*

Meters are critical components in a water loss control program. Master meters on water sources and bulk imports and exports of water are absolutely vital to knowing how much water is being supplied to the system or exported in bulk out of it. These meters are the most important component of the water balance. The water balance will be negatively impacted if the readings from these meters are not accurate, as they will provide the value for the total quantity of water supplied to the system. Two conditions can cause inaccurate or incorrect readings: poorly calibrated meters (the meter is not reading properly) and poorly installed meters (the meter, itself is calibrated correctly, but it is incorrectly measuring the flow passing through it). If these meters are in need of repair or replacement, this would be an excellent place to start water loss control activities and this activity



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TC-5

While both of these types of meters have substantial benefits, they come with considerable costs. This type of activity should be prioritized with the other activities on the water loss control program to ensure that it is the highest and best use of the available funds. There may be other priorities that will help the system more, necessitating a delay in using this type of technology. Before making this decision, carefully consider how the automatic meter data will be used and whether this technology is cost effective and right for your utility.

should be near the top of the prioritization list. If the sources or bulk imports or exports are not metered at all, adding these meters is a crucial first step.

Meters on customer connections provide information regarding water use. If the utility has no customer meters, it will be extremely difficult to complete a water audit and it will be nearly impossible to implement an effective water conservation program. Even if customers will continue to receive a flat rate bill that does not vary with usage, a water utility should consider installing meters and reading them. Metering of customers should rank very high on the priority list. If the system has customer meters, but does not read them, a meter reading program should be an immediate priority. If customer meters are stopped or inaccurate, a meter replacement program should be undertaken to provide more accurate readings and increase revenue to the system. The meter replacement program can be prioritized based on meter use (i.e., those meters that experience the highest volume of water passing through them consistently over time would have the highest priority of replacement) or meter age or a combination of both. A utility may also wish to consider an ongoing replacement program in which a percentage of the meters in the system are replaced every year, such that every 10, 15 or 20 years all the meters have been replaced. Malfunctioning meters should be given the highest priority for replacement since they are not reading anything at all, and they cause both lost revenue and inequities in billing.

The utility may have various size customer meters if there are commercial, institutional, industrial or large residential users. If a decision must be made regarding which meters to replace, larger, older meters or large meters found to be out of calibration should be given the highest priority as they generate the most revenue.

Many utilities wish to convert their standard meters to radio read meters, which lightens the work load on the meter reader and improves accuracy. Another option is to switch to automatic meters that send an electronic reading to a computer, eliminating the need for a meter reader.

## Energy Efficiency

Energy is often a large expense associated with producing water. Water utilities use a considerable amount of energy in the production of water, and if this use can be reduced through implementation of energy efficiency programs, the water utility will save money and the environment will benefit by reducing the amount of energy that must be produced.

An energy efficiency program is very similar to asset management and water loss control. The program starts by identifying, or inventorying, all of the assets within the utility that use energy. The inventory includes a description of the type and quantity of energy used. This inventory can be done as part of an overall energy audit, or it can be completed as part of an asset inventory process. Interestingly, this inventory step alone can be very revealing and beneficial to a utility. One utility inventoried all of its energy meters only to discover that two of those meters were not actually supplying energy to the utility but rather were supplying energy to a golf course. Worse



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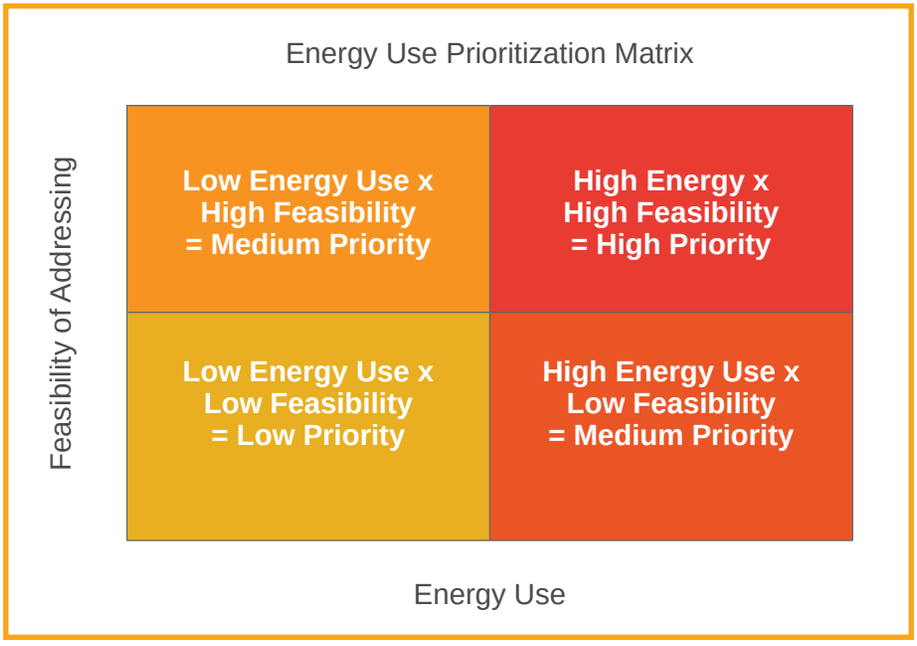
## GOOD GOALS ARE "SMART"


yet, these were the two highest energy using meters. The water utility had been erroneously paying these electric bills for years. Following the inventory, they were able to remove those meters from their energy inventory and have experienced a considerable savings.

Once the sources of energy use are identified, the next step is to set goals regarding what the utility is trying to achieve with its program. Similarly, these goals should meet the SMART criteria (see box), and the goals should be measured over time to make sure the utility is making progress in reducing energy use.

Energy uses can then be prioritized in terms of criticality. In this case, criticality refers to how much energy the asset uses and whether or not it is feasible to address the energy use. An asset using more energy is more critical in terms of energy savings since there is more opportunity to reduce energy use and save money. Assets for which there are opportunities to address the energy use by using a different type of asset, different type of energy or revising the asset in some way to reduce use are more critical because there is more opportunity to address the issue at hand. These two factors are combined such that assets that have a high energy use and an opportunity to address the issue are the highest priority. In other words, when an asset uses a lot of energy and it can be addressed in some way, there is a benefit to the utility in doing so and these projects should be higher priority. (see chart)




Once priority projects have been established, the utility can determine what projects can be completed with the available funds. It is important to remember that energy efficiency projects have the potential to pay back over time, in what is called the "payback period." Another term for the same idea is "return on investment (ROI)." The payback period or ROI is the time it would take to pay off the investment in the project through energy savings. The shorter the payback period, the more advantageous the project. For example, if replacing traditional light bulbs with energy efficient ones has a payback period of 6 months, the utility will collect enough savings over a 6 month period to pay back the investment. The payback period should be considered when making any decisions about implementing an energy efficiency project.

Funding for energy efficiency can come from the utility budget or energy savings. It is also possible for utilities to enter into



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arrangements with energy service companies or ESCOs to have energy efficiency projects paid for up-front by the ESCO, with the utility paying the ESCO over time through the energy savings. The ESCO reaps more of the energy savings, at least initially, in these arrangements, but the utility does not have to pay the up-front construction costs and will see some of the savings. The savings are also guaranteed so that the utility is not taking a big risk in these arrangements. Whether an ESCO is a preferred option will depend on many factors, including the size of the utility and the type and quantity of energy savings possible.

The potential amount of energy savings is generally lower for water utilities than wastewater utilities, but there are opportunities if the utility takes a thorough look at its inventory. Choosing appropriate projects will allow the utility to reap significant financial benefits from energy efficiency activities.

## REGULATORY COMPLIANCE

### Safe Drinking Water Act Regulations

The Safe Drinking Water Act (SDWA) was passed by Congress in 1974 in order to ensure a safe and healthy public drinking water supply. The SDWA required the Environmental Protection Agency (EPA) to regulate contaminants that were known to be or were likely to be present in drinking water supplies and that could cause a risk to public health. In implementing the SDWA, the EPA was tasked with creating national interim drinking water regulations that included establishing Maximum Contaminant Levels (MCLs) for primary contaminants; developing schedules and procedures for the monitoring and analyses of these contaminants; requiring record keeping; and providing public notification if a water system failed to meet any of the standards. In order to establish MCLs, EPA first sets a non-enforceable health goal called the Maximum Contaminant Level Goal (MCLG). The MCLG is the concentration of a contaminant that may be found in drinking water below which there is no known health effect. EPA then sets the MCL as close to the MCLG as possible based on technology as well as cost considerations. EPA revises the standards as necessary following a comprehensive review. These primary standards, as well as any revisions, are enforceable by EPA. An example of a standard that has changed over time is the arsenic standard that was set at 50 micrograms/liter and lowered to 10 micrograms/liter in 2001.

As part of the SDWA, Congress gave EPA the authority to delegate the primary responsibility for enforcing drinking water regulations to states, territories or tribes as long as the entities meet overall requirements and adopt regulations that are at least as stringent, if not more stringent than, the federal regulations. Kansas has been granted primacy by EPA to enforce the SDWA through the Kansas Department of Health and Environment (KDHE).

In 1979, under the SDWA, EPA created the national secondary drinking water regulations, a set of non-enforceable guidelines for contaminants that could cause aesthetic issues in drinking water. These secondary contaminants include constituents that might cause drinking water to be discolored or have an off taste or smell but do not have health-based effects.

In 1986, Congress amended and reauthorized the SDWA. This was done in order to speed up the process of regulating new contaminants and to better control disease-causing microbial contamination in water systems. Between 1986 and 1992 EPA revised and issued regulations for 76 of the 83 mandated contaminants. These 76 contaminants fell under four basic rules including: the Total Coliform Rule (TCR), the Surface Water Treatment Rule (SWTR), the Chemical Rule and the Lead and Copper Rule (LCR).

The latest amendments of the SDWA in 1996 were designed to emphasize:

- Comprehensive public health protection through risk-based standard setting
- Increased funding
- Prevention tools and programs
- Strengthened enforcement authority
- Public participation in drinking water issues

These regulations also established the capacity development program that includes the development of capacity development strategies by states and the provision of technical assistance to build managerial, financial and technical capacity.

The SDWA regulates public drinking water systems, which are defined by EPA as: a system for the provision to the public of piped water for human consumption if such system has at least fifteen (15) service



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### A PUBLIC WATER SYSTEM ACCORDING TO THE SDWA

**Has at least fifteen (15) service connections OR**

**Regularly services an average of at least twenty-five (25) individuals at least (60) days out of the year**

connections or regularly services an average of at least twenty-five (25) individuals at least sixty (60) days out of the year. As the primacy agency that administers the SDWA in Kansas, KDHE has adopted a more stringent definition of a public water system. In Kansas, a public water supply system is defined as: a system for the provision to the public of piped water for human consumption, if such system has at least ten (10) service connections OR regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year.

As discussed previously in Chapter 1, two factors determine how a water utility is regulated: the type of customers served and the source of the drinking water supply. The type of customers served divides the systems into different types: Community Water Systems (CWSs), Non Transient Non-Community systems (NTNC) and Transient Non-Community systems (TNCs). The source of drinking water divides systems into the following types: groundwater, surface water and groundwater under the influence of surface water (GWUDI).

Community Water Systems have the highest regulatory burden under the SDWA since their customers use the water continually on a year-round basis. These systems must test their water for all regulated contaminants. Non Transient Non-Community systems have the second highest regulatory burden under the SDWA behind community systems because the public is consuming the water regularly, but not as extensively as in a residence. The least regulated systems are Transient Non-Community systems because the people served change frequently and no one customer is expected to use the water often. These systems are facilities such as campgrounds, seasonal facilities, restaurants and gas stations. Because individuals will only have short term exposure, these systems will only be concerned with acute contamination (contamination that has the potential to very quickly make someone sick if they drink the water). Surface water and GWUDI systems have higher regulatory burdens than groundwater systems.

### A PUBLIC WATER SYSTEM ACCORDING TO KANSAS

**Has at least ten (10) service connections OR**

**Regularly services an average of at least twenty-five (25) individuals at least (60) days out of the year**

## KDHE Drinking Water Regulatory and Assistance

The Public Water Supply Section (PWSS) of KDHE's Bureau of Water oversees primacy for the State of Kansas. While KDHE, under EPA's oversight, adopts, implements and enforces drinking water regulations, they also have the function of assisting the utilities in a variety of ways, including enhancing system capacity development, funding infrastructure improvements and replacements, as well as training managers and operators. The PWSS oversees more than 1,000 public water supply systems including municipalities, rural water districts and privately owned systems ranging in size from a few customers up to hundreds of thousands of customers. Three units within the PWSS regulate and assist water utilities: the Engineering and Permits Unit, the Data Management and Compliance Unit, and the Capacity Development Unit.



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### *Engineering and Permits Unit*

The Engineering and Permits Unit reviews and approves plans and specifications for public water supply system drinking water projects and issues permits for completed projects. The reviews are based on KDHE's minimum design standards and other generally recognized drinking water design standards. The Engineering and Permits Unit also issues permits for all public water supply systems. There are two types of public water supply permit applications: Existing Public Water Supply System Permit Applications and New Public Water Supply System Permit Applications, which includes a management, financial and technical capacity assessment.

### *Data Management and Compliance Unit*

The regulatory programs administered by the PWSS require water systems to monitor for the drinking water contaminants contained in the SDWA. The Data Management and Compliance Unit oversees this water quality monitoring and measures system compliance. Water quality monitoring as required by the SDWA is dependent on system type and can include monitoring for microbiologicals, inorganic compounds (IOCs), volatile organic compounds (VOCs), synthetic organic compounds (SOCs), lead and copper, disinfection byproducts and radionuclides. In some situations, rather than regulating the contaminant, the system is required to meet treatment technique standards. To verify that water quality standards or treatment techniques are being met, regulations have been adopted to ensure regular monitoring and reporting of water quality parameters. This is the case with surface water treatment facilities that must monitor for turbidity and several other constituents.

### *Capacity Development Unit*

The Capacity Development Unit oversees the programs designed to enhance the managerial, financial and technical capacity of water utilities. This unit includes many assistance and outreach programs. A few of these programs are:

- KanCap Education Program: Used to fund the development of this document and the associated board member training.
- Capacity Development Achievement Awards: KDHE recognizes utilities that have demonstrated excellence in achieving and maintaining managerial, financial and technical capacity. The awards are given out annually to acknowledge systems that go beyond compliance.
- Financial Planning Tools: Financial planning and rate setting software is available through KDHE to assist water utilities in calculating user fees.
- Public Water Supply Capacity Survey: This survey can be taken by water utilities to assess their managerial, financial and technical capacity. It also helps KDHE set priorities for capacity assistance, establish a statewide baseline for capacity and identify training needs.

#### KDHE DRINKING WATER REGULATORY COMPLIANCE AND ASSISTANCE

**Permits and Engineering Unit**

- Reviews and approves plans and specifications for drinking water projects
- Issues permits for completed projects

**Data Management & Compliance Unit**

- Monitors water quality
- Measures compliance

**Capacity Development Unit**

- Oversees EPA's capacity development program
- KanCap Education Program
- Financial Planning Tools



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## TOTAL COLIFORM RULE VIOLATIONS

***Routine Monitoring Violation***: failing to collect any water samples within the monthly compliance period

***Repeat Monitoring Violation:*** failing to collect repeat (check) samples

***MCL Violation:*** water samples test positive for total coliform

***Acute MCL Violation:*** *E. coli* are found

***Treatment Technique Violation:*** failing to conduct a Level 1 or 2 assessment; failing to correct all sanitary defects; failing to conduct state approved start-up procedures for seasonal systems

### Monitoring and Reporting Requirements

To determine whether drinking water quality standards have been met, water utilities are required to monitor and report their results to KDHE. This information is reviewed for compliance and stored in a database so that state-wide compliance and trends can be examined. The database can also determine if systems are significant non-compliers so that additional measures can be taken to address the problems and return the system to compliance.

The monitoring and reporting requirements are dependent on the system type (population served and source of water) and vary by category of contaminant and regulatory rule and are presented below.

#### *Total Coliform*

All public water supply systems are required by state regulation K.A.R. 28-15-19(a) to disinfect all drinking water provided to the public. To evaluate the effectiveness of the disinfection method employed, all systems are required by state regulation K.A.R. 28-15a-21 to submit monthly water samples for total coliform testing. Total coliform testing is used as an indicator of the presence of other bacteriological contaminants. Systems can choose to have this bacteriological testing performed by KDHE's microbiology laboratory or can use a certified private laboratory. For groundwater systems, a minimum of two water samples must be collected and tested per month for systems serving up to 2,500 people. Groundwater systems serving more than 2,500 persons are required to collect and test more water samples per month, increasing in sample number from 3 to 180 as the population served by the system increases. Surface water systems serving a population of less than 4,100 must collect and test a minimum of 4 samples per month. As surface water system population increases, the number of samples will increase. *(41)*

Since 1989 this testing has been required as part of the Total Coliform Rule (TCR). On April 1, 2016 all public water supply systems had to begin complying with the Revised Total Coliform Rule (RTCR). Both the TCR and the RTCR require routine monitoring based on system type and size and establish a Maximum Contaminant Level (MCL) for total coliform and *E. coli*. The RTCR also requires systems to perform assessments (either Level 1 or Level 2, depending on the severity of the potential microbial contamination) that help identify sanitary defects that could allow microbial contamination to enter the distribution system, and to take corrective action to fix these defects. In addition, the RTCR requires all systems to have a written sampling plan that identifies sampling sites in the distribution system that are representative of water quality throughout the entire distribution system. This plan must include both routine and repeat sample sites.

The RTCR also specifies that seasonal systems must follow these provisions:

- State approved start-up procedures must be conducted prior to serving water to the public
- Seasonal systems that maintain adequate distribution system pressures during non-operating times of the year



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may be allowed an exemption from having to conduct state approved start-up procedures

- The state must be provided with certification that the start-up procedures have been performed

A Treatment Technique violation is assessed if a system fails to:

- Conduct a Level 1 or Level 2 assessment within 30 days of a trigger (an event that prompts the need for an assessment)
- Correct all sanitary defects from an assessment or state approved corrective action plan within 30 days of a trigger
- Conduct state approved start-up procedures before serving water to the public (if the system is seasonal and does not have an exemption)

## CHEMICAL CONTAMINANTS

- **Arsenic**
- **Asbestos**
- **Nitrate/Nitrite**
- **Inorganic Compounds (IOC)**
- **Volatile Organic Compounds (VOC)**
- **Synthetic Organic Compounds (SOC)**
- **Lead and Copper**
- **Disinfection By-Products**
- **Radionuclides**

Systems failing to collect any required water samples within the monthly compliance period are assessed a routine monitoring violation. Systems that have a positive water sample are required to do three repeat samples (also called check samples). If the system fails to collect these repeat (check) samples, the system is then assessed a repeat monitoring violation. Both of these monitoring violations require the system to issue public notice by publishing the violation notice in a local newspaper of general circulation. *(41)*

Systems are assessed a maximum contaminant level (MCL) violation if repeat water samples test positive for total coliform. The system can incur an acute MCL violation if fecal coliform or *E. coli* is also found. In both cases, the system is required to issue public notice through the electronic news media (radio and television) and publishing the violation notice in a local newspaper of general circulation. *(41)*

### *Chemical Contaminants*

The SDWA National Primary Drinking Water Regulations established maximum contaminant levels (MCL) for 83 chemical contaminants affecting drinking water. These contaminants are divided into five groups, all of which are harmful to human health, with most being toxic and/or carcinogenic. Numerous contaminants such as heavy metals, solvents, pesticides and herbicides are monitored by this regulation.

*All* Community Water Systems (CWSs) and Non Transient Non-Community water systems (NTNCs) are required to monitor for all of the chemical contaminants, whether or not the system has treatment in place to remove any of these contaminants. Water systems that exclusively purchase water from other systems are not required to monitor for these contaminants, but the water wholesaler must do so.

Systems monitor for chemical contaminants under a standardized monitoring schedule consisting of three compliance periods of three years each. During these compliance periods, water systems are required to do specific monitoring, depending on the size of their population and whether they use surface or ground water. The first three-year compliance period under this rule began January 1, 1993 and ended December 31, 1995. The compliance period that began January 1, 2014 will end on December 31, 2016. Systems with surface water as their source are required to monitor more frequently since their source is more vulnerable to contaminants than groundwater. Systems with populations greater than 3,300 are also required to monitor more frequently than small systems. *(41)*

Regulations also specify that all water samples must be collected at the point of entry (POE). The POE is defined as a point after the raw water has been treated and before it enters the distribution system. Systems with a surface water treatment plant typically have one point of entry while groundwater systems could have multiple points of entry, one for each well and treatment plant or well field and treatment plant.

Water supply systems that are out of compliance with this regulation, either by failing to monitor or by having a MCL violation, must issue a



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public notice of the violation to all of their consumers using newspaper, television, radio, mail and/or posted notices. *(41)*

Arsenic

The contamination of a drinking water source by arsenic can result from either natural or human activities. Arsenic is an element that occurs naturally in rocks, soil, water, air, plants and animals. Volcanic activity and the erosion of rocks and minerals, as well as forest fires, are natural events that can release arsenic into the environment. Arsenic is naturally occurring in groundwater in many areas of Kansas and several treatment plants have been constructed to remove this contaminant. Although about 90% of the arsenic used by industry in the United States is currently used for wood preservative purposes, arsenic is also used in paints, drugs, dyes, soaps, metals and semi-conductors. Agricultural applications along with mining and smelting also contribute to arsenic releases. Studies link arsenic ingestion to a number of health effects, including cancerous effects (skin, bladder, lung, kidney, nasal passages, liver and prostate cancer) and non-cancerous effects (cardiovascular, pulmonary, immunological, neurological and endocrine effects).

The current MCL for arsenic is 0.010 mg/L. This MCL was reduced from 0.050 mg/l to 0.010 mg/L effective January 23, 2006.

Asbestos

In recent years, people have become very aware of the health risks related to asbestos. Inhalation of asbestos fibers has been shown to produce lung tumors in laboratory animals and in humans. Ingestion of asbestos fibers greater than 10 micrometers in length has been shown to cause benign tumors in laboratory rats. To reduce the potential risk of cancer or other adverse health effects that have been observed in laboratory animals, EPA has set the drinking water standard for asbestos at 7 million fibers per liter (fibers longer than 10 micrometers). *(41)*

Asbestos generally enters drinking water from either contact with natural mineral deposits or asbestos-cement pipes used in water distribution systems. Geologically, Kansas does not have any naturally occurring asbestos. Therefore, the EPA gave the state of Kansas a waiver from having to perform asbestos monitoring. However, water systems using asbestos-cement pipes in their distribution system are required to test for asbestos.



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## Nitrate/Nitrite

Many drinking water contaminants, like nitrates and nitrites, are naturally occurring in the environment. Nitrogen may find its way into both ground and surface water from decaying plant and animal matter, precipitation and urban runoff. Fertilization of agricultural and urban land with ammonium nitrate and runoff from livestock operations are a significant cause of nitrate contamination in water.

Excessive amounts of nitrates and nitrites can cause methemoglobinemia in infants, also known as “blue-baby syndrome.” To safeguard infants from this condition, K.A.R. 28-15a-62 sets an MCL of 10 mg/l for nitrates and 1 mg/l for nitrites. K.A.R. 28-15a-62 requires public water supply systems with their own sources of water to monitor all their points of entry (POE) at least once a year for nitrates. Systems that exclusively rely on purchased water are exempt from this monitoring, although the water wholesaler must conduct the monitoring and report the results to the purchaser.

Several water systems in Kansas have had to remove nitrate from their drinking water. Options include: building a treatment plant to remove nitrate, blending water with a higher level of nitrate water with a lower of nitrate in order to reduce the concentration below the MCL, relocating wells to lower nitrate groundwater sources, or purchasing water from neighboring systems.

## Inorganic Compounds (IOCs)

Inorganic compounds (IOCs) consist of substances that do not have any carbon in their composition. Two major classes of inorganic compounds (IOCs) are metals and non-metals. K.A.R. 28-15a-62 sets MCLs for eight metals and two non-metal contaminants. Most of these IOCs occur naturally in the environment and are soluble in water. This solubility means the IOCs are potential contaminants in drinking water. Not all IOCs originate from natural mineral deposits. Industrial activities such as metal finishing, textile manufacturing, mining operations, electroplating, fertilizer manufacturing, paints and glass making also generate these contaminants.

All of these IOCs are toxic to humans at certain levels. Cadmium, chromium and selenium can cause damage to the kidneys, liver and nervous and circulatory systems. Barium has been associated with high blood pressure, and mercury has been shown to damage kidneys. Antimony, beryllium, cyanide, nickel and thallium have been shown to damage the brain, lungs, kidneys, heart, spleen and liver. Once detected, these IOCs can be removed from drinking water using various available technologies such as coagulation/filtration, lime softening, reverse osmosis, ion exchange, chlorine oxidation, activated alumina and granular activated carbon. A list of regulated IOCs with the MCL for each can be found in Appendix D.

## Volatile Organic Compounds (VOCs)

Volatile organic compounds (VOCs) are commonly referred to as organic solvents. These compounds are generally found as constituents in many degreasers, industrial cleaners, spot/stain removers, paint thinners, some paints, varnishes and lacquers, many paint removers/strippers, many pesticides/herbicides, most dry cleaning chemicals, many printing inks and printing press chemicals and most petroleum products, including many types of fuels. These compounds can often be identified by their distinct aromatic smell. Most of these compounds are flammable and toxic to varying degrees. Because of this, they are also a potential source of environmental pollution and pose a health hazard.

A list of the twenty-one volatile organic compounds regulated by K.A.R. 28-15a-61 and the MCLs for each contaminant can be found in Appendix D.

## Synthetic Organic Compounds (SOCs)

Synthetic organic compounds (SOCs) are man-made compounds, many of which are chlorinated and used as herbicides, pesticides, fungicides and insecticides. There are 33 synthetic organic compounds that are regulated in K.A.R. 28-15a-61. A list of these contaminants and the MCL for each is included in Appendix D.

## Lead and Copper

High exposure to metals in humans has long been recognized as a cause of adverse health effects. Lead has been singled out because of its possible presence in drinking water and its high toxicity to humans. Copper, although an essential nutrient, also poses a health threat at elevated levels. Young children are especially susceptible to the toxic effects of these metals.



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Due to the use of lead and copper in pipe and plumbing solder in the past, these contaminants have the possibility of leaching into the drinking water. Besides leaching from water pipes and solder, lead and copper can also leach from water fittings and faucets. Because of these concerns, the 1986 SDWA Amendments included the requirement for EPA to adopt lead and copper standards. The final regulations were adopted by EPA in 1991 and later adopted by reference in the Kansas Administrative Regulation 28-15a-80 through 28-15a-91. This regulation applies to all Community Water Systems and Non Transient Non-Community Water Systems, and requires monitoring for lead and copper on a scheduled basis. If monitoring results indicate unacceptable levels, the water system is required to initiate corrosion control treatment techniques to minimize lead and copper contamination. Action levels set by this regulation are 0.015 mg/l for lead and 1.3 mg/l for copper.

As part of an effort to eliminate lead exposure, all new pipe fittings must now be labeled “lead free”, which is defined as very low levels of lead, with varying concentrations allowed depending upon the product’s intended use. These rules cover both the water consumer side (faucets, solder, pipe, etc.) and the water utility side (meters, service lines, distribution pipe, etc). Over time, this action will eliminate many of the possible sources of lead leaching into drinking water.

## Disinfection By-Products

To ensure drinking water is safe and pathogen free it must be disinfected. The most commonly used method of disinfection is chlorination. When a disinfectant is added to water to kill pathogenic microorganisms, it reacts with naturally occurring organic matter that is found, in varying amounts, in all source waters to form disinfection byproducts (DBPs). These byproducts have been demonstrated to have adverse health effects, including cancer. The two most prevalent DBPs are total trihalomethanes (TTHMs) and haloacetic acids (HAA5s). Starting January 1, 2004 all water systems which add a chemical disinfectant had to comply with new MCLs of 0.080 mg/l for TTHMs and 0.060 mg/l for HAA5s established under the Stage 1 Disinfectants and Disinfection Byproducts Rule (D/DBPR).

The Stage 1 D/DBPR also established Maximum Residual Disinfectant Levels (MRDLs) for the disinfectant(s) being used in a water system (most commonly chlorine, chloramines and chlorine dioxide). MRDL is the maximum amount of disinfectant allowed in the distribution system. The MRDL for chlorine and chloramines is 4.0 mg/L, while the MRDL for chlorine dioxide is 0.8 mg/L. Compliance with the MRDLs for chlorine and chloramines is based upon the concentration of disinfectant measured at the same times and locations in which the system collects bacteriological samples under the Total Coliform Rule. Compliance with the MRDL is determined based on a running annual average (RAA) of monthly averages.

The Stage 2 D/DBPR was promulgated on January 4, 2006. Its purpose is to build upon the Stage 1 D/DBPR in addressing systems with the highest risk for disinfection by-products. Specifically the rule determines compliance with the MCLs based on a locational running annual average (LRAA) for



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each sampling location in the distribution system. Previously, the Stage 1 D/DBPR determined MCL compliance based on the running annual average for all sampling locations in the distribution system put together. In addition, the Stage 2 D/DBPR requires that consecutive systems that purchase water from a wholesale system sample for disinfection by-products and meet compliance requirements under the rule. Consecutive systems do not typically provide any treatment and rely on the wholesaler to provide them with water that meets standards. Some consecutive systems may receive water that exceeds the disinfection by-product MCLs and will either have to work with the wholesaler to improve water quality or in some cases they may have to install a treatment system to remove DBPs.

Each system required to comply with the Stage 2 D/DBPR is required to develop and implement a monitoring plan that specifies:

- Location and schedules for collecting all required samples
- Procedures for calculating compliance with MCLs and MRDLs
- If approved for monitoring as a consecutive system, or if providing water to a consecutive system, the sampling plan must reflect the entire distribution system

The plan shall be kept on file for review by the state. *(41,42)*

## Radionuclides

Radiation occurs naturally and is readily present in the environment. Radiation in groundwater occurs mainly when the natural decay of uranium in rocks and soil comes in contact with groundwater. In most circumstances, this radiation occurs at such low levels as to be harmless to human health. Occasionally, in some areas of the state, these radiation levels do occur at higher levels which may present a health risk. For this reason, regulations have been legislated requiring public water supply systems to monitor their water for radionuclides. A table showing radiological contaminants and their corresponding MCLs as set by K.A.R. 28-15a-66 can be found in Appendix D. *(41, 42)*

## Public Notification

Public notification is intended to provide consumers important information about problems with their drinking water quality. The most basic public notification that occurs is the Consumer Confidence Report (CCR). This report is prepared by Community Water Systems each year and provided to customers by July 1st. Non-Community Systems do not have to complete these reports. The CCR summarizes basic information about the source of drinking water used by the water system. It also provides information regarding any contaminants that were found in the water and the level of contamination, the compliance history of the water utility over the past year and educational information for consumers. There is required standard language for the CCRs, but communities are allowed to supplement the report with other information, beyond the required language, that they would like to share with customers. This is an excellent opportunity for the utility to get its message out to consumers. Communities can do a simple, straight-forward CCR report that uses standard white paper and paragraphs. Alternatively, communities can be very creative with their CCRs. Some communities have turned their CCRs into small magazines with pictures of the utility. A few communities in Texas created a calendar version of the CCR. One year, the utility used book titles as the starting point and altered them to be water related (e.g., A Tale of Two Waters, rather than *A Tale of Two Cities*). Another year, they used movie titles. The CCR calendars were both informative and humorous and were probably very effective at getting the attention of the system's customers.

In addition to the annual CCR, utilities need to provide public notice when violations of the SDWA occur. The timing of the notices and the type of notice vary based on the seriousness of the potential problem. When a contaminant has the potential to cause imminent health concerns, a Tier 1 notice is mandated to provide an immediate alert to consumers (e.g., a boil water emergency). For less serious problems, such as a missed test, water utilities are given up to a year to provide public notice. While public notice requirements have always been part of the SDWA, EPA recently revised these requirements to increase their effectiveness by making them quicker, shorter and easier to understand. Water suppliers are also allowed to combine notices for less serious problems

Depending on the severity of the situation, water suppliers have between 24 hours and one year to notify their customers after a violation occurs. EPA specifies three categories, or tiers, of public notification which vary based on the length of



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| TABLE 4-2: PUBLIC NOTIFICATION REQUIREMENTS | | | |
|---|---|---|---|
| | **Required Distribution Time** | **Examples** | **Notification Delivery Method** |
| **Tier 1** (Immediate Notice, Within 24 Hours) | Any time a situation occurs in which there is the potential for human health to be immediately impacted, water suppliers have 24 hours to notify people who may drink the affected water. | Acute MCL violation of the TCR with a coliform or *E. coli* present sample, followed by an *E. coli* present repeat sample; a violation of the Nitrate MCL; a Treatment Technique violation of the Surface Water Treatment Rules. | Water suppliers must provide notice to their customers as soon as practical or within 24 hours via radio, TV, hand delivery and/or posting. Water systems must also initiate consultation with the State within 24 hours. The State may establish additional notice requirements during consultation. |
| **Tier 2** (Notice as Soon as Possible, Within 30 Days) | Any time a water system provides water with levels of a contaminant that exceed EPA or state standards or that has not been treated properly, but that does not pose an immediate risk to human health, the water system must notify its customers as soon as possible, but within 30 days of the violation. | MCL violations for IIOCs, SOCs, VOCs, radionuclides, DBPs. A Monthly MCL violation of the TCR with more than one coliform present sample in a month. | Water systems must repeat notice every three months until the violation is resolved. For CWSs, notice via mail or direct delivery is required. For NCWSs, notice via posting, direct delivery or mail is required. All PWSs must use additional delivery methods reasonably calculated to reach consumers not notified by the first method. |
| **Tier 3** (Annual Notice) | When water systems violate a drinking water standard that does not have a direct impact on human health, the water supplier has up to a year to provide notice of this situation to its customers. The extra time gives water suppliers the opportunity to consolidate these notices and send them with annual water quality reports (Consumer Confidence Reports). | Failing to take a required sample on time. Failing to report a sample result to the State. | Water suppliers must provide notice to their customers within 12 months, repeated annually for unresolved violations. For CWSs, notice via mail or direct delivery is required. For NCWSs, notice via posting, direct delivery or mail is required. All PWSs must use additional delivery methods reasonably calculated to reach consumers not notified by the first method. |



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time required for and method of notification. Water systems are required to submit each type of notice they send to customers as well as a completed Certificate of Delivery to KDHE within 10 days of providing notice to customers. *(41)* (see Table 4-2)

### Record Keeping

Any owner or operator of a public water system must retain on its premises, or at a convenient location near its premises, records of compliance monitoring and violations. Actual laboratory reports may be kept or data may be transferred to tabular summaries. Table 4-3 shows the types of records and how long they must be kept.

## WATER QUANTITY

The basics of water rights and the need to obtain them are discussed in Chapter 1. This chapter focuses on other issues associated with water rights, including losing water rights, reporting requirements, minimum stream flows and specific Kansas programs related to water quantity. Assistance with water rights is available from the Kansas Department of Agriculture, Division of Water Resources. A Division of Water Resources field office map and contact information are located in Appendix H.

A utility can acquire new water rights or alter existing rights by application to the Kansas Division of Water Resources. This is the only means for a utility to obtain water rights; adverse use and possession (obtaining a right by using the water long enough) are not adequate. A brief description of the steps to obtain water rights is included in Appendix D, and additional information can be found on the Kansas Department of Agriculture website under Water Law Basics at: https://agriculture.ks.gov/divisions-programs/dwr/water-appropriation/water-law-basics.

Water rights holders must actually use the water to which they have been granted. Failure to do so can result in loss of those rights. Water rights can be relinquished two ways: abandonment or forfeiture. Abandonment is a deliberate choice to give up the right, while forfeiture occurs by failure to maintain the right.

Abandonment can occur if five years elapse during which the right holder does not use the water right and no “due and sufficient” cause exists for non-use. If the source dries up and cannot deliver the amount of water in the water right, it is not considered abandonment. Nor is it abandonment if the source becomes polluted for longer than twenty years and the withdrawing of water would be harmful to human health. Similarly, if the Chief Engineer orders a right holder to cease usage for some time (in deference to a more senior right holder, for example), that period of time is not counted against the twenty year limit. Abandonment can only be determined after a hearing is held by the Chief Engineer.

Forfeiture of water rights can result from the right holder’s failure “to comply with the provisions of the approval of application and permit to proceed and its terms, conditions and limitations without good cause” (K.A.R.5-3-6). The result is loss of priority date, permit revocation and application dismissal.

Annual water use reports are required to prove that the water right continues to be used, has not been abandoned and to perfect the water right. Reports are due on March 1 of each year and cover the previous calendar year. They must be filed by all permit holders whether water was withdrawn or not. Failure to report on time will result in a civil fine of $250. Falsification of water report data is a Class C misdemeanor. The office of the Chief Engineer bases its water appropriation rights in part on the reports, and incorrect information could lead to poor decision making. The office of the Chief Engineer will mail permit holders the required form. More information can be found at: http://agriculture.ks.gov/divisions-programs/dwr/water-appropriation/water-use-reporting.

### Minimum Desired Streamflow

Riparian regions (areas in and near a river) depend on the flow of water to maintain their biodiversity and ecology. Rivers are also important for human recreation and associated wetlands clean toxins from the environment and provide wildlife habitat. Streamflow is also required in order to support existing water appropriation rights on rivers. For these reasons, the Kansas State Legislature, from time to time, establishes a minimum desirable streamflow for waterways, meaning that, by law, the flow rate (volume of water per given time interval) must be maintained above a certain level. The Chief Engineer is responsible for ensuring that these streamflows are met.

When obtaining new water rights, a form must be filed acknowledging that minimum



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| TABLE 4-3: RECORD KEEPING REQUIREMENTS | | |
|---|---|---|
| **Records to Keep** | **Time to be Kept** | **What to Keep** |
| Microbiological Analyses and Turbidity Analyses | 5 years | • The date, place and time of sampling and the name of the person who collected the sample<br>• Identification of the sample as to whether it was a routine distribution system sample, repeat (check) sample, raw or process water sample or other special purpose sample<br>• Date of analysis<br>• Laboratory and person responsible for performing analysis<br>• The analytical technique/method used<br>• The results of the analysis |
| Chemical Analyses | 10 years | • The date, place and time of sampling and the name of the person who collected the sample<br>• Identification of the sample as to whether it was a routine sample, raw or process water sample or other special purpose sample<br>• Date of analysis<br>• Laboratory and person responsible for performing analysis<br>• The analytical technique/method used<br>• The results of the analysis |
| Records of action taken by the system to correct violations of primary drinking water regulations | 3 years after the last action taken with respect to the particular violation involved | All |
| Copies of any written reports, summaries or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant or by any local, State or Federal agency | 10 years after completion of the sanitary survey | All |
| Records concerning a variance or exemption granted to the system | 5 years following the expiration of such variance or exemption | All |
| Copies of public notices issued and certifications made to the primacy agency | 3 years after issuance | All |
| Copies of monitoring plans | The same period of time that the records of analyses taken under the plan are required to be kept | All |



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desirable streamflow designations exist. The form also acknowledges the Chief Engineer has the right and duty under state law to ensure that the flows are met, possibly by restricting water diversions from some or all water rights holders.

Under current state law, water rights and applications for permits with a priority date up to April 12, 1984 are not subject to minimum desirable streamflow requirements. Any rights obtained after that date are subject to these requirements.

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Director, Kansas Water Office
*"Kansas Water Office Programs"*
TC-6

## Restrictions on the Use of Existing Water Rights

Water rights are not always absolute; Kansas state law governs the conditions under which some rights may be limited for a period of time. The responsibility for this decision lies with the Office of the Chief Engineer. As long as water supplies are sufficient to meet the needs of all water rights holders, as well as all other legal conditions discussed above, all water right holders should find their legal access unimpeded. In times of scarcity, however, the more junior holders of water rights may find themselves restricted in their legal ability to withdraw water. Should two or more water rights have the same date of priority, domestic users will have first preference and municipal users will rank second. Other users will rank lower in priority.

The Chief Engineer may require an appropriation rights holder to implement a conservation plan to preserve water during times of drought or other water supply emergencies, provided that the public will benefit and conservation will promote the public interest. In assigning conservation efforts, the Chief Engineer will give more urgency to: users that share common sources that may be insufficient; users whose usage rates are much higher than users with comparable use in the same area; and users who apply for state grants, loans or cost-sharing plans for water projects. If the Chief Engineer mandates a conservation plan, users will be informed of available technical assistance resources to assist with preparing and implementing a plan.

The imposition of a conservation plan is not a sudden or short-term measure. Rights holders have a minimum of sixty days to prepare a plan and this timeframe may be extended with good cause at the discretion of the Chief Engineer. Actual conservation plan implementation may take as long as five years, depending on the physical effort it will take to make the necessary changes in water use. *(52)*

### AS OF JUNE 1, 2015, MINIMUM DESIRABLE STREAMFLOWS EXIST ON THE FOLLOWING RIVERS

| | | | |
|---|---|---|---|
| Arkansas River | Little Arkansas River | Ninnescah River | Solomon River |
| Big Blue River | Little Blue River | North Fork Ninnescah River | South Fork Ninnescah |
| Chapman Creek | Marais des Cygnes River | Rattlesnake Creek | Spring River |
| Chikaskia River | Medicine Lodge River | Republican River | Walnut River |
| Cottonwood River | Mill Creek (Wabaunsee Co. area) | Saline River | Whitewater River |
| Delaware River | Neosho River | Smoky Hill River | |



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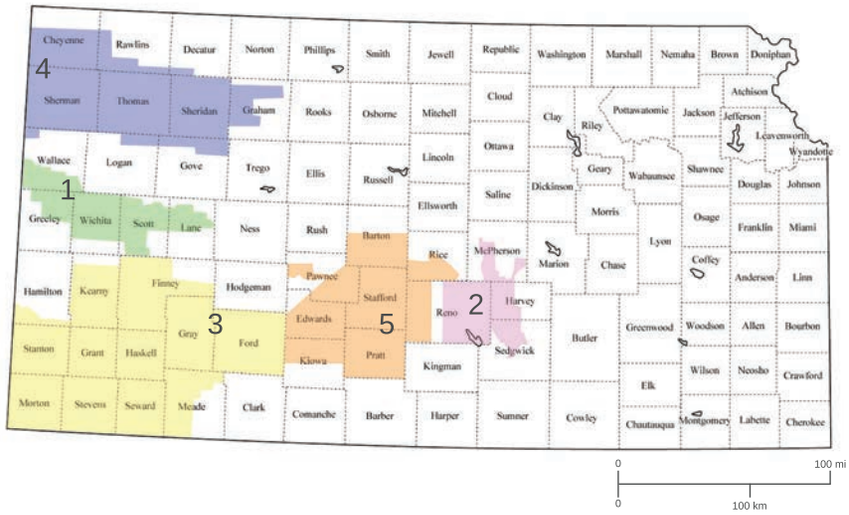
**LOCATIONS OF GROUNDWATER MANAGEMENT DISTRICTS IN KANSAS**




(recreated from image at http://www.kgs.ku.edu/Hydro/gmd.html)

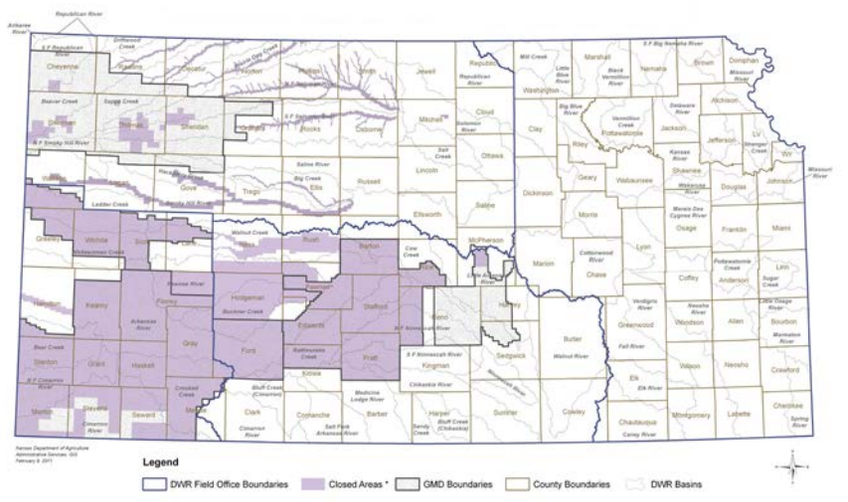
## Groundwater Management Districts and Special Water Areas

There are five groundwater management districts in the State of Kansas. Each of these districts is controlled by an elected board of directors who are owners of non-domestic water rights. If water rights are located in a groundwater management district, the first point of contact with regards to water rights will be the groundwater management district.

Groundwater management districts typically have special rules regarding water usage and appropriation of new water rights. The bulk of land in groundwater management districts is closed to new appropriations either by regulation or by full allocation of estimated recharge. Therefore, purchase of existing water rights is the only viable way, in general, to gain new water rights in most areas of groundwater management districts.

Various areas of Kansas, typically in the western part of the state, have special regulations. These areas have been created in response to local conditions of water quality and/or quantity. For the most part, these areas are closed to new water rights appropriations to protect existing water rights holders and/or fish and wildlife. In order to expand water rights in these areas, purchase of existing rights is required.

**AREAS CLOSED TO NEW APPROPRIATIONS OF GROUNDWATER**




(image from http://agriculture.ks.gov/divisions-programs/dwr/maps#closed)

## State Sponsored Water Purchase Programs

Kansas has created two programs to help ensure the availability of water for its residents: the Water Marketing Program and the Water Assurance Program. These related programs are run by the Kansas Water Office to ensure delivery of water to municipal and industrial water rights holders in certain areas of the state. Both programs use water stored in federal reservoirs located in Kansas and operated by the U.S. Army Corps of Engineers.

The State Water Plan Storage Act (K.S.A. 82a-1301 et seq.), enacted in 1974 established the basic framework for the Kansas Water Marketing Program. The program provides water from 13 federal reservoirs in which the state owns storage to municipal and industrial customers through contracts with terms up to 40 years. The quantity that is available for this purpose is defined as the amount that would be in the reservoir during a 1950's severity drought with 40 years of sediment.



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Water purchased through the Water Marketing Program under contracts executed before March 17, 1983 carries a fixed rate of 10¢ per 1000 gallons of raw water. Subsequent contracts have variable rates which are set each year on July 15 and become effective the following January 1. The rate for the calendar year 2015 is 32.7¢ per 1000 gallons of water and applies to all contract holders with contracts executed after March 17, 1986. Additional information and program applications can be obtained from the Kansas Water Office (www.kwo.org) or by contacting the Kansas Water Office (785-296-3185 or 888-526-9283).

The Water Assurance Act (K.S.A. 82a-1330 et. seq.) was enacted in 1986 as an alternative to the Water Marketing Program. Its members are municipal and industrial water rights holders on mainstream rivers below federal reservoirs. The districts provide



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the members with an assurance of a water supply during times of natural low flow. Three water assurance districts are currently in operation: the Kansas River Water Assurance District No.1, the Marais de Cygnes River Water Assurance District No. 2 and the Cottonwood/Neosho River basin Water Assurance District No 3. The reservoirs in these river basins are operated as a single system for increased efficiency in water delivery.

Releases are made by the U.S. Army Corps of Engineers as prescribed in operations agreements with the Kansas Water Office and each assurance district. The releases are protected from divergence for other uses by the Kansas Department of Agriculture's Division of Water Resources. The key difference between the Water Assurance Program and the Water Marketing Program is that water assurance districts have an ownership interest in the reservoirs in the particular basin. The districts pay the costs associated with the operation and maintenance of those reservoirs, as well as administration and enforcement costs associated with the program. The districts levy an annual charge on their members to cover these costs.

## CONCLUSION

This chapter has covered the operational or technical aspects of the water utility. It is important for the board to be aware of all of the aspects of an operator's job, from day-to-day operations and maintenance, to regulatory compliance and sampling, as well as sustainability programs. The board should support the operators by providing financial assistance for training and certification and by properly funding the operations of the utility. It is highly recommended that board members take the time to tour the utility in person to see the complexity of the operation and the assets that make up the system.

Thank you again for reading and using this manual. We sincerely hope that it has been and will continue to be useful to you in your journey to understanding water utility capacity and fulfilling your duty to protect public health by proving safe and reliable drinking water to your community now and in the future.



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# BOARD FOUNDATIONS

## APPENDIX A - CHAPTER 1





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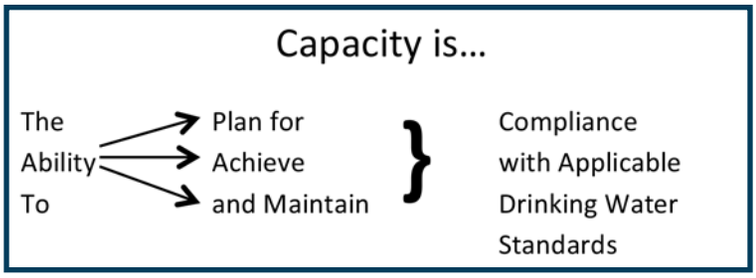
# A-1: CAPACITY DEVELOPMENT FACT SHEET

Kansas Department of Health and Environment
Public Water Supply Section
Capacity Development Program




The 1996 Amendments to the Safe Drinking Water Act outline two programs that states must implement to receive their full Drinking Water State Revolving Fund (DWSRF) allotment.

- New System Program: States must ensure that new systems commencing operation after October 1, 1999 have adequate Technical, Financial and Managerial (TFM) capacity before providing service to their customers.

- Existing System Strategy: States must develop and implement a strategy to help existing public water supply systems achieve and maintain TFM capacity.

The fundamental goals of Capacity Development are:

- To protect public health by ensuring consistent compliance with drinking water standards, including federal and state regulations and other applicable standard of performance.

- To enhance performance beyond compliance through measures that bring about efficiency, effectiveness and service excellence.

- To promote continuous improvement through monitoring, assessment and strategic planning. All water systems, regardless of size or other characteristics, can benefit from a program of continuous improvement.

Kansas Capacity Development Program emphasis:

- Provide water system board/council continuing education to improve TFM capabilities

- Provide on-site technical assistance to small systems to improve TFM capabilities

- Assess improvements in TFM capacity through a Capacity Development Survey every three years

For a system to have capacity, adequate capability is required in three distinct but interrelated areas:

- **Managerial:** The ability of a water system to conduct its affairs in a manner enabling the system to achieve and maintain compliance with SDWA requirements, including institutional and administrative capabilities.

- **Financial:** The ability of a water system to acquire and manage sufficient financial resources to allow the system to achieve and maintain compliance with SDWA requirements.

- **Technical:** The physical and operational ability of a water system to meet SDWA requirements, including the adequacy of physical infrastructure, technical knowledge and capability of personnel, and adequate source of water.



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| ELEMENTS OF MANAGERIAL CAPACITY | |
|---|---|
| **Ownership Accountability** | Ownership accountability ensures that the system owners are clearly identified and can be held accountable for the system. Identification of roles and responsibilities can help prevent confusions, mistakes and misunderstandings in the daily operation of the system. Owners are actively involved in capital improvement and strategic planning to meet short- and long-term needs of the system. |
| **Staffing and Organization** | System operators and managers should be clearly identified and their roles and responsibilities should be clearly explained. System personnel should have adequate expertise to manage operations; understand regulatory requirements; and have the necessary licenses and certifications. Another aspect of staffing and organization is ensuring the ongoing training of managers and operators. |
| **Effective External Linkages** | Water system personnel need to interact regularly with customers and with regulators. System personnel also need to know where to get technical or financial help. Building relationships with assistance providers, regulators and water users will increase a system's ability to solve problems as they occur. |



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| ELEMENTS OF FINANCIAL CAPACITY | |
|---|---|
| **Revenue Sufficiency** | Revenue sufficiency is the cornerstone of a well-run system. Revenues from rates and charges should cover system expenses. A system should know, and be able to measure, all costs and revenues. Rates should reflect the true cost of service. |
| **Fiscal Management and Controls** | Sound financial management allows a system to maintain efficient and effective operations. This includes keeping adequate books and records; using appropriate budgeting, accounting and financial planning methods; and managing revenues effectively. |
| **Credit Worthiness** | Having an established credit rating will allow the system to access funds for an emergency or for implementation of a capital improvement plan. Financial institutions will look at the health of the system, as measured through indicators, ratios and ratings, previous credit records and proof of repayment, when determining whether the system is a good credit risk. Having access to capital through public or private sources is one element of a financially capable system. |

| ELEMENTS OF TECHNICAL CAPACITY | |
|---|---|
| **Source Water Adequacy** | The system's water source is adequate to meet current and future demands, is of generally good quality and is adequately protected. |
| **System Operations:** | Technical Knowledge and Implementation. System employs a certified operator who understands the benefits of public health protection; knows the applicable drinking water standards; understands the system's technical and operational characteristics; and is successfully implementing the system's operation and maintenance plan. |
| **Infrastructure Adequacy** | Infrastructure adequacy and improvement means the system can provide water that meets SDWA standards because its infrastructure, from source to distribution, is in good condition and has not exceeded its useful life. |

For more information on the Kansas Capacity Development Program call (785) 368-7130
Or visit the KDHE web page: http://www.kdheks.gov/pws/download/2011_TFMSurvey.pdf
Information on this fact sheet was obtained from U.S. EPA Drinking Water Academy Electronic Workshop:
http://water.epa.gov/type/drink/pws/smallsystems/state_guidance.cfm



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# A-2: PUBLIC WATER SUPPLY CAPACITY SURVEY

Public water supply systems face many challenges in achieving the goal of providing safe drinking water to their customers. Aging infrastructure, more stringent drinking water standards and the desire to keep water rates to a minimum are factors that public water supply managers must resolve if they are to be successful. One goal of the Kansas Capacity Development Strategy for Public Water Supply Systems is to identify systems most in need of assistance to improve their technical, managerial and financial capabilities. This Capacity Survey is one component of the Strategy and will be used to help the State and other public water supply assistance providers develop programs to provide assistance to water utilities, and to provide a "capacity" benchmark which will be used to measure improvements in water system capacity. The Survey should also be useful as a tool for water system managers to measure their strengths and identify their weaknesses.

In addition, the Kansas Water Plan encourages public water supply systems to achieve capacity. One component of the Kansas Water Plan is for all public water supply systems to develop and maintain the technical, financial and managerial capability or the "capacity" to comply with drinking water standards.

The survey questionnaire is organized by the three areas comprising capacity development.

1. Technical Capacity requests information concerning adequacy of the water source or water purchase contracts and general information about the physical infrastructure aspects of the utility.

2. Management Capacity considers the accountability of the governing body or owner, planning, organization, communication and linkages with mentor organizations such as the League of Kansas Municipalities, Kansas Rural Water Association, American Water Works Association or others.

3. Financial Capacity considers the revenue sufficiency, including income, expense, debt service coverage ratios, capital improvement planning, general fiscal management and overall credit worthiness.

The following survery can be found at: http://www.kdheks.gov/pws/download/2011_TFMSurvey.pdf

If you have questions or need assistance completing this survey, please contact:

Cathy Tucker-Vogel
ctuckerv@kdheks.gov
(785) 368-7130

Kansas Department of Health and Environment
Bureau of Water – Public Water Supply Section
1000 SW Jackson, Suite 420
Topeka, KS 66612
FAX: (785) 296-5509



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Name of system _____

City _____ County _____

Name of person completing survey _____ Phone _____

Water system email address _____

## TECHNICAL CAPACITY

Technical capacity refers to the physical infrastructure of the water system, including but not limited to, the source water adequacy; infrastructure adequacy (including well(s) and/or source water intakes, treatment, storage and distribution); and the ability of system personnel to implement the requisite technical requirements.

### Source

1. What is your system's raw water source and/or who do you purchase water from (check and fill in all that apply)?

   ☐ Surface ☐ Ground

   Lake Name _____ # Of wells used _____

   Stream Name _____

   ☐ Purchased from: _____

   ☐ Don't know

2. Does your system have an emergency or supplemental water supply?

   ☐ Yes ☐ No ☐ Don't know

3. If question 2 is yes, please identify emergency source.

   ☐ Not applicable, No back-up source

   ☐ Back-up wells ☐ Connection with another system (name) _____

   ☐ Back-up surface source (stream or lake name) _____

   ☐ Other (specify) _____

4. If water is purchased from or treated by another system, is there a drought or other "cut-off" clause limiting the amount of water in your system's purchase contract?

   ☐ Yes ☐ No ☐ Don't know ☐ No purchased water



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5. If water is not purchased, does your water system have sufficient water rights issued from the Kansas Department of Agriculture, Division of Water Resources?

☐ Yes ☐ No ☐ Don't know ☐ No water rights, purchase water only

6. How many times in the previous 3 years did your system impose water use the restrictions and what was the total length of time restrictions were imposed?

☐ None ☐ Once ☐ Twice ☐ 3 or more ☐ Don't know

Total Time:

☐ Less than 1 month ☐ 1 to 3 months ☐ 3 to 6 months ☐ More than 6 months

7. If restrictions were imposed in question 6, was this restriction drought related? If no restrictions were imposed proceed to question 9.

☐ Yes ☐ No

8. If restrictions were imposed in question 7, was this restriction due to: (please check all that apply).

☐ Treatment capacity ☐ Distribution or storage capacity ☐ Raw water supply source

☐ Water right limitations ☐ Water quality ☐ Water purchase contract

☐ Minimum desirable streamflow ☐ Other (specify) _____

9. If yes in question 7, has the cause for restriction been corrected?

☐ Yes ☐ No ☐ Don't know

10. Does your system have an approved Source Water Protection Plan or Wellhead Protection Plan?

☐ Yes ☐ No ☐ Don't know ☐ Purchase treated water

10.1 If yes, has your plan been reviewed and updated within the last 3 years?

☐ Yes ☐ No ☐ Purchase treated water ☐ Not, applicable, no plan

11. Has your system updated your Source Water Assessment to include any new or reactivated wells that were not in use prior to 2003?

☐ Yes ☐ No ☐ Don't know ☐ Purchase treated water

☐ Not applicable, no new/reactivated wells



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12. Is your system's source capacity higher than your peak day demand by a margin of 50%?

☐ Yes ☐ No ☐ Don't know ☐ Purchase treated water

13. How many times in the previous 3 years has your system experienced taste and odor problems?

☐ None (if none, go to question 16) ☐ Once ☐ Twice ☐ 3 or more

14. What is the average length of time your system's taste and odor problems persist?

☐ Less than 1 week ☐ 1 to 2 weeks ☐ 2 to 4 weeks ☐ More than 4 weeks

15. What types of taste and odor problems does your system typically experience?

Check all that apply and circle the number to indicate severity of problem.
(1 = most severe, 2 = moderately severe, 3 = least severe)

☐ Musty/Earthy 1 2 3 ☐ Fishy 1 2 3 ☐ Grassy 1 2 3

☐ Rotten Egg 1 2 3 ☐ Chlorine 1 2 3 ☐ Metallic/Iron 1 2 3

☐ Other (specify) 1 2 3 _____

## Treatment

16. Did your system have any primary drinking water standard violations last year?

☐ No

☐ Yes, list _____

☐ Don't know

17. Did your system have any monitoring, reporting or other violations last year?

☐ No

☐ Yes, list _____

☐ Don't know

18. What is your system's daily average water production expressed as a percentage of peak production capacity?

☐ Less than 50% ☐ 50% - 75% ☐ Greater than 75%

☐ Purchase treated water ☐ Don't know



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19. What is your system's average daily production in gallons per day (gpd)?

☐ GPD ☐ Don't know ☐ Purchase treated water

20. Does your system have emergency/standby electrical service (production and/or distribution)?

☐ Yes ☐ No ☐ Don't know

21. Can your system maintain full pumping and production operations during a 100 year flood event?

☐ Yes ☐ No ☐ Don't know

22. If your system has a surface water treatment plant constructed more than 20 years ago, have treatment processes been upgraded to meet current standards?

☐ Yes ☐ No ☐ Don't know

☐ Does not apply (ground water treatment, purchase treated water)

## Distribution

23. Does your system's operation pressure for any customer service connection fall below 20 psi?

☐ Yes ☐ No ☐ Don't know

24. Does your system have at least 24 hours of finished water supply storage at average daily use?

☐ Yes ☐ No ☐ Don't know

25. Have your system's water storage facilities been inspected during the past 24 months?

☐ Yes ☐ No ☐ Don't know

26. What is your system's unaccounted for water loss as a percentage of total production or purchase?

☐ Less than 15% ☐ Between 15% and 29% ☐ More than 29% ☐ Don't know

27. Does your system have an active cross-connection control program?

☐ Yes ☐ No ☐ Don't know



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28. Does your system have accurate maps of your distribution system?

☐ Yes ☐ No ☐ Don't know

29. Does your system's distribution system overlap or intertwine with another public water supply distribution system with which it is not interconnected?

☐ Yes ☐ No ☐ Don't know

## MANAGERIAL CAPACITY

Managerial capacity refers to the management structure of the water system, including but not limited to ownership accountability, staffing and organization, and effective linkages.

30. What is your system's governance structure?

☐ Elected board/council ☐ Appointed ☐ Sole ownership

☐ Other (Describe) _____ ☐ Don't know

31. Is your system aware of the benefits or does it utilize industry related service organizations such as the Kansas League of Municipalities, the Kansas Rural Water Association or the American Water Works Association?

☐ Yes ☐ No ☐ Don't know

32. Do your system's operators have appropriate levels of certification according to the Kansas Department of Health and Environment classifications?

☐ Yes ☐ No ☐ Don't know

32.1 If No, does your system have a KDHE approved Operator In Training (OIT)? If you answered yes, please select "Not Applicable.

☐ Yes ☐ No ☐ Don't know ☐ Not applicable



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33. Does your system have written personnel policies and job descriptions signed by the employees?

☐ Yes ☐ No ☐ No employees, contract labor

☐ No employees, volunteer labor ☐ Don't know

34. Does your system provide benefits to employees (retirement, insurance, etc.)?

☐ Yes ☐ No ☐ No employees, contract labor

☐ No employees, volunteer labor ☐ Don't know

35. Does your system have formal policies for: payments/collections, main extensions/connections, etc.?

☐ Yes ☐ No ☐ Don't know

36. Does the governing body review a monthly summary of revenues and expenses of the utility system?

☐ Yes ☐ No ☐ Don't know

37. Does your system have a formal plan for operations and maintenance (line flushing, pumps, meters, storage tanks etc.)?

☐ Yes ☐ No ☐ Don't know

38. Does your system have an emergency or contingency plan approved by the Kansas Department of Health and Environment?

☐ Yes ☐ No ☐ Don't know

39. Does your emergency plan coordinate with your county emergency plan?

☐ Yes ☐ No ☐ Don't know ☐ Don't have approved plan

40. Does your system have a Water Conservation Plan approved by the Kansas Department of Agriculture, Division of Water Resources or the Kansas Water Office?

☐ Yes ☐ No ☐ Don't know



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41. Has your system been cited for violations for any deficiencies on the most recent sanitary survey, which have not been corrected?

☐ Yes ☐ No ☐ Don't know

42. Does your system have a public information program?

☐ Yes ☐ No ☐ Don't know

43. Does your system have a computerized record-keeping system?

☐ Yes ☐ No ☐ Don't know

44. Does the governing body approve expenses prior to payment being issued?

☐ Yes ☐ No ☐ Don't know

45. Are at least two signatures required to purchase goods and services over $100.00?

☐ Yes ☐ No ☐ Don't know

## FINANCIAL CAPACITY

The challenge for most utility systems is to operate like a business. The following questions will assist in evaluating the financial capacity.

46. Does your water system income exceed operating expenses (including debt service)?

☐ Yes ☐ No ☐ Don't know

47. Does your system fund a depreciation/capital improvement account?

☐ Yes ☐ No ☐ Don't know



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48. Does your system have a capital budget or capital improvement plan that projects future capital needs for at least 5 years?

☐ Yes ☐ No ☐ Don't know

49. Does your system have financial reserves for emergencies?

☐ Yes ☐ No ☐ Don't know

50. Does your water utility support other enterprise funds or the general fund (cities)?

☐ Yes ☐ No ☐ Don't know ☐ Does not apply (RWD)

51. Does your system require revenues from other enterprise funds or the general fund for normal operations?

☐ Yes ☐ No ☐ Don't know

52. Does your system develop and follow an annual budget that is approved by the governing body?

☐ Yes ☐ No ☐ Don't know

53. Does your system have an audited financial statement prepared by a certified public accountant?

☐ Yes ☐ No ☐ Don't know

54. Has the auditor submitted a copy of their most recent peer review?

☐ Yes ☐ No ☐ Don't know

55. Are the audited financial statements prepared according to generally accepted accounting principles (GAAP)?

☐ Yes ☐ No ☐ Don't know

56. Have your system's water rates been reviewed within the last 3 years?

☐ Yes ☐ No ☐ Don't know



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57. Does your system's current rate structure produce income to cover: (check all that apply)

☐ Current expenses ☐ Replacement costs ☐ Reserves

☐ Contractual obligations ☐ No to all items ☐ Don't know

58. Please complete the following table for residential customers only

| WATER RATE SCHEDULE FOR RESIDENTIAL CUSTOMERS | COST |
|---|---|
| Monthly Minimum Residential Fee<br>(Includes debt service, meter charge, maintenance fee, etc.) | $ |
| Amount of water included in monthly minimum residential fee (gallons) | |
| Total cost for 5,000 gallons | $ |
| Total cost for 10,000 gallons | $ |
| Total cost for 15,000 gallons | $ |
| Total cost for 20,000 gallons | $ |
| Total cost for 30,000 gallons | $ |

58.1 Please indicate your type of rate.

☐ Flat rate (not metered) ☐ Uniform block rate ☐ Increasing block rate

☐ Decreasing block rate ☐ Seasonal rate

58.2 If you sell wholesale water only (public wholesale water supply district, utility authority, etc.) please provide your cost per 1,000 gallons _____

☐ Do not sell only wholesale water

59. If you operate a wastewater system, what is your cost for treatment of 5,000 gallons?

$ _____ per 5,000 gallons ☐ Don't operate a wastewater system ☐ Don't know

60. Please provide number of service connections.

| YEAR | RESIDENTIAL | COMMERCIAL | INDUSTRIAL | WHOLESALE | STOCK WATER/ PASTURE | POWER PRODUCTION | TOTAL |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



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61. Did your system's governing body review this survey before returning it to the Kansas Department of Health and Environment?

☐ Yes ☐ No ☐ Don't know

## FUTURE PLANNING NEEDS

Planning for future needs is a critical component of developing technical, financial and managerial capacity. The following questions will help identify water systems needing assistance to meet future water supply demands.

62. Is your system considering an additional or different water supply source (raw or treated)?

☐ Yes, please list below ☐ No, not considering another source

_____

_____

_____

_____

63. If your system is considering additional sources, within what timeframe do you anticipate activation?

☐ Not considering another source ☐ 5 years or less ☐ 6 to 10 years

☐ 11 to 20 years ☐ Don't know



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# A-3: SAMPLE CODE OF ETHICS INCLUDING CONFLICT OF INTEREST

This code of ethics is a guide to the board members, committee members and staff in their conduct when acting on behalf of _____. The Code contains broad principles reflecting the types of behavior the _____utility expects towards employees, contractors and the public.

This policy is not intended as an exhaustive or stand-alone policy, nor does it answer every ethical question or issue that might arise. Rather, it is one element of a broader effort to create and maintain a quality organization that gives ethical conduct the highest priority. This Code will be reviewed periodically.

Board members, committee members and staff:

1. Are agents of the public and shall hold office for the benefit of the public;
2. Shall remain independent, impartial and responsible to the public;
3. Shall actively participate in the exercise of the duties and responsibilities of their positions with integrity, care and collegiality;
4. Shall make decisions free from influence of family members, private business relationships or other personal relationships;
5. Shall seek at all times to avoid both ethical impropriety and the appearance thereof;
6. Shall not use their position for personal gain or benefit, including the enhancement of their financial status through uses of specific contractors or suppliers;
7. Shall not use information obtained in their position as a board member, committee member or staff member for personal gain or benefit;
8. Shall not willingly misrepresent facts to board, committee or staff members or the public with the purpose of personal benefit or gain, advancing a personal cause or causing anyone to pressure the Board into advancing a personal cause.
9. Shall not accept gifts or favors made with the intent of influencing actions or decisions on any official matter;
10. Shall not promise anything not approved by the board to any contractor, subcontractor, supplier, agent thereof or other individual before, during or after negotiations;
11. Shall comply with all applicable federal, state and local laws, regulations and fiduciary responsibilities in an effort to create transparency in all of our operations;
12. Shall abide by the provisions of K.S.A. 75-4300 et seq. and any other applicable statutes or regulations relating to conflicts of interest of public officers and employees;
13. Shall immediately disclose any conflict of interest where a board decision or action will result in a conflict between the individual's personal interests and the best interests of _____.
14. Shall, in any situation in which it is unclear whether a conflict of interest exists, notify the board of the potential conflict and, if deemed necessary, assist the board in obtaining an advisory opinion from the Kansas State Governmental Ethics Commission.



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15. Shall not harass, threaten or otherwise attempt to control or instill fear into any Board, committee or staff member;

16. Shall keep language and decorum in board, committee and staff meetings professional, and shall not make any personal attacks against anyone;

17. Shall not violate the duty of confidentiality by disclosing to anyone (including, but not limited to, spouses, relatives, friends and business associates) any confidential information not addressed in open Board meetings.

By signing this document, I acknowledge that I have read and comprehend the foregoing Code of Ethics and pledge to abide by its provisions.

Name: _____

Signature: _____

Date: _____



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# A-4: GUIDELINES FOR DEALING WITH THE MEDIA

(From: Albuquerque Bernalillo County Water Utility Authority, Albuquerque, New Mexico)

**You may be approached by members of the media seeking interviews and/or information. If this should happen, remember that your response will reflect not only on you, but also on the entire utility. With this in mind, consider these guidelines for interacting with the media:**

1. You may always refer media questions to the utility's Public Affairs Manager or person designated to handle the media, possibly a board member.

2. Questions that go beyond the basics of water repairs (including questions about injuries or water contamination) should **ALWAYS** be referred to the Public Affairs Manager or person designated to deal with the media.

3. Please feel free to answer questions about outages and repairs in progress. Tell the reporter:

    a. When the malfunction occurred or was first reported

    b. Size/type of the line involved

    c. How many (if any) customers are out of service as a result

    d. Any expected traffic lane closures or traffic delays

    e. How long you expect repairs to take (be realistic)

    f. The availability/location of water stations (if this applies).

    g. Beyond this, questions should be referred to the Public Affairs Manager or person designated to deal with the media.

4. Do not guess why something malfunctioned. If you don't know the cause, simply say that the cause has not been determined.

5. Do not guess how much water was lost. Simply say that you cannot accurately judge how much water has been lost at this point.

6. In cases where lines have been damaged by equipment (such as when a contractor hits a line with a backhoe), you can say that the damage was apparently caused by construction work. Do not name the contractor or give the idea that utility crews were involved or to blame. Simply say that you can't say who is at fault and that the cause is under investigation.

7. Any time you speak with a reporter, get the individual's name, the name of their news organization and the time they expect the story to run. Report this information to the Public Affairs Manager or person designated to deal with the media immediately. Always let the Public Affairs Manager or person designated to deal with the media know when you've spoken with a reporter.

8. If possible, if you have referred media questions to the Public Affairs Manager or person designated to deal with the media, give him/her a heads-up to let him/her know to expect a media inquiry.



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9. If you do end up in front of the camera, follow these tips for giving a good interview:

   - Take a moment to formulate your answer, and then answer in short, positive sentences. Repeat the question in your answer. ***For example: Question: Why did the water line break? Answer: We are not sure yet why the water line broke. We have concentrated on getting it repaired as quickly as possible and expect service to be restored within the hour.***

   - **Don't say "no comment" or be evasive.** If you don't know the answer to a question, say that you don't know and offer to find out the answer, or offer to put the reporter in touch with the Public Affairs Manager. If a reporter is trying to tempt you into answering with questions like *"Why won't you answer?' or " Do you have something to hide?"*, you can always "bridge" back to YOUR message with phrases like "The important thing to remember is…" and "We mustn't forget that…"

   - **Look reporters in the eye when you are speaking to them.** Making eye contact says you are sincere, you are telling the truth and you can be trusted. Don't wear sunglasses if you are doing an outside interview, even if you're facing into the sun. Ask if they can readjust their camera angle so you don't have to squint.

   - **Don't chew gum, jingle the change in your pocket or make other nervous gestures.** Keep your hands in your lap (if you're sitting) or by your sides (if you're standing) unless you use them to emphasize a point, gesture to a specific area, etc.

   - **Don't get angry, even if the reporter seems disrespectful or sarcastic or hostile.** You may not like the questions they are asking, but if you take the high road and are always polite, you will win in the end. Also, remember it's their job to ask questions that you might not like.

   - **Avoid using humor.** What is funny to one person is not funny to another, and joking about a serious subject can backfire.

   - **If someone has been inconvenienced by the actions of the utility, express empathy.** For example, if people have been without water for several hours, lead off your comments with "We really regret the fact that the neighborhood has been without water. We know it is inconvenient, and we're working to fix the problem as soon as possible."



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# MANAGING A WATER UTILITY (MANAGERIAL CAPACITY)

## APPENDIX B - CHAPTER 2





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# B-1: SAMPLE LEVEL OF SERVICE AGREEMENT

The XYZ Utility believes its customers are vitally important. As such, we have established the following goals to ensure excellent customer service.

Meet all applicable state and federal public health regulations 100% of the time.

Maintain a minimum water pressure of 40 PSI throughout the system 95% of the time.

Provide fire flow to 100% of customers.

All customer complaints related to water quality or safety will be investigated within 2 business days.

All other customer complaints will be investigated within 5 business days.

Rates will be reviewed annually. Rate adjustments will be made as required based on the results of the review.

Water service will be restored within 8 hours of notification or discovery of water outages, unless it is related to an electrical outage or a natural disaster (flood, fire, tornado, earthquake, severe drought).

Reports of water line leaks will be investigated within 1 business day of discovery or reporting.

Repairs of water line leaks will be made within 5 business days of investigating the leak.

# B2: LEVEL OF SERVICE GOALS

| B2: LEVEL OF SERVICE GOALS | | | | | | |
|---|---|---|---|---|---|---|
| **Category** | **Internal or External Goal** | **Level of Service Goal** | **Data Needed to Measure Goal** | **Where Data is Available** | **When Goal Will be Measured** | **Who Goal Will be Reported to** |
| | | | | | | |
| | | | | | | |
| | | | | | | |



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| LEVEL OF SERVICE GOALS<br>AN EXAMPLE | | | | | | |
|---|---|---|---|---|---|---|
| **Category** | **Internal or External Goal** | **Level of Service Goal** | **Data Needed to Measure Goal** | **Where Data is Available** | **When Goal Will be Measured** | **Who Goal Will be Reported to** |
| Customer Service | External | The water utility will respond to all water quality complaints within 1 business day 95% of the time | Date customer called in; nature of the complaint; when the complaint was responded to | Customer complaint logs; work order records for staff | Monthly | Customers, Board |
| Water Quality | External | The water system will meet all primary drinking water standards 100 percent of the time. | Water quality test results | Data from labs regarding water quality test results | Monthly | Customers, Board |
| Water Loss | Internal | Real water loss will be held to twice unavoidable losses | Water audit results | AWWA Water Audit Results | Annually | Board |



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# B-3: SAMPLE EMERGENCY RESPONSE PLAN FOR WATER SYSTEM EMERGENCIES

*[This sample Emergency Response Plan is meant only as a general representation and is not a substitute for a well-researched and drafted ERP which is tailored specifically for your water system. It is highly recommended that you review the available state and federal resources that are listed at the end of this sample, paying particular attention to the Emergency Response Planning Guidance for Kansas Public Water Supply Systems, Kansas Department of Health and Environment, Bureau of Water, 01/11/2005. Those resources will provide guidance for developing or revising your ERP. Additionally, nearby utilities may be able to provide assistance in crafting your ERP. Finally, your ERP is not a static document. Water systems, and the risks associated with running them, will change over time, as will the personnel involved with emergency response procedures. Build plan review and updating procedures into your annual operations to ensure that your ERP remains up to date and effective.]*

Pursuant to the requirements of K.A.R. 28-15-18, the Board of _____ (the Board) has compiled the following Emergency Response Plan ("ERP"). This ERP was adopted by the Board on _____.



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| TABLE OF CONTENTS | | |
|---|---|---|
| **Section** | **Title** | **Information Documented** |
| 1 | Purpose | Summary of ERP purpose |
| 2 | System Description | Summary of the utility infrastructure components, locations and purposes |
| 3 | Incident Command - Emergency Organization, Roles and Responsibilities | Description of Emergency Organization members, roles and chain of command |
| 4 | Notification Procedures | |
| 5 | Mutual Aid Agreements/Alternate Water Sources | Summary of mutual aid agreements the utility has entered into to provide alternate sources of potable water |
| 6 | Emergency Equipment and Supplies | Available supplies and equipment, purpose, location and qualified operators |
| 7 | System Vulnerabilities/Disaster Response | Outline of known vulnerabilities, protection measures and disaster response steps |
| 8 | Personnel Safety | Personnel Safety Plan |
| 9 | Emergency Water Requirements/Water Rationing | Details of EWSP water rationing plan and notification procedures including details of alternate water sources |
| 10 | Emergency Contacts | List of all emergency contacts necessary for ERP implementation |
| 11 | Testing, Training and Updating | Summary of ERP testing, training and updating procedure |
| 12 | Annual Review | Requirement for annual review |



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## Section 1: Purpose

The purpose of this ERP is to isolate and conserve an adequate supply of potable water during emergency conditions that will be used only to sustain human life, the lives of pets and maintain standards of hygiene and sanitation.

## Section 2: System Description

A. The _____ system serves an area of approximately _____ square miles located in _____. There are approximately ____ connections, serving a total population of _____.

Water System ID Number: _____

Owner: _____

Primary Contact: _____

Secondary Contact: _____

B. System Information Technology Infrastructure

*[This includes the Supervisory Control and Data Acquisition (SCADA) system as well as other information technology support for the system along with their applications to all aspects of the operation, monitoring and maintenance of the system.]*

C. Physical Plant and Business Critical Information

*[Describe the system infrastructure. Include distribution system details such as facility types and locations, components, connections, boosters, line sizes, tank volumes, emergency power supply locations and connections, etc. General service area descriptions or maps, pressure boundary maps, service flow diagrams, site plans, as-built engineering drawings and number of connections can be included or incorporated by reference. If incorporating by reference, include a detailed description of exactly where these resources are, who has authorized access and how to access them.]*



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D. Potable Water Sources

The system's potable water supply is obtained from the following sources:

PURCHASE:

*[List each utility from which water is purchased, contact information, connection locations and typical demand.]*

| Utility | Location & Contact | Connection location | Typical Demand (gal/m) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

GROUND WATER WELLS:

*[Identify each well, location, volume it can supply and the typical monthly demand.]*

| Identifier | Location | Volume Range (gal/m) | Typical Demand (gal/m) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

SURFACE WATER SOURCES:

*[Identify each source, its location, the volume range it can supply and the typical monthly volume available from source.]*

| Identifier | Location | Volume Range (gal/m) | Typical Demand (gal/m) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |



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STORAGE FACILITIES:

*[List all facilities, type, locations, capacities and typical volumes on hand.]*

| Identifier/Type | Location | Capacity (gal) | Typical Vol. on Hand (gal) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

OTHER:

*[List any other sources including details similar to those above.]*

Further technical information covering normal operations including; infrastructure maps, facilities, mechanical components and physical barriers, are located _____.

## Section 3: Incident Command - Emergency Organization, Roles and Responsibilities

*List the members of your Incident Team and their alternates, including descriptions of their roles and responsibilities and all available contact information. Create and include an organization chart defining the chain of command and the locations of command and staging posts.*

*Typically, Incident Team members include at least (1) a board chairperson or designee or a government executive such as a mayor or city manager; and (2) a licensed Operator employed by the utility. However, responding to a major crisis will often require an expanded team. Other local individuals and organizations to consider for DT membership include: plant superintendents and maintenance personnel, legal counsel, the county clerk, local police, fire and healthcare department representatives, local emergency planning commission members, HAZMAT coordinators, community coordinators and representatives from your community and neighboring communities, suppliers and contractors necessary for repairs and parts and appropriate state and federal officials.*

*At a minimum the following 9 roles and responsibilities should be included and assigned to appropriate persons:*

1. Coordinate and direct efforts of maintenance personnel in repair of damage
2. Establish communications with governing body, local news media and general public
3. Establish necessary command posts, medical posts, shelters etc. while working with federal/state/local emergency preparedness personnel



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4. Assess damages and establish communications with local government executive and other officials

5. Notify KDHE District Engineer and/or Bureau of Water to request assistance if necessary

6. Oversee any required repairs or alterations from the source of supply to treatment and pumping throughout the distribution system

7. Request necessary emergency equipment and supplies

8. Request necessary personnel assistance

9. Contact power utilities regarding power losses

*KDHE recommends the use of the Incident Command System (ICS), a widely used model tool for command, control and coordination of emergency response, to manage emergency events. Information regarding ICS training is included in the resource section at the end of this sample ERP.*

A. Incident Commander:

Jane Doe
Board Chairperson
123 Main Street
Anytown, KS 12345
Home Phone:
Cell Phone:
Email:

Alternate Incident Commander:

John Q Public
City Manager
456 Side Street
Anytown, KS 12345
Home Phone:
Cell Phone:
Email:

Incident Commander Roles and Responsibilities:

1. Coordinate and direct efforts of maintenance personnel in repair of damage

2. Establish communications with governing body, local news media and general public

3. Establish necessary command posts, medical posts, shelters etc. while working with federal/state/local emergency preparedness personnel



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B. District Operator:

Jim Operator
System Operator
789 Back Street
Anytown, KS 12345
Home Phone:
Cell Phone:
Email:

District Operator Roles and Responsibilities:

1. Assess damages and establish communications with local government executive and other officials
2. Notify KDHE District Engineer and/or Bureau of Water to request assistance if necessary
3. Oversee any required repairs or alterations from the source of supply to treatment and pumping throughout the distribution system
4. Request necessary emergency equipment and supplies
5. Request necessary personnel assistance
6. Contact power utilities regarding power losses

C. Public Information Officer:

Susan Spokesperson
System Administrator
111 Front Street
Anytown, KS 12345
Home Phone:
Cell Phone:
Email:

*[Ideally the individual designated as the public and media contact person will not be a key person needed for implementing ERP action plans.]*

Public Information Officer Roles and Responsibilities:

1. Coordinate with Incident Commander and District Operator to facilitate the flow of information to the public and media
2. Establish communications with public and media as required



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3. Disseminate required public notices

4. Act as information point for public and media inquiries

## Section 4: Notification Procedures

*[List the additional entities that are not part of the DT that may need notification depending on the situation and contact information for those entities. Notifications may include the following, as the situation requires: water utility managers, chief engineer or consulting engineer, etc.; heads of local government (city manager or mayor), wastewater utility, other local government branches and government-owned utilities, etc.; drinking water regulatory agencies, other health or environmental state agencies; critical customers (schools, hospitals); and mutual aid partners, suppliers, other water systems and utilities, etc.]*

Public Notification Procedures:

Press Release, Advisory and Order Notice Templates (include maps of affected areas in notices if possible):

Water Conservation Advisory:
*[Include language appropriate for "Water Conservation" advisory or order.]*

Boil Water:
*[Include language appropriate for "Boil Water" advisory or order. A well-crafted example can be found at https://www.kcwaterservices.org/kc-water-services-issues-precautionary-advisory-to-boil-water/ ]*

Do Not Drink:
*[Include language appropriate for a "Do Not Drink" water advisory or order.]*

Do Not Use:
*[Include language appropriate for "Do Not Use" water advisory or order.]*

## Section 5: Mutual Aid Agreements & Alternate Water Sources

*[Include a short description of the system's ability to provide water both with and without fire protection in the event of an emergency impacting the utility water supply. List alternate sources of potable water which are available in the event an emergency impacting the entire distribution system.]*

The system has a storage capacity of _____ gallons which will provide its customers with up to a ____ day supply of potable water without fire protection, and up to a ____ day supply of potable water with fire protection.



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A. Mutual Aid Agreements:

*[Include details of any mutual aid agreements your utility has entered into, including the parties, type of agreement, basic agreement details and locations of any interconnections.]*

B. Additional Potable Water Supplies:

*[List other potential sources of potable water (e.g., private water storage facilities and wells, local retailers and distributors, state and federal emergency response agencies, etc.*

*Include information about supply access and (to the extent known) timing, e.g. " Additional temporary potable water supplies are available via water tank truck from Utility XYZ" or " Additional temporary potable water can be obtained from Utility XYZ under the terms of a Mutual Aid Agreement Dated ____, via a temporary bypass pipe. It is estimated that 24 hours would be required to install, test and bring such a temporary bypass into operation."]*

## Section 6: Emergency Equipment and Supplies

*[List all of your available emergency equipment and supplies. Include location of: (a) equipment and operating instructions; (b) emergency supplies (e.g., spare parts, materials, testing and sampling equipment) and handling instructions; (c) any physical barriers to equipment or supplies; (d) equipment and supplies available under mutual aid agreements and mutual aid activation procedures; (e) other sources of equipment, materials and resources; and (f) instructions for emergency purchases. If possible include lead times and contact information for obtaining equipment that is available to, but not owned by, the utility.]*

A. Utility owned equipment, supplies and barriers to access

1. Spill containment equipment
2. Communications equipment
3.
4.

B. Locally owned equipment and supplies

1.
2.
3.
4.

C. Equipment available through the State of Kansas

1. Chlorinators (through KDHE and KRWA)
2. Federally owned units such as portable storage tanks and filter plants etc., available through the National Guard and Bureau of Water Supply

D. Emergency purchase procedures



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## Section 7: System Vulnerability/Disaster Response

*[At a minimum address your systems vulnerability to the following situations, as well as your emergency response plan to each situation. Include property protection, equipment replacement strategy and water sampling and monitoring information where appropriate.]*

A. Drought/Water Shortage

*[Incorporate applicable regulations or policies; Public Notification Secure potable water from listed alternate sources]*

B. Accidental Spills or Contamination

1. Operator shall contact 911 and notify IC of the emergency with as much specificity as possible
2. Operator will perform a preliminary assessment of damage and notify KDHE, Regional EPA Office or State Office of Emergency Preparedness of the extent thereof
3. Pursuant to the provisions of this ERP, communications will be established with local police, fire, media and the public, and appropriate notices will be disseminated
4. Operator will assess status of system water sources and storage facilities, document available capacity and, to the extent possible, ensure that uncontaminated storage facilities are full
5. To the extent safely possible, the following containment measures shall be implemented to prevent spread of contaminant:
   *a. Scenario 1*
   *b. Scenario 2*
6. If necessary, applicable Mutual Aid agreements will be activated to obtain potable water for distribution
7. If necessary, the IC will authorize the emergency purchase and distribution of bottled water for consumption

C. Treatment Facility and Other Infrastructure

1. Power Outage
2. Equipment Damage
3. Facility Structural Damage
4. Etc.

D. Distribution System

1. Transmission Main Damage
2. Storage Tank Damage
3. Etc.



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E. Terrorist Threats

In the event of a terrorist threat, the IC and Operator will be immediately notified of the threat. They will coordinate with appropriate civil defense personnel to evaluate threat and provide protection for water sources and distribution facilities.

F. Radioactive Fallout

## Section 8: Personnel Safety Plan

[If your system has a stand-alone Personnel Safety Plan, incorporate its provisions here by reference. If your system does not have a stand-alone Personnel Safety Plan, include plan details here to direct your staff on how to respond to emergencies such as on site chemical releases, fire, tornado, vandalism, etc.

The safety plan may include elements of security, labeling, coordination with fire and medical responders, but it typically includes:

- Emergency assistance (fire, ambulance) call procedures
- List and quantity of hazardous materials stored on site and associated hazards
- List of scenarios that require evacuation
- Facility evacuation routes and exits and alternates
- Employee assembly area and method of accounting for all employees
- List of scenarios that require shelter
- Locations to shelter-in-place or locations of designated shelter
- Operation and maintenance procedures for emergency and protective equipment
- Description of the training program and schedule(s) for new and existing employees
- First aid: precautions, location of supplies, emergency medical treatment, name and phone number(s) of who is trained to provide treatment (employee(s) or medical professionals (911 or other local emergency contact number)).]

## Section 9: Water Rationing

*[Include water rationing plan information including notification procedures. If an existing ordinance covers this information it can be incorporated by reference.]*



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## Section 10: Emergency Contacts

*[Include current emergency contact information for all individuals on DT as well as contact information for any outside organization discussed in the EWSP.]*

A. Board Contacts:

a. Chairperson:

b. Vice Chairperson:

B. Operator Contacts:

a. Operator:

b. On Call Operator:

C. Local Government Contacts:

a. Mayor:

b. City Executive:

D. Emergency Services:

a. Local 911:

b. Police Department:

c. Fire Department:

d. Local Health Department:

e. Local Emergency Planning Committee:

f. Power Utility:

g. Kansas Department of Emergency Management: (800) 275-0297 / (785) 296-8013

h. State Fire Marshall Hazmat Hotline: (866) 542-9628 / (913) 684-0455

E. Mutual Aid Agreement Contacts:

F. Federal and State Agencies:

a. KDHE District Office:

b. KDHE After Hours: (785) 296-1500

c. KDHE Water Supply Section (Topeka): (785) 296-5503

d. Adjutant General Division of Emergency Management: (785) 274-1409

e. EPA District Office:

f. Kansas Highway Patrol:



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g. Department of Homeland Security: (800) 237-3239

h. FBI:

G. Emergency Service Providers:

H. Customers:

a. Healthcare Facilities:

b. Schools:

c. Industrial:

d. Commercia:l

I. Media Contacts:

## Section 11: Training and Testing

*[Incorporate provisions about training and testing board, committee and staff members on the ERP.*

*An ERP is only useful if you know how to implement it. Training and testing provide you opportunities to fine tune and strengthen your ERP and account for infrastructure and personnel changes that necessarily occur over time. This section can simply be a statement indicating a commitment to training and testing on a schedule or a more detailed description of your system's training and testing regime.]*

## Section 12: Annual Review

*[The ERP should be reviewed by all Board members and Operators and at least annually and updated as required. Such review should be documented below]*

This ERP shall be reviewed and signed below by all Board Members and Operators annually. New Board members and Operators shall be required to review and sign this ERP as part of their on-boarding process.



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| Name | Signature | Position | Date Reviewed |
|---|---|---|---|
| | | | |
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# FINANCING A WATER UTILITY (FINANCIAL CAPACITY)

## APPENDIX C - CHAPTER 3





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# C-1: PROJECT EVALUATION WORKSHEET

Project name:

Project description:

Need for project:

Year needed:

Date flexible (Y or N):

Benefits as a result of the project:

Risk of not doing project:

Existing asset condition (if replacement):

Estimated useful life of existing asset:

Probability of failure:

Consequence of failure:

Current O&M of existing asset (if replacement):

Estimated capital cost of project:

Potential funding source(s):

Method of cost estimation:

O&M of proposed project on an annual basis:

Expected useful life:

What options are there for O&M to be used to delay the need for the project?

Consequence of not completing the project:

What alternatives were evaluated?



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**Project Recommendation**

**The following action is recommended:**

- ☐ Project should go forward in this year's Capital Improvement Plan.
- ☐ Project should be delayed until _____ year's CIP.
- ☐ Insufficient Information; project should be resubmitted when additional information is provided.
- ☐ Alternatives require further investigation; more work required before re-submittal.
- ☐ Alternative _____ should be selected, not the project that was submitted; redo with this alternative.
- ☐ Additional O&M is recommended; project should be delayed _____ years.
- ☐ Project should not go forward; project is unnecessary and asset should be run to failure and abandoned.

## C-2: FINANCIAL CONTROL PRACTICES

Listed below are specific suggestions for internal financial control practices. Each system should evaluate its own needs and vulnerabilities to determine which controls are needed. Some utilities will not need all the controls listed. For example, systems with a lot of cash payments may use cash registers, but those with very few cash payments may have no need of cash registers. Similarly, a system with only a few employees probably does not need time clocks, but does need controls that verify hours worked. The important point to remember about internal controls is that they should be designed to provide assurance to both the board and the auditors that the financial assets of the utility are well-managed and protected, as much as possible, against both error and fraud.

### *Cash Receipts*

- Hold cash in a safe or other secure location until deposited.
- Separate cash handling and accounting duties among various staff members. The person who receives the cash should not be one who records the payments and makes the deposit, if at all possible.
- Allow only authorized employees to make cash deposits, and require these employees to make the deposit within a specific time period after receipt of cash (e.g. 48 hours).
- Keep records of all deposits (both receipt logs and bank deposit slips) and compare them to the bank statement each month.
- Protect cash registers or drawers with individual authentication so that there is a record of who accessed which register at which times.
- Store copies of all cash register tapes in a secure location.



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- Give a receipt to every customer and keep copies of receipts.
- Do not allow the sharing of safe combinations and passwords.
- Store keys to cash drawers in a secure location and require checkout of keys.

### *Check Receipts*

- Have an employee outside of the accounting department open the mail, if possible. This employee should make a list of the checks received before forwarding the checks to the accounting department.
- The utility should have a “For Deposit Only” stamp which includes the utility’s name. Every check should be stamped as soon as received.
- A deposit slip should be prepared individually listing all checks received.
- Copies of the checks deposited, along with any correspondence received with the check, should be kept as support for the deposit.
- An employee who is not involved in receiving and depositing payments should record the payments, both in the customer’s record and in the general accounting records.
- Management should receive regular notification of the amount of the deposits made (e.g. through a daily or weekly report).

### *Writing Checks*

- Involve as many people as possible. At least two is necessary. Three is preferable. One person authorizes the payments. A second writes the checks. The third is the signer.
- Limit check signers to board members and management.
- Use only pre-numbered checks.
- Use accounting software to print checks, if possible.
- Limit software access (physically or digitally) to necessary users.
- Keep all unused checks in a safe or locked cabinet and limit the number of people with access.
- Require two signatures for amounts above a set amount.
- Someone other than the person writing and mailing the checks should open the bank statement and review it before it is reconciled, preferably by a different person.
- Update signature authorizations. When check signers leave the utility, remove them from the authorized check signer list and forward this information to the bank.



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### *Purchasing and Accounts Payable*

- All purchases should be made with a written purchase order.
- Duplicates of purchase orders should be kept on file.
- A log should be kept recording all purchase orders.
- Purchase orders should be signed by an authorized employee other than the person preparing the purchase order.
- Vendor invoices should be entered in the purchases journal when received.
- Vendor invoices and supporting documents should be reviewed by the check signer.
- Vendor invoices or receiving reports should be stamped with the date goods were received.
- Mark invoices “paid” with the payment date to avoid duplicate payments.
- Pay only from invoices. Do not pay from vendor statements. Statements are summaries of all transactions in a period. Paying statement amounts can result in duplicate payments.
- NEVER pay a vendor without a valid invoice or contract.
- Avoid paying with automatic bank withdrawals.

### *Credit Cards or No Credit Cards*

Many utilities, even small ones, use credit cards and issue them to employees. Others, even large utilities, do not do so. There are a number of reasons for using credit cards and a number of reasons for not doing it.

**Pros:**

- Convenience
- Demonstrates trust in employees
- Can be used almost anywhere
- Allow for disputing billing errors and defective merchandise
- Provide a record of purchases
- May provide discounts or incentives

**Cons:**

- Risk of loss or theft
- Require strict monitoring
- Risk of employee misuse
- Require extra bookkeeping for reconciliation of statements



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- Risk of over-purchasing
- Risk of spending beyond budget limitations

### *Credit Cards*

- Create a formal credit card policy that identifies which employees are authorized to use the utility's credit cards. The policy should clearly state the types of purchases that are allowed.
- Require employees to submit receipts and a log to the bookkeeping department for reconciliation with statements.
- Have a supervisor who is knowledgeable about the activities of the utility (preferably not a credit card holder) open and review all credit card statements and supporting receipts to verify that all charges are correct.
- Set monthly and overall credit limits for all employees who are issued credit cards.
- Set up monitoring rights with the credit card company to allow online review and notification of any unusual activity.
- Limit the number of credit card users to employees that absolutely need them.
- Limit the types of purchases that can be made with a credit card (e.g., only fuel for vehicles).
- Prohibit the personal use of utility issued credit cards.
- Do not allow cash advances or ATM withdrawals on credit cards.
- Compare credit card use to prior periods. Be on the alert for unusual spikes in use or large charges.

### *Payroll*

- Consider installing a computerized time clock, if appropriate for the system size.
- If payroll is manually calculated, have a second person verify all calculations, including hours worked, pay rates used, tax deductions and withholdings.
- Always have a supervisor approve hours worked by employees.
- Match the payroll register to supporting documents (e.g. timesheets and payroll calculations).
- Match timecards to an employee list to avoid the risk of an employee not turning in a timesheet and not getting paid.
- Have supervisors authorize overtime in advance, when possible.
- Require two approval signatures for an employee pay change– one by the employee's supervisor and another by the next-higher level of supervisor. Many systems require board approval for all pay increases.



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- Use automatic direct deposit, if possible. If not, hand checks directly to employees. The person handing out the checks should not be the same person who makes out the checks. The person handing out the checks should check off the employee names on the employee list.
- Lock up unused checks.
- Lock up undistributed paychecks.
- If the company mails checks to its employees, match the addresses on the checks to employee addresses.
- If possible, pay employees from a separate checking account, and fund this account only for the total amount of the checks written. This can prevent theft from someone fraudulently increasing the amount on an existing paycheck or creating an entirely new one, since the funds in the account will not be sufficient to pay the altered check. To prevent honest employees from being penalized if a fraudulent check is processed first, set up a means of immediate notification by the bank if there are insufficient funds to process a check. This notification should be made to someone other than the person who has written the checks.

### *Inventory*

Inventory, for a utility, consists mainly of spare parts and materials used in the normal course of operations. The total quantity of inventory may fluctuate upward when large projects are undertaken and then dwindle when projects are completed. However, the system should keep on hand a sufficient quantity of spare parts to complete all regular maintenance and repairs anticipated for a specified period. This period is typically at least monthly, but might be shorter or longer depending on the cash resources of the utility.

- Fence and lock the warehouse.
- Organize the inventory. Number all locations, and track items by location.
- Tag all inventory with part number, description, unit of measure and quantity.
- Count and inspect all incoming inventory. Check off incoming inventory against the purchase order, and check for damage. Any items that fail inspection should be returned at once, and the accounts payable staff should be notified that the returned items should not be paid for.
- Sign the packing list with the date received and forward it to the accounting department.
- Note any missing or backordered items on the purchase order copy.
- Standardize record keeping for inventory picking. When an item is picked from the shelf in the warehouse, have a standard procedure for recording the picks as soon as they leave the warehouse.
- Sign for all inventory removed from the warehouse. If inventory is being removed to “loan” to another system, have the person receiving the item sign for it. Maintain a record keeping system for tracking loaned items. This system should include a method for “reminding” or billing the borrowing system for the item(s).
- Conduct a periodic obsolete inventory review. Form a materials review board to periodically examine the inventory records to determine which items should be sold or otherwise eliminated.
- Conduct an annual inventory review.



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# C-3: STEPS IN SELECTING AN AUDITOR

Listed below are suggested steps that utilities might use in selecting a qualified independent auditor. These steps are very similar to those used to select other contractors (see Chapter 2) and should follow the procurement policies set by the utility. As with other types of procurement, it can often be helpful to contact other systems of similar size and type for recommendations and suggestions. However, since the audit report is a very important document for funding and bonding agencies, it is important that the auditor be both completely independent and qualified to audit water utilities.

1. Request for Proposals (RFP). RFPs can be advertised or sent to selected firms based on research by the audit committee. Consult the utility's policy and municipal laws about when and how RFPs must be advertised. Chapter 2 includes more specifics about RFPs.The following items should be included in the RFP.

    a. Requirements for length of experience.

    b. Resumes of employees who will actually conduct the audit.

    c. Fee structure.

    d. At least three professional references.

    e. Separate envelopes for price and qualifications (allows the committee to evaluate qualifications without being influenced by price).

    f. A closing date for receipt of proposals.

2. Audit Proposals

    a. Proposals should be stamped with the date received and entered into a log.

    b. The envelopes containing qualifications should be opened and place in a file for that firm.

    c. Envelopes containing price information should be kept separately and unopened until evaluations are completed.

    d. A member of the audit committee should evaluate the proposals for completeness. Incomplete proposals should be rejected. In addition, proposals from related parties must be rejected before evaluation.

3. Evaluation

    a. All proposals should be evaluated by every member of the audit committee. Each member should rate his/her top 3-5 choices (check policies or laws for requirements here). The committee can meet as a whole to agree on the top candidates.

    b. Check references for all candidates selected in this initial evaluation.

4. Selection

    a. Interview all of the top candidates. In-person interviews are preferable, but in cases where the cost might be prohibitive, interviews can be conducted by phone. In either case, the interviews should be conducted by the committee as a whole.



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b. After interviews are complete, open the price proposals for the top candidates.

c. Prepare scoring sheets for committee members to use in rating the candidates. Cost should comprise only 20-40 percent of the evaluation. As tempting as it is to take the lowest bid, this is not always the best option.

d. After the interviews and scoring sheets are complete, the committee should meet as a whole to discuss the selection of the auditor.

e. Notify the auditor selected of his/her selection, subject to full board approval.

5. After Selection

a. Prepare a written contract for the audit work. It should include all of the requirements of the audit, the time frame in which the audit is to be done, the price agreed upon and stipulations for remedies for unfinished or unsatisfactory work, including work not completed on time. Auditing contracts are often “boilerplate” provided by the auditor. This is acceptable, but it should be reviewed by the system’s attorney before signing.

b. Present the contract to the auditor for review and signature.

c. Present the contract to the full board for approval.



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# C-4: THE RATE SETTING PROCESS

The following is summary of  logical steps to follow in designing a water rate structure. Setting water rates is an iterative process. The first pass might start at the beginning and come out at the end with a rate that covers the costs of operations, but is not affordable to many of the users. A second pass might lower the base rate and/or increase the variable rates. It is important not to go round and round endlessly, but to test different scenarios until a structure is found that satisfies both cost recovery and affordability.

1. Determine projected costs. Start with the latest complete year and look at several previous years (up to 5) to determine trends. Add a factor for inflation and also include any anticipated new costs. Then divide the costs into fixed and variable components.

2. Determine projected revenues. As a starting point, look at revenues for last year as well as trends for several years.

3. Determine reserve needs. The repair and replacement schedule and capital improvement plan are essential here, as is information about current or anticipated debt. Don't forget to factor in operating reserves and reserves for emergencies.

4. Determine current financial position. If there is a recent operating deficit, or the system has been getting transfers from the general fund, this would be the time to deal with those.

5. Gather information about customers. This will include, for instance, how many users are in each usage bracket (tiers or blocks) and how many gallons are sold from each bracket.

6. Gather information about production and use. Include the following information;

    a. How much water did the system produce or purchase?

    b. How much water did the system sell?

    c. How much water is used by the community and not paid for? (firefighting, schools, community buildings, etc.)

    d. How much water is "lost"? (leaked, stolen, etc.)

7. Design a rate. This can be done with a spreadsheet or software package that calculates revenue by customer usage class. EPA's STEP guide Setting Small Drinking Water System Rates for a Sustainable Future can be helpful for very small systems (http://www.epa.gov/ogwdw/smallsystems/pdfs/guide_smallsystems_final_ratesetting_guide.pdf)

8. Test the rate on several different scenarios to determine whether it will meet all the system's needs. Spreadsheets are extremely helpful with this process, and once they are set up, they can be used over and over. The final rate should meet all costs and should be fair and affordable. Knowing the community's annual median household income is extremely helpful. This will help in understanding whether customers can really afford the proposed rate. Please note that ability to pay is quite different from willingness to pay. Customers sometimes say they "cannot pay" the rates after an increase. But what they really are saying is that they do not want to pay the rates or that they feel the rates are too high. It is important for the utility to understand the difference between ability to pay and willingness to pay. An assessment of the ability to pay should be based on the Annual Median Household Income (AMHI). Generally, residential rates should not exceed 1.5-2% of AMHI to be considered affordable.



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9. Willingness to pay is often based on the customers' perception of the value or importance of the service provided. Many people will gladly pay $50-$100 per month for cable TV service, but will balk at a $50 water bill. When there is ability to pay, but not willingness to pay, it is the job of the utility to educate the public about the cost and value of the water service provided. Chapter 2 provides suggestions for methods of educating and communicating with customers.

10. The last steps to the rate setting process are board approval and implementation. Both of these steps may require education. If the study determines that customers can afford to pay the proposed rate, but there seems to be a lot of resistance, then the job becomes one of "selling." The more informed customers are about the real costs of producing and delivering their water, and the more transparent the process is, the more willing they will be to support the new rates. Keeping the public informed will increase the buy-in. Chapter 2 contains information about various methods of informing the public, as well as soliciting public input. How long it takes to get a new rate approved and implemented will depend on rules governing your utility and the processes of the board (e.g. frequency of meetings, requirements for review, requirements for public comment period, etc.).



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# C-5: KANSAS WATER AND WASTEWATER FUNDING SOURCES

Note: These programs change periodically and a utility should always contact the funder prior to initiating projects to ensure eligibility and funding availability

| C-5: Kansas Water and Wastewater Funding Sources (cont.) | | | | | |
|---|---|---|---|---|---|
| Organization | Program | Purpose or Use of Funds | Application Dates | Website | Contact |
| Kansas Department of Health and Environment | Kansas Public Water Supply Loan Fund (KPWSLF) (water) | The KPWSLF provides financial assistance to Kansas municipalities for construction of public water supply system infrastructure. | No actual dates found | http://www.kdheks.gov/pws/loan/loanfund.htm | William Carr<br>wcarr@kdheks.gov<br>785-296-0735<br>1000 SW Jackson St., Suite 420<br>Topeka, Kansas 66612 |
| | Kansas Drinking Water State Revolving Funds (water) | The DWSRF authorizes the U.S. EPA to award capitalization grants to the states. The grant is deposited into a reserve account and pledged as security for repayment of state issued revenue bonds. | | http://water.epa.gov/grants_funding/dwsrf/index.cfm | William Carr<br>wcarr@kdheks.gov<br>785-296-0735<br>1000 SW Jackson St., Suite 420<br>Topeka, Kansas 66612 |
| | Kansas Water Pollution Control Revolving Loan Fund (sewer) | The KWPCRF is to help communities finance water pollution control projects through low interest loans to local government, and also to provide technical assistance in addition to funding construction project costs. | | http://www.kdheks.gov/muni/index.htm | Rodney R. Geisler, P.E., Chief<br>rgeisler@kdheks.gov<br>785-296-5527<br>1000 SW Jackson St., Suite 420<br>Topeka, KS 66612-1367 |
| Kansas Department of Commerce | Community Development Block Grant Program (CDBG) (Annual Competitive Round and KAN STEP)<br>(water, sewer) | The CDBG Program allows the Department of Commerce to distribute federal funds to Kansas cities and counties looking to improve their community. | For the Annual program, application is due in September 2012 and award announcement is no later than January 11, 2013. KAN STEP application is due in March and September. | http://www.kansascommerce.com/index.aspx?nid=126 | Salih Doughramaji<br>salih@kansascommerce.com<br>785-296-3610<br>1000 SW Jackson St.<br>Topeka, KS 66612 |
| Kansas Development Finance Authority | Bond Issuance (in partnership with Kansas Department of Health and Environment)<br>(water, sewer) | Issues bonds for four state revolving loan fund programs, including Kansas Clean Water Supply Revolving Loan Fund Program, Public Water Supply Revolving Loan Fund Program, Kansas Department of Transportation, and Communication's Revolving Loan Fund Program. | Issuance of bonds year round | http://www.kdfa.org/ | Jim MacMurray<br>jmacmurray@kdfa.org<br>785- 296-6747<br>555 S. Kansas Ave., Suite 202<br>Topeka, KS 66603 |

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## C-5: Kansas Water and Wastewater Funding Sources

| Organization | Program | Purpose or Use of Funds | Application Dates | Website | Contact |
|---|---|---|---|---|---|
| USDA Rural Development | Water and Waste Disposal Loans and Grants (water, sewer) | The funds are available to public bodies, non-profit corporations and Indian tribes to develop community water, sewer, storm sewer and solid waste systems in rural areas and towns with a population not in excess of 10,000, for the construction or improvement of water and waste disposal projects. | Applications received year round. Contact a local USDA Rural Development Office to apply. | http://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program/ks | State Office<br>785-271-2700<br>1303 SW First American Place, Suite 100<br>Topeka, KS 66604 |
| | Solid Waste Management Grants (solid waste) | Assistance may be provided to help reduce or eliminate pollution of water resources and improve planning and management of solid waste sites. | October 1 through December 31 | http://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program/ks | State Office<br>785-271-2700<br>1303 SW First American Place, Suite 100<br>Topeka, KS 66604 |
| | Technical Assistance and Training Grants for Rural Waste Systems (water, sewer) | To make grants to non-profit organizations in rural areas with a population of 10,000 or less to provide technical assistance and/or training to associations on a wide range of issues relating to delivery of water and waste disposal service. | October 1 through December 31 | http://www.rurdev.usda.gov/UWP-wwtat.htm | State Office<br>785-271-2700<br>1303 SW First American Place, Suite 100<br>Topeka, KS 66604 |
| Midwest Assistance Program, Rural Community Assistance Partnership | Technical Assistance for Communities and Tribal Nations (water) | The RCAP provides technical assistance and training to small water systems and provide access to funding for water system improvement projects. | Not Applicable | http://www.map-inc.org | Phil Fishburn<br>pfishburn@map-inc.org<br>620-465-2780<br>PO Box 491<br>Haven, KS 67543-0491 |
| Economic Development Administration, Department of Commerce | Public Works and Economic Adjustment Assistance Programs (water, sewer) | This program provides strategic investments that foster job creation and attracts private investment to support development in economically distressed areas of the United States. These investments support construction, non-construction, technical assistance and revolving loan fund projects. | December 13, 2012 for funding cycle 2 of FY 2013; March 13, 2013 for funding cycle 3 of FY 2013; June 13, 2013 for funding cycle 4 of FY 2013; September 13, 2013 for funding cycle 1 of FY 2014 | http://www.eda.gov | Paul Hildebrandt<br>phildebrandt@eda.doc.gov<br>573- 442-8084608 East Cherry, Rm B-2<br>Columbia, MO 65201 |



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# OPERATING A WATER UTILITY (TECHNICAL CAPACITY)

## APPENDIX D - CHAPTER 4





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# D-1: EXAMPLES OF MAINTENANCE TASKS

## Well Operation & Maintenance

### Daily Tasks

- Record well pump run times, pump cycle starts and master meter reading for each source
- Inspect well pump motors and control systems

### Weekly Tasks

- Record the pumping rate for each well or source water pump
- Clean pump house and grounds

### Monthly Tasks

- Record electrical usage for each well pump
- Check and record static water levels and drawdown for each well
- Check that well caps, seals and vents are intact

### Annual Tasks

- Perform maintenance on building

### Long Term Tasks

- Have a qualified individual inspect each well including scoping the well with a camera as needed

## Water Pumping Facilities

### Daily Tasks

- Record pump run times, pump cycle starts and master meter reading for each pump
- Inspect pump motors and control systems

### Weekly Tasks

- Record the pumping rate for each pump
- Clean pump house and grounds
- Do a security check of locks, hatches, doors, windows, vents, lighting and alarms for signs of intrusion or vandalism

### Monthly Tasks

- Record electrical usage for each pump



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### Annual Tasks

- Perform maintenance on building

## Water Storage Reservoirs

### Daily Tasks

- Check and record water levels in storage tanks
- Check water level measuring equipment for proper operation
- Do a security check of locks, hatches and fences for signs of intrusion or vandalism

### Annual Tasks

- Inspect for sanitary deficiencies that include checking for:
  - Proper screening of vents, holes and overflows
  - Deterioration and corrosion of tank walls, floor, roof, overflow, hatch and vents
  - Deterioration of the tank foundation
  - Silt buildup: remove as needed

## Water Filtration Facilities

### Daily Tasks

- Check filter influent and effluent turbidity with an approved device
- Ensure that instrumentation is calibrated at a frequency per manufacturer's recommendation

### Weekly Tasks

- Clean facility and grounds
- Do a security check of locks, hatches, doors, windows, vents, lighting and alarms for signs of intrusion or vandalism

### Monthly Tasks

- Inspect and lubricate backwash and surface wash pumps
- Inspect surface wash equipment to ensure free operation and check nozzles for blockage
- Check filter valves for leakage and exercise valves to ensure operation
- Inspect the air scour blower as applicable and check oil levels
- Check cartridge filters and replace as needed



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### Annual Tasks

- Inspect the filter media and ensure that it is uniformly graded and distributed
- Inspect the underdrain system
- Evaluate equipment for corrosion issues and address if required

## Chemical Feed Systems

### Daily Tasks

- Check chemical solution tanks and record amounts used
- Inspect chemical feed pumps for proper operation
- Check and record chlorine residual at point of application

### Weekly Tasks

- Inspect chlorine and fluoride test equipment
- Clean treatment facility and grounds
- Do a security check of locks, hatches, doors, windows, vents, lighting and alarms for signs of intrusion or vandalism

### Quarterly Tasks

- Inspect and clean chemical feed lines
- Inspect and clean chemical solution tanks

### Annual Tasks

- Overhaul chemical feed pumps
- Calibrate chemical feed pumps
- Perform maintenance on building

## Surface Water Intake Structures

### Annual Tasks

- Inspect to ensure that intake screens are intact and are not plugged
- Backflush the intake line if possible



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## General Plant Maintenance

### Daily Tasks

- Check instrumentation for proper function
- Inspect testing equipment and ensure that the proper reagents are being used and are within their expiration date
- Inspect heater operation during winter months

### Weekly Tasks

- Inspect the backup power supply for proper operation
- Clean plant and grounds
- Do a security check of locks, hatches, doors, windows, vents, lighting and alarms for signs of intrusion or vandalism

### Monthly Tasks

- Perform an inventory of spare parts including equipment, repair clamps, pipes and valves
- Replace spare parts as they are used

### Biannual Tasks

- Inspect and exercise all valves inside pump houses and treatment plants

### Annual Tasks

- Inspect and clean control panels. Repair as needed
- Calibrate onsite testing equipment
- Perform maintenance on building.

## Hydropneumatic/Pressure Tanks

### Daily Tasks

- Check and record water levels in tanks
- Check and record pressure levels



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### Water Distribution System

Daily Tasks

- Check and record chlorine residual levels
- Check and record system pressures
- Check and record fluoride levels
- Investigate customer complaints

Monthly Tasks

- Read all customer meters and compare against total water produced

Biannual Tasks

- Inspect, exercise and maintain hydrants

Annual Tasks

- Inspect, exercise and maintain valves
- Flush the entire distribution system to remove built up silt and debris and to keep water quality uniform

## D-2: SUMMARY OF CROSS CONNECTION CONTROL DEVICES

| Type | Description | Protects Against | Uses |
|---|---|---|---|
| Air Gap | • Physical separation between a potable water system and a receiving vessel or source of contamination<br>• Air gap between the outlet of the potable system and the flood level rim of the receiving vessel or any source of contamination must be at least twice as large as the diameter of the potable water outlet but never smaller than 1 inch<br>• May require additional pumping downstream of air gap<br>• Safest and simplest<br>• Useful for all hazard levels | Backpressure and Backsiphonage | • Livestock watering operations<br>• Chemical tanks<br>• Filling of surface water features such as ponds or swimming pools |
| Barometric Loop | • Consists of a continuous section of water supply piping that suddenly rises to a height of at least 35 feet before returning to the original level | Backsiphonage | • A pumped main that has a high point that is higher than the outlet point at the end |



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# SUMMARY OF CROSS CONNECTION CONTROL DEVICES (CONT.)

| Type | Description | Protects Against | Uses |
|---|---|---|---|
| Atmospheric Vacuum Breakers | • Consists of a float check, check seat, air inlet port and possibly a shutoff valve immediately upstream<br>• Allows air to enter the downstream water connection<br>• Sizes from ½ inch to 3 inches<br>• Must be installed vertically and 6 inches higher than final outlet<br>• Cannot be tested | Backsiphonage | • Sinks<br>• Residential irrigation systems |
| Pressure Vacuum Breakers | • Consist of a spring that is located on top of the atmospheric vacuum breaker disc and float assembly, two gate valves, a test cock and a first check valve<br>• Available in a range of sizes from ½-inch up to 10-inches | Backsiphonage | • Agriculture<br>• Irrigation |
| Double Check Valves | • Consists of two independently acting, tightly closing, resilient seated check valves in series with test ports<br>• Have tightly closing, resilient seated shutoff valves attached at each end of the assembly<br>• Can be tested inline<br>• Typically approved for only low to medium hazards | Backpressure and Backsiphonage | • Lawn irrigation<br>• Fire sprinklers |
| Double Check with Intermediate Atmospheric Vent | • Consists of a double check valve with an atmospheric vent located between the two check valves. Line pressure pushing against the device keeps the atmospheric vent closed, but zero supply pressure will open the inner chamber to atmosphere, providing another level of protection<br>• Can be used on ½-inch and ¾-inch pipe sizes<br>• May be used under constant pressure<br>• Protect against moderate hazards. | Backpressure | • Laboratory equipment<br>• Processing tanks<br>• Sterilizers<br>• Dairy equipment<br>• Boiler feed lines |
| Reduced Pressure Zone Backflow Preventers | • Similar to double check valve but also contain an independently acting pressure relief valve between the two check valves<br>• Sizes ¾ inch to 10 inches<br>• Protect against high water pollution hazards<br>• Can be tested inline | Backpressure and Backsiphonage | • Plating plants<br>• Car washes<br>• Funeral parlors<br>• Hospital autopsy rooms |



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# D-3: STATE OF KANSAS WATER OPERATOR CERTIFICATION REQUIREMENTS

| POINTS/EXPERIENCE REQUIREMENTS | | |
|---|---|---|
| **Class** | **Points** | **Years of Experience** |
| Small System | 12.5 | 6-months |
| I | 13.0 | 1-year |
| II | 14.0 | 1-year |
| III | 16.0 | 2-years |
| IV | 18.0 | 2-years |

| TRAINING/EDUCATION/EXPERIENCE CREDIT | | |
|---|---|---|
| **Training/Education/Experience** | **Continuing Education Credit Hours** | **Experience Points** |
| 1 day training | 5 | 0.00 |
| 2 day training | 10 | 0.25 |
| KDHE annual school<br>• 2 days<br>• 3 days | <br>10<br>15 | <br>0.25<br>0.50 |
| High School Diploma or GED | Not applicable | 12.00 |
| College Education – Each year | Not applicable | 1.00 |
| Operating Experience – Each year must be involved in daily operation and/or must work full time for the water system | Not applicable | 1.00 |
| California State University courses per volume | Not applicable | 1.00 |
| Approved semester long courses | 54 | 1.50 |
| Approved 2 year environment technology degree | Not applicable | 6.00 |
| Approved training (40 contact hours) | 40 | 1.00 |



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# D-4: WATER LOSS CONTROL PROGRAM

### *Establishing the Nature of the Problem*

The best tool for establishing the nature of water losses is the American Water Works Association (AWWA) water audit tool. This tool is available free of charge from AWWA at: http://www.awwa.org/resources-tools/water-knowledge/water-loss-control.aspx.

This website requires registration, but the registration is free. After registration and log in, the water audit software can be accessed. The water audit software is downloadable and is listed at the bottom of the page under the heading “Free Tools for Water Loss Analysis.” There are multiple versions of the software available for download. It is best to download the latest version.

The water audit tool is a spreadsheet that guides the user through a data entry process. The first step is to enter values for the amount of water entering the system. This includes all the water the utility withdraws from surface or groundwater sources plus any water purchased from another system. The user then enters values for the amount of water billed and/or exported through metering. There are additional entries for such factors as unbilled usage, unauthorized consumption and data handling errors. Several of these values can be obtained by selecting the default option and allowing the software to calculate a value. If more is known about the system, the user can enter appropriate values instead. As the system becomes more familiar with its water losses, these values will get more and more accurate.

In addition to the actual data, it is necessary to enter values for the quality of the data. This step is extremely important because if the data is of poor quality, the system must be very careful about relying too heavily on the results of the water audit. Poor data may lead to incorrect results which could lead to expending money in the wrong places. The program will provide an overall data validity score. If this score is low, especially if it is less than 50%, the best place to start a water loss control program is by improving the data, rather than taking on any major activities. It may take a year or two to improve the data quality to a reliable point. However, no matter what the quality of the data, it is advisable to start with the audit. It will provide information regarding strengths and weaknesses and help determine where to make improvements.

The results of the audit will provide information about the system’s non-revenue water and the magnitude of each type (authorized unbilled consumption, meter inaccuracies, water theft, data handling errors and real water losses). The program will not break down the real water loss number into its components, but will provide a total number for real water losses. As a reminder, the data validity score should be taken into consideration when looking at the categories of water losses. If the validity score is low, the amount of water loss in each category may be incorrect.

### *Setting Goals*

It is extremely important to think about the system’s goals for a water loss control program. Is the goal to reduce real water losses to the maximum extent possible because the area is in a drought? Is the system trying to reduce water theft because either customers or businesses are stealing water from the system and impacting both revenues and equity? Is it important to address faulty meters that may be inoperable or inaccurate? Different goals require different strategies and varying amounts of funding to address. Some goals are related to revenue enhancement, while others are focused on preserving the water resource or improving system integrity.



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Goals should be set using the SMART acronym.

- The goals should be very Specific. A goal of “reduce water loss” is not very helpful. A goal such as “reduce real water loss by 10 percent within 2 years” is much more specific.
- The goal must be Measurable. It is necessary to know whether a goal has been met or not, and the only way to know is to measure it.
- It is important to set Attainable goals. If the system has very little ability to address real water losses, due to lack of technology, personnel, time, money or equipment, a goal of reducing real water losses by 25% is probably not attainable.
- The goals should be Relevant to the system and the system characteristics. If the system has very little water theft, then goals related to water theft are not relevant to the system and the problems it is experiencing.
- The final element is to make the goals Time bound where appropriate. For example, state the time period in which the system expects to achieve the result (e.g. next year, next five years).

When setting the goals, it is important to think about where the data to measure the goals will come from. It may be necessary to start a data collection program to obtain the information. To do this, the cooperation of the entire organization is needed. It is also important to think about how often the goals will be measured and how they will be reported. A table such as the one presented in Appendix B for level of service goals can be used for this purpose as well.

### *Selecting Appropriate Strategies*

Depending on the nature of the water loss issues, there are many different strategies that can be used to address water losses. For example, if the issue is inaccurate meters, a meter replacement program may be necessary. If the issue is water leaks from service lines, a service line replacement program might be helpful. If the issue is main line leaks, leak detection strategies may be appropriate. Strategies for addressing water losses are very specific to the type of water loss and to the characteristics of the individual system. For example, leak detection will not work well on a system made up primarily of plastic pipe with very few contact points (valves, hydrants and meters). It will work well on a system with metallic pipe and many contact points. A full discussion of all water loss strategies is beyond the scope of this manual, but there are many resources available to assist in identifying strategies. Some of these resources are included in Appendix H.

The most important factor is to select potential strategies that address the concerns the system is facing and that fit within the context of the system. After strategies are selected, it is necessary to determine the cost of implementing the strategies, the time frame of implementation and the expected results. For example, if 100 meters are replaced, what would be the expected increase in revenue? If 25 leaking service lines were replaced, how much water would be saved? Knowledge of this information will aid in the next step of prioritizing strategies.

### *Prioritizing Strategies for Implementation*

There are almost always more strategies that can and should be implemented to control water loss than there are resources – personnel, money, time and equipment – to implement them. Therefore, it is extremely important to prioritize the strategies for implementation.



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A prioritized plan of strategies indicating the order in which they should be addressed should be developed along with a time line of when it is anticipated the strategies will be deployed. The prioritization plan should be revisited every year or two to determine if any adjustments are necessary. It should also be reassessed if budget increases or decreases occur.

### *Developing a Funding Plan*

As with any activity in a water utility, it is necessary to have a plan to fund the program. Water loss control is somewhat unique because it is not just an expense. There is the potential to increase revenues and/or decrease expenses by implementing some of the strategies. Revenue may increase or costs may decrease in any or all of the following ways depending on the nature of the water losses and the strategies implemented:

- Increased revenues from reducing the number of customers who are authorized to use water but do not pay for it. For example, if the water utility is currently giving water away to a park that is used by the local soccer club and the decision is made to meter and bill the soccer club for the water, revenues into the water department will increase.

- Increased revenues from reduction in water theft. If water theft is a major problem in the system, either from customers illegally tying into the system or from businesses stealing water from hydrants, addressing the theft and billing the individuals using the water will increase revenues to the system. Whether or not there is much potential to increase revenues in this way depends on the individual system and the customer dynamics. Some utilities have a very prominent water theft problem, while others have almost no problem with theft.

- Increased revenues from meter replacement. If customer meters are inaccurate, replacing them with new meters can result in increased revenues.

- Increased revenues due to fixing data handling errors. If the data handling errors are such that customers are receiving bills that do not include all the water they are using, addressing the errors will bring in additional revenues.

- Reduction in costs related to a lower production of water. If real water losses are reduced, the system will not need to purchase and/or produce and treat as much water to supply the community. This reduction in production will lower the costs of the operation. However, it must be recognized that for most utilities, the cost of water is so low that the expenses will not go down enough to pay for the water loss control program.

- Reduction in costs by delaying capital improvements. For systems at or near treatment or pumping capacity, reducing real water losses in the distribution system may help to delay or eliminate capital projects related to developing additional water supplies, treatment capacity or pumping capabilities.

While the strategies implemented may increase revenues or reduce costs, they are unlikely to pay the entire cost of the water loss control program. Furthermore, there is a potential that some of these strategies may increase revenues only in the short term. If customers adjust their usage patterns to reduce use (by voluntarily cutting back on water use to reduce their bill), the increases in revenue may be short term. Therefore, it will generally be necessary to provide additional funding for the program beyond the revenue increases or cost reductions. Providing proper funding is necessary to allow for implementation of a robust water loss control program that achieves the utility's goals. The budget for the water loss control program should be reviewed annually to ensure it is adequate.



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***Important Water Loss Considerations***

There are several important considerations with water loss and water loss control programs that are identified below.

- Understanding the nature of the problem is vital to achieving the desired results. Water loss control activities should not be implemented until the nature of the problem is understood.
- Bad data leads to bad decisions. If the data quality is poor or extremely poor, improving data quality should be the first step.
- Leak detection only finds leaks, so leak detection by itself will not save any water. It is only through fixing the leaks that water is saved. Consider whether the system has the manpower, money, equipment and parts to fix the leaks that are identified before embarking on this type of program.
- If additional revenue from implementing water loss control programs is being used to pay for the program, make sure the money is designated and dedicated for this use and not added to the general budget.
- Measure progress towards meeting water loss goals and adjust strategies as necessary to ensure the goals are met.

## D-5: REGULATED CONTAMINANTS

**Regulated Inorganic Compounds (IOCs)**
**K.A.R. 28-15a-62 sets maximum contaminant levels (MCLs) for the following inorganic compounds**

| Compound Name | Maximum Contaminant Level (MCL) |
|---|---|
| Antimony (metalloid) | 0.006 mg/L |
| Arsenic (metalloid) | 0.010 mg/L* |
| Barium (metal) | 2 mg/L |
| Beryllium (metal) | 0.004 mg/L |
| Cadmium (metal) | 0.005 mg/L |
| Chromium (metal) | 0.1 mg/L |
| Cyanide (compound) | 0.2 mg/L |
| Fluoride (ion) | 4 mg/L |
| Mercury (metal) | 0.002 mg/L |
| Nickel (metal) | 0.1 mg/L |
| Nitrate (ion) | 10 mg/L |
| Nitrite (ion) | 1 mg/L |
| Selenium (non-metal) | 0.05 mg/L |
| Thallium (metal) | 0.002 mg/L |
| *Reduced to 0.010 mg/L effective January 23, 2006 | |



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| Regulated Volatile Organic Compounds (VOCs)<br>K.A.R. 28-15a-61 sets MCLs for the following volatile organic compounds | | |
|---|---|---|
| Compound Name | MCL | Uses |
| Benzene | 0.005 mg/l | Fuels, pesticides, paints, pharmaceutical |
| Carbon tetrachloride | 0.005 mg/l | Degreasing agents, fumigants |
| p-Dichlorobenzene | 0.075 mg/l | Insecticides, moth balls |
| o-Dichlorobenzene | 0.6 mg/l | Insecticides, industrial solvents |
| 1,2 Dichloroethane | 0.005 mg/l | Gasoline, insecticides |
| 1,1 Dichloroethylene | 0.007 mg/l | Paints, dyes, plastics |
| cis-1,2 Dichloroethylene | 0.07 mg/l | Industrial solvents, chemical manufacturing |
| trans-1,2 Dichloroethylene | 0.1 mg/l | Industrial solvents, chemical manufacturing |
| Dichloromethane | 0.005 mg/l | Paint strippers, refrigerants, fumigants |
| 1,2 Dichloropropane | 0.005 mg/l | Soil fumigants, industrial solvents |
| Ethylbenzene | 0.7 mg/l | Gasoline, insecticides |
| Monochlorobenzene | 0.1 mg/l | Industrial solvents, pesticides |
| Styrene | 0.1 mg/l | Plastics, synthetic rubber, resins |
| Tetrachloroethylene | 0.005 mg/l | Dry cleaning/industrial solvents |
| Toluene | 1 mg/l | Gasoline, industrial solvents |
| 1,2,4 Trichlorobenzene | 0.07 mg/l | Industrial solvents |
| 1,1,1 Trichloroethane | 0.2 mg/l | Metal cleaning/degreasing agent |
| 1,1,2 Trichloroethane | 0.005 mg/l | Industrial degreasing solvents |
| Trichloroethylene | 0.005 mg/l | Paint strippers, dry cleaning, degreasers |
| Vinyl chloride | 0.002 mg/l | Plastics/synthetic rubber, solvents |
| Xylenes | 10 mg/l | Paints/inks solvent, synthetic fibers, dyes |



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| Regulated Synthetic Organic Compounds (SOCs)<br>K.A.R. 28-15a-61 sets a MCL for the following synthetic organic compounds and requires public notifications by systems failing to monitor any of these SOCs or having MCL violations | | |
|---|---|---|
| Compound Name | MCL | Uses |
| Alachlor (Lasso) | 0.002 mg/l | Pesticide |
| Aldicarb | 0.003 mg/l | Insecticide |
| Aldicarb sulfoxide | 0.003 mg/l | Insecticide |
| Aldicarb sulfone | 0.003 mg/l | Insecticide |
| Atrazine (Atranex, Crisazina) | 0.003 mg/l | Weed control |
| Benzo(a)pyrene | 0.0002 mg/l | Coal tar lining and sealants |
| Carbofuran (Furadan 4F) | 0.04 mg/l | Rootworm, weevil control |
| Chlordane | 0.002 mg/l | Termite control |
| Dalapon | 0.2 mg/l | Herbicide |
| Dibromochloropropane(DBCP, Nemafume) | 0.0002 mg/l | Pesticide, nematocide, soil fumigant |
| 2,4-D (2,4-dichlorophenoxyacetic acid) | 0.07 mg/l | Weed control, defoliant |
| 2,4,5-TP (Silvex) | 0.05 mg/l | Herbicide, defoliant |
| Di(diethylhexyl)adipate | 0.4 mg/l | Plasticizer |
| Di(diethylhexyl)phthalate | 0.006 mg/l | Plasticizer |
| Dinoseb (2,4-dinitro-6-sec-butylphenol) | 0.007 mg/l | Insecticide, herbicide |
| Diquat | 0.02 mg/l | Herbicide |
| Endothall | 0.1 mg/l | Herbicide, defoliant |
| Endrin | 0.002 mg/l | Insecticide |
| Ethylene Dibromide (EDB, Bromofume) | 0.00005 mg/l | Gasoline additive, fumigants, & sol-vents |
| Glyphosate | 0.7 mg/l | Herbicide |



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| Regulated Synthetic Organic Compounds (SOCs) (cont.)<br>K.A.R. 28-15a-61 sets a MCL for the following synthetic organic compounds and requires public notifications by systems failing to monitor any of these SOCs or having MCL violations | | |
|---|---|---|
| Compound Name | MCL | Uses |
| Heptachlor (H-34,Heptox) | 0.0004 mg/l | Termite control |
| Heptachlor epoxide | 0.0002 mg/l | Insecticide |
| Hexachlorobenzene | 0.001 mg/l | By-product of solvents & pesticides |
| Hexachlorocyclopentadiene | 0.05 mg/l | Pesticide, fungicide |
| Lindane | 0.0002 mg/l | Pesticide |
| Methoxychlor (DMDT, Marlate) | 0.04 mg/l | Insecticide |
| Oxamyl (Vydate) | 0.2 mg/l | Insecticide |
| Pentachlorophenol (PCP) | 0.001 mg/l | Herbicide, fungicide, wood preservative |
| Picloram (Tordon) | 0.5 mg/l | Herbicide, defoliant |
| Polychlorinated Biphenyls (PCB, Aroclors) | 0.0005 mg/l | Herbicide |
| Simazine | 0.004 mg/l | Herbicide |
| 2,3,7,8 TCDD (Dioxin) | 3E-8 mg/l | Pesticide byproduct |
| Toxaphene | 0.003 mg/l | Pesticide |



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| Radionuclides<br>K.A.R. 28-15a-66 sets MCLs for the following radiological contaminants volatile organic compounds | | |
|---|---|---|
| Contaminant | MCL | Source/Uses |
| Gross Alpha | 15 pCi/l | Natural decay of uranium in rocks and soil |
| Gross Beta | 50 pCi/l or 4 mrem/yr | Natural decay of uranium in rocks and soil, nuclear weapon production, pharmaceuticals |
| Combined Radium (Radium 226 + Radium 228) | 5 pCi/l | Natural decay of uranium in rocks and soil |
| Strontium-90 | 8 pCi/l | Artificial isotope, used in research and medicine, in industrial density measuring devices, in atomic batteries, in luminous paint |
| Tritium | 20,000 pCi/l | Man-made isotope, used as chemical tracer in research, in nuclear weapons production, in luminous instrument dials |
| Uranium | 30 ug/l | Erosion of natural deposits |
| Key: pCi/l = picoCurie per liter, mrem/yr = millirem per year, ug/l = micrograms per liter | | |



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# D-6: STEPS IN SECURING WATER RIGHTS

Appropriating or altering a water right must be done by application to the Kansas Division of Water Resources. This is the only means for a utility to obtain a water right. Adverse use and possession (obtaining a right by using the water long enough) are not adequate. Information on the appropriation process is detailed on the Kansas Department of Agriculture web site under Water Law Basics (https://agriculture.ks.gov/divisions-programs/dwr/water-appropriation/water-law-basics). The basic steps are summarized here for easy reference.

1. **File an Application to Appropriate Water For Beneficial Use:** Along with the appllication form, supplemental forms for municipal use and minimum desirable streamflow form are also required. (See the minimum desirable streamflow section for more information.) The basic form includes information such as the amount of water to be diverted, the source type (ground or surface water), location, intended use, means of pumping the water, date of anticipated start and relevant maps of the area.

2. **Receive the permit:** If the requested water is available at the requested location and the appropriation will not interfere with existing water rights or minimum desirable streamflow and will not harm the public interest, a permit will be granted.

3. **Build the diversion:** The system will install the combination of pumps, wells or dams that is necessary to divert the water. Dams holding more than 50 acre feet of water require additional approval and permitting from the Water Structures Section of the Water Resources Division.

4. **Develop the water right:** The system can begin using the water right in the manner specified on the application. This process is known as “perfecting” the water right. Twenty years is a typical time in which to develop municipal water rights, though an extension is possible with a written request. The largest amount of water used in a given year during this time (not exceeding legal conditions already specified on the permit) will be the foundation for the final water right.

5. **Field Inspection:** The Division of Water Resources will conduct a field inspection at this time to collect information about the diversion.

6. **Draft Certificate Issuance:** A draft certificate of appropriation will be issued describing the extent of the water right developed. The utility must examine the certificate and comment on it within 30 days. If there is a disagreement regarding the extent to which the water right has been developed, it should be raised at this time.

7. **Certificate Issuance:** After the 30 day period, a final Certificate of Appropriation will be issued. It must be filed with the Register of Deeds in the appropriate county. If the utility is diverting water from another county, it must be filed in that county as well.

8. **Annual Reports:** The utility must file a water use report annually by March 1.



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# APPENDIX E

## ACRONYMS

## A B

**AM:** Asset Management

**AMHI:** Annual Median Household Income

**AWWA**: American Water Works Association

**BMP:** Best Management Practices

## C

**CCR:** Consumer Confidence Report

**CIP:** Capital Improvement Plan

**CPI:** Consumer Price Index

**CWS:** Community Water System

## D E

**D/DBPR:** Disinfectant/Disinfection Byproducts Rules

**EFC:** Environmental Finance Center

**EPA:** Environmental Protection Agency

**ERP:** Emergency Response Plan

**EWSP:** Emergency Water Supply Plan

## F G

**GO Bond:** General Obligation Bond

**GUIP:** Ground Water Under the Influence Purchase System

**GWP:** Ground Water Purchase System

**GWR:** Ground Water Rule

**GWUDI:** Ground Water Under the Direct Influence of Surface Water



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# H I

**IOC:** Inorganic Compounds

# J K

**KDHE:** Kansas Department of Health and Environment

**KMU:** Kansas Municipal Utilities

**KOMA:** Kansas Open Meetings Act

**KORA:** Kansas Open Records Act

**KSMAP:** Kansas Mutual Aid Program for Utilities

**KWAA**: The Kansas Water Appropriation Act

# L

**LCR:** Lead and Copper Rule

**LOS:** Level of Service

**LT2:** Long Term 2 Enhanced Surface Water Treatment Rule

# M

**MCL:** Maximum Contaminant Level

**MCLG:** Maximum Contaminant Level Goal

**MRDL:** Maximum Residual Disinfectant Level

# N

**NCWS:** Non-Community Water System

**NRW:** Non-Revenue Water

**NTNC:** Non-Transient Non-Community Water System

# O P Q

**O&M:** Operations and Maintenance

**OIT:** Operator in Training

**PWS:** Public Water System



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# R

**R&R:** Repairs and Replacement

**RCAP:** The US Department of Agriculture Rural Community Assistance Partnership

**RFP:** Request for Proposal

**RFQ:** Request for Qualifications

**RPZ:** Reduced Pressure Zone Backflow Preventer

**RTCR:** Revised Total Coliform Rule

**RUS:** USDA Rural Utilities Service

**RWD:** Rural Water District

# S

**SDWA:** Safe Drinking Water Act

**SMART:** Smart, Measureable, Attainable, Relevant, Timely

**SOC:** Synthetic Organic Compounds

**SOP:** Standard Operating Procedure

**SWA:** Source Water Assessment

**SWP:** Surface Water Purchase System

**SWPP:** Source Water Protection Plan

**SWTR:** Surface Water Treatment Rule

# T

**TCR:** Total Coliform Rule

**TNC:** Transient Non-Community Water System

# U V W X Y Z

**VOC:** Volatile Organic Compounds

**WMP:** Water Marketing Program

**WRAPS:** The Watershed Restoration and Protection Strategy



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# APPENDIX F

## CONTACT INFORMATION FOR KANSAS WATER SUPPLY SYSTEMS

### KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT

**Curtis State Office Building**
1000 SW Jackson St., Suite 420
Topeka, KS 66612-1367
http://www.kdheks.gov/pws/index.html

**Public Water Supply Section**.....(785) 296-5514
**Permits & Engineering**.....(785) 296-5516
**Monitoring, Reporting, and Compliance**.....(785) 296-5523
**Drinking Water Revolving Loan Program**.....(785) 296-0735
**Capacity Development Program**.....(785) 368-7130
**Technical Services Section**.....(785) 296-5504
**Operator Training/Certification**.....(785) 296-2976
**Watershed Management Section**.....(785) 296-5567
**Source Water, Wellhead Protection**.....(785) 291-3103
**Bureau of Environmental Remediation**
Storage Tank Section, Wellhead Protection Unit.....(785) 291-3103
**Health and Environmental Laboratories**
Forbes Field, Building 740
Topeka, KS 66620
Chemistry Laboratory.....(785) 296-1647
Environmental Microbiology Laboratory.....(785) 296-1636
Radiation Chemistry Laboratory.....(785) 296-1629

### KDHE DISTRICT AND SECTION OFFICES

**North Central Office**
2501 Market Place, Suite D
Salina, Kansas 67401
NCDOAdmin@kdheks.gov
Jennifer Nichols - District Environmental Administrator.....(785) 827-9639

**Northeast District Office**
800 West 24th Street
Lawrence, Kansas 66046-4417
NEDOAdmin@kdheks.gov
Julie Coleman - District Environmental Administrator.....(785) 842-4600

**Northwest District Office**
2301 East 13th Street
Hays, Kansas 67601-2651
NWDOAdmin@kdheks.gov
Dan Wells - District Environmental Administrator.....(785) 625-5663



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**South Central District Office**
130 S. Market, 6th Floor
Wichita, Kansas 67202-3802
SCDOAdministrators@kdheks.gov
Allison Herring - District Environmental Administrator.....(316) 337-6020

**Southeast District Office**
1500 West 7th
Chanute, Kansas 66720-9701
SEDOAdmin@kdheks.gov
Victoria O'Brien - District Environmental Administrator.....(620) 431-2390

**Southwest District Office**
302 West McArtor Road
Dodge City, Kansas 67801-6098
SWDOAdmin@kdheks.gov
Erich Glave - District Environmental Administrator.....(620) 225-0596

**Surface Mining Section**
4033 N. Parkview Drive
Frontenac, Kansas 66763
mbalk@kdheks.gov
Murray Balk - Section Chief.....(620) 231-8540

**Ulysses Satellite Office**
313 W. Oklahoma Terrace
Ulysses, Kansas 67880
SWDOAdmin@kdheks.gov
Erich Glave - SW District Environmental Administrator (Dodge City).....(620) 356-1075

**Kansas Corporation Commission**
1500 SW Arrowhead Road
Topeka, KS 66604
**Utilities Division**.....(785) 271-3165
**Kansas One Call**.....(800) 344-7233 or (800) DIG-SAFE

**Kansas Department of Agriculture, Division of Conservation**
1320 Research Park Dr.
Manhattan, KS 66502
**Water Conservation Program**.....(785) 564-6622
**Flood Control and Lakes Program**.....(785) 564-6620

**Kansas Department of Agriculture, Division of Water Resources**
109 SW 9TH St., 2nd Floor
Topeka, KS 66612-1283
http://agriculture.ks.gov/divisions-programs/dwr
**Water Rights and Water Use Reporting**.....(785) 564-6638

**Kansas Department of Commerce**
Curtis State Office Building
1000 SW Jackson St., Suite 100
Topeka, KS 66612-1354
http://www.kansascommerce.com/
**Community Development Block Grant Program**.....(785) 296-4100
http://www.kansascommerce.com/cdbg
**Kan STEP Program**.....(785) 296-3610



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**Kansas Water Office**
901 South Kansas Avenue
Topeka, KS 66612-1249.....(785) 296-318
*toll free* (888) 526-9283
**Regional Public Water Supply Planning**.....(785) 296-0865
**Water Marketing/Assurance Programs**.....(785) 296-0867
**Water Conservation Planning** (785) 296-0875
http://www.kwo.org

## FEDERAL AGENCIES

**U.S. Department of Agriculture – Rural Development**
1303 First American Place, Suite 100
Topeka, KS 66604
http://www.rd.usda.gov/ks
**Utility Programs**.....(785) 271-2730

**U.S. Environmental Protection Agency – Region 7**.....(800) 223-0425
11201 Renner Blvd.
Lenexa, KS 66219
http://www.epa.gov/region7/water/dwgw.htm
**Drinking Water Management Branch**.....(913 ) 551-7051

## TECHNICAL ASSISTANCE PROVIDERS

| | |
|---|---|
| **Wichita State University Environmental Finance Center** | hws.wichita.edu/efc |
| **Environmental Finance Center Network** | www.efcnetwork.org |
| **American Water Works Association, Kansas Section** | www.ksawwa.org |
| **Kansas Rural Water Association** | www.krwa.net |
| **League of Kansas Municipalities** | www.lkm.org |
| **Midwest Assistance Program** | www.map-inc.org |



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# APPENDIX G

## GLOSSARY

# A

**Accounts Payable:** amounts an entitiy owes for normal operations (e.g. bills for supplies, utilities, office supplies etc.)

**Accounts Receivable:** money owed to an organization in the normal course of business

**Accrued Liabilities:** amounts that are owed by an entity but are not yet due

**Agenda:** a list of items to be considered in a meeting

**Air Gap:** a non-mechanical means of isolating the potable water supply from a non-potable source in which there is a physical distance between the potable water supply and a non-potable source

**Appropriation Rights:** the right to take a specific quantity of water, from a specific supply for a beneficial use (obtained after June 28, 1945)

**Aquifer:** any geologic material such as sand, gravel or fractured bedrock that is filled with water and can yield that water through a well

**Assets:** the economic resources of a utility

**Asset Management:** a system for maintaining a desired level of service at the lowest life cycle cost

**Atmospheric Vacuum Breaker:** a cross connection control device that allows air to enter the water line when the line pressure is reduced to a gauge pressure of zero or below

# B

**Backflow:** the flow of water or liquid into the distribution system of a potable water supply from any source or sources other than its intended source

**Backpressure:** a condition in which downstream water pressure is greater than the water supply pressure

**Backsiphonage:** a condition in which there is negative pressure from a vacuum (or partial vacuum) in the supply piping causing outside water or other liquid to be pulled in the pipe

**Balanced Budget:** a budget in which anticipated yearly expenditures and reserve set-asides match anticipated yearly revenues



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**Balance Sheet:** a financial statement that shows an organization's financial position as of the date of the balance sheet

**Barometric Loop:** a cross connection control method consisting of a continuous section of water supply piping that suddenly rises to a height of at least 35-feet before returning to the original level

**Base Charge:** a fixed amount that each customer pays regardless of the volume of water used

**Basic Accounting Formula (or Balance Sheet Formula):** Total Assets = Liabilities + Equity

**Bond:** a debt instrument in which an investor loans money to an entity (typically corporate or governmental) which borrows the funds for a defined period of time at a variable or fixed interest rate

**Bylaws:** the rules and regulations enacted by an organization to provide a framework for its operation and management

# C

**Call Date:** the date when the bonds can be paid off at the option of the borrower prior to their stated maturity date

**Callable Bond:** A bond that can be redeemed by the issuer prior to its maturity

**Capacity Development:** the process water systems use to acquire and maintain adequate technical, financial and managerial capabilities to assist them in providing safe drinking water

**Capital Improvement Plan (CIP):** a list of large-scale projects the water utility will need, when they will be needed, and how much they are expected to cost

**Cash Equivalents:** any security that has a maturity date of less than 90 days

**Change Orders:** deviations from written specifications as a result of changes in conditions or requirements during construction

**Chlorination:** a method of water disinfection in which gaseous, liquid or dissolved chlorine is added to a water supply

**Chlorine Residual:** the amount of chlorine remaining in a water purification system after the initial reaction

**Code of Ethics:** a written set of guidelines issued by an organization to help the members conduct their actions in accordance with its primary values and ethical standards

**Coliform:** a broad class of bacteria found in the environment, including the feces of humans and other warm-blooded animals. The presence of coliform bacteria in drinking water may indicate a possible presence of harmful, disease-causing organisms

**Community Water System (CWS):** public water supply system which serves at least ten (10) service connections used by year-round residents or regularly serves at least twenty-five (20) year-round residents

**Conflict of Interest:** a situation in which a person or organization is involved in multiple interests (financial, emotional, or otherwise), one of which could possibly corrupt the motivation of the individual or organization



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**Conflict of Interest Policy:** a written set of guidelines issued by an organization that spells out what constitutes a conflict of interest for different levels of individuals within the organization and specifically requires individuals to disclose potential conflicts

**Connection Fee (Hookup Fee):** an amount charged to property owners at the time they connect with existing municipal drinking water facilities

**Consecutive System:** a public water system that purchases some or all of its finished water from a wholesaler

**Consumer Confidence Report (CCR):** an annual water quality report that a community water system is required to provide to its customers

**Contract:** a written agreement with specific terms between two or more persons or entities in which there is a promise to do something in return for a valuable benefit

**Criticality:** an assessment of the importance of each asset in terms of its likelihood and consequence of failure

**Cross Connection:** actual or potential connections between a potable and non-potable water supply

**Current Assets:** items that can be converted into cash within one year of the date of the balance sheet

**Current Liabilities:** amounts that are due within one year of the date of the balance sheet

**Current Portion of Long-Term Debt:** the amount of principle that is due on long-term loans during the next year

**Current Ratio (or Liquidity Ratio):** current assets divided by current liabilities; considered a measure of an entity's ability to pay current liabilities

**Current State of the Assets:** an inventory all of the physical components of a facility

**Customer Policies and Regulations:** a document which establishes the way in which service will be provided to customers and the way in which customers are expected to receive and pay for services

# D

**Debt Service Coverage Ratio:** net operating income plus depreciation divided by total debt service; considered a measure of an entity's ability to pay its debt

**Decreasing Block Rates:** a rate structure in which water use is defined in tiers based on volume (e.g. 1000-3000 gallons, 3000-5000 gallons) and the charge per unit decreases for each tier

**Depreciation:** a method for allocating the cost of high-cost assets over time

**Design-Bid-Build:** traditional process in which a designer or engineer is first hired to design a project, which is then put out to bid, and a contractor is selected to complete the work

**Design-Build:** process in which a single contractor is hired to complete both the design and building phases of a project



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**Developing a Water Right:** a multi-year process consisting of applications, constructed infrastructure, and "perfection" through use over a period of 5 years for most water rights and generally 20 years for municipal (or similar) water rights

**Disconnect Fee (Reconnect Fee):** an amount charged to reconnect customers after disconnection

**Disinfection By-Products:** substances formed when chemicals used for disinfecting water react with naturally occurring organic matter found in water. The most prevalent are trihalomethanes (TTHMs) and haloacetic acids (HAA5s)

**Dodd-Frank Wall Street Reform and Consumer Protection Act:** law passed by Congress in 2010 regulating individuals who advise state and local governments and other borrowers involved with the issuance of municipal securities, requiring that they be registered with the Securities and Exchange Commission

**Double Check with Intermediate Atmospheric Vent:** a cross connection control device consisting of a double check valve with an intermediate atmospheric vent

**Double Check Valve:** a cross connection control device consisting of two single check valves put into a single body with the addition of two test cocks

**Duty of Care:** taking the care and exercising the judgment that any reasonable person would use in making informed decisions

**Duty of Loyalty:** acting in good faith and in the best interest of the utility and not in the interests of the individual board member, his/her family, or friends

**Duty of Obedience:** the board as a whole and individual board members adhering to the mission, bylaws, and policies of the utility, as well as all applicable laws, rules, and regulations

# E

***E. coli*:** a bacterium commonly found in the intestines of humans and other animals, some strains of which can cause disease, especially in old people and children

**Effective Rate of Interest:** the interest cost stated on the bond plus the total cost of issuance

**Emergency Response Plan (ERP):** a document that provides basic information and instructions to guide managers and employees in the event of a catastrophic event that interrupts basic service

**Equity:** the net value of an enitity

**Executive Session:** a meeting of a governing body that is held in private to discuss sensitive or confidential issues such as hiring, employee discipline, or legal or security matters

**Expenses:** all the money paid out by the system in the course of operations

# F

**Fiduciary Responsibility:** a legal duty to act solely in another party's interests



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**Financial Audit:** an independent, objective evaluation of an organization's financial reports and financial reporting processes

**Financial Capacity:** the system's ability to maintain sufficient revenue to cover the full cost of providing service, including reserves for unexpected expenses

**First in Time, First in Right:** a concept for allocating water rights based on when the user first began using the water, how much they use, and what they use it for

**Fixed Assets:** the land, buildings, equipment, furniture and fixtures that is owned by a utility and that it uses in its day-to-day operations

**Flat Fee Rates:** a rate structure in which rates do not vary by customer characteristics or water usage (i.e., everyone pays the same amount regardless of usage)

# G

**General Obligation (GO) Bond:** a municipal bond backed by the credit and "taxing power" of the issuing jurisdiction rather than the revenue from a given project

**Ground Water:** water that is found below ground and stored in underground aquifers

**Ground Water Purchase (GWP) System:** a consecutive system that purchases some or all of its finished water from a wholesaler that uses ground water as a source

**Ground Water Under the Direct Influence of Surface Water (GWUDI):** Any water beneath the surface of the ground with significant occurrence of contamination or water characteristics which closely correlates to climatological or surface water conditions

**Ground Water Under the Influence Purchase (GUIP) System:** a consecutive system that purchases some or all of its finished water from a wholesaler that uses GWUDI as a source

# H I

**Hookup Fee (Connection Fee):** an amount charged to property owners at the time they connect with existing municipal drinking water facilities

**Hydropneumatic Tank:** a device for storing water prior to distribution in which a pressure is maintained in a specific pressure range; also known as pressure tank

**Incident Action Plan:** steps to take in response to emergency situations which contain general objectives for managing the situation

**Income Statement:** a summary of revenues and expenses over a period of time

**Increasing Block Rates:** a rate structure in which water use is defined in tiers based on volume (e.g. 1000-3000 gallons, 3000-5000 gallons) and the charge per unit increases for each tier

**Inorganic Compounds (IOC):** substances that do not have any carbon in their composition, divided into metals and non-metals



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**Internal Controls:** systems, policies, procedures and practices that are used to detect or prevent errors of commission and omission

**Inventory:** parts or other items kept on hand that are available for use or sale within the next year

# J K

**Kansas Open Meetings Act (KOMA):** a law passed by the state of Kansas which requires that meetings of elected governing bodies be open to the public

**Kansas Open Records Act (KORA):** a law passed by the state of Kansas requiring all public organizations make certain records open to the public

# L

**Level of Service:** a concept by which an organization defines what it wants its assets to provide and how it wants them to perform

**Leverage Ratio:** total liabilities divided by total assets; considered a measure of how much the organization relies on debt

**Liabilities:** the amounts owed by an organization to others

**Life Cycle Costing:** an assessment of the total costs associated with an asset over the entire period it is owned

**Liquidity:** a measure of how easily an asset can be converted into cash

**Liquidity Ratio (or Current Ratio):** current assets divided by current liabilities; considered a measure of a organization's ability to pay current liabilities

**Long-Term Assets:** assets that cannot be converted into cash within one year of the date of the balance sheet (e.g. bonds)

**Long Term Funding Strategy:** a plan that indicates the source of money for various activities anticipated in the future

**Long-Term Liabilities:** amounts owed that are not due within the next year

# M

**Managerial Capacity:** the system's institutional and administrative capability

**Maximum Contaminant Level (MCL):** the legal threshold limit on the amount of a substance that is allowed in public water systems under the Safe Drinking Water Act

**Maximum Contaminant Level Goal (MCLG):** the concentration of a contaminant in drinking water below which there is no known health effect



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**Maximum Residual Disinfectant Level (MRDL):** the maximum amount of disinfectant allowed in the distribution system

**Minutes:** the official record of the board meeting

**Mission Statement:** a short phrase or sentence that encapsulates the purpose of an organization

**Mitigation Plan:** actions an organization will take in order to eliminate or minimize risks identified in a vulnerability assessment

**Motion:** a formal proposal to be considered by a governing body

**Mutual Aid Agreement:** an agreement among different entities to lend assistance to each other in the event of an emergency event that exceeds local resources

# N

**Net Operating Income:** an amount determined by subtracting total operating expenses from total revenues, when revenues exceed expenses

**Net Operating Loss:** an amount determined by subtracting total operating expenses from total revenues, when expenses exceed revenues

**Non-Transient Non-Community Water System (NTNC):** a public water supply system that regularly serves at least twenty-five (20) of the same persons for more than six (6) months:

**Non-Community Water System (NCWS):** any public water system that is not a CWS (i.e. does not serve year-round residents)

**Non Point-Source Pollution:** pollution discharged over a wide land area, as opposed from one specific location

**Non-Potable Water:** water that is not suitable for drinking

**Non-Revenue Water:** water that is produced by the water utility that does not provide revenue for a variety of reasons (e.g. stolen, given away, or not properly measured)

# O

**Operating Ratio:** operating revenues divided by operating expenses; often used as a measure of profitability or stability of a business

**Operations Budget:** a plan for raising and spending money for the daily operations of a system in the coming year



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# P

**Perfected Water Right:** a water right for which it has been shown that the uses made by the user were for beneficial use

**Personnel Policies:** a set of rules and principles that guide managers and workers in how to behave in the workplace

**Point of Entry Sample:** a water sample taken after treatment and before entry into the distribution system

**Point Source Pollution:** pollution that comes from a single identifiable source (e.g. a factory)

**Policies and Procedures:** a set of written principles, rules, and guidelines formulated or adopted by an organization to guide the actions of employees and managers in given situations

**Potable Water:** water that is suitable for drinking

**Prepaid Expenses:** expenses paid in advance (e.g. annual insurance premium)

**Pressure Vacuum Breaker:** a cross connection control device consisting of a spring loaded check valve, an independently operating air inlet valve, two resilient shutoff valves and two resilient seated test cocks

**Primacy:** the authority given by the USEPA to states to implement and enforce the Safe Drinking Water Act

**Primary Contaminants:** contaminants that affect health

**Primary Drinking Water Regulations:** regulations that specify maximum contaminant levels for contaminants that affect public health (primary contaminants)

**Public Notification Rule:** a SDWA requirement for keeping water consumers informed of any violation of the regulations including failures to monitor and violations of MCLs or emergency situations

**Public Water System (PWS):** a system for delivery to the public of piped water for human consumption that has at least 10 service connections OR regularly serves at least 20 individuals daily at least 60 days out of the year

**Purchasing Policies and Procedures:** a set of rules and principles that provide guidance and support to staff on procuring goods and services

# Q

**Quorum:** the minimum number of members of an assembly or society that must be present at any of its meetings to make the proceedings of that meeting valid—i.e. a majority of those entitled to vote

# R

**Radionuclide:** An unstable form of a chemical element that is sometimes found in water sources that radioactively decays, resulting in the emission of radiation



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**Reconnect Fee (Disconnect Fee):** an amount charged to reconnect customers after disconnection

**Reduced Pressure Zone Backflow Preventer:** a cross connection control device consisting of a modified double check valve with an atmospheric venting capability that is placed between the two checks

**Repair and Replacement Schedule:** a list of repairs and replacements of assets anticipated during an upcoming period of time

**Request for Proposal (RFP):** a published advertisement with a detailed scope of the proposed project, including technical documents, surveys, etc., used to solicit bids for large engineering or construction projects

**Request for Qualifications (RFQ):** a published advertisement requesting qualifications, experience and (usually) pricing schedule, usually used to pre-select engineers or accountants

**Reserve Accounts:** an account which holds monies specified for certain uses (e.g. emergencies or debt repayment)

**Resolution:** the formal decision of an organization; motion which has obtained the necessary majority vote in favor

**Retained Earnings:** the current year net income to date

**Revenue:** all the money taken in by the system, including payments for water used, base fees, hookup fees, late fees, interest, and bulk water sales, but not including loan proceeds

**Revenue Bond:** a municipal bond on which the debt service is payable mainly from revenues generated through the operation of the project being financed, or from other non-property tax sources

**Robert's Rules of Order:** a handbook for running meetings effectively and efficiently, based on the procedures used in the British parliament and applicable to any decision-making organization

# S

**Safe Drinking Water Act (SDWA):** a law passed by Congress in 1974 in order to ensure a safe and healthy public drinking water supply and requiring that the Environmental Protection Agency (EPA) to regulate contaminants that are known or likely to be present in drinking water supplies and cause a risk to health

**Sales Tax Revenue Bond:** a municipal bond on which the debt service is payable from a portion of sales tax dedicated to that purpose

**Seasonal Rates:** a rate structure in which prices rise and fall according to water demands and weather conditions (with higher prices usually occurring in the summer months)

**Secondary Contaminants:** contaminants that could cause aesthetic issues in drinking water, but do not affect health

**Secondary Drinking Water Regulations:** a set of non-enforceable guidelines for contaminants that could cause aesthetic issues in drinking water, but do not affect health (secondary contaminants)

**Short-Term Investments:** investments and security instruments with maturities of more than 90 days but less than 1 year



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**Source Water Assessment:** a document which identifies point-sources and non-point-sources of potential contamination to drinking water source(s)

**Source Water Protection Plan:** a document which outlines procedures to safeguard a utility's water source from contamination

**Surface Water Purchase (SWP) System:** a consecutive system that purchases some or all of its finished water from a wholesaler that uses surface water as a source

**Surface Water:** water that is found above the ground in streams, rivers and lakes

**Sustainability:** the ability of any system to continue to do what it does in the way that it does it for an indefinite period of time

**Sustainable Rate Structure:** a structure for charging for water that is low enough to be affordable but also high enough to cover the full cost of service and send efficient price signals to guide consumption and product decisions

**Synthetic Organic Compounds (SOC):** man-made compounds, many of which are chlorinated and used as herbicides, pesticides, fungicides, and insecticides

# T

**Technical Capacity:** the system's ability to reliably produce and deliver an adequate supply of water that meets all drinking water standards

**The Watershed Restoration and Protection Strategy (WRAPS):** a program to restore, maintain and protect watersheds

**Time Of Day Pricing:** a rate structure in which higher prices are charged during a utility's peak demand periods

**Transient Non-Community Water System (TNC):** a water system that usually does not serve the same individuals on a daily basis

# U

**Uniform Rate Structure:** a rate structure that charges the same price-per-unit for water usage beyond the base charge

**User fees:** the charges to industrial, commercial and residential customers for the use of water utility services

# V

**Variable Charge:** a charge that is based on the volume of water used

**Vested Rights:** water rights obtained prior to June 28, 1945



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**Volatile Organic Compounds (VOC):** organic chemicals that have a high vapor pressure at ordinary room temperature which causes large numbers of molecules to enter the surrounding air

**Vulnerability Assessment:** the process of identifying, quantifying, and prioritizing (or ranking) possible threats to a system which also identifies corrective actions to reduce or mitigate risks

# W X Y Z

**Water Board:** a legal entity charged with the responsibility for overseeing the activities of a Public Water System

**Water Meter:** a device for measuring the volumetric flow of water (some water meters can also measure and display instantaneous rate of flow)

**Water Pressure:** the force of water available in a system

**Water Rate Structure:** a plan for charging customers for water based on various different factors (e.g. volume used, time of day or season)

**Water Right:** a legal right granted by the state for a person or entity to withdraw water from a water source

**Water System:** the components for securing, treating and delivering water to customers

**Water System Capacity:** the ability of a system to plan for, achieve, and maintain compliance with applicable drinking water standards

**Watershed:** an area of land from which all surface water that does not evaporate or get removed by human action, flows through a specific point

**Water Source:** the origin of water in a water supply system

**Water Surcharges:** higher rates imposed on “excessive” water use (i.e., water consumption that is considered higher than average)

**Water Utility:** an organization whose purpose is to provide water to customers in a specified area

**Wholesale System:** a public water system that supplies finished water to one or more other public water systems



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# APPENDIX H

## REFERENCES AND RESOURCES

The following is a list of references and resources available to you, along with short descriptions of the materials available. Many of the organizations discussed in this manual have websites with free downloads and software – these resources have been arranged by topic. Additional resources and contact information for the various agencies and organizations discussed in the manual are also provided.

### ASSET MANAGEMENT

(1) **A.M. KAN Work!**
An Asset Management and Energy Efficiency Manual
Prepared by the New Mexico Environmental Finance Center
For the Kansas Department of Health and Environment

To register for AM KAN Work! Training contact Kansas Municipal Utilities at (620) 241-1423

### BOARD MEETINGS

(2) **Robert's Rules of Order Newly Revised (11th Edition):**

"The book on parliamentary procedure for parliamentarians and novice club presidents alike, Robert's Rules of Order Newly Revised is this country's recognized guide to smooth, orderly and fairly conducted meetings. It is the only book to have been maintained since 1876 under the continuing program established by General Henry M. Robert himself in cooperation with the official publishers of Robert's Rules."

Available in Print:
Robert's Rules of Order Newly Revised (11th Edition)
Henry M Robert III
ISBN-13: 978-0-306-82021-2 (hardcover)
978-0-306-82020-5 (paperback)
978-0-306-82022-9 (leather bound)
Copyright 2011, Da Capo Press

Online summary and additional information available at www.robertsrules.com



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(3) **The Big Guide for Small Systems: A Resource for Board Members**

This guide contains sample documents including standard operating procedures, job descriptions, a variety of useful sample policy statements relating to customer service policies, board codes of ethics and cross connection controls, as well as information on emergence response planning and other topics. Published by:

The US Department of Agriculture Rural Community Assistance Partnership
1701 K Street, N.W., Suite 700
Washington, DC 20006
Phone: (202) 408-1273 or (800) 321-7227

It is available for free download at: www.rcap.org/boardguide

## BOND INFORMATION

(4) **Guidebook of Financial Tools** available online at http://www2.epa.gov/envirofinance

(5) **USDA Rural Utilities Service Borrower's Guide**
A How-to Guide for Water and Wastewater Loans from USDA Rural Development
http://www.rcap.org/sites/default/files/rcap-files/publications/RCAP%20USDA%20RUS%20Borrowers%20Guide.pdf

## BUDGETING AND FINANCE

(6) **Financial Accounting Guide for Small Water Utilities**
Kansas Rural Water Association
This document is available by calling the National Drinking Water Clearinghouse,
West Virginia University 800-624-8300

(7) **Kansas Municipal Budgeting Requirements**
https://www.da.ks.gov/ar/muniserv/Complete%20manual.pdf

(8) **The Basics of Financial Management for Small Community Utilities**
Rural Community Assistance Partnership, Inc.
1701 K. St. NW, Suite 700
Washington, DC 20006
www.rcap.org



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## CAPACITY DEVELOPMENT

(9) **US Environmental Protection Agency**
http://water.epa.gov/type/drink/pws/smallsystems/

This web site is designed to help small system owners and operators, state and tribal agencies, technical assistance providers and consumers learn more about helping small water systems provide safe drinking water and protect public health. Every state has a capacity development program to help small systems improve their finances, management, infrastructure and operations.

*Assessing Water System Managerial Capacity, March 2012*
Developed by a national workgroup to evaluate and describe best practices in assessing and building managerial capacity.
http://water.epa.gov/type/drink/pws/smallsystems/upload/epa816k12004.pdf

## CODE OF ETHICS AND CONFLICT OF INTEREST

(10) "The Kansas Governmental Ethics Commission (GEC) is charged with administering, interpreting and enforcing the Campaign Finance Act and laws relating to conflict of interests, financial disclosure and the regulation of lobbying. These laws establish the public's right to information about the financial affairs of Kansas' public officials, lobbyists and candidates for office. In addition, the GEC renders advisory opinions and can adopt rules and regulations under a less comprehensive conflict of interests law covering local government officials and employees."
http://www.kansas.gov/ethics/

Information on Substantial Statement of Interest, including definitions, who should file and when, and a guide to completing form online. http://www.kansas.gov/ethics/Local_Level_Conflict_of_Interest/SSI_Instruction,_Guide_&_Form/index.html

**Kansas statutes related to state and local official conflicts of interest can be found at:**
http://www.kansas.gov/ethics/Local_Level_Conflict_of_Interest/Statutes/index.html

**A searchable online database of their past opinions can be found at:**
https://www.kansas.gov/ethicsopinion/

(11) **Sample codes of ethics can be found at:**

Unified Government Wyandotte County, Kansas City, Kansas Code of Ethics (Unified Government Ordinance Number O-75-09, Adopted October 1, 2009): http://www.wycokck.org/uploadedFiles/Departments/Ethics_Commission/Codified2010EthicsCodeFinalVersion.pdf

City of Kansas City, MO (Missouri) Code of Ethics https://www.municode.com/library/mo/kansas_city/codes/code_of_ordinances?nodeId=PTIICOOR_CH2AD_ARTXVCOET



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## CONTRACT OPERATORS

(12) **List of Available Contract Operators**
KDHE: (785) 296-5511
Database of certified drinking water and waste water operators
http://kensas.kdhe.state.ks.us/pls/certop/BOW_ADMINL.Home

## CROSS CONNECTION CONTROL

(13) **Cross Connection Control Manual** (EPA 816-R-03-002; February 2003)
Free downloadable document
http://water.epa.gov/infrastructure/drinkingwater/pws/crossconnectioncontrol/crossconnectioncontrol_manual.cfm

(14) **EPA Cross-Connection Control: A Best Practices Guide PDF** (4 pp, 177K)
Tips for detecting and responding effectively to a backflow event and information on helpful technology. (EPA 816-F-06-035, September 2006) Free downloadable document
http://water.epa.gov/infrastructure/drinkingwater/pws/crossconnectioncontrol/

## DISASTER/EMERGENCY RESPONSE

(15) **Emergency/Incident Information**
Natural disasters and other types of incidents can disrupt drinking water and wastewater systems. This page provides information to water consumers, water and wastewater utilities and private well and septic owners to help in emergency/incident response efforts. It is important to be prepared because drinking water and wastewater disruptions can directly threaten your health, the health of your family and the health of your community.
http://water.epa.gov/drink/emerprep/index.cfm

(16) **Emergency Response Plan Guidance for Small and Medium Community Water Systems** to comply with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002
United States Environmental Protection Agency, April 2004
http://www.epa.gov/safewater/watersecurity/pubs/small_medium_ERP_guidance040704.pdf

(17) **Emergency Response Planning Guidance**
http://www.kdheks.gov/water/download/Emergency_Response_Planning_Guidance_01_11_2005.pdf



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(18) **EPA Vulnerability Self-Assessment Tool** (VSAT) 6.0
available for download at:
http://water.epa.gov/infrastructure/watersecurity/techtools/vsat.cfm

(19) **EPA Water Security Resources Page**
http://water.epa.gov/infrastructure/watersecurity/

(20) **Federal Emergency Management Administration Incident Command System Training**
https://training.fema.gov/is/courseoverview.aspx?code=IS-100.b

(21) **Kansas Mutual Aid Program For Utilities (KSMAP)**
www.ksmap.org

or contact:

Kansas Municipal Utilities
101 1/2 North Main Street
McPherson, Kansas 67460
ph. (620) 241.1423
fax (620) 241.7829

or

Kansas Rural Water Association
706 Waterway Drive
Seneca, Kansas 66538
ph. (785) 336.3760
fax (785) 336.2751

(22) **Sample Plans:**

2013 Emergency Operations Plan, Olathe Kansas
http://www.olatheks.org/files/fire/City%20of%20Olathe%20EOP%202013%20WEB%20READY.pdf

City of Downs Emergency Water Supply Plan
http://www.downsks.net/ewExternalFiles/EmergencyWaterSupplyPlan15.pdf

## DISPUTE RESOLUTION

(23) The Kansas Water Office provides facilitation services for people and organizations involved in water or natural resources related issues, whether they are between two parties or involve multiple parties. Participation in facilitated sessions is voluntary.
http://www.kwo.org/projects_programs/Projects_Programs.htm



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## DOCUMENTS AND RECORDKEEPING: KANSAS OPEN RECORDS ACT (KORA) AND KANSAS OPEN MEETINGS ACT (KOMA)

(24) **KOMA/KORA Assistance**

Kansas Attorney General's Office
Legal Opinions and Government Counsel
120 SW 10th Ave, 2nd Floor
Topeka KS 66612-1597
(785) 296-2215
Online at: www.ag.ks.gov/legal-services/open-govt

### KOMA/KORA documents available online

- KOMA-KORA Training Slides PDF, 185.22 KB
  Last updated on 7/2/2015
- Kansas Open Meetings Act (KOMA) Guidelines PDF, 240.45 KB
  Last updated on 7/2/2015
- Kansas Open Records Act (KORA) Guidelines PDF, 277.47 KB
  Last updated on 7/2/2015
- 2015 House Bill 2256 - As Enrolled PDF, 85.38 KB
  Last updated on 7/2/2015
- A Citizen's Guide to KOMA-KORA PDF, 804.23 KB
  Last updated on 7/29/2013
- Frequently Asked Questions about the Kansas Open Meetings Act (KOMA)
- Frequently Asked Questions about the Kansas Open Records Act (KORA)

## DROUGHT MONITORING

(25) The Kansas Water Office has the statutory responsibility to advise the Governor on drought conditions and coordinates the Governor's drought response team. The Drought Monitoring Program collects climate data from a variety of sources, monitors drought activities and publishes the Drought Report each month.
http://www.kwo.org/projects_programs/Projects_Programs.htm



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## MAPPING ASSISTANCE PROGRAM

### (26) Public Water Supply System GIS Mapping Assistance Program

Kansas Water Office

This program is designed to promote modern mapping of public water supply systems in the State of Kansas. Mapping of water supply infrastructure provides a number of benefits, including the capacity to more accurately respond to facility locate requests (such as Kansas One Call). System operations and maintenance also benefit from more easily locating problems; completing repairs; and scheduling maintenance.

The decision to map a system is determined by the governing body of the public water supply system. The program is a voluntary program to provide assistance to qualifying systems to map public water supply infrastructure. In order to receive funding, a mapping proposal must be submitted to the KWO. The KWO has developed forms for application (listed below in pdf format).

For more information and applications see:
http://www.kwo.org/projects_programs/Projects_Programs.htm

## PURCHASING AND PROCUREMENT INFORMATION

### (27) Kansas Small Towns Environment Program (KAN STEP)

Salik Doughramaji - KAN STEP Manager
Kansas Department of Commerce
1000 S.W. Jackson Street, Suite 100
Topeka, KS 66612-1354
Phone: (785) 296-3610
TTY: 711

Website: http://www.kansascommerce.com/
Online contact form: http://www.kansascommerce.com/forms.aspx?FID=41

### (28) Online Handbooks available from Kansas Department of Commerce

Procurement of Professional Services:
http://ks-kdoc.civicplus.com/DocumentView.aspx?DID=189

Sample Bid and Contract Specifications Forms:
http://www.kansascommerce.com/DocumentCenter/View/5776

### (29) Purchasing Policy Example (City of Pittsburg):

http://www.pittks.org/DocumentCenter/View/1462



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## RATE SETTING INFORMATION

(30) **A Guide for Financing and Rate Setting Options for Small Water Systems**
Virginia Water Resources Research Center, Virginia Polytechnic Institute and State University
Available online at https://vtechworks.lib.vt.edu/bitstream/handle/10919/49463/VWRRC_sr199917.pdf?sequence=1&isAllowed=y

(31) **Financial Sustainability and Rates Dashboards**
Developed by the Environmental Finance Center at the University of North Carolina, Chapel Hill
http://www.efc.sog.unc.edu/project/utility-financial-sustainability-and-rates-dashboards

(32) **North Dakota's Small Community Water System's Handbook on Developing and Setting Water Rates**
The Midwest Assistance Program, the Midwestern RCAP
Available online at http://www.in.gov/idem/files/rwsd_guide_devsetwaterrates.pdf

(33) **Rate Setting and Capacity Development**
The Environmental Finance Center at the University of Maryland
Available online at http://www.mde.state.md.us/programs/Water/Water_Supply/CapacityDevelopmentResources/Documents/www.epa.gov/waterinfrastructure/pdfs/final_ratesetting_guide.pdf

(34) **Rate Setting for Small Water Systems**
Gene Theodori, Associate Professor and Extension Specialist; Monty Dozier, Assistant Professor and Extension Specialist; and Ric Jensen, Assistant Research Scientist
Texas Water Resources Institute; The Texas A&M University System
http://publications.tamu.edu/WATER/PUB_water_Rate%20Setting%20for%20Small%20Water%20Systems.pdf

(35) **Setting Small Drinking Water System Rates for a Sustainable Future**
US Environmental Protection Agency STEP Guide (EPA 816-R-05-006, January 2006)
http://water.epa.gov/type/drink/pws/smallsystems/managementhelp.cfm

(36) **Small System Guide to Developing and Setting Water Rates**
Rural Community Assistance Partnership, Inc.
Available by mailing or faxing a request to RCAP at Rural Community Assistance Partnership, Inc.,

1522 K Street NW, Suite 400
Washington, DC 20005
Fax: (202) 408-8165



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(37) **Water and Wastewater Rates Analysis Model**
Developed by the Environmental Finance Center at the University of North Carolina, Chapel Hill
Available at no cost at http://www.efc.sog.unc.edu/reslib/item/water-sewer-rates-analysis-model

(38) **Water and Wastewater Residential Rates Affordability Assessment Tool**
Developed by the Environmental Finance Center at the University of North Carolina, Chapel Hill
http://www.efc.sog.unc.edu/reslib/item/water-wastewater-residential-rates-affordability-assessment-tool

(39) **Water Utility Customer Assistance Program Cost Estimation Tool**
Developed by the Environmental Finance Center at the University of North Carolina, Chapel Hill
http://www.efc.sog.unc.edu/reslib/item/water-utility-customer-assistance-program-cost-estimation-tool

(40) **Water Utility Revenue Risk Assessment Tool**
Developed by the Environmental Finance Center at the University of North Carolina, Chapel Hill
Available at no cost at http://www.efc.sog.unc.edu/reslib/item/water-utility-risk-assessment-tool

## REGULATORY COMPLIANCE/SAFE WATER DRINKING ACT (SWDA)

(41) **US Environmental Protection Agency**
Office of Water (4100T)
1200 Pennsylvania Ave, N.W.
Washington DC 20406

Safe Water Drinking Act Regulatory Information
http://water.epa.gov/lawsregs/rulesregs/sdwa/index.cfm

Drinking Water Standards and Risk Management
http://water.epa.gov/drink/standardsriskmanagement.cfm

Basic Information about Regulated Drinking Water Contaminants and Indicators
http://water.epa.gov/drink/contaminants/basicinformation/index.cfm

Public Notification Rule Quick Reference Guide
http://www2.epa.gov/region8-waterops/public-notification-rule-quick-reference-guide

Stage 1 D/DBPR Monitoring
http://water.epa.gov/lawsregs/rulesregs/sdwa/stage1/upload/s1dbprimplguid.pdf

EPA Online Contact Form:
http://water.epa.gov/contactus.cfm



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(42) **Kansas Department of Health and Environment (KDHE)**
Curtis State Office Building
1000 SW Jackson St., Suite 420
Topeka, KS 66612
(785) 296-1500
(Responsible for SDWA enforcement in Kansas)

## TECHNICAL ASSISTANCE

(43) **Kansas Rural Water Association**
http://www.krwa.net

(44) **The US Department of Agriculture Rural Community Assistance Partnership**
http://www.rcap.org

(45) **WSU – Environmental Finance Center**
http://www.wichita.edu/

## WATER CONSERVATION

(46) The Kansas Water Office has the statutory responsibility to develop and maintain guidelines for water conservation plans and practices and to provide, or arrange to provide, technical assistance for water users required to adopt and implement conservation plans and practices. The Water Conservation Program has developed guidelines for municipal, industrial and irrigation water use. See:
http://www.kwo.org/Projects.html

Water Conservation Education

The Kansas Water Office has partnered with the U.S. Environmental Protection Agency (EPA) on WaterSense, a national program that offers people a simple way to make product choices that use less water - and perform as well or better than existing products.
http://www.kwo.org/Projects/Water-Conservation-Education.html

## WATER LOSS CONTROL



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(47) **American Water Works Association, Water Loss Control Committee**

There is a wealth of resources on this page including the Free Water Audit Software. The water audit software download link can be found on the bottom of the page. Note that although the software is free, you will have to register to access it. The registration is free. If you are already a member of AWWA, you can use that registration.
http://www.awwa.org/resources-tools/water-knowledge/water-loss-control.aspx

M36 Water Audits and Loss Control Programs
American Water Works Association,
Third Edition 2009, ISBN: 9781583216316
AWWA catalog no: 30036

The M36 Manual is a comprehensive resource for water loss control and audits. It is not free, but can be obtained from the following website.
http://www.awwa.org/store/productdetail.aspx?productid=6725

(48) **Real Loss Component Analysis: A Tool for Economic Water Loss Contro**l
Water Resource Foundation, Report 4372a, 2014, Prepared by Water System Optimization, Inc.
The website includes a PDF report as well as two spreadsheets that can be downloaded for free.
http://www.waterrf.org/Pages/Projects.aspx?PID=4372

(49) **Water Audit Handbook for Small Drinking Water Systems**
Developed by the Southwest Environmental Finance Center at the University of New Mexico.
This handbook was developed as a companion piece for small systems to the AWWA Water Audit Software. It contains worksheets that can be used to collect data. It is available for free at the following website:
http://efcnetwork.org/documents/2014/01/water-audit-handbook.pdf

(50) **Water Audits and Water Loss Control for Public Water Systems**
(EPA 816-F-13-002 July 2013)
Free downloadable file available at:
http://water.epa.gov/type/drink/pws/smallsystems/upload/epa816f13002.pdf

(51) **Southwest EFC Webinars on Water Loss**
The Southwest EFC has completed a number of webinars on water loss as part of an EPA funded project to assist small systems that have been recorded and archived. They are available for free viewing at the following websites:

Webinar: Aging Infrastructure and Impact on Water Loss
http://efcnetwork.org/webinar-aging-infrastructure-impact-on-water-loss/

Webinar: Water Loss Reduction Part 1
http://efcnetwork.org/webinar-water-loss-reduction-part-i/



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Webinar: Water Loss Reduction Part 2
http://efcnetwork.org/webinar-water-loss-reduction-part-ii/

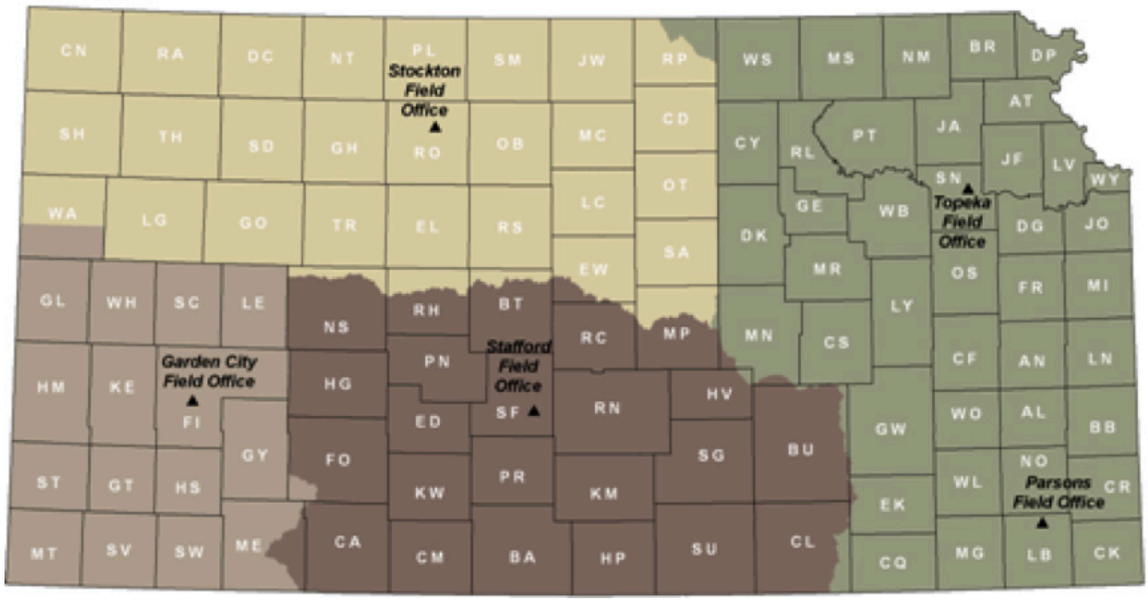
Webinar: Water Loss Reduction Part 3
http://efcnetwork.org/webinar-water-loss-reduction-part-iii/

## WATER RIGHTS AND APPROPRIATION ISSUES

(52) **Kansas Department of Agriculture**
Division of Water Resources
1320 Research Park Drive
Manhattan, Kansas 66502
(785) 564-6700
http://agriculture.ks.gov/divisions-programs/dwr

Water Appropriation information:
http://agriculture.ks.gov/divisions-programs/dwr/water-appropriation

KDA DWR Field and Satellite Offices:



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*Garden City:*

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Kansas Department of Agriculture
Division of Water Resources - Garden City Field Office
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Fax: (620) 276-9315
E-mail: Mike.Meyer@kda.ks.gov

*Stafford:*

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**Kelly Stewart – Water Commissioner**
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Stockton, KS 67669
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Fax: (785) 425-6842
E-mail: stocktonfo@kda.ks.gov

*Topeka & Parsons:* **Katie Tietsort – Water Commissioner**

*Topeka:*

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Division of Water Resources - Topeka Field Office
Building 282, Forbes Field (office location)
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Topeka, KS 66619
Phone: (785) 296-5733
Fax: (785) 296-8298
E-mail: topekafo@kda.ks.gov

*Parsons Satellite Office:*

Kansas Department of Agriculture
Division of Water Resources - Parsons Satellite Office
300 N 17th St
Parsons, KS 67357-3232
Phone: (620) 421-2697
Fax: (620) 421-2742



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## ADDITIONAL DOCUMENT REFERENCES

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777 Glades Road
Boca Raton, FL 33431
http://www.fau.edu

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Kansas Department of Health and Environment

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By Zane Satterfield, P. E. and Vipin Bhardwaj, engineering scientists
Published by The National Environmental Services Center at West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064

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http://www.infrastructurereportcard.org/

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Howard W. Penrose, PhD, CMRP
Success by Design Publishing 2008

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http://www.epa.gov/safewater/disinfection/tcr/regulation_revisions.html

## ADDITIONAL WEB RESOURCE LINKS:

**American Public Works Association:** www.apwa.net

> "The American Public Works Association (APWA) serves professionals in all aspects of public works—a fact that sets it apart from other organizations and makes it an effective voice of public works throughout North America. With a worldwide membership over 28,500 strong, APWA includes not only personnel from local, county, state/province and federal agencies, but also private sector personnel who supply products and services to those professionals."

**American Water Works Association:** www.awwa.org

> "Established in 1881, the American Water Works Association is the largest nonprofit, scientific and educational association dedicated to managing and treating water, the world's most important resource. With approximately 50,000 members, AWWA provides solutions to improve public health, protect the environment, strengthen the economy and enhance our quality of life."

**Association of Metropolitan Water Agencies:** www.amwa.net

> "The Association of Metropolitan Water Agencies (AMWA) is an organization of the largest publicly owned drinking water systems in the United States. AMWA's membership serves more than 130 million Americans – from Alaska to Puerto Rico – with safe drinking water."

**Association of State Drinking Water Administrators:** www.asdwa.org

> "The Association of State Drinking Water Administrators (ASDWA) is the professional Association serving state drinking water programs. Formed in 1984 to address a growing need for state administrators to have national representation, ASDWA has become a respected voice for state primacy agents with Congress, the United States Environmental Protection Agency (EPA), and other professional organizations."



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**Government Finance Officers Association:** www.gfoa.org

"The Government Finance Officers Association (GFOA), founded in 1906, represents public finance officials throughout the United States and Canada. The association's nearly 18,000 members are federal, state/provincial and local finance officials deeply involved in planning, financing and implementing thousands of governmental operations in each of their jurisdictions. The GFOA"s mission is to enhance and promote the professional management of governmental financial resources by identifying, developing and advancing fiscal strategies, policies and practices for the public benefit. The GFOA has accepted the leadership challenge of public finance. To meet the many needs of its members, the organization provides best practice guidance; consulting; networking opportunities; publications including books, e-books and periodicals; recognition programs; research; and training opportunities for those in the profession."

**National Association of Clean Water Agencies:** www.nacwa.org

"NACWA was established in 1970 by a group of individuals representing 22 large municipal sewerage agencies. They came together to secure federal funding for municipal wastewater treatment and discuss emerging national interest in improving the quality of the nation's waters. Based upon the shared goal of effectively representing the interests and priorities of publicly-owned treatment works (POTWs), they formed NACWA - the National Association of Clean Water Agencies."

**National Association of Water Companies:** www.nawc.org

"The National Association of Water Companies (NAWC) is the voice of the private water industry—the organization exclusively representing this group of quality service providers, innovation drivers and responsible partners. We are an association defined by our members, and by working together we can leverage our strengths to more effectively address the opportunities and challenges facing our nation."

**National Rural Water Association:** www.nrwa.org

"The National Rural Water Association is a non-profit organization dedicated to training, supporting and promoting the water and wastewater professionals that serve small communities across the United States. The mission of NRWA is to strengthen State Associations."

"NRWA provides training and technical assistance through 49 affiliated State Rural Water Associations, that currently have over 31,000 utility system members. Last year, State Rural Water Association staff delivered over 75,000 on-site technical assistance visits and 150,000 hours of training to more than 37,000 utilities. Rural Water training and technical assistance covers every aspect of operating, managing and financing water and wastewater utilities."

**Rural Community Assistance Program:** www.rcap.org

"The Rural Community Assistance Partnership (RCAP) is a national network of nonprofit organizations working to ensure that rural and small communities throughout the United States have access to safe drinking water and sanitary wastewater disposal. The six regional RCAPs - its partners or affiliates - provide a variety of programs in their section of the United States to accomplish this goal, such as direct training and technical assistance, leveraging millions of dollars to assist communities develop and improve their water and wastewater systems.

The work in communities is coordinated and carried out by each of RCAP's regional partners. The network includes a national office in Washington, D.C., that coordinates funding, reporting and finances for the programs and handles communications at a national level for the network."



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**Rural Utilities Service:**
http://www.rd.usda.gov/programs-services/all-programs/water-environmental-programs

> "Through Rural Utilities Service Water and Environmental Programs (WEP), rural communities obtain the technical assistance and financing necessary to develop drinking water and waste disposal systems. Safe drinking water and sanitary waste disposal systems are vital not only to public health, but also to the economic vitality of rural America. Rural Development is a leader in helping rural America improve the quality of life and increase the economic opportunities for rural people.
>
> WEP provides funding for the construction of water and waste facilities in rural communities and is proud to be the only Federal program exclusively focused on rural water and waste infrastructure needs of rural communities with populations of 10,000 or less. WEP also provides funding to organizations that provide technical assistance and training to rural communities in relation to their water and waste activities. WEP is administered through National Office staff in Washington, DC, and a network of field staff in each State."
>
> Kansas specific information located at http://www.rd.usda.gov/ks

**USDA Water & Waste Disposal Loan and Grant Program in Kansas:**
http://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program/ks

> "Provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas."

Kansas Program Contact:

Dan Fischer
Water & Environmental Programs Specialist
USDA
(785) 271-2737
dan.fischer@ks.usda.gov

**Water Environment Federation:** www.wef.org

> "The Water Environment Federation (WEF) is a not-for-profit technical and educational organization of 36,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. Since 1928, WEF and its members have protected public health and the environment. As a global water sector leader, our mission is to connect water professionals; enrich the expertise of water professionals; increase the awareness of the impact and value of water; and provide a platform for water sector innovation. With a staff of nearly 100, WEF is headquartered in Alexandria, Va., just outside of Washington, DC."



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# APPENDIX I

## VIDEO INDEX AND CONTACT INFORMATION

### Chapter 1: Board Foundations

Video BF-1: Introduction
**Mike Tate**
Director
KDHE Bureau of Water
1000 SW Jackson, Suite 420
Topeka, KS 66612
(785) 296-5500
mtate@kdheks.gov

Video BF-2: Media Relations
**Carl Slaugh**
City Administrator
2 W. Jackson Ave
P.O. Box 308
Iola, KS 66749
(620) 365-4900
carl.slaugh@cityofiola.com

Video BF-3: Board Training
**Randy Frazer**
City Administrator
111 S. Christian Ave
Moundridge, KS 67107-9998
(620) 345-8246
rfrazer@moundridge.com

Video BF-4: Effective Meetings
**Gary Fisher**
Mayor
111 S. Christian Ave
Moundridge, KS 67107-9998
(620) 345-8246

Video BF-5: Effective Teams
**Nathan Law**
City Administrator
618 Main St
Kiowa, KS 67070
(620) 825-4128
administrator@sctelcom.net

### Chapter 2: Managing a Water Utility (Managerial Capacity)

Video MC-1: Personnel
**Jacob Wood**
City Administrator
209 Hudson Ave.
Oakley, KS 67748
(785) 671-3136

Video MC-2: Customer Service
**Carl Slaugh**
City Administrator
2 W. Jackson Ave
P.O. Box 308
Iola, KS 66749
(620) 365-4900
carl.slaugh@cityofiola.com

Video MC-3: Asset Management
**Larry Paine**
City Administrator
118 E Grand Ave., PO Box 125
Hillsboro, KS 67063
(620) 947-3162
lpaine@cityofhillsboro.net

Video MC-4: Emergency Planning
**Greg DuMars**
City Administrator
101 S. Main St.
P.O. Box 70
Lindsborg, KS 67456-0070
(785) 227-3355
gregd@lindsborgcity.org



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## Chapter 3: Financing a Water Utility (Financial Capacity)

Video FC-1: Financial Management Principles
**Randall Oliver**
City Administrator
131 N Main
Cheney, KS 67025
(316) 542-3622
roliver@cheneyks.org

Video FC-2: Budget and Planning
**John Sweet**
City Administrator
201 W. Main
Lyons, KS 67554
(620) 257-2320
jsweet@lyonmsks.org

Video FC-3: Financial Reserves
**Mike Gilliland**
Utilities Director
201 S. 5th Street
Osage City, KS 66523
(785) 528-9714

Video FC-4: Capital Improvement Planning
**Patty Schlesener**
Director
Dickinson County Rural Water District No. 2
804 South Buckeye Road
Abilene, KS 67410
(785) 263-3434
dkrd2@eaglecom.net

Video FC-5: Audits
**Brenda Chance**
City Clerk
945 Second Street
Phillipsburg, KS 67661
(785) 543-5234
bchance@cityofphillipsburg.com

Video FC-6: Rates
**Mike Todd**
Director of Public Works
221 W. 5th Street
Scott City, KS 67871
sccityshop@wbsnet.org

## Chapter 4: Operating a Water Utility (Technical Capacity)

Video TC-1: Regulations
**Mike Tate**
Director
KDHE Bureau of Water
1000 SW Jackson, Suite 420
Topeka, KS 66612
(785) 296-5500
mtate@kdheks.gov

Video TC-2: Operations and Maintenance
**Dave Grimm**
Public Work Director
701 Oregon Street
Hiawatha, KS 66434
(785) 742-3196
daveg@cityofhiawatha.org

Video TC-3: Source Water Protection
**Angela Beavers**
District Manager
Geary County Conservation District
135 E 8th Street
Junction City, KS 66441
(785) 238-4251
angela.beavers@ks.usda.gov

Video TC-4: Operator Training
**Brenda Adkins**
District Manager
RWD #3, Jackson County
PO Box 350
Holton, KS 66436
(785) 364-3056
rwdmgr@giantcomm.net

Video TC-5: Water Meters
**Lon Schrader**
Director of Public Works
419 N. Broadway, PO Box 519
Abilene, KS 67410
(785) 263-2550
pwdirect@abilenecityhall.com

Video TC-6: Kansas Water Office Programs
**Tracy Streeter**
Director
Kansas Water Office
900 SW Jackson Street, Suite 404
Topeka, Kansas 66612
(785) 296-3185
Tracy.Streeter@kwo.ks.gov



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Video TC-7: Final Remarks

**Mike Tate**
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mtate@kdheks.gov



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RANSON FINANCIAL CONSULTANTS, LLC. | RANSONFINANCIAL.COM

THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT | WWW.KDHEKS.GOV

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