

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

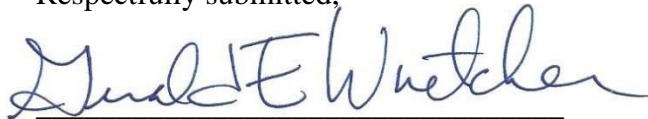
ELECTRONIC APPLICATION OF MONROE)
COUNTY WATER DISTRICT FOR RATE) CASE NO. 2017-00070
ADJUSTMENT PURSUANT TO 807 KAR 5:076)

NOTICE OF FILING

Pursuant to the Commission's Orders of August 18, 2017 and of September 18, 2017, Monroe County Water District ("Monroe District") gives notice of the filing of a list of exhibits that it may introduce at the hearing on October 25, 2017 and that were not identified in its List of Expected Exhibits filed with the Commission on September 19, 2017. A copy of these expected exhibits are attached. Monroe District reserves the right to introduce additional exhibits during such cross-examination if the circumstances.

Dated: September 20, 2017

Respectfully submitted,



Gerald E. Wuetcher
Stoll Keenon Ogden PLLC
300 West Vine Street, Suite 2100
Lexington, Kentucky 40507-1801
gerald.wuetcher@skofirm.com
Telephone: (859) 231-3017
Fax: (859) 259-3517

Mary Ellen Wimberly
Stoll Keenon Ogden PLLC
300 West Vine Street, Suite 2100
Lexington, Kentucky 40507-1801
gerald.wuetcher@skofirm.com
Telephone: (859) 231-3047
Fax: (859) 246-3647

Counsel for Monroe County Water District

CERTIFICATE OF SERVICE

In accordance with 807 KAR 5:001, Section 8, I certify that Monroe County Water District's October 18, 2017 electronic filing of this Notice is a true and accurate copy of the same document being filed in paper medium; that the electronic filing has been transmitted to the Commission on October 18, 2017; that there are currently no parties that the Commission has excused from participation by electronic means in this proceeding; and that an original paper medium of this Notice and six copies in paper medium will be delivered to the Commission on or before October 20, 2017.

A handwritten signature in blue ink that reads "Gerald E. Wuetcher". The signature is written in a cursive style with a horizontal line underneath the name.

Gerald E. Wuetcher

MONROE COUNTY WATER DISTRICT'S
ADDITIONAL EXPECTED EXHIBITS

1. Environmental Protection Agency, Asset Management: A Handbook for Small Water Systems
2. Commission on Rural Water, *Guide for the Support of Rural Water-Waste Water Systems* (Excerpts)
3. Executive Order 2016-832 (Nov. 18, 2016)
4. Kaiser Family Health Foundation and Health Research & Educational Trust, *Employer Health Benefits: 2016 Annual Survey* (Excerpts)



Asset Management: A Handbook for Small Water Systems

**One of the Simple Tools for Effective
Performance (STEP) Guide Series**



Office of Water (4606M)

EPA 816-R-03-016

www.epa.gov/safewater

September 2003

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Is This Guide for Me?

This guide is designed for owners and operators of small community water systems (CWSs). CWSs include all systems (both publicly and privately owned) with at least 25 year-round residential customers or 15 year-round service connections. Typical systems that may find this guide useful include:

- Small towns
- Rural water districts
- Tribal systems

This guide presents basic concepts of asset management and provides the tools to develop an asset management plan. Very small CWSs may have some difficulty in completing some of the worksheets included in this booklet, while medium CWSs may find the worksheets too simple for their needs. Due to each system's particular circumstances, the time and effort needed to develop the plan will vary. Building a team, made up of your operator, board members, owners, assistance providers, and state drinking water staff, will help you develop an effective and complete plan.

State and Regional Tribal Capacity Development Program Coordinators are available to help you understand the concepts covered in this guide and complete the accompanying worksheets. They can also provide additional asset management tools and offer resources to help implement an asset management plan. Contact your Capacity Development Program for more information. Contact information is provided in Appendices E and F.

Additional copies of this guide may be obtained by calling the Safe Drinking Water Hotline at (800) 426-4791 and requesting document number EPA 816-R-03-16. You may also download the guide from EPA's Safe Drinking Water Website at www.epa.gov/safewater/smallsys/ssinfo.htm.

EPA has developed a simpler asset management booklet for homeowners' associations and manufactured home communities called "Taking Stock of Your Water System" (EPA 816-K-03-002). You can obtain this booklet by calling the Safe Drinking Water Hotline or downloading it from EPA's Safe Drinking Water Website at www.epa.gov/safewater/smallsys/ssinfo.htm.

What Will I Learn?

As a drinking water system owner or operator, your most important job is delivering safe and secure drinking water to your customers. Part of providing safe and secure drinking water is taking care of your system's facilities and equipment and planning for any needed rehabilitations and replacements. An asset management plan will help you meet these goals in an efficient and cost-effective manner.

This guide will help you by providing information about:

- How asset management can help improve your system's financial health and ability to provide safe drinking water.
- How asset management fits into the development of an overall plan for your system's future (i.e., strategic planning).
- How to complete a five-step asset management process including:
 - ▶ **Conducting** a thorough asset inventory.
 - ▶ **Prioritizing** the rehabilitation and replacement of your assets.
 - ▶ **Developing** an annual estimate of needed reserves and an annual budget.
 - ▶ **Implementing** the asset management plan.
 - ▶ **Reviewing and revising** the asset management plan.



A water tower that has exceeded its useful life!

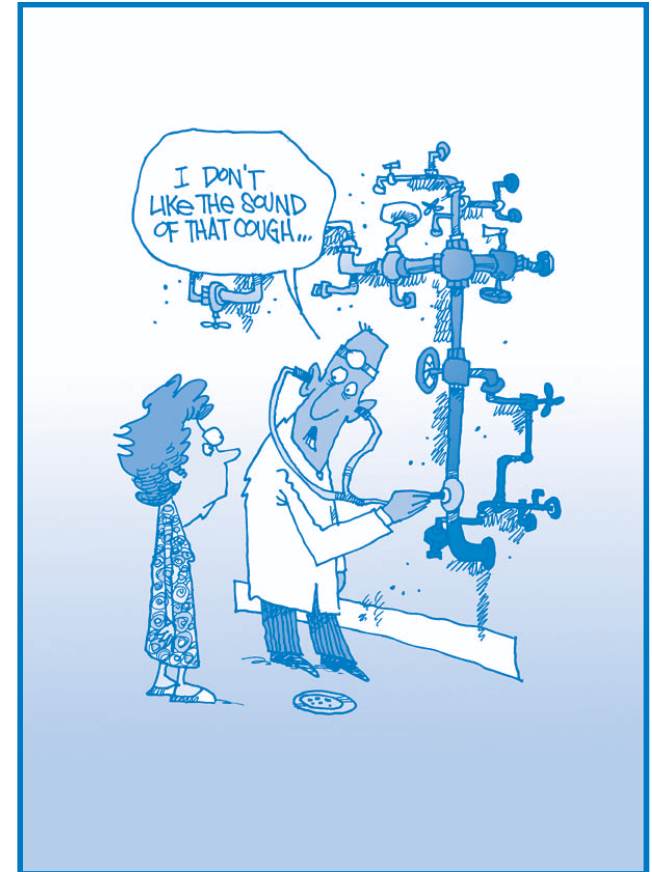
The worksheets and other information in this guide will also help you begin to develop an overall strategy for your system. Using this guide along with EPA's "Strategic Planning: A Handbook for Small Water Systems" (EPA 816-R-03-015) will help you develop, implement, and receive optimal benefit from an asset management plan that fits in with your system's overall strategy.

How Can Asset Management Help Me?

Applying the practices recommended in this guidebook will help you improve the management of your system by:

- Increasing your knowledge of your system, which will allow you to make better financial decisions. This is useful information when considering options to address various system challenges such as meeting regulatory requirements or upgrading system security.
- Reducing system “down-time” and the number of emergency repairs, since you will have planned for the replacement and rehabilitation of your assets.
- Prioritizing rehabilitation and replacement needs and providing time to research cost-effective alternatives.
- Showing investors and the public that you are using their money effectively and efficiently, which may make them more likely to increase investment or tolerate rate increases.
- Giving you greater access to financial assistance. Some funding sources give applicants extra credit (higher priority ratings) for having an asset management plan or a capital improvement plan.

For additional information on funding sources, see Appendix B. EPA’s Sources of Technical and Financial Assistance Workbook (EPA 816-K-02-005), which you can obtain by calling the Safe Drinking Water Hotline ((800) 426-4791), provides additional information. Additional resources, such as electronic programs, documents, and a listing of organizations, are provided in Appendix D. Your State or Regional Tribal Capacity Development Program can also provide assistance to help you develop and implement an asset management plan. Contact information is provided in Appendices E and F.



What Is Asset Management?

Asset management is a planning process that ensures that you get the most value from each of your assets¹ and have the financial resources to rehabilitate and replace them when necessary. Asset management also includes developing a plan to reduce costs while increasing the efficiency and the reliability of your assets. Successful asset management depends on knowing about your system's assets and regularly communicating with management and customers about your system's future needs.

You should thoroughly review your asset management plan at least once a year, noting any relevant changes. Throughout the year, you should keep a running list of items to consider or include in the annual update.



What Is the Governmental Accounting Standards Board's Statement #34?

The Governmental Accounting Standards Board's Statement #34 (GASB 34) revises several accounting and financial reporting practices for state and local governmental entities including publicly-owned water systems. If your water system is publicly owned, you will need to follow GASB 34 requirements to obtain a "clean opinion" (i.e., a good credit rating) from an auditor. Without a clean opinion, you may face higher interest rates on loans and bonds and may be more closely scrutinized by regulators and public officials. Following GASB 34 standards will require publicly-owned water systems to report the value of infrastructure assets and the cost of deferred maintenance. An accurate and up-to-date asset management plan will help you comply with this requirement. See Appendix C for more information on GASB 34.

Note: If you operate a privately owned water system, you do not need to comply with GASB 34. However, complying with generally accepted accounting principles (GAAP) makes sense for any system. Visit the Financial Accounting Standards Board (FASB) at www.fasb.org for more information on GAAP for private entities.

¹ In this guide, an "asset" is any building, tool, piece of equipment, furniture, pipe, or machinery used in the operation of your system.

How Does Asset Management Relate to Strategic Planning?

The U.S. drinking water industry faces many key challenges in the 21st century, such as replacing aging infrastructure, addressing security concerns, and complying with new regulations. Depending on the circumstances of your system, you may need to make changes to the operation of your system.

Strategic planning is a management concept that helps you address and prepare for both anticipated and unexpected problems. Strategic planning utilizes asset management to evaluate your system's current physical situation, and it also evaluates your system's financial and managerial situation. It requires you to make fundamental decisions about your water system's purpose, structure, and functions.

In order to make Strategic Planning work for your water system, you need to collect the information that will allow you to make intelligent, informed decisions about your system's future. Developing an asset management plan can provide you with some of that information. For more information on Strategic Planning, see EPA's Strategic Planning Workbook (EPA 816-R-03-015), which you can obtain by calling the Safe Drinking Water Hotline ((800) 426-4791), visit the Alliance for Nonprofit Management at <http://www.allianceonline.org/faqs.html>, or contact your State or Regional Tribal Capacity Development Program Coordinator.



What Is the Asset Management Process?

Asset management consists of the following five steps:

- 1. Taking an inventory.** Before you can manage your assets, you need to know what assets you have and what condition they are in. This information will help you schedule rehabilitations and replacements of your assets.
- 2. Prioritizing your assets.** Your water system probably has a limited budget. Prioritizing your assets will ensure that you allocate funds to the rehabilitation or replacement of your most important assets.
- 3. Developing an asset management plan.** Planning for the rehabilitation and replacement of your assets includes estimating how much money you will need each year to maintain the operation of your system each year. This includes developing a budget and calculating your required reserves.
- 4. Implementing your asset management plan.** Once you have determined how much money you will have to set aside each year and how much additional funding (if any) you will need to match that amount, you need to work with your management and customers and with regulators to carry out your plan and ensure that you have the technical and financial means to deliver safe water to your customers.
- 5. Reviewing and revising your asset management plan.** Once you have developed an asset management plan, do not stick it in a drawer and forget about it! Your asset management plan should be used to help you shape your operations. It is a flexible document that should evolve as you gain more information and as priorities shift.



This guidebook provides information and worksheets that will help you complete all five steps. As you work your way through this guidebook, you should remember that the suggestions provided and the results you develop based on the worksheets are not set in stone. You should adjust your plan based on your own experience and the particular characteristics of your system. In addition, you should reevaluate your plan every year, updating each of the worksheets provided in this booklet.

Contact your State or Regional Tribal Capacity Development Program Coordinator for more information or assistance. Other sources of information on asset management are listed in Appendix D of this guide.

Step #1 – How Do I Inventory My Assets?

Before you can manage your assets, you need to know what you have, what condition it is in, and how much longer you expect it to last. To complete an inventory, list all your assets and collect the following information for each:

1. **Condition**
2. **Age**
3. **Service history**
4. **Useful life**

The worksheets on the following pages will help you develop an asset inventory and keep track of important information. Detailed instructions are provided.

You may want to keep track of your assets on a computer spreadsheet or use custom software. Appendix D includes information on electronic programs you may want to use.

Inventorying your assets can be an intensive job. Get the best information that you can, but don't get bogged down in this step and use estimates where needed. If you keep up with an asset management program, new information will become available as assets get replaced or rehabilitated, and your inventory of assets will improve.



Remember!

The worksheets in this guide could contain sensitive information about your water system. Make sure you store these worksheets, as well as all other asset information about your system, in a secure location.

Introduction to the System Inventory Worksheet

The following System Inventory Worksheet will help you:

- Identify all of your system's assets;
- Record the condition of your assets;
- Record the service history of your assets;
- Determine your assets' adjusted useful lives;
- Record your assets' ages; and,
- Estimate the remaining useful life of each of your assets. Usually, there are two steps to estimating useful life:
 1. Determine the expected useful life by using the manufacturer's recommendations or the estimates provided in the box to the right. Adjust these numbers based on the specific conditions and experiences of your system.
 2. Calculate an adjusted useful life by taking into account the service history and current condition of your asset.

Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.

Estimated Useful Lives

Asset	Expected Useful Life (in years)
Intake Structures	35-45
Wells and Springs	25-35
Galleries and Tunnels	30-40
Chlorination Equipment	10-15
Other Treatment Equipment	10-15
Storage Tanks	30-60
Pumps	10-15
Buildings	30-60
Electrical Systems	7-10
Transmission Mains	35-40
Distribution Pipes	35-40
Valves	35-40
Blow-off Valves	35-40
Backflow Prevention	35-40
Meters	10-15
Service Lines	30-50
Hydrants	40-60
Lab/Monitoring Equipment	5-7
Tools and Shop Equipment	10-15
Landscaping/Grading	40-60
Office Furniture/Supplies	10
Computers	5
Transportation Equipment	10

Note: These numbers are ranges of expected useful lives drawn from a variety of sources. The ranges assume that assets have been properly maintained.

System Inventory Worksheet

Date Worksheet Completed/Updated: **1**

Asset	Expected Useful Life	Condition	Service History	Adjusted Useful Life	Age	Remaining Useful Life
2	3	4	5	6	7	8

Using the System Inventory Worksheet

This section presents instructions for completing the System Inventory Worksheet. Each step presented here corresponds to a numbered section of the sample worksheet on page 10.

Step #1

Enter the date.

- Circle whether you are completing or updating the worksheet and fill in the date. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets change, or start a new worksheet each year.

Step #2

Identify your assets.

- Write in each of your system's assets. Be as specific as possible by providing location, manufacturer, or some other identifier for each asset. List separately assets made of different materials or installed at different times. For example, you might list a section of your distribution system as "10-inch PVC on Main St." You can make a copy of this worksheet if you need more room to list assets.

Step #3

Fill in expected useful life.

- Use the manufacturer's recommendation or the list provided in the box on page 9 to enter the expected useful life for each asset.

Step #4

Describe assets' condition.

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

Step #5

Describe service history.

- Briefly describe the service history of each asset. Include routine maintenance activities as well as any repairs and rehabilitations. List how often you have made repairs and rehabilitations.

Step #6

Estimate the adjusted useful life for each asset.

- Using the Expected Useful Life (step 3) as a guide, estimate the adjusted useful life for each of your assets by considering its current condition (step 4) and its service history (step 5).
- If your asset is in poor condition, has not been properly maintained, or faces other challenges (poor water or soil quality, excessive use, etc.), then the adjusted useful life is likely to be less than the lower end of the expected useful life range.
- If your asset is in good condition, has been properly maintained, and faces average water quality, then you can use the average useful life value. However, you may want to use the lower end of the range to be more conservative and help ensure that you are prepared to replace the asset.

Step #7

Record age.

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

Step #8

Calculate the remaining useful life.

- For each asset, calculate the remaining useful life by subtracting its age (step 7) from its adjusted useful life (step 6).

Example System Inventory Worksheet

Date Worksheet Completed/Updated: 8/14/02

Asset	Expected Useful Life	Condition	Service History	Adjusted Useful Life	Age	Remaining Useful Life
Well 1 (1993)	30	Good		30	9	21
Well 1 pump	10	Good	Rehab (1996)	10	9	1
Well 2 (1993)	30	Good		30	9	21
Well 2 pump	10	Good	Rehab (1998)	10	9	1
Pumphouse (1993)	30	Good		30	9	21
Electrical components	10	Some corrosion	Rehab (1994)	10	9	1
Chlorinator (1993)	10	Good	Rehab (1998)	5	3	2
Storage tank 1 (1993)	40	Good	Rehab (2000) - \$17,000	40	9	31
Storage tank 2 (1993)	40	Good	Rehab (2000) - \$17,000	40	9	31
Storage tank 3 (2000)	40	Almost new		40	2	38
<i>Distribution System:</i>						
Hydrants (15)	40	Unknown		40	9	11
Valves (45)	40	Unknown	6 valves don't work	40	9	11
6-inch (PVC)	60	Unknown		60	9	51
4-inch (PVC)	60	Unknown		60	9	51
2-inch (PVC)	60	Unknown	Repair breaks (2/year)	60	9	51

Explanation of Example System Inventory Worksheet

A small, municipally-owned water system serving 750 service connections has decided to develop an asset management plan. A neighboring water system recently negotiated very good interest rates on a loan to fund distribution pipe replacement due in part to their asset management plan. This inspired the managers of this system to develop their own asset management plan.

In addition, the municipality plans to begin significant road work sometime in the next five years. The water system managers have been asked to determine whether any of the pipes under the roads scheduled to be repaired will need to be replaced in that time frame.

As a first step, the system operator develops a list of the system's assets and evaluates the condition of each asset. To differentiate the assets, the operator includes the year that some of the assets were installed. Although he does not have comprehensive information about every asset on the list, there is enough information to begin assessing the overall health of the system.

Note that although the estimated useful life for a chlorinator is 10 years (see the box on page 9), the operator of this system knows that they had to replace their previous chlorinator after only 5 years. He adjusts the useful life for the chlorinator from the estimated 10 years to a more conservative 5 years. He uses the manufacturers' recommendations as the useful life for the hydrants, valves, and PVC pipes.

Upon completing the System Inventory Worksheet, the system managers notice that they will have to replace a significant number of their assets starting next year and then about every ten years (11, 21, and 31 years from now). They begin to consider whether spacing the projects out over two or three years is possible, or if they will need to replace these assets in the same year.

In addition to the System Inventory Worksheet, the other worksheets in this guide will help the system managers prioritize the assets and determine how much money they will need to set aside each year to meet the financial demands of replacing them when necessary.

Step #2 – How Do I Prioritize My Assets?

Once you have inventoried your assets, your next step will be to prioritize your assets based on their importance to your system. Prioritization means ranking your system's assets to help you decide how to allocate resources. Factors involved in prioritization include:

- How soon will you have to replace an asset (its remaining useful life).
- How important the asset is to the provision of safe drinking water (its impact on public health).
- How important the asset is to the operation of the system (can other assets do the same job?).

A water system is often one of many responsibilities of a community or municipality. Other factors can influence which water system projects are funded and when they are completed. For example, in many small communities, distribution system rehabilitation and replacement is tied to the road repair schedule and budgeting. Developing an asset management plan and prioritizing your assets will help you determine when you should replace your assets so as to not jeopardize water delivery, but you may have to work with your community or municipality to develop a replacement schedule that works for all parties.

Ideally, an asset management plan will help you forecast your financial needs well into the future and develop a rehabilitation and replacement schedule appropriate for your system's priorities.

An Example Prioritization Scheme

There is no one correct way to prioritize your assets. Most often, assets are prioritized based on their remaining useful life. However, this is not the only way to prioritize your assets and may not be the best way for your system.

One possible prioritization scheme, in order from most critical assets to the least critical:

1. Existing threat to public health, safety, or environment;
2. Potential public health, safety, or environmental concern;
3. Internal safety concern or public nuisance;
4. Improved system operations & maintenance (O&M) efficiency; and
5. It would be nice to have...

Introduction to the Prioritization Worksheet

The following Prioritization Worksheet will help you:

- Consider the redundancy and importance of each of your system's assets; and,
- Prioritize your assets based on their remaining useful life, redundancy, and importance.

Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.

Things to Keep In Mind

- Assets with a shorter **remaining useful life** should have a higher priority, as you will have to replace these assets sooner.
- Assets that are more **important** to your ability to deliver safe water should have a higher priority, because your water system relies on these assets to deliver safe water.
- Assets for which there is less **redundancy** should have a higher priority, because your system will have trouble continuing to operate without them.
- The “big picture,” or how your community is planning development, is important to your operating plans and your prioritization decisions. For example, if the replacement of distribution system pipes is tied to road repairs, and the road repairs are delayed, water system improvements will also be delayed.
- Any engineering master plans, capital improvement plans (CIPs), or comprehensive performance evaluations (CPEs) done for your system.

Prioritization Worksheet

Date Worksheet Completed/Updated: **1**

Asset 2	Remaining Useful Life 3	Importance 4	Redundancy 5	Priority (1 is high) 6

Using the Prioritization Worksheet

This section presents instructions for completing the Prioritization Worksheet. Each step presented here corresponds to a numbered section of the sample worksheet on page 16.

Step #1

Enter the date.

- Circle whether you are completing or updating the worksheet and fill in the date. You should update this worksheet at least every year. You can either make minor adjustments to the worksheet as your priorities change or problems are addressed, or start a new worksheet each year.

Step #2

List your assets.

- Copy your list of assets from step 2 of the System Inventory Worksheet.

Step #3

Enter assets' remaining useful life.

- For each of your assets, copy the remaining useful life from step 8 of the System Inventory Worksheet.

Step #4

Describe assets' importance.

- Briefly describe the importance of each of the assets to the operation of your system and the protection of public health. Assets that are required in order to keep the system running are usually more important than those that just make operation more efficient.

Step #5

Describe assets' redundancy.

- Briefly describe the redundancy of each of the assets. Are there assets that can do the same job, even if they cannot do it as well?

Step #6

Evaluate assets' priority.

- Considering remaining useful life, importance, redundancy, and any other important factors, rank your assets in terms of how important it is to reserve money for them. Write "1" next to the asset with the highest priority, "2" next to the asset with the next highest priority, and so on. You may find that you have more than one asset with the same level of priority. You can assign the same ranking to all assets with the same priority.
- Assets with a shorter **remaining useful life** should have a higher priority (lower number) because you will need to rehabilitate or replace them relatively soon.
- Assets that are more **important** to your ability to deliver safe water should have a high priority (lower number), because of public health protection goals.
- Assets for which there is less **redundancy** should have a high priority (lower number), because your system will have trouble continuing to operate without them.

EXAMPLE Prioritization Worksheet

Date Worksheet Completed/Updated: 8/14/02

Asset	Remaining Useful Life	Importance	Redundancy	Priority (1 is high)
<i>Well 1 (1993)</i>	<i>21</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>6</i>
<i>Well 1 pump</i>	<i>1</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>3</i>
<i>Well 2 (1993)</i>	<i>21</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>6</i>
<i>Well 2 pump</i>	<i>1</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>3</i>
<i>Pumphouse (1993)</i>	<i>21</i>	<i>Needed for service</i>	<i>Other well, but need backup</i>	<i>6</i>
<i>Electrical components</i>	<i>1</i>	<i>Needed for control</i>	<i>No redundancy - corrosion</i>	<i>2</i>
<i>Chlorinator (1993)</i>	<i>2</i>	<i>Mandatory</i>	<i>No redundancy - need backup</i>	<i>1</i>
<i>Storage tank 1 (1993)</i>	<i>31</i>	<i>Need for fire flow and demand</i>	<i>Other tanks</i>	<i>6</i>
<i>Storage tank 2 (1993)</i>	<i>31</i>	<i>Need for fire flow and demand</i>	<i>Other tanks</i>	<i>6</i>
<i>Storage tank 3 (2000)</i>	<i>38</i>	<i>Need for fire flow and demand</i>	<i>Other tanks</i>	<i>6</i>
<i>Distribution System:</i>				
<i>Hydrants (15)</i>	<i>11</i>	<i>Needed for public safety</i>	<i>Other hydrants</i>	<i>5</i>
<i>Valves (45)</i>	<i>11</i>	<i>Needed for isolation</i>	<i>Other valves, but some are out of service</i>	<i>4</i>
<i>6-inch (PVC)</i>	<i>51</i>	<i>Needed for delivery</i>	<i>No redundancy</i>	<i>6</i>
<i>4-inch (PVC)</i>	<i>51</i>	<i>Needed for delivery</i>	<i>No redundancy</i>	<i>6</i>
<i>2-inch (PVC)</i>	<i>51</i>	<i>Needed for delivery</i>	<i>No redundancy</i>	<i>6</i>

Explanation of Example Prioritization Worksheet

Once the water system operator completes the System Inventory Worksheet (see page 12), he begins to work with the system managers to prioritize the assets. A number of assets will require attention within the next five years. These assets are given the highest priority.

Even though the chlorinator has a longer remaining useful life than both well pumps and the electrical components, the system managers have assigned the chlorinator the highest priority. The delivery of safe drinking water and the system's compliance with drinking water regulations depends on the chlorinator. The managers have also assigned a high priority to both well pumps and the electrical components of the pumphouse since consistent and adequate water delivery will be in jeopardy if these items are not replaced.

Deciding whether to assign the chlorinator, the pumps, or the electrical components a higher priority was a difficult decision, as all are integral to the operation of the water system. The managers know they will have to replace all of these assets if they expect to continue to provide their customers with safe drinking water. By completing the prioritization worksheet, however, the managers gave themselves some time to properly evaluate the situation, collect the necessary resources, and replace all critical assets according to a schedule that will work for the system.

The Prioritization Worksheet also helps the managers forecast future needs and allocate resources. The managers are able to inform the municipality that the distribution pipes will not require replacement for another 50 years. By not replacing the pipes before the end of their useful lives, the funds that might have been allotted to the pipe-replacing project can now be assigned to more critical projects, such as replacing the chlorinator.

The managers will need to decide how to fund the necessary rehabilitations or replacements. Based on the System Inventory Worksheet, many of the system's assets will require major rehabilitation or replacement every 10 years. The remaining worksheets in this guide will help the system managers determine how much money they will need to reserve each year and whether current revenues can cover the costs of on-going operation and rehabilitation and replacement of all of these assets. If current revenues are insufficient, they will need to seek additional sources of funding.

Step #3 – How Do I Plan for the Future?

Now that you have prioritized your assets, you will have to determine how much it will cost to rehabilitate and replace them as they deteriorate. To properly protect public health and deliver safe water, you need to rehabilitate and replace your assets in addition to operating your water system. Many systems will need considerable lead-time to budget and gather the necessary funds. By developing an asset management plan, you will be able to allocate your resources in the most efficient way.

The Required Reserve Worksheet on the next few pages will lead you through the steps necessary to determine how much money you need to put in reserve each year (for the next five years) to fund your highest priority activities. This reserve should be protected from other use.

The worksheet will give you an idea of how much money you should set aside to fund your reserve account this year. Changes in your system's finances and costs of new assets can change from year to year. It is important that you update this worksheet every year. This will ensure that you have enough reserves to cover necessary rehabilitations and improvements. This worksheet only helps account for additional funds you will need to rehabilitate or replace your assets. Standard O&M costs (e.g., chemicals for disinfection) are not included in the calculations on this worksheet.



Remember that while the total reserves needed each year may at first seem overwhelming, it is easier to put aside \$500 a year to replace a storage tank than to pay \$20,000 to replace it when it fails. Step #4 will discuss some of your system's options for raising revenues to carry out your asset management plan. Contact your State or Regional Tribal Coordinator for additional ideas on funding options available to your system.

Remember!

A preventive maintenance program will allow you to maximize the useful lives of your assets and can help you avoid problems and cut down or delay replacement costs. Contact your State or Regional Tribal Coordinator for more information on developing and implementing a preventive maintenance program.

Introduction to the Required Reserve Worksheet

The following Required Reserve Worksheet will help you calculate the amount of money that you will need to set aside every year (your annual reserve) to pay for the rehabilitation and replacement of your assets. Standard O&M costs are not included.

The worksheet asks for the estimated cost of rehabilitation and replacement activities associated with your highest-priority assets. Remember to gather information on all of the costs associated with rehabilitation and replacement such as equipment purchase, installation, pilot tests, labor charges, clean up, and disposal of the replaced asset. To determine your estimated costs, you can:

- Ask local contractors and businesses for estimated costs.
- Contact equipment manufacturers.
- Talk to neighboring systems about the cost of their rehabilitations or replacements.
- Discuss this with your state, tribal, or local technical assistance organization.

This worksheet can be used to estimate your annual reserves for the next five years. The worksheet uses a five year forecast to help you think about and begin financial planning for your short-term future needs. Although several of your assets will have remaining useful lives considerably longer than five years, it is unlikely that you will be able to forecast your water system's situation much farther into the future. You should update the worksheet at least once a year because your system is likely to experience changes in costs, budgeting, and funding.

Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.

Required Reserve Worksheet¹

Date Worksheet Completed/Updated:

1

Asset (list from highest to lowest priority)	Activity	Years until action needed	Cost (\$)	Reserve required current year
2	3	4	5	6
Total reserve in the current year				7

¹ Note: The Required Reserve Worksheet only helps you account for the additional funds you will require to rehabilitate or replace your asset. Standard O&M costs are not included in this calculation.

Using the Required Reserve Worksheet

This section presents instructions for completing the Required Reserve Worksheet. Each step presented here corresponds to a numbered section of the sample worksheet on page 22.

Step #1

Enter the date.

- Circle whether you are completing or updating the worksheet and fill in the date. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet, or start a new worksheet each year.

Step #2

List your prioritized assets.

- List the assets from the Prioritization Worksheet. List the assets in order, with the highest priority assets (lowest number) first.

Step #3

List activities.

- For each asset, list the rehabilitation and replacement activities that you expect to perform over the next five years. Provide enough detail for each activity so that you can determine the cost of the activity.

Step #4

Estimate years until action needed.

- For each activity, fill in the number of years before you will need to do that task.
 - For annual activities, enter “1.”
 - For replacement activities, enter the remaining useful life you estimated in step 8 of the System Inventory Worksheet.

Step #5

Estimate cost.

- Fill in the expected cost for each activity. Make sure to include the complete cost, including preparation, clean-up, removal, and disposal of any waste.
 - If you expect to sell an asset at the end of its useful life, subtract the estimated sale price from the cost of a new item and enter the difference.

Step #6

Calculate the reserve required per year.

- For each asset, calculate the reserve required by dividing the cost by the years until the action is needed. This is the estimated amount of money that your system needs to set aside per year for that asset.

Step #7

Calculate the total reserve required in the current year.

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

EXAMPLE Required Reserve Worksheet¹

Date Worksheet Completed/Updated: 8/15/02

Asset (list from highest to lowest priority)	Activity	Years until action needed	Cost (\$)	Reserve required current year
1. Chlorinator	Replace	2	\$2,000	\$1,000
	Purchase redundant unit	1	\$2,000	\$2,000
2. Pumphouse - Electrical	Replace with controller	1	\$2,000	\$2,000
3. Well Pumps	Replace Well 1 pump	1	\$5,000	\$5,000
	Replace Well 2 pump	1	\$5,000	\$5,000
	Next Replacements (2 well pumps at \$5000 each)	10	\$10,000	\$1,000
4. Valves	Replacement (45 valves at \$500 each)	31	\$22,500	\$726
5. Hydrants	Replacement (30 hydrants at \$2,000 each)	31	\$60,000	\$1,935
6. Pipe	6-inch (3600 ft. at \$20/ft.)	51	\$302,000	\$5,922
	4-inch (9500 ft. at \$20/ft. - replace 4-inch with 6 inch)			
	2-inch (2000 ft. at \$20/ft. - replace 2-inch with 6 inch) (Total is 15,100 ft. at \$20/ft.)			
7. Storage	Rehabilitate 3 tanks (1 every 8 years, 1993 and 2000 tanks)	5	\$50,000	\$10,000
	Replace - 2 tanks (1993 tanks)	31	\$40,000	\$1,290
	1 tank (2000 tank)	38	\$20,000	\$526
Total reserve in the current year				\$36,399

¹ Note: The Required Reserve Worksheet only helps you account for the additional funds you will require to rehabilitate or replace your asset. Standard O&M costs are not included in this calculation.

Explanation of Example Required Reserve Worksheet

In order to calculate the funds the system will have to set aside each year to pay for the upkeep of its assets, the managers complete the Required Reserve Worksheet. By inventorying and determining the condition of the system's assets, and evaluating when they will need to be replaced, the managers realize:

- That while none of the items that require replacement within the next 1-2 years (the chlorinator, the pumps, and the electrical system for the pumphouse) is very expensive, they will have to set aside approximately \$16,000 in the next two years to cover the cost of replacing these assets.
- The replacement of pipes in this system's distribution system is by far the most costly activity for the system. It will cost an estimated \$302,000 to replace pipes, but since this cost can be spread out over 50 years, they only need to put aside an additional \$6,000 a year (every year) to fund this activity.
- The total reserve required to successfully implement this asset management plan is around \$36,500 per year.

Before beginning the asset management plan process, the managers were planning on replacing the chlorinator next year but did not plan on replacing either of the well pumps until they broke. Now, they plan on using some of the system's current reserve fund to purchase a redundant unit and to begin saving for the replacement of one of the well pumps. They also decide to meet with town officials to discuss system priorities, costs, and funding options.

Step #4 – How Do I Carry Out This Plan?

In the previous section, you may have discovered that you should be reserving additional money every year to cover the cost of rehabilitating and replacing your assets. Preparing a financial forecast (by estimating how much revenue you expect for the next five years) will help you determine if you will need to supplement your revenues to carry out your asset management plan.

If you don't already have a five-year forecast, the Budgeting Worksheet on page 28 will help you complete this task. In addition, to increase or more efficiently use your revenues to operate and maintain your system and carry out your asset management plan you can:

- **Create additional reserve accounts.** Reserve all or some of the money you will need in a protected capital improvement reserve account and create an emergency account to fund unexpected repairs and replacements. You may be restricted in how much money can be placed in reserve accounts. Check with your state or tribal coordinator for more information. Contact information is provided in Appendix E.
- **Form partnerships.** Working with other water systems may allow you to lower costs, simplify management, and continue to provide your customers with safe drinking water.
- **Consider increasing rates.** Alternatively, consider assessing a flat fee for infrastructure improvements or funding of a reserve account. Check with your state for rate-setting information.
- **Apply for financial assistance.** Banks and government agencies can provide funds for infrastructure projects such as treatment facilities, distribution lines, and water source development. If you do not have enough funds to pay for needed capital improvements, you can apply for loans and grants. Although you will pay interest on loans which will, over the long term, increase your costs, loans will allow you to address needed system improvements without dramatically increasing rates or assessing fees to cover the costs. Seek financial advice from your city clerk, a certified accountant, or contact your State or Regional Tribal Capacity Development Coordinator if you are considering a loan to fund capital improvement projects. The table in Appendix B provides information on some programs that may provide financial assistance to help you fund major infrastructure improvement and replacement projects.



Introduction to the Budgeting Worksheet

The following simple five-year Budgeting Worksheet will help you quickly determine:

- Your system's annual revenues from fees, loans and grants, interest from any accounts, and other sources of income.
- Your annual expenditures on maintenance, utilities, salaries and benefits, office supplies, professional services, taxes, and loan payments.
- Your net income.
- How much additional funding you will need to continue to operate and maintain your system and replace and repair your assets.²

You should complete the Budgeting Worksheet every year. It will allow you to assess your financial situation and properly plan for future needs. Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.

The budgeting worksheet is intended to help you understand the financial position of your system and forecast any potential shortfalls you may face. It will help you determine whether or not you are adequately funding your reserve account(s) and whether or not you should begin searching for additional funding sources. It *is not* meant to serve as an accounting tool, nor is it intended to replace your current accounting practices.

² The Budgeting Worksheet does not take into account current reserves or your annual contributions to other reserve accounts. If you already have reserve accounts, you can use them to supplement your asset management plan. It is important, however, to continue contributing to these reserve accounts so that you don't experience a shortfall if you use these funds for repair and replacement of assets.

Budgeting Worksheet

Date Worksheet Completed/Updated: **1**

Revenues	Expenses	Net Income
Service Fees: _____ Fees and Service Charges (late fee, connection fee, fire fee, etc.): _____ Impact Fees (demand fee, system development fee, etc.): _____ Secured Funding: 2 _____ Interest: _____ Other: _____ _____ _____ _____ _____	Maintenance: _____ Utilities (power, telephone): _____ Salaries and Benefits: _____ Equipment Cost: _____ Chemicals: _____ Monitoring and Testing: _____ Rent or Mortgage: _____ Insurance: _____ Professional Services (legal, accounting, engineering, etc.): 4 _____ Training Costs: _____ Billing Costs: _____ Fees (state PWS fee, franchise fee, conservation fee, etc.): _____ Security: _____ Other (debt payments, taxes, miscellaneous, etc.): _____ _____ _____ _____	Total Revenues: _____ Total Expenses: _____ Net Income 6 (Revenue - Expenses): _____ <hr/> Additional Reserves Needed 7 Total Required Reserves: _____ Net Income: 8 _____ Additional Reserves Needed 9 (Income - Required Reserves): _____
Total Revenues: 3	Total Expenses: 5	

Using the Budgeting Worksheet

This section presents instructions for completing the Budgeting Worksheet. Each step presented here corresponds to a numbered section of the sample worksheet on page 28.

Step #1

Enter the date.

- Circle whether you are completing or updating the worksheet and fill in the date. You should update this worksheet once a year. You can either make minor adjustments to the worksheet, or start a new worksheet each year.

Step #2

List your revenues.

- Fill in your revenues in the lines provided. If your system has other sources of income not listed on the worksheet, enter them in the “Other” lines provided.

Step #3

Calculate total annual revenues.

- Calculate your total revenues by adding all the revenues you listed in the previous step. Enter this number in the box marked “Total Revenues.” Do not include funding you expect but have not secured.

Step #4

List your expenses.

- Fill in your expenses in the lines provided. If your system has other expenses not listed on the worksheet, enter them in the “Other” lines provided.

Step #5

Calculate total expenses.

- Calculate your total expenses by adding all the expenses you listed in the previous step. Enter this number in the box marked “Total Expenses.”

Step #6

Calculate net income.

- Enter the result of step 3 on the “Total Revenues” line and the result of step 5 on the “Total Expenses” line. Calculate your net income by subtracting your expenses from your revenues. Enter this number on the “Net Income” line.

Step #7

Enter your total required reserves.

- Enter your total required reserves from the Required Reserves Worksheet.

Step #8

Enter your net income.

- Enter the result of step 6 on the “Net Income” line.

Step #9

Calculate additional reserves needed.

- Subtract your total required reserves (from step 7) from your net income (from step 8). Enter this number in the box marked “Additional Reserves Needed.”
- If the result is a positive number (i.e., your resources are larger than your required reserves), you will not have to plan for ways to make up for the shortfall and can set aside the required funds in a reserve account.
- If the result is a negative number (i.e., your resources are less than the required reserves), you should start planning for ways to make up for the shortfall.

EXAMPLE Budgeting Worksheet

Date Worksheet Completed/Updated: 8/14/02

Revenues	Expenses	Net Income
Service Fees: <u>\$249,971</u>	Maintenance: <u>\$54,320</u>	Total Revenues: <u>\$255,430</u>
Fees and Service Charges (late fee, connection fee, fire fee, etc.): <u>\$5,284</u>	Utilities (power, telephone): <u>\$3,992</u>	Total Expenses: <u>\$245,072</u>
Impact Fees (demand fee, system development fee, etc.): <u>\$175</u>	Salaries and Benefits: <u>\$76,689</u>	Net Income
Secured Funding: _____	Equipment Cost: <u>\$1,371</u>	(Revenue - Expenses): <u>\$10,358</u>
Interest: _____	Chemicals: <u>\$40,512</u>	
Other: _____	Monitoring and Testing: <u>\$8,096</u>	
_____	Rent or Mortgage: _____	
_____	Insurance: <u>\$1,453</u>	
_____	Professional Services (legal, accounting, engineering, etc.): <u>\$400</u>	
	Training Costs: <u>\$1,000</u>	
	Billing Costs: <u>\$2,500</u>	
	Fees (state PWS fee, franchise fee, conservation fee, etc.): <u>\$500</u>	Additional Reserves Needed
	Security: <u>\$609</u>	Total Required Reserves: <u>\$34,625</u>
	Other (debt payments, taxes, miscellaneous, etc.): <u>\$53,630</u>	Net Income: <u>\$10,358</u>

	_____	Additional Reserves Needed
		(Income - Required Reserves): <u>-\$24,267</u>
Total Revenues: <u>\$255,430</u>	Total Expenses: <u>\$245,072</u>	

Explanation of Example Budgeting Worksheet

In order to better understand their financial position, the managers for the water system must complete the budgeting worksheet. Note that almost all of their revenues come from service fees (\$249,971 of \$255,430 in total revenues). Most of their expenditures go to pay for maintenance, salaries and benefits, and chemicals.

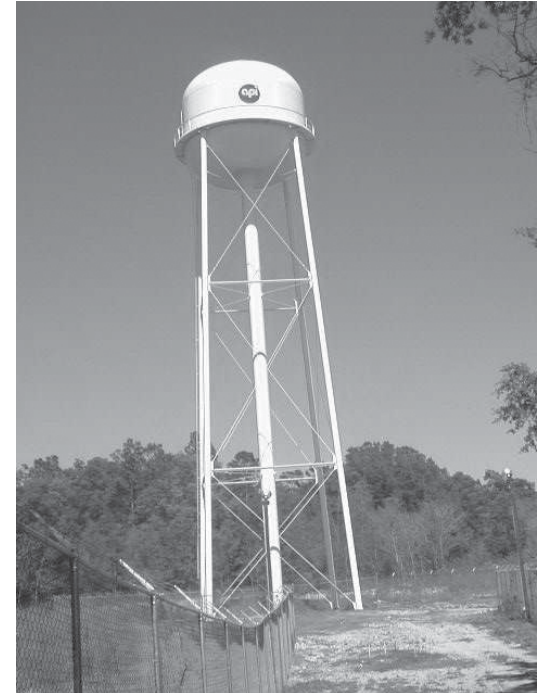
On the surface, it would seem that the system is in a fairly good financial situation. After expenses, it has a net income of \$10,358 a year. However, the system cannot afford the annual \$34,625 contribution to its reserve account with its current income. If the system does not raise revenues or secure outside funding, it will not have the income necessary to pay for rehabilitation and replacement of its assets in the future. The water system managers will have to start thinking about how to raise the additional revenue necessary to make up for the shortfall.

Step #5 – What Should I Do Next?

Once you have inventoried and prioritized your assets, determined how much money you will need to set aside each year to fund the rehabilitation and replacement of your assets, and explored funding options for your water system, you can use your asset management plan to help plan your water system's future. You will have a good picture of when you will need to replace your assets and how much money you will need to fund those replacements and continue to deliver safe and secure drinking water to your customers.

Remember that the worksheets should be reviewed, revised, and updated on an annual basis. Your asset management plan should help you shape your system's operations and should change as your priorities change. Current information in the worksheets provides a better picture of your system's position, and better prepares you to meet your water system's future needs.

Taken in tandem with the strategic planning tools available in EPA's Strategic Planning STEP Guide (EPA 816-R-03-015), the worksheets will give you a good idea of the challenges your system may face in the future and help you think about the most cost-effective and efficient way to address those challenges. Consulting with your State or Regional Tribal Capacity Development Coordinators and developing a plan of action with their assistance will ensure that you can continue to deliver safe and secure drinking water well into the future.



Appendix A: Worksheets

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System Inventory Worksheet						
Date Worksheet Completed/Updated:						
Asset	Expected Useful Life	Condition	Service History	Adjusted Useful Life	Age	Remaining Useful Life

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Prioritization Worksheet

Date Worksheet Completed/Updated:

Asset	Remaining Useful Life	Importance	Redundancy	Priority (1 is high)

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Required Reserve Worksheet¹				
Date Worksheet Completed/Updated:				
Asset (list from highest to lowest priority)	Activity	Years until action needed	Cost (\$)	Reserve required current year
Total reserve in the current year				

¹Note: The Required Reserve Worksheet only helps you account for the additional funds you will require to rehabilitate or replace your asset. Standard O&M costs are not included in this calculation.

-----cut along dotted line-----

Budgeting Worksheet		
Date Worksheet Completed/Updated: _____		
Revenues	Expenses	Net Income
Service Fees: _____ Fees and Service Charges (late fee, connection fee, fire fee, etc.): _____ Impact Fees (demand fee, system development fee, etc.): _____ Secured Funding: _____ Interest: _____ Other: _____ _____ _____ _____	Maintenance: _____ Utilities (power, telephone): _____ Salaries and Benefits: _____ Equipment Cost: _____ Chemicals: _____ Monitoring and Testing: _____ Rent or Mortgage: _____ Insurance: _____ Professional Services (legal, accounting, engineering, etc.): _____ Training Costs: _____ Billing Costs: _____ Fees (state PWS fee, franchise fee, conservation fee, etc.): _____ Security: _____ Other (debt payments, taxes, miscellaneous, etc.): _____ _____ _____ _____	Total Revenues: _____ Total Expenses: _____ Net Income (Revenue - Expenses): _____
		Additional Reserves Needed
		Total Required Reserves: _____
		Net Income: _____
		Additional Reserves Needed (Income - Required Reserves): _____
Total Revenues:	Total Expenses:	

Appendix B: Sources of Financial Assistance to Drinking Water Systems

System improvements can be funded by raising rates, issuing bonds, or by successfully applying for loans or grants. The table below provides information on some programs that may provide financial assistance to help you raise the money your system will require to maintain its assets in good condition, replace deteriorated assets, and continue to provide safe and secure drinking water to your customers. Consult with your State or Regional Tribal Capacity Development Coordinator and the Public Service Agency in your state for additional information.

Major Providers of Financial Assistance to Drinking Water Systems		
Name of Program	Description	Contact Information
Drinking Water State Revolving Fund (DWSRF)	These state-administered loans enable water systems to finance infrastructure improvements, provide training, and fund source water protection activities.	www.epa.gov/safewater/dwsrf/contacts.html Safe Drinking Water Hotline at (800) 426-4791
Rural Utilities Service (RUS) Water and Wastewater Loan and Grant Program	This program offers loans and grants to develop water and waste-disposal systems in rural areas to reduce user costs.	www.usda.gov/rus/water/states/usamap.htm (202) 720-9540
State-specific programs	Your state may offer additional funding programs.	See Appendix E for state contact information
Tribal-specific programs	EPA gives grants (not loans) to tribes through the DWSRF Tribal Set-Aside program for improvements to water systems that serve tribes. States and the Indian Health Service may provide additional financial assistance.	See Appendix F for tribal contact information

Other Potential Sources of Financing or Financial Assistance for Drinking Water Systems		
Name of Program	Description	Contact Information
Community Development Block Grants (CDBG)	This program offers grants to disadvantaged cities, urban counties, and states to develop viable communities.	www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/stateadmincontact.cfm (202) 708-1112
Public Works and Infrastructure Development Grants	These grants help distressed communities overcome barriers that inhibit the growth of their local economies.	www.doc.gov/eda/HTML/1c_regloffices.htm (202) 482-5081
National Bank for Cooperatives Loan Program (CoBank)	CoBank provides loans to larger, credit-worthy rural utilities.	www.cobank.com (800) 542 -8072
Rural Community Assistance Corporation (RCAC)	RCAC provides loans to rural utilities in 11 western states to help meet the financing needs of rural communities and disadvantaged populations.	http://www.rcac.org/programs/serv-financial.html (916) 447-2854
Small Business Administration (SBA)	SBA helps small businesses get low-interest loans.	www.sba.gov (800) 827-5722
Local Commercial Banks	Banks in your community can offer loans to help finance capital improvements. Although interest rates may not be as favorable as other options, it may be easier for you to negotiate a loan through a local bank.	Talk to your city clerk about what banks in your area most closely match your needs.

Before you apply for funding, find out what each source will pay for and what information they will need to consider in your application. Ask about local matching fund requirements, application procedures, what makes a project “fundable,” and special program requirements and restrictions. Ask to see applications from previously funded projects. Get an idea of what information is required for an application; most lending and granting agencies will want to see financial statements such as budgets, income statements, and cash flow documents. Publicly-owned systems may need a clean opinion from an auditor to show good accounting practices and/or compliance with GASB 34. See Appendix C for more information on GASB 34.

Appendix C: Introduction to GASB 34

The Governmental Accounting Standards Board (GASB) is a private, nonprofit organization that is responsible for establishing and improving governmental accounting and financial reporting standards. GASB also establishes generally accepted accounting principles (GAAP) for state and local governmental entities, including publicly-owned water systems.³ The standards and principles developed by GASB are strictly voluntary. However, some states may incorporate them into their laws and regulations and therefore make them mandatory for local governments and the water systems they operate.

In June 1999, GASB approved “Statement Number 34, Basic Financial Statements and Management’s Discussion and Analysis for State and Local Governments.”⁴ Statement Number 34 revised several accounting practices and established new standards for the annual financial reports required of state and local governments. The revisions were intended to make annual financial reports easier to understand and make the financial data more useful to decision makers.

GAAP and GASB 34 make good sense for publicly-owned water systems as these principals are often the best way to keep track of finances. Following them will help you form a better picture of your system’s financial health, forecast future shortfalls, and continue to deliver safe drinking water to your customers. In addition, following GASB standards is a must for obtaining a “clean opinion” (i.e., a good credit rating) from an auditor. Clean opinions are often necessary for loans, negotiating favorable interest rates, or issuing bonds.

GASB 34 requires:

1. An accounting of revenues and expenditures in the period in which they are earned or incurred. This is called accrual-based accounting. For example, if the water system provides water in December 2003 and receives payment in February 2004, the water system would report that the money was earned in 2003. This change will allow the system and its investors to understand the direct financial results of its investments.

³The Financial Accounting Standards Board (FASB) establishes and improves standards of financial accounting and reporting in the private sector. If your system is privately owned, visit www.fasb.org for more information on private accounting standards.

⁴The new standards took effect for small governments (including water systems) with annual revenues of less than \$10 million on June 15, 2003.

2. A reporting of the value of infrastructure assets and the cost of deferred maintenance. These measures allow the public to evaluate how well the system is managing its assets. A current asset management plan is a valuable tool to help you meet this requirement if you are complying with Statement 34. In addition, reporting the true cost of deferred maintenance (i.e., unmade repairs that result in equipment or facility deterioration) may allow systems to more easily raise money for maintenance activities necessary to use facilities and equipment for their full expected lives.
3. Contributed capital (for example, federal grants) to be considered a form of income. This change will increase a system's reported income. While reporting all forms of income is a necessary accounting principal, this method of reporting (which includes contributed capital) may make it more difficult to justify rate increases.

For more information, talk to your city clerk, ask a certified public accountant, or contact your State or Regional Tribal Capacity Development Coordinator. GASB's website offers more information on Statement 34, as well as guidance documents, case studies of entities that have implemented Statement 34, and trainings. Visit www.gasb.org for more information.

Appendix D: Sources for More Information on Asset Management

Electronic Programs

- **CAPFinance.** The Environmental Finance Center at Boise State University has developed an easy-to-use computer program to help water systems inventory their assets and analyze funding options for rehabilitation and replacement of assets. For more information or to order a copy, call (208) 426-1567 or visit their website <http://sspa.boisestate.edu/efc/services.htm>.
- **Show-me Water Ratemaker.** The Missouri Department of Natural Resources has developed analysis software to help water systems set rates. To obtain a free copy see: <http://www.dnr.state.mo.us/oac/Ratemakerbrochure.pdf>, or call (800) 361-4827.

Documents

- *A Guidebook of Financial Tools*, produced by the Environmental Financial Advisory Board and the Environmental Finance Center Network, is available in PDF format at: <http://www.epa.gov/efinpage/guidbkpdf.htm>. It is also available by emailing efin@epa.gov or by calling (800) 490-9198.
- *Financial Accounting Guide for Small Water Utilities*, Michael D. Peroo, 1997, Kansas Rural Water Association. This document is available through the National Drinking Water Clearinghouse, West Virginia University, (800) 624-830.
- *GASB 34: What Is It? Why Should You Care?*, copy can be downloaded from www.nrwa.org/2001/frontpage/Pages/gasb34.htm.

Assistance

- **EPA's Environmental Finance Program** provides financial and technical assistance to water systems and other regulated entities. Visit www.epa.gov/efinpage/ or call (202) 564-4994 for more information about the program, for access to the program's publications, and to reach the Environmental Finance Center network.

Additional Organizations

- American Water Works Association: www.awwa.org
- Association of Metropolitan Water Agencies: www.amwa.net
- Association of State Drinking Water Administrators: www.asdwa.org
- Government Finance Officers Association: www.gfoa.org
- National Association of Regulatory Utility Commissioners: www.naruc.org
- National Association of Water Companies: www.nawc.org
- National Rural Water Association: www.nrwa.org
- Rural Community Assistance Program: www.rcap.org
- Rural Utilities Service: www.usda.gov/rus

Appendix E: Safe Drinking Water Act Primacy Agencies

For additional information or to learn more about the laws in your own state, please contact your EPA Regional Coordinator or State Drinking Water Agency.

EPA Region 1	www.epa.gov/region1/eco/drinkwater/index.html	(617) 918-1584
Connecticut Department of Public Health: Drinking Water Division	www.dph.state.ct.us/BRS/water/dwd.htm	(860) 509-7333
Maine Maine Department of Human Services: Division of Health Engineering	www.state.me.us/dhs/eng/water/index.htm	(207) 287-2070
Massachusetts Department of Environmental Protection: Drinking Water Program	www.state.ma.us/dep/brp/dws/dwshome.htm	(617) 292-5770
New Hampshire Department of Environmental Services: Water Supply Engineering Bureau	www.des.state.nh.us/wseb/	(603) 271-2513
Rhode Island Department of Health: Office of Drinking Water Quality	www.healthri.org/environment/dwq/Home.htm	(401) 222-6867
Vermont Department of Environmental Conservation: Water Supply Division	www.vermontdrinkingwater.org	(802) 241-3400

EPA Region 2	www.epa.gov/region02/water/drinkingwater/	(212) 637-3879
New Jersey Department of Environmental Protection: Bureau of Safe Drinking Water	www.state.nj.us/dep/watersupply/safedrnk.htm	(609) 292-5550
New York Department of Public Health: Bureau of Public Water Supply Protection	www.health.state.ny.us/nysdoh/water/main.htm	(518) 402-7650
Puerto Rico Department of Health: Public Water Supply Supervision Program	www.epa.gov/region02/cepd/prlink.htm	(787) 977-5870
Virgin Islands Department of Planning and Natural Resources: Division of Environmental Protection	www.epa.gov/region02/cepd/vilink.htm	(340) 773-1082

EPA Region 3	www.epa.gov/reg3wapd/	(215) 814-2300
Delaware Delaware Health and Social Services: Division of Public Health	www.state.de.us/dhss/dph/hsp.htm	(302) 739-5410
District of Columbia Environmental Health Administration: Water Resources Management Division	www.dcwasa.com/	(202) 535-2190
Maryland Department of the Environment: Public Drinking Water Program	www.mde.state.md.us/aboutmde/reports/index.asp	(410) 537-3000
Pennsylvania Department of Environmental Protection: Bureau of Water Supply Management	www.dep.state.pa.us/dep/deputate/watermgt/wsm/wsm.htm	(717) 787-5017
Virginia Department of Health: Division of Water Supply Engineering	www.vdh.state.va.us/ddw/index.htm	(804) 786-5566
West Virginia Bureau for Public Health: Environmental Engineering Department	www.wvdhhr.org/oehs/eed/	(304) 558-2981

EPA Region 4	www.epa.gov/region4/water/	(404) 562-9345
Alabama Department of Environmental Management: Water Supply Branch	www.adem.state.al.us/WaterDivision/WaterDivisionPP.htm	(334) 271-7773
Florida Department of Environmental Protection: Drinking Water Section	www.dep.state.fl.us/water/drinkingwater/index.htm	(850) 487-1762
Georgia Department of Natural Resources: Water Resources Branch	www.dnr.state.ga.us/dnr/environ/	(404) 656-4087
Kentucky Department of Environmental Protection: Drinking Water Branch	water.nr.state.ky.us/dw/	(502) 564-3410
Mississippi Department of Health: Division of Water Supply	www.msdh.state.ms.us/watersupply/index.htm	(601) 576-7518
North Carolina Department of Environment and Natural Resources: Public Water Supply Section	www.deh.enr.state.nc.us/pws	(919) 733-2321
South Carolina Department of Health and Environmental Control: Bureau of Water	www.scdhec.net/water/html/dwater.html	(803) 898-4300
Tennessee Department of Environment and Conservation: Division of Water Supply	www.state.tn.us/environment/dws/	(615) 532-0191

EPA Region 5	www.epa.gov/r5water/	(312) 886-4239
Illinois Environmental Protection Agency: Division of Public Water Supplies	www.epa.state.il.us/water/index-pws.html	(217) 785-8653
Indiana Department of Environmental Management: Drinking Water Branch	www.ai.org/idem/owm/dwb/index.html	(317) 308-3282
Michigan Department of Environmental Quality: Drinking Water and Radiological Protection Division	www.michigan.gov/deq	(517) 335-9216
Minnesota Department of Health: Drinking Water Protection Section	www.health.state.mn.us/divs/eh/index.html	(651) 215-0770
Ohio Environmental Protection Agency: Division of Drinking and Ground Water	www.epa.state.oh.us/dsw/	(614) 644-2752
Wisconsin Department of Natural Resources: Bureau of Water Supply	www.dnr.state.wi.us/org/water/dwg/index.htm	(608) 266-2299

EPA Region 6	www.epa.gov/region6/water	(214) 665-2757
Arkansas Department of Health: Division of Engineering	www.healtharkansas.com/eng/index.html	(501) 661-2623
Louisiana Office of Public Health: Division of Environmental and Health Services	www.dhh.state.la.us/OPH/safewtr.htm	(225) 765-5038
New Mexico Environment Department: Drinking Water Bureau	www.nmenv.state.nm.us/dwb/dwbtop.html	(505) 827-7536
Oklahoma Department of Environmental Quality: Water Quality Division	www.deq.state.ok.us/WQDnew/index.htm	(405) 702-8100
Texas Texas Commission on Environmental Quality: Water Supply Division	www.tnrcc.state.tx.us/permitting/waterperm/pdw/pdw000.html	(512) 239-6096

EPA Region 7	www.epa.gov/region7/water/dwgw.htm	(913) 551-7030
Iowa Department of Natural Resources: Water Supply Section	www.state.ia.us/epd/wtrsuply/wtrsup.htm	(515) 725-0275
Kansas Department of Health and Environment: Public Water Supply Section	www.kdhe.state.ks.us/pws/	(785) 296-5514
Missouri Department of Natural Resources: Public Drinking Water Program	www.dnr.state.mo.us/wpscd/pdwp/homepdwp.htm	(573) 751-5331
Nebraska Department of HHS Regulation and Licensure	www.hhs.state.ne.us/enh/enhindex.htm	(402) 471-2541

EPA Region 8	www.epa.gov/region08/water/	(303) 312-7021
Colorado Department of Public Health and Environment: Drinking Water Program	www.cdphe.state.co.us/wq/wqhom.asp	(303) 692-3500
Montana Department of Environmental Quality: Public Water Supply Section	www.deq.state.mt.us/wqinfo/index.asp	(406) 444-3080
North Dakota Department of Health: Division of Municipal Facilities	www.ehs.health.state.nd.us/ndhd/environ/mf/index.htm	(701) 328-5211
South Dakota Department of Environment and Natural Resources: Drinking Water Program	www.state.sd.us/denr/des/drinking/dwprg.htm	(605) 773-3754
Utah Department of Environmental Quality: Division of Drinking Water	www.deq.state.ut.us/eqdw/Index.htm	(801) 536-4200
Wyoming EPA Region VIII: Wyoming Drinking Water Program	www.epa.gov/region08/water/dwhome/wycon/wycon.html	(303) 312-6312

EPA Region 9	www.epa.gov/region9/water/index.html	(415) 744-1884
American Samoa Environmental Protection Agency: American Samoa	www.epa.gov/Region9/cross_pr/islands/samoa.html	(415) 744-2170
Arizona Department of Environmental Quality: Drinking Water Monitoring and Assessment Division	www.adeq.state.az.us/environ/water/dw/index.html	(602) 207-4644
California Department of Health Services: Division of Drinking Water and Environmental Management	www.dhs.cahwnet.gov/org/ps/ddwem/	(916) 323-6111
Guam Guam Environmental Protection Agency	www.epa.gov/region09/cross_pr/islands/guam.html	(671) 472-8863
Hawaii Department of Health: Environmental Management Division	www.hawaii.gov/health/eh/sdwb/index.html	(808) 586-4258
Nevada Department of Human Resources: Bureau of Health Protection Services	www.health2k.state.nv.us/bhps/phe/sdwp.htm	(775) 687-6615

EPA Region 10	www.epa.gov/region10/	(206) 553-1389
Alaska Department of Environmental Conservation: Drinking Water and Wastewater Program	www.state.ak.us/dec/deh/safewater.htm	(907) 269-7653
Idaho Department of Environmental Quality: Water Quality Division	www2.state.id.us/deq/water/water1.htm	(208) 373-0502
Oregon Department of Human Resources: Drinking Water Program	www.ohd.hr.state.or.us/dwp/index.htm	(503) 731-4317
Washington Department of Health: Drinking Water Division	www.doh.wa.gov/ehp/dw/	(360) 236-3096

Appendix F: Tribal Contacts

For additional information or to learn more about the laws governing your Tribe, use the contact information provided in this Appendix.

US EPA Headquarters		
American Indian Environmental Office	www.epa.gov/indian	(202) 564-0303

US EPA Regional Tribal Capacity Development Coordinators		
EPA Region 1	www.epa.gov/region01/topics/government/tribal.html	(888) 372-7341
EPA Region 2	www.epa.gov/region02/nations/index.html	(212) 637-3600
EPA Region 4	www.epa.gov/region04/ead/indian/index.htm	(404) 562-6939
EPA Region 5	www.epa.gov/region5/water/stpb	(312) 353-2123
EPA Region 6	www.epa.gov/region06/6xa/tribal.htm	(800) 887-6063
EPA Region 7	www.epa.gov/region07/government_tribal/index.htm	(913) 551-7030
EPA Region 8	www.epa.gov/region08/tribes	(303) 312-6116
EPA Region 9	www.epa.gov/region09/cross_pr/indian/index.html	(415) 744-1500
EPA Region 10	yosemite.epa.gov/r10/tribal.NSF/webpage/tribal+office+homepage?opendocument	(206) 553-4011

Other Contacts		
Administration for Native Americans	www.acf.dhhs.gov/programs/ana/	(877) 922-9262
Bureau of Indian Affairs	www.doi.gov/bureau-indian-affairs.html	(202) 208-3710
Indian Health Services	www.ihs.gov	(301) 443-3024
Native American Water Association	www.nawainc.org	(775) 782-6636

Appendix G: Other STEP Guide Documents

This brochure is one in a series of Simple Tools for Effective Performance (STEP) documents for small drinking water systems. The STEP documents can be obtained from EPA by calling the Safe Drinking Water Hotline at (800) 426-4791 and requesting the document by its publication number. The documents can also be found at www.epa.gov/safewater/smallsys/ssinfo.htm.

AVAILABLE NOW

A Small Systems Guide to the Total Coliform Rule (TCR)

This workbook is designed to help small systems understand the TCR and the mandatory monitoring required under the rule. The workbook provides sample worksheets to help systems organize and track TCR monitoring data, and provides appropriate follow-up actions should monitoring show a positive presence of coliform.

Publication number EPA 816-R-01-017A

Published: June 2001

Safe Drinking Water Act (SDWA) Regulation Overview Brochure for Small Systems

This brochure summarizes SDWA regulations that currently exist, are proposed, or are under development that affect or will affect small water systems. The brochure emphasizes how the regulations relate to each other, and explains the multi-barrier approach to microbial and chemical/radiological risks and how SDWA regulations fit into this type of framework.

Publication number EPA 816-R-03-017

Published: September 2003

Complying With the Revised Drinking Water Standard for Arsenic: Small Entity Compliance Guide

This workbook is designed to help systems understand and achieve compliance with the Arsenic Rule. The workbook provides sample worksheets to help systems organize data, and provides guidance for small systems on their selection of appropriate compliance options.

Publication number EPA 816-R-02-008A

Published: August 2002

Strategic Planning Workbook

This workbook is designed to help systems understand the concept of strategic planning and how it can help them prepare their water system to meet public expectations and regulatory requirements while maintaining organizational and financial stability in the future. The workbook provides worksheets to help systems begin to plan strategically, assess their capacity, define their area of service, identify options, and develop an implementation plan for their system.

Publication number EPA 816-R-03-015

Published: September 2003

UNDER DEVELOPMENT

Disinfectants/Disinfection By-Products (D/DBP) Rule Workbook

Rate-Setting: A Handbook for Small Systems

Restructuring: A Handbook for Small Systems

Commission on Rural Water

O&M
Guide for the Support of
Rural Water-Wastewater Systems



\$10.00

Commission on Rural Water

O&M **Guide for the Support of** **Rural Water-Wastewater Systems**



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Further information regarding National Demonstration Water Project and the Commission on Rural Water available from:

Information Clearinghouse
Commission on Rural Water
Suite 2026
221 North La Salle Street
Chicago, Illinois 60601

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Preface

This manual is intended primarily as a guide for the manager of a small rural water and wastewater system. He is the "you" referred to in the text. The book is not meant to be a textbook for engineers nor even a sufficient handbook for plant operators. Instead it focuses on the things the manager needs to know if he is to assume the responsibility for system operation. It gives him a look at management and administration, handling of equipment and personnel, estimating costs and budgeting, and supervising the technical side of water-wastewater system operation. This is the gap in the literature of rural water development which we have tried to fill. Nowhere else, we believe, is information on so many different topics pulled together in one place, written for the non-technician, and concentrated on the special problems of rural areas. For those who need more detailed technical information, a selected bibliography is included in the appendix.

A number of people associated with National Demonstration Water Project and the Commission on Rural Water have combined their efforts in producing this guide. Here are the important contributors in both research and writing:

Chapter One (Management) -- Mary E. Morgan of Conset, Inc.

Chapter Two (Water Systems) -- Michael D. Campbell and William Hunt of the National Water Well Association Research Facility.

Chapter Three (Wastewater Systems) -- Steven N. Goldstein and Walter Moberg, Jr., of Conset, Inc.

Chapter Four (Personnel) -- Campbell, Hunt and Moberg.

Chapter Five (Costs) -- Goldstein

Many others contributed their expertise to the guide in the form of comments and suggestions. They include: Jay H. Lehr, executive director, National Water Well Association; Stanley Zimmerman, executive director, National Demonstration Water Project; John E. Foster, P.E., Conset, Inc.; Heinz Russelmann, National Sanitation Foundation; Roscoe Thornbury, president, National Demonstration Water Project; Harry Conard, New Mexico Home Education Livelihood Program; Joseph H. VanDeventer and Wallace

Johnston, Demonstration Water Project, Roanoke, Virginia.

The book was designed by Leo Zayauskas. Production was under the supervision of the Ground Water Council, which serves as the Information Clearinghouse for the Commission.

Finally, the manuscript was organized, largely written, and edited by Edwin L. Cobb of Conset, Inc. He may be blamed for the corny jokes which pop up from time to time. These are intended only to lighten the narrative; it goes without saying that water and wastewater service is a serious matter.

National Demonstration Water Project, for which the Commission on Rural Water serves as a public relations and publications unit, is attempting to improve water and wastewater services in rural areas through affiliate projects, public information efforts, and publications. Hopefully, this guide will be a significant addition to the "Rural Water Bookshelf," which has been designed to meet the specific needs of small rural communities.

Commission on Rural Water
Washington, D.C.
October, 1974

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marily concerned with failure resulting from wear and tear.

Estimating Replacement Expenses

The first item needed in estimating major repair and replacement costs is the expected equipment service lifetime. For example, the service lifetime of small pumps is usually estimated at anywhere from three to seven years -- five years on the average. Table 44 gives average lifetimes for the major water and wastewater system components.

Table 44
Average Service Lifetimes,
Major Systems Components

WATER SYSTEMS	
<u>Well</u>	
Casing, metal	10-50 years
Casing, plastic	25-75 years
Screen, metal	4-50 years
Screen, plastic	4-75 years
Pump, submersible	1-15 years
Pump, jet	1-15 years
Pump, turbine	7-20 years
<u>Storage Tanks</u>	
Hydroneumatic	30-50 years
Elevated/Standpipes, metal	30-50 years
Elevated/Standpipes, concrete	30-50 years
Ground Storage, metal	25-50 years
Ground Storage, concrete	40-60 years
Reservoir Liners	10-15 years
<u>Transmission Systems</u>	
Pumps, auxiliary	7-15 years
Mains, plastic	40-75 years
<u>Distribution Systems</u>	
Pumps, auxiliary	7-15 years
Mains, plastic	25-50 years
Water meters	7-10 years
<u>Treatment Systems</u>	
Sand Filters	30-40 years
Greensand Filters	30-40 years
Zeolite Softeners	15-30 years
<u>Disinfection Devices</u>	
Gas Chlorinators	7-10 years
Hypochlorinators, liquid	7-10 years
Hypochlorinators, dry chemical	7-15 years
Ozonators	5-10 years
WASTEWATER SYSTEMS	
<u>Septic Tank-Soil Absorption</u>	
Septic Tank	20-50 years
Soil Absorption System	10-30 years
<u>Home Aerobic Tanks</u>	
Tank	20-50 years
Mechanical Components	3-10 years

Collection Systems

Gravity Sewers, clay, cement	25-50 years
Gravity Sewers, cast iron	30-75 years
Gravity Sewers, plastic	30-75 years
Manholes, structures	20-50 years
Lift Stations, structures	20-50 years
Lift Station, pumps, etc.	7 years
Pressure sewers, plastic, small dia.	5-10 years
Small (household) sewage pumps	5-10 years
Pressure Mains - same as gravity sewers	

Treatment Systems

Primary

Comminutors	5 years
Screens	10 years
Clarifier Tanks, concrete	20 years
Clarifier Tanks, metal	20 years
Grit and Sludge Handling Equipment	5-10 years

Secondary

Lagoons	5-25 years
Extended Aeration tankage, concrete	20-50 years
Extended Aeration tankage, metal	20-30 years
Aerator Compressors	5-10 years
Air diffusers	3 years
Sludge pumps	5-10 years
Clarifier Tankage, Concrete	20-50 years
Clarifier Tankage, Metal	20-30 years
Chlorinators	10 years
Sludge Digesters	same as aeration tankage

Advanced Wastewater Treatment

Sand Filters	5-10 years
--------------	------------

Sludge Disposal Equipment

Drying beds	5-15 years
Incinerators	
Dewatering devices	

Effluent Disposal

Irrigation Pumps	5-10 years
Sprinkler Heads	2- 5 years

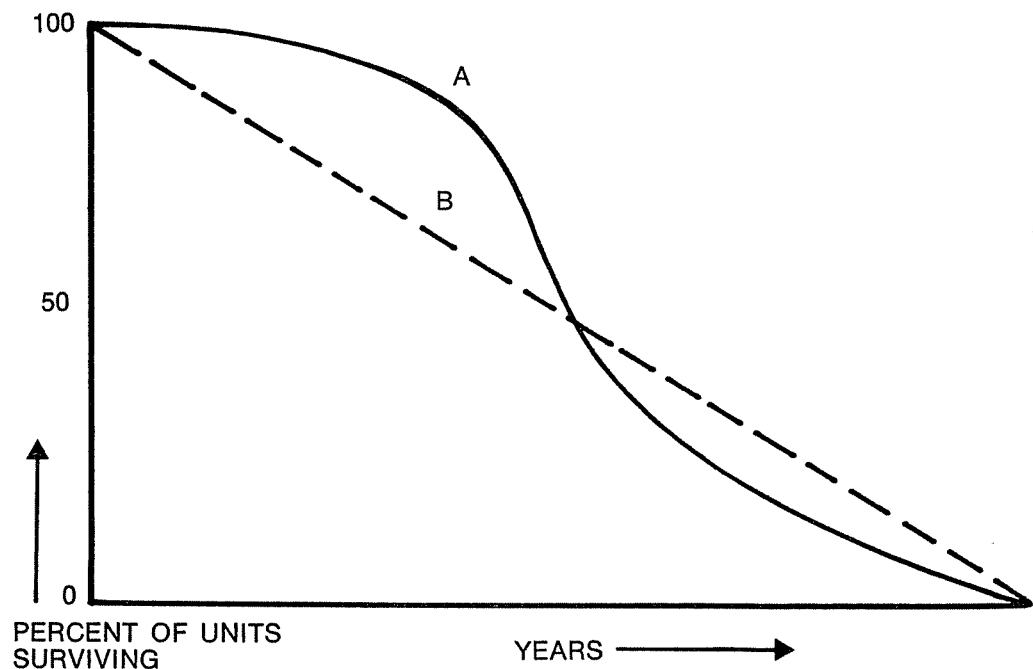
General Use Equipment

Laboratory instrumentation	3-10 years
Service Vehicles	3- 5 years
Pumper/Tank trucks	5-10 years
Automatic Controls	5-20 years

Service lifetimes vary, of course, because of differences in the way equipment is used and maintained. Environmental factors such as corrosive water and soils, temperature extremes, and humidity are always important. A submersible pump may fail in six months in one location while the same model lasts 10 or 15 years in another. Obviously, if only premium materials and equipment have been used in the system, service lifetimes will be longer. The lower initial cost of a less-than-premium item must be weighed against the fact that it will probably have to be replaced sooner.

Even better than a simple estimate of the service lifetime of a system component is a "survivor curve" for the component. The survivor curve is a graph which shows the percentage of units of a particular item which are still working after a certain number of years. Unfortunately, it is difficult to obtain survivor curves for many components. Figure 21 has a sample curve.

Figure 21
Sample Survivor Curves



Survivor curve "A" depicts a group of units of which very few fail for a number of years, after which there is a rapid fall-off and most experience failure within a few years. Submersible pumps are a good example. Curve "B" represents a situation where a constant number of units fail each year. Not many items will fit this pattern perfectly, but some may approximate it. The equipment units represented by both curves "A" and "B" have about the same average service life.

It is important to know the failure patterns of equipment as well as the average service life so that adequate capital can be available when replacement is necessary. Some components may be replaced on a regular basis under a preventive maintenance program. For example, a 1,000-customer utility may elect to start replacing 100 water meters annually with rebuilt meters after the first 10 years of operation. This would correspond to a 15-year service life for new

meters and a 10-year life for rebuilt meters if the replacement continues beyond year 20.

Some system components are costed at a constant annual rate per unit for repair and replacement -- for example, sewer maintenance and repair at 10-cents per foot/year. If the system has been properly designed and installed, there should be few major failures for several years of operation. Thereafter, failure may occur at a steady or even an increasing rate. The main reason for quoting the constant annual rate, therefore, is that detailed survival information is not available. In an expanding system, there is a mixture of new and old equipment, making a composite cost more convenient.

Funding an Equipment Replacement Reserve

There are several strategies which may be used in setting up a financial reserve for equipment replacement. First, suppose that a component which costs \$10.00 today will have to be replaced at the end of 10 years of service. Assume further that the component is subject to an average annual inflation rate of 6 percent. At the end of 10 years, it will cost $(1.06)^{10}$, or 1.79 times as much to replace -- \$17.91 plus installation. The objective is to accumulate this much money over the 10-year period.

If the component had been depreciated over 10-years, \$10.00 would have been recovered from its replacement. (You cannot depreciate an item more than its original cost.) \$10.00 would not be enough to buy a replacement. If the straight-line method of depreciation (see Chapter One) had been used and if the annual depreciation of one dollar had been invested at interest every year, \$12.58 would have been accumulated at 5 percent interest or \$13.18 at 6 percent -- still not enough to buy a replacement unit. If accelerated depreciation had been taken and the money invested at interest, more would have accumulated at the end of 10 years than under the straight-line method because a greater amount would have been invested in the early years. Even so, the cost of a replacement unit would not have been matched.

Suppose that the \$10.00 initial cost had been treated as a loan which had to be paid off in annual installments with interest payable on the unpaid balance (annualized or capitalized). The annualized payment at 6 percent interest is \$1.36, or \$13.60 at the end of 10 years. Still not

enough. Suppose, though, that an amount annualized at 6 percent is invested in an interest-bearing account. If the account pays 6 percent, 17.91 would have accumulated -- just enough!

The point is that if the replacement cost of a unit is annualized for n years at a rate equal to the inflation rate and the annual amounts are invested also at an interest rate equal to that of inflation, then at the end of n years there will be exactly as much available as the inflated replacement cost. The inflation rate and interest rates will rarely be identical. However, if the sum of the chosen annualization rate plus the bank's interest rate is equal to twice the inflation rate, the amount of money available after n years will be approximately equal to the inflated price.

Inflation varies in a fairly unpredictable manner, interest rates are not always stable, and the lifetime of the equipment at the start of its use cannot be exactly forecast, so there is no exact method for accumulating funds for equipment replacement. Nevertheless, here is a strategy which goes a long way to achieving the desired results:

- (1) Estimate the lifetime of the unit.
- (2) Estimate the inflation rate over the lifetime.
- (3) Estimate what interest can be earned on funds earmarked for equipment replacement.
- (4) Annualize the present purchase price at a rate which, when combined with the interest rate, yields twice the inflation rate.

Annualization factors for a wide range of rates are given in Table 45.

An example of the above strategy: A steel storage tank costs \$2,000 and has an expected 20-year lifetime. The inflation rate for steel tanks is expected to be 5.5 percent over the next 20 years. Interest of 5 percent can be earned in a demand savings account. An annualization rate of 6 percent plus the 5 percent interest totals 11 percent, twice the assumed rate of inflation. After 20 years at 5.5 percent inflation, the unit should cost \$5,836 ($2,000 (1 + .055)^{20} = 2,000 \times 2.9178 = \$5,836$). This is the

amount you will need.

A regular deposit of one dollar annually for 20 years at 5 percent interest will yield \$33.066. The annualization factor for 20 years at 6 percent is 0.08719. If the annualized amount ($\$2,000 \times 0.08719$ or $\$174.38$) is invested regularly at 5 percent interest, it will yield \$5,766 ($\174.38×33.066), or just under the expected inflated replacement cost. If the inflation, earned interest, and annualized interest rates had all been the same, the results would have been perfect -- that is, exactly \$5,836 would have accumulated in the bank account.

As an added insurance, three additional precautions may be taken. First, estimate the service life conservatively so that money will be accumulated at a faster rate. Secondly, the full replacement cost, including transportation and installation, should be used rather than the purchase price alone. Finally, you may disregard interest earned and make annual reserve payments equal to the total replacement cost divided by expected lifetime. This is a very conservative measure which can be justified only in cases of extreme uncertainty and a system which is highly vulnerable to failure of expensive equipment.

Equipment Replacement Costs and Depreciation

Depreciation is a loss of value of a capital investment, such as a treatment plant, because of wear and tear, etc. It is thus closely related to equipment replacement.

From a tax accounting viewpoint, however, depreciation is a method for recovering capital investment. While the rate of capital recovery is supposed to be related to the rate of loss of value, depreciation accounting normally involves the choice of a reasonable lifetime ("asset depreciation period") consistent with norms defined by federal and state tax authorities and the use of an acceptable recovery formula (for example, "straight line", "double declining balance", or "sum-of-digits").

The depreciation amount is treated as a business expense which reduces the amount of revenues subject to taxation as income. The value of the asset for tax and rate-making purposes is also reduced by the total amount of depreciation taken on it over the years

(accumulated depreciation). For example, a plant which originally cost \$1,000,000, but for which \$300,000 had been recovered as depreciation over the years, could only be counted as a \$700,000 investment for figuring allowable profit. There are many other considerations which would tend to adjust the \$700,000 figure, but the basic principle remains unchanged.

In theory, if utility services were to be provided in perpetuity, the annual depreciation allowances could be invested and then used at a later time to replace or overhaul major items of equipment as needed. In practice, profit-making companies tend to regard depreciation allowances as a tax break (they do not have to pay taxes on the amount of income equal to the depreciation), and the money recovered from depreciation would normally be invested in system expansion or some other aspect of the business rather than being held unused in a savings account. The attitude of the businessman -- and it is a sensible attitude -- is that he is better off using the depreciation money for his business needs rather than borrowing money at high rates and investing the depreciation money at lesser rates. He banks on the premise that because his is a growing concern with an expanding capital base, he can always borrow the money at favorable terms later on when the need arises.

In the case of small rural utilities with a well-defined, slowly-changing service population and little opportunity for system expansion, the above premises are not likely to apply. Furthermore, if the utility is run as a non-profit or a municipal entity, the whole tax accounting structure changes and the use of the depreciation allowance does not apply, since there are no surplus revenues that have to be offset by allowances to prevent their taxation as income. Depreciation in such situations is important mainly insofar as it may reduce asset values for purposes of local property taxes.

Whether the utility or support company is run as a profit-motivated business or as a public service organization, it is important that the equipment replacement needs be realistically estimated and that resources be clearly earmarked and kept available for replacement when the need arises. If, for example, a profit-making organization uses its depreciation allowance to fund system expansion, the manager should insure that there will be funds available from other sources for replacing major equipment. This could mean

that the organization would not borrow up to the full limit of its credit in order to preserve borrowing power for emergencies.

AND FINALLY...

We have tried in these pages to cover the subject of operation and maintenance for water and wastewater systems in a way that will be most useful to you, the system manager. We have tried to do it with some wisdom and even a little wit. Once again, you are reminded that our intention is to help you become a better manager, not an engineer. But at least you should have more grasp of what is technically involved than the construction foreman who yelled at one of his workers on the job site: "Leave that wheelbarrow alone, Henry; you don't know nuthin' about machinery!"





MATTHEW G. BEVIN
GOVERNOR

EXECUTIVE ORDER

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Secretary of State
Frankfort
Kentucky

2016-832
November 18, 2016

ALISON LUNDERGAN GRIMES
SECRETARY OF STATE
COMMONWEALTH OF KENTUCKY
BY R. Adler

RELATING TO THE REORGANIZATION OF THE
ENERGY AND ENVIRONMENT CABINET
PUBLIC SERVICE COMMISSION

WHEREAS, this Administration desires and will implement more effective and efficient management of state government operations; and

WHEREAS, greater efficiency, economy and improved administration will result from the alteration of current organizational units as set out in this Executive Order; and

WHEREAS, the Public Service Commission, which is administratively attached to the Energy and Environment Cabinet, is charged with ensuring safe and reliable service at a reasonable price to the customers of jurisdictional utilities while providing for the financial stability of those utilities by setting fair and just rates, and supporting their operational competence by overseeing regulated activities:

NOW THEREFORE, I, Matthew G. Bevin, Governor of the Commonwealth of Kentucky, under the authority vested in me by the Constitution, Sections 69 and 81, and Kentucky Revised Statutes 12.028, do hereby Order and Direct the following organizational changes within the Public Service Commission:

- I. The Office of General Counsel is hereby created, and shall be headed by an executive director who shall report to the executive director of the Public Service Commission.
- II. The Division of General Administration is hereby created, and shall be headed by a director who shall report to the executive director of the Public Service Commission.
- III. The Division of Inspections is hereby created, and shall be headed by a director who shall report to the executive director of the Public Service Commission.



MATTHEW G. BEVIN
GOVERNOR

EXECUTIVE ORDER

Secretary of State
Frankfort
Kentucky

2016-832
November 18, 2016

- IV. The Division of Engineering is hereby abolished. All files, funds, personnel, records and equipment are hereby transferred to the newly established Division of Inspections.
- V. The Division of Consumer Services is hereby abolished. All files, funds, personnel, records and equipment are hereby transferred to the newly established Division of General Administration.
- VI. The Division of Filings is hereby abolished. All files, funds, personnel, records and equipment are hereby transferred to the newly established Division of General Administration and the Division of Financial Analysis.
- VII. The Division of General Counsel is hereby abolished. All files, funds, personnel, records and equipment are hereby transferred to the newly established Office of General Counsel.
- VIII. The Energy and Environment Cabinet, Finance and Administration Cabinet, Office of State Budget Director, and Personnel Cabinet are directed to initiate all actions that are necessary to effectuate the provisions of this Order.

This Order is effective November 16, 2016.


MATTHEW G. BEVIN, Governor
Commonwealth of Kentucky


ALISON LUNDERGAN GRIMES
Secretary of State



MATTHEW G. BEVIN
GOVERNOR

EXECUTIVE ORDER

Secretary of State
Frankfort
Kentucky

2016-832
November 18, 2016

REORGANIZATION PLAN

INTRODUCTION

The Public Service Commission's mission is to foster the provision of safe and reliable service at a reasonable price to the customers of jurisdictional utilities while providing for the financial stability of those utilities by setting fair and just rates, and supporting their operational competence by overseeing regulated activities. In order to promote the efficient and effective management of state government resources, the Public Service Commission is recommending a reorganization of its current structure. This reorganization will streamline the operations of the Commission by appropriately allocating agency functions, funds, personnel, and other resources to provide improved service to the citizens of the Commonwealth.

Five (5) divisions within the Commission will be affected as a result of this reorganization: The Division of General Counsel, Division of Engineering, Division of Financial Analysis, Division of Filings, and the Division of Consumer Services. This proposal creates one (1) new office, two (2) new divisions, and six (6) new branches and abolishes four (4) divisions and thirteen (13) branches. All personnel, funds, records, files and equipment shall be maintained by the Commission.

SUMMARY OF PLAN

The Division of General Counsel will be abolished and the Office of General Counsel will be created. All existing staff of the Division of General Counsel will transfer to the newly created Office of General Counsel. This Division is being elevated to an Office to provide a better organizational structure for the management of the General Counsel functions. This will allow for better supervision, attorney management, and long term retention of institutional knowledge.

The Administrative Services Branch will be abolished and the Division of General Administration will be created to consolidate the support functions such as rotational phone coverage and special project assignments. within the Commission into one division. These functions previously were located in three separate divisions under multiple directors and branch managers. This consolidation will allow for more efficient scheduling of personnel resources into the areas where they are needed. Three (3) branches will be established within this newly created division: the Consumer Services Branch, the Filings Branch, and the Administrative Services Branch. All existing staff from the Administrative Services Branch will transfer to the new Administrative Services Branch within the newly created Division.

The Division of Engineering, along with the three (3) branches located within, the Gas Pipeline Safety Branch, the Water and Sewer Branch, and the Electric and Communications Branch, will be abolished and the Division of Inspections will be created. All positions within the former Division of Engineering will transfer to the newly created Division of Inspections, which will more accurately reflect the functions of the division. The focus of the Division of Inspections is to ensure safe and reliable service to the customers of the regulated utilities. The Commission no longer relies on engineering services given the evolution of the utility industry.



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The Division of Consumer Services is abolished and all positions will transfer to the Consumer Services Branch, under the newly created Division of General Administration. This abolishment and transfer of staff into the Division of General Administration/Consumer Services Branch is due to a decreased workload due to changing regulations. It is more efficient to consolidate into the General Administrative Support Division as it provides support to the Commission's core mission of safe and reliable services, at fair, just and reasonable rates. Further, the administrative functions of this branch are transferrable between the other branches within this division, allowing for cross training of functions and duties.

The Division of Filings as well as its four (4) branches, the Docket Branch, the Annual Report Branch, the Tariff Review Branch, and the Information Technology Branch, will be abolished. All positions within the Docket Branch and the Annual Report Branch will transfer to the newly created Filings Branch, Division of General Administration. This transfer of personnel and consolidation of branches will allow for more efficient services within the General Administrative Support Division, as it provides support to the Commission's core mission of safe and reliable services, at fair, just and reasonable rates. Further, the administrative functions of this branch are transferrable between the other branches within this division, allowing for cross training of functions and duties. All positions within the Tariff Review Branch will transfer to the Division of Financial Analysis to more closely align their job duties as Public Utility Rate Analysts within the organization. This consolidation will ensure that tariff review will be done more efficiently. All positions within the Information Technology Branch will transfer to the newly created Administrative Services Branch, Division of General Administration, due to the information technology functions being a support function of the Commission. Further, the maintenance of the in house docket system is primarily a support function for multiple divisions within the agency, similar to other support functions within the Administrative Services Branch.

While the Division of Financial Analysis will remain, all five (5) branches within this organizational unit will be abolished. The Electric and Gas Revenue Requirements Branch, Water Revenue Requirements Branch, Electric and Gas Rate Design Branch, Water and Sewer Rate Design Branch, and the Audit and Telecommunications Branch will be abolished. The Water and Sewer Branch and the Electric and Gas Branch will be created. All positions from the abolished Water and Sewer Rate Design Branch and the Water Revenue Requirements Branch will transfer to the newly created Water and Sewer Branch. All positions from the Electric and Gas Revenue Requirements Branch, the Electric and Gas Rate Design Branch, and the Audit and Telecommunications Branch will transfer to the newly created Electric and Gas Branch. Abolishing the former branches and establishing joint new branches allows employees responsible for casework involving specific utility types to become cross trained between rate design and revenue requirements. Additionally, combining the personnel and resources of the former branches enables the Commission to more efficiently use the positions involved in the financial analysis of water and sewer utilities and electric and gas utilities. The creation of these new branches will utilize existing knowledge and skills which will benefit the Division of Financial Analysis as a whole, by allowing cross training and greater collaboration.



MATTHEW G. BEVIN
GOVERNOR

EXECUTIVE ORDER

Secretary of State
Frankfort
Kentucky

2016-832
November 18, 2016

The Communications and Editing Branch will be established and will report directly to the Executive Director of the Public Service Commission. This branch shall process, edit, and distribute press releases, Commission Orders, and all other documents for the Public Service Commission as needed. This branch shall be comprised of three existing positions that will transfer from the office of the Public Service Commission.

FISCAL IMPACT

There will be no fiscal impact associated with this reorganization.

PERSONNEL IMPACT

All staff of the Commission affected within this reorganization will be reassigned to newly created divisions and branches within the Commission. There will be no increase in the personnel cap. The personnel changes as a result of this reorganization would be one (1) less division director, and three (3) fewer branch manager positions. Employees currently in management positions within branches being abolished will be reclassified into accurate job classifications after the reorganization is complete.

NET EFFECT

There will be no increase in personnel cap or budget for the Public Service Commission on the effective date of this reorganization. There has been a concentrated effort to streamline several program areas and shifting duties to effectively align with the objectives of the new structures to better serve the Commission. This reorganization is anticipated to increase efficiency and effectiveness of staff due to streamlining of program areas and duties.

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Employer
Health
Benefits

2016
ANNUAL SURVEY



-and-



Primary Authors:

KAISER FAMILY FOUNDATION

Gary Claxton

Matthew Rae

Michelle Long

Anthony Damico

Bradley Sawyer

HEALTH RESEARCH & EDUCATIONAL TRUST

Gregory Foster

NORC AT THE UNIVERSITY OF CHICAGO

Heidi Whitmore

Lindsey Schapiro

Filling the need for trusted information on national health issues, the **Kaiser Family Foundation** is a nonprofit organization based in Menlo Park, California.

Founded in 1944, the **Health Research & Educational Trust (HRET)** is the not-for-profit research and education affiliate of the American Hospital Association (AHA). HRET's mission is to transform health care through research and education. HRET's applied research seeks to create new knowledge, tools and assistance in improving the delivery of health care by providers and practitioners within the communities they serve.

NORC at the University of Chicago is an independent research organization headquartered in downtown Chicago with additional offices on the University of Chicago's campus and in the D.C. Metro area. NORC also supports a nationwide field staff as well as international research operations. With clients throughout the world, NORC collaborates with government agencies, foundations, educational institutions, nonprofit organizations, and businesses to provide data and analysis that support informed decision making in key areas including health, education, economics, crime, justice, energy, security, and the environment. NORC's 75 years of leadership and experience in data collection, analysis, and dissemination—coupled with deep subject matter expertise—provides the foundation for effective solutions.

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Employer Health Benefits

2016
ANNUAL SURVEY



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EMPLOYER HEALTH BENEFITS
2016 ANNUAL SURVEY

Worker and
Employer
Contributions
for Premiums

SECTION

6

WORKER AND EMPLOYER CONTRIBUTIONS FOR PREMIUMS

IN 2016, PREMIUM CONTRIBUTIONS BY COVERED WORKERS AVERAGE 18% FOR SINGLE COVERAGE AND 30% FOR FAMILY COVERAGE.¹ THE AVERAGE MONTHLY WORKER CONTRIBUTIONS ARE \$94 FOR SINGLE COVERAGE (\$1,129 ANNUALLY) AND \$440 FOR FAMILY COVERAGE (\$5,277 ANNUALLY).² COVERED WORKERS IN SMALL FIRMS (3-199 WORKERS) HAVE A LOWER AVERAGE CONTRIBUTION AMOUNT FOR SINGLE COVERAGE (\$1,021 VS. \$1,176), BUT A HIGHER AVERAGE CONTRIBUTION AMOUNT FOR FAMILY COVERAGE (\$6,597 VS. \$4,719) THAN COVERED WORKERS IN LARGE FIRMS (200 OR MORE EMPLOYEES).

- ▶ In 2016, covered workers on average contribute 18% of the premium for single coverage and 30% of the premium for family coverage (Exhibit 6.1). These contribution percentages have remained stable in recent years for both single and family coverage.
 - Covered workers in small firms contribute a higher percentage of the premium for family coverage (39% vs. 26%) than covered workers in large firms (Exhibit 6.23).
- ▶ On average, workers with single coverage contribute \$94 per month (\$1,129 annually), and workers with family coverage contribute \$440 per month (\$5,277 annually) towards their health insurance premiums (Exhibit 6.2), (Exhibit 6.3), and (Exhibit 6.4).
 - The average worker contribution in HDHP/SOs is lower than the overall average worker contribution for single coverage (\$943 vs. \$1,129) and family coverage (\$4,289 vs. \$5,277) (Exhibit 6.5).
- ▶ Worker contributions also differ by firm size. As in previous years, workers in small firms contribute a lower amount annually for single coverage than workers in large firms (\$1,021 vs. \$1,176). In contrast, workers in small firms with family coverage contribute significantly more annually than workers in large firms (\$6,597 vs. \$4,719) (Exhibit 6.6).
- ▶ The average worker contributions for single coverage and family coverage are similar to last year for both small firms and large firms (Exhibit 6.8) and (Exhibit 6.9).

VARIATION IN WORKER CONTRIBUTIONS TO THE PREMIUM

- ▶ The majority of covered workers are employed by a firm that contributes at least half of the premium for single and family coverage.
 - Twelve percent of covered workers are in plans where the employer pays the entire premium for single coverage; three percent of covered workers are in plans where the employer pays the entire premium for family coverage (Exhibit 6.17).
 - Covered workers in small firms are much more likely to work for a firm that pays 100% of the premium than workers in large firms. Thirty percent of covered workers in small firms have an employer that pays the full premium for single coverage, compared to five percent of covered workers in large firms (Exhibit 6.18). For family coverage, eight percent of covered workers in small firms have an employer that pays the full premium, compared to one percent of covered workers in large firms (Exhibit 6.19).
- ▶ Fifteen percent of covered workers have a plan where they are required to contribute more than 50% of the cost of family coverage.

NOTE:

¹ Estimates for premiums, worker contributions to premiums, and employer contributions to premiums presented in Section 6 do not include contributions made by the employer to Health Savings Accounts (HSAs) or Health Reimbursement Arrangements (HRAs). See Section 8 for estimates of employer contributions to HSAs and HRAs.

² The average percent contribution is calculated as a weighted average of all a firm's plan types and may not necessarily equal the average worker contribution divided by the average premium.

- Three percent of covered workers in small firms and 1% of covered workers in large firms contribute more than 50% of the premium for single coverage (Exhibit 6.18). For family coverage, 34% of covered workers in small firms work in a firm where they must contribute more than 50% of the premium, compared to seven percent of covered workers in large firms (Exhibit 6.19).
- ▶ There is considerable variation around the distribution of the average dollar contribution amounts. Note that we changed our methods beginning in 2016: previously, the percentages were calculated excluding workers who do not make a premium contribution; now all covered workers are included (with a zero dollar contribution value for those workers where the employer pays 100% of the premium).
 - For single coverage, 34% of covered workers contribute \$1,355 or more annually (140% or more of the average worker contribution), while 41% of covered workers have an annual worker contribution of less than \$903 (less than 60% of the average worker contribution) (Exhibit 6.16).
 - For family coverage, 28% of covered workers contribute \$6,332 or more annually (140% or more of the average worker contribution), while 41% of covered workers have an annual worker contribution of less than \$4,222 (less than 60% of the average worker contribution) (Exhibit 6.16).

DIFFERENCES BY FIRM CHARACTERISTICS

- ▶ The percentage of the premium paid by covered workers varies by several firm characteristics.
 - Covered workers in firms with a larger share of lower-wage workers (35% or more earn \$23,000 or less annually) contribute a greater percentage of the premium for single coverage (23% v. 18%) and family coverage (35% vs. 30%) than those in firms with a smaller share of lower-wage workers (Exhibit 6.21) and (Exhibit 6.22). Covered workers in firms with a larger share of higher-wage workers (35% or more earn \$59,000 or more a year) contribute less on average for family coverage (27% vs. 33%) than those in firms with a smaller share of higher-wage workers.
 - Looking at dollar amounts, covered workers in firms with a larger share of lower-wage workers (35% or more earn \$23,000 or less annually) on average contribute \$1,322 for single coverage compared with \$1,115 for covered workers in firms with a smaller share of lower-wage workers (Exhibit 6.15).
 - Covered workers in large firms that have at least some union workers have lower average contribution percentages for family coverage than those in firms without any unionized workers (22% vs. 29%). Covered workers at firms with some union workers have a lower average contribution amount for family coverage (\$4,264 vs. \$5,800) (Exhibit 6.15) and (Exhibit 6.22).
 - Covered workers in large firms that are partially or completely self-funded have a lower average percentage contribution for family coverage than workers in large firms that are fully insured (25% vs. 30%) (Exhibit 6.22).³
 - Covered workers in public organizations have lower average premium contributions for single and family coverage than workers in private for-profit firms (Exhibit 6.21) and (Exhibit 6.22).

NOTE:

³ For definitions of Self-Funded and Fully-Insured plans, see the introduction to Section 10.

CONTRIBUTION APPROACHES

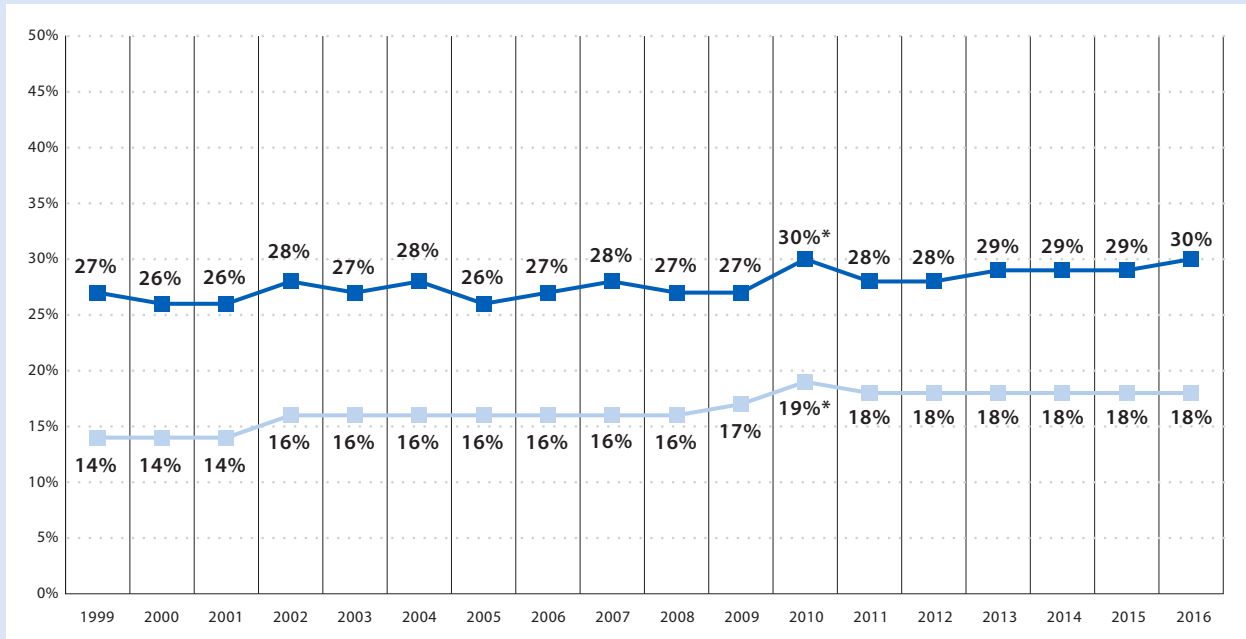
- ▶ Firms take different approaches for contributing towards family coverage. Among firms offering health benefits, 45% of small firms and 18% of large firms contribute the same dollar amount for single coverage as for family coverage, which means that the worker must pay the entire difference between the cost of single and family coverage if they wish to enroll their family members. Forty-five percent of small firms and 67% of large firms make a larger dollar contribution for family coverage than for single coverage (Exhibit 6.26).
- ▶ Among firms offering health benefits, 15% require workers who use tobacco to contribute more towards the premium or cost-sharing than those who do not use tobacco (Exhibit 6.28).

CHANGES OVER TIME

- ▶ The average worker contributions for single and family coverage have increased 80% and 78%, respectively, over the last 10 years, and 23% and 28%, respectively, over the last five years.
- ▶ The average premium contributions for covered workers with single and family coverage have grown at similar rates in small firms and large firms (Exhibit 6.8) and (Exhibit 6.9).

EXHIBIT 6.1

Average Percentage of Premium Paid by Covered Workers for Single and Family Coverage, 1999-2016



SOURCE:

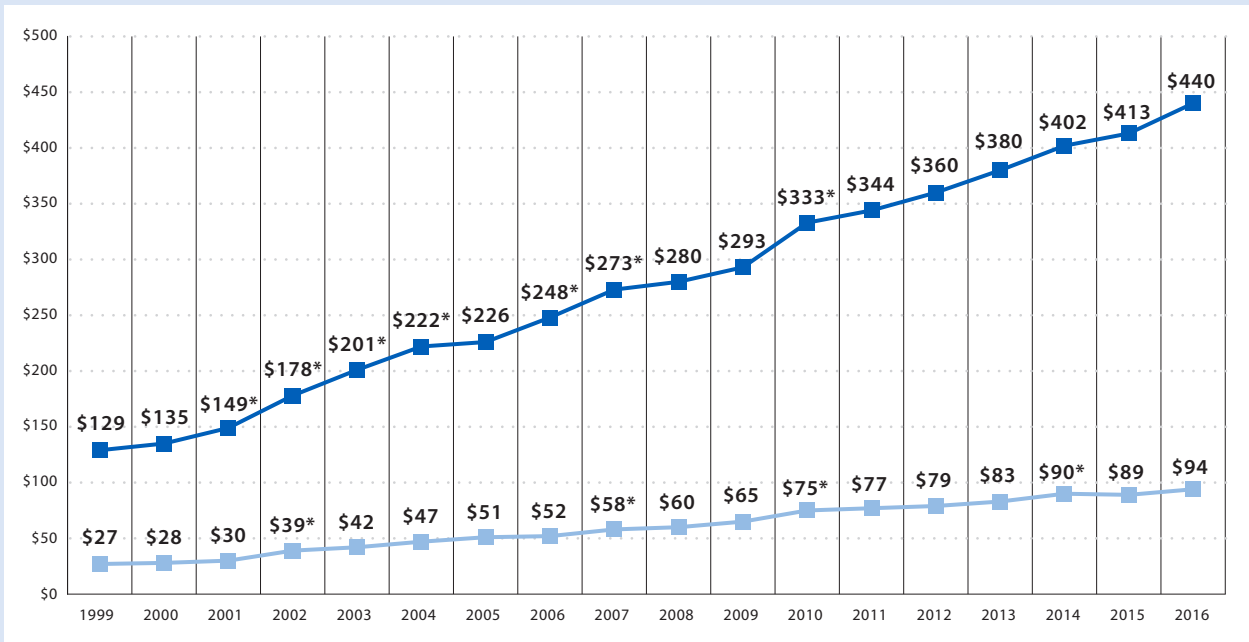
Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2016.

■ FAMILY COVERAGE
■ SINGLE COVERAGE

* Estimate is statistically different from estimate for the previous year shown ($p < .05$).

EXHIBIT 6.2

Average Monthly Worker Premium Contributions Paid by Covered Workers for Single and Family Coverage, 1999-2016



SOURCE:

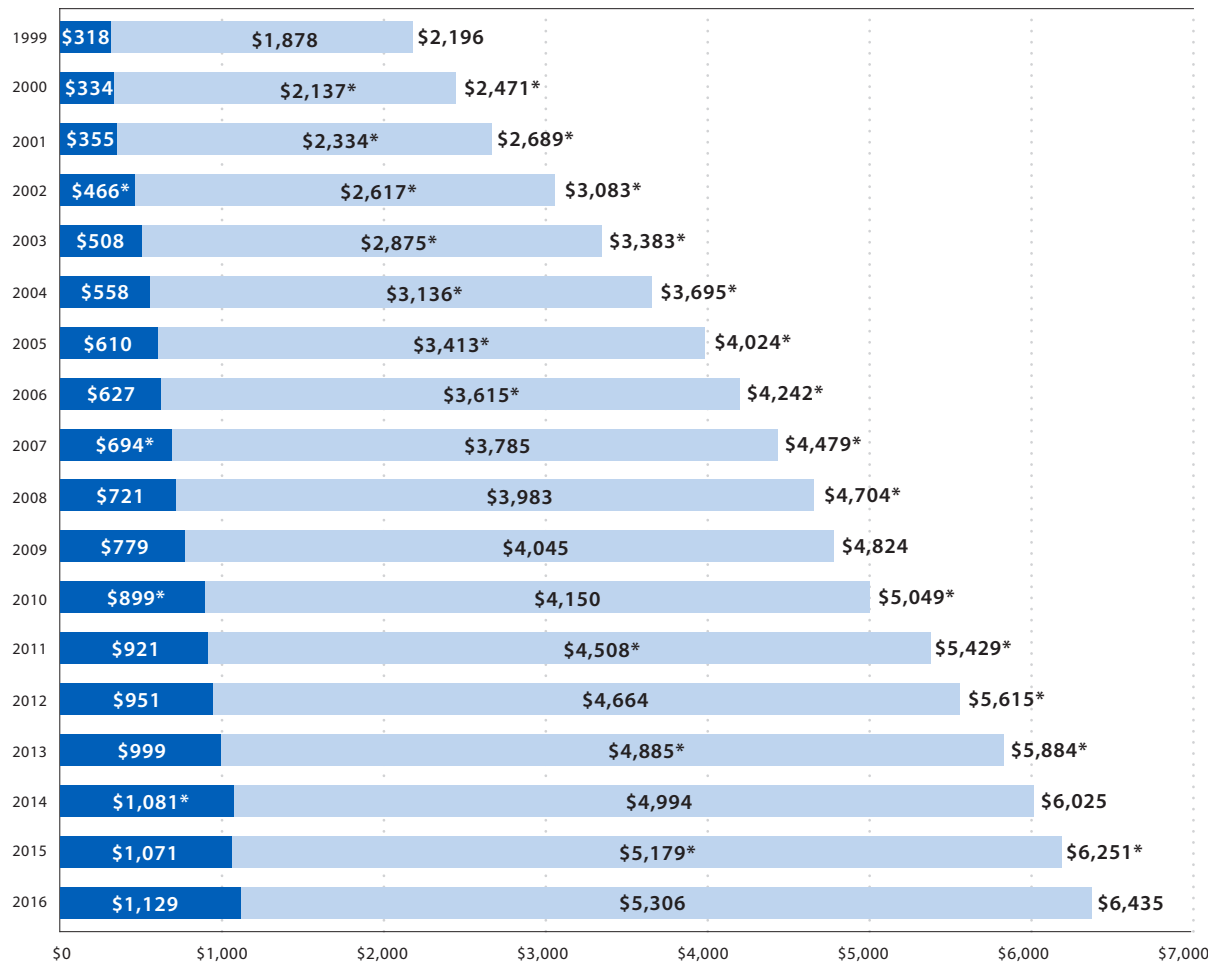
Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2016.

* Estimate is statistically different from estimate for the previous year shown (p < .05).

■ FAMILY COVERAGE
■ SINGLE COVERAGE

EXHIBIT 6.3

Average Annual Worker and Employer Contributions to Premiums and Total Premiums for Single Coverage, 1999-2016



SOURCE:

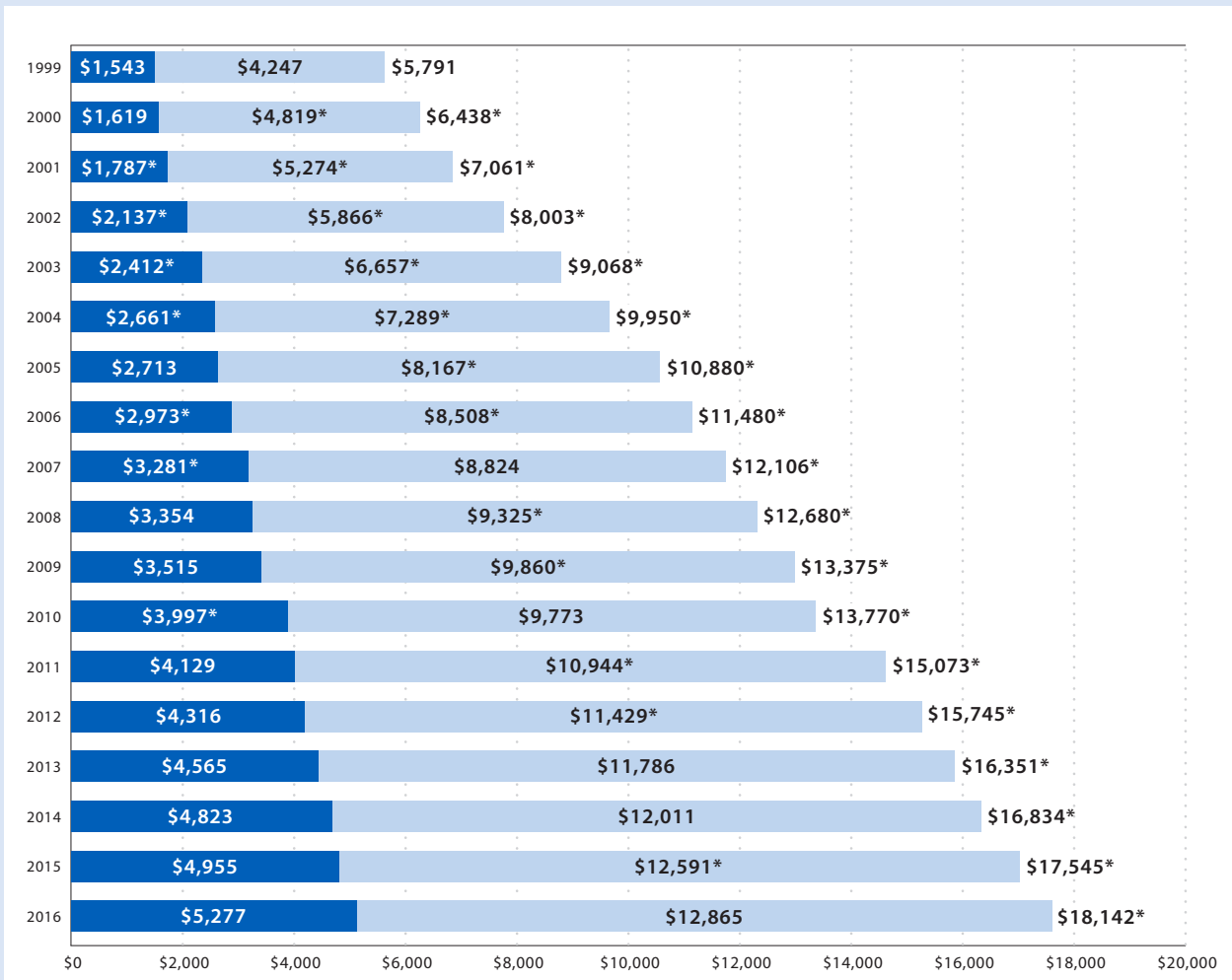
Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2016.

■ WORKER CONTRIBUTION
■ EMPLOYER CONTRIBUTION

* Estimate is statistically different from estimate for the previous year shown (p < .05).

EXHIBIT 6.4

Average Annual Worker and Employer Contributions to Premiums and Total Premiums for Family Coverage, 1999-2016



SOURCE:

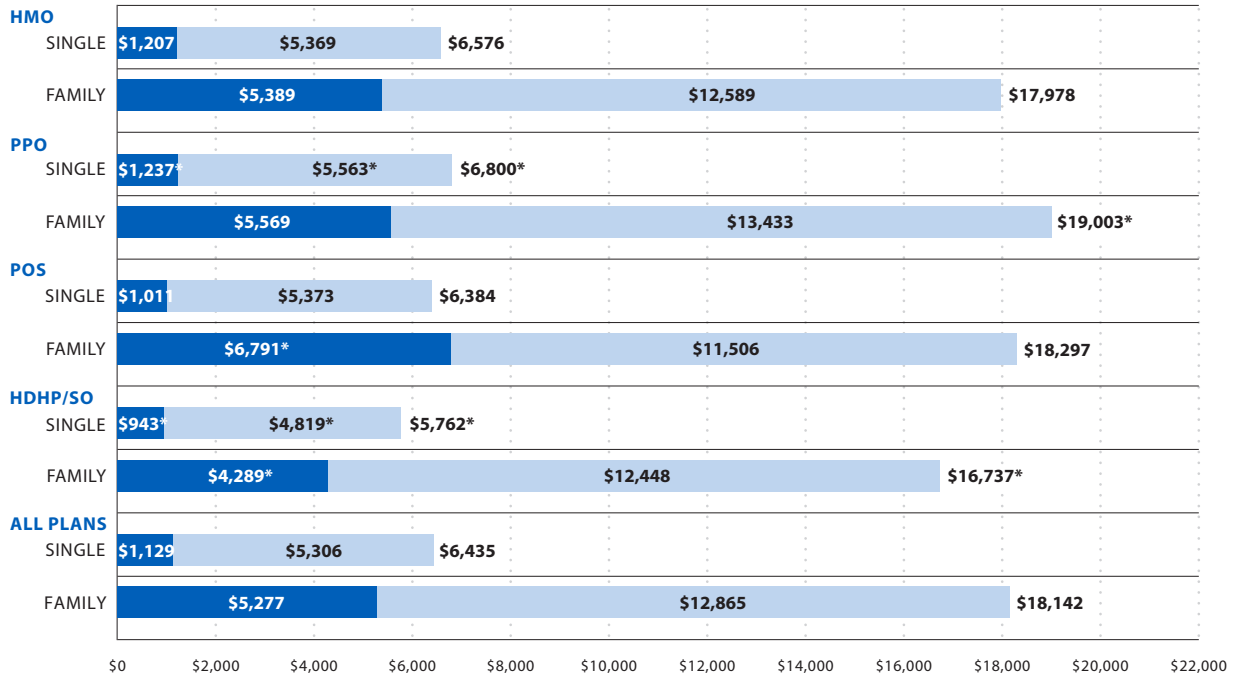
Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2016.

* Estimate is statistically different from estimate for the previous year shown ($p < .05$).

■ WORKER CONTRIBUTION
 ■ EMPLOYER CONTRIBUTION

EXHIBIT 6.5

Average Annual Firm and Worker Premium Contributions and Total Premiums for Covered Workers for Single and Family Coverage, by Plan Type, 2016



SOURCE:

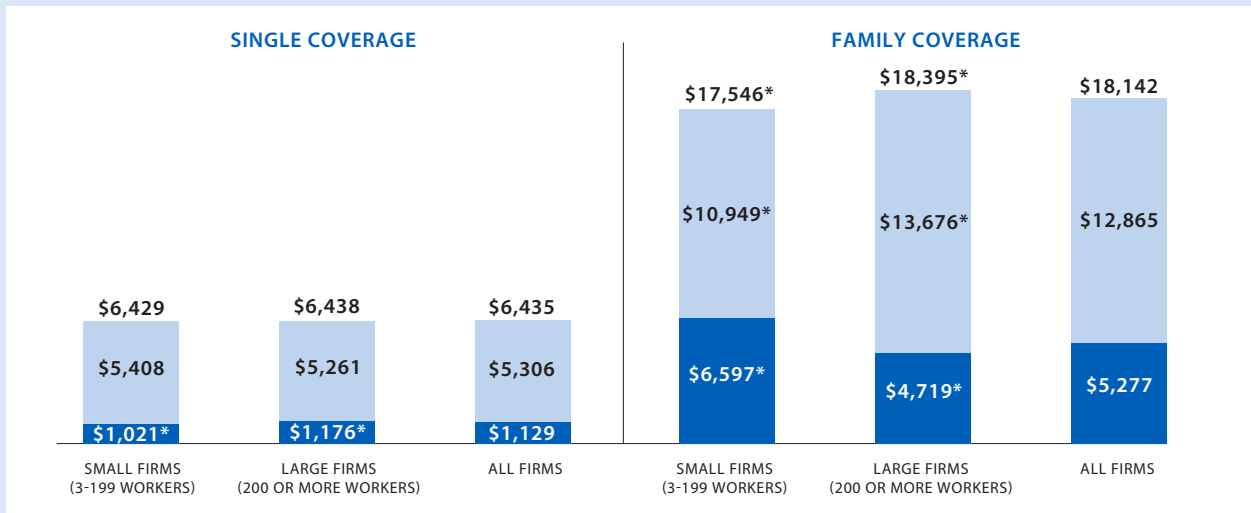
Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

■ WORKER CONTRIBUTION
■ EMPLOYER CONTRIBUTION

* Estimate is statistically different from All Plans estimate by coverage type (p < .05).

EXHIBIT 6.6

Average Annual Worker and Employer Contributions to Premiums and Total Premiums for Single and Family Coverage, by Firm Size, 2016



SOURCE:

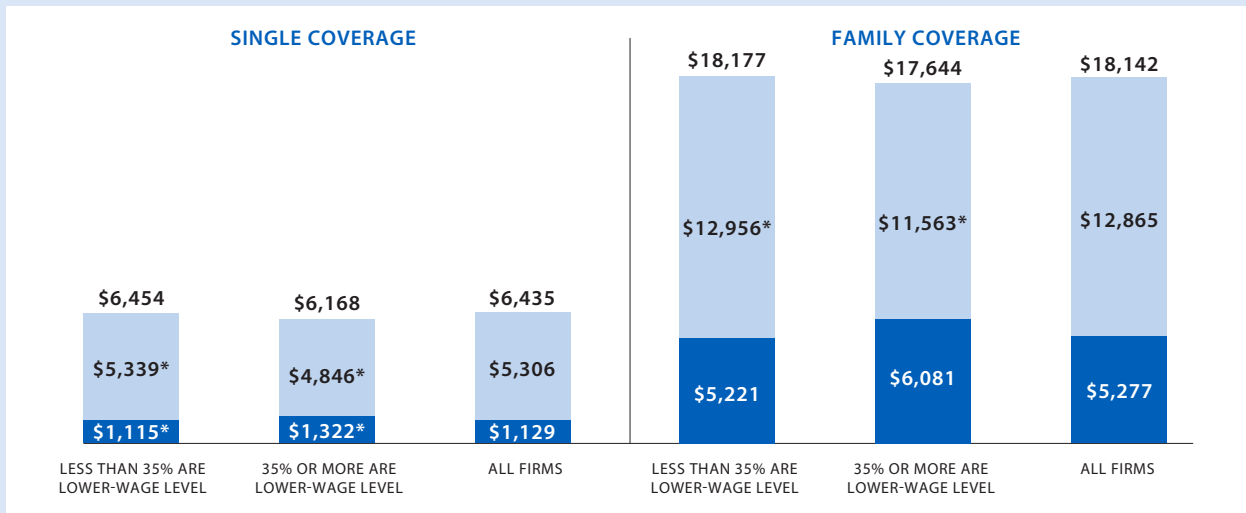
Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

EMPLOYER CONTRIBUTION
WORKER CONTRIBUTION

* Estimate is statistically different between All Large Firms and All Small Firms estimate (p < .05).

EXHIBIT 6.7

Average Annual Worker and Employer Contributions to Premiums and Total Premiums for Single and Family Coverage, by Firm Wage Level, 2016



SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

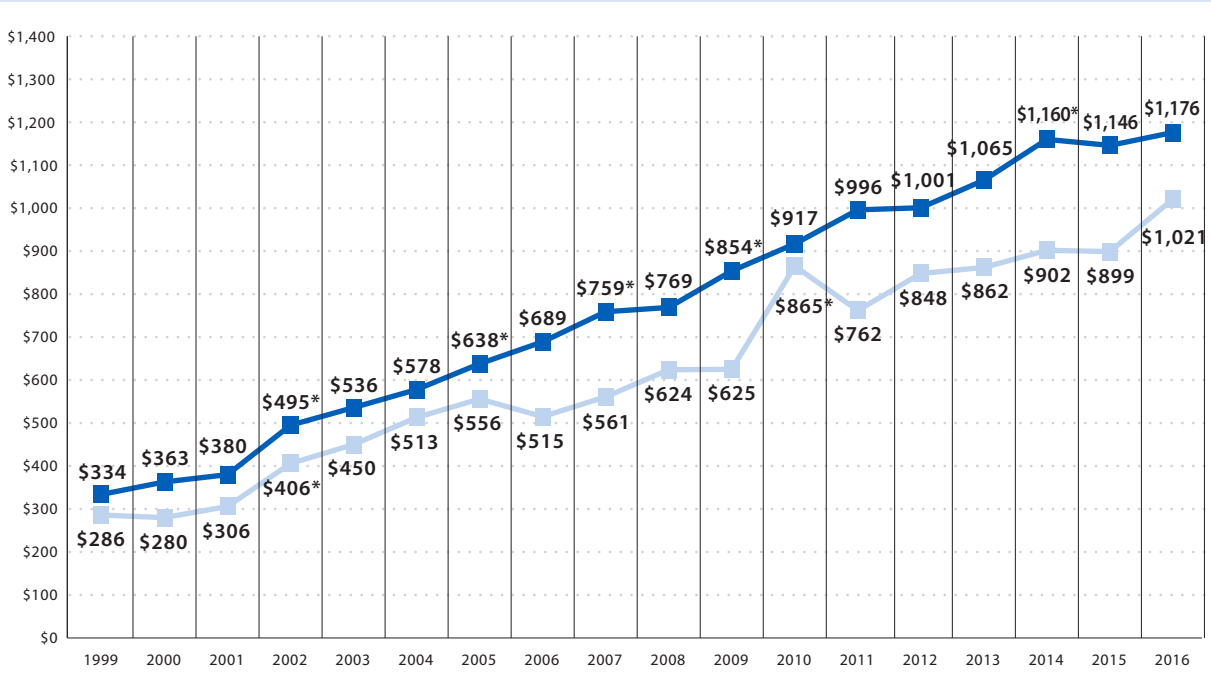
EMPLOYER CONTRIBUTION
WORKER CONTRIBUTION

* Estimate is statistically different between All Large Firms and All Small Firms estimate (p < .05).

NOTE: Lower wage level is \$23,000 annually or less, the 25th percentile for workers' earnings nationally.

EXHIBIT 6.8

Average Annual Worker Contributions for Covered Workers with Single Coverage, by Firm Size, 1999-2016



SOURCE:

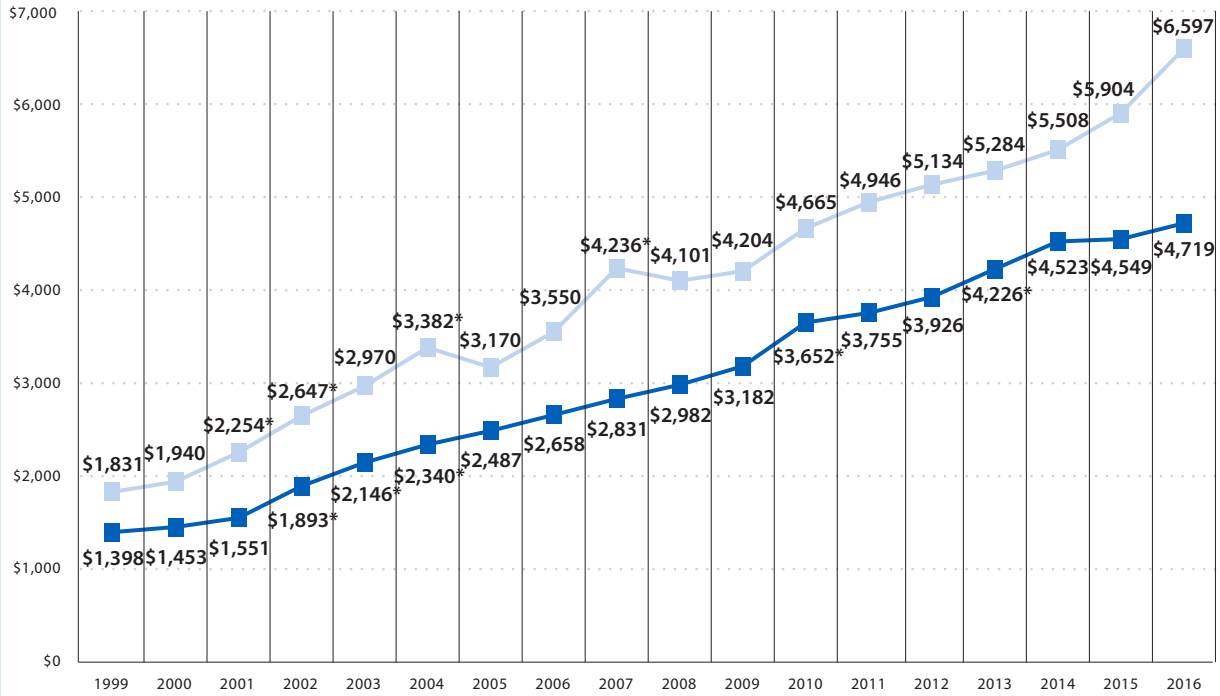
Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2016.

* Estimate is statistically different from estimate for the previous year shown (p < .05).

- ALL SMALL FIRMS (3-199 WORKERS)
- ALL LARGE FIRMS (200 OR MORE WORKERS)

EXHIBIT 6.9

Average Annual Worker Contributions for Covered Workers with Family Coverage, by Firm Size, 1999-2016



SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2016.

* Estimate is statistically different from estimate for the previous year shown (p < .05).

- ALL SMALL FIRMS (3-199 WORKERS)
- ALL LARGE FIRMS (200 OR MORE WORKERS)

EXHIBIT 6.10

Average Annual Worker Premium Contributions Paid by Covered Workers for Single and Family Coverage, by Firm Size, 1999-2016

	Single Coverage		Family Coverage	
	All Small Firms (3-199 Workers)	All Large Firms (200 or More Workers)	All Small Firms (3-199 Workers)	All Large Firms (200 or More Workers)
1999	\$286	\$334	\$1,831*	\$1,398*
2000	\$280*	\$363*	\$1,940*	\$1,453*
2001	\$306*	\$380*	\$2,254*	\$1,551*
2002	\$406*	\$495*	\$2,647*	\$1,893*
2003	\$450	\$536	\$2,970*	\$2,146*
2004	\$513	\$578	\$3,382*	\$2,340*
2005	\$556	\$638	\$3,170*	\$2,487*
2006	\$515*	\$689*	\$3,550*	\$2,658*
2007	\$561*	\$759*	\$4,236*	\$2,831*
2008	\$624*	\$769*	\$4,101*	\$2,982*
2009	\$625*	\$854*	\$4,204*	\$3,182*
2010	\$865	\$917	\$4,665*	\$3,652*
2011	\$762*	\$996*	\$4,946*	\$3,755*
2012	\$848*	\$1,001*	\$5,134*	\$3,926*
2013	\$862*	\$1,065*	\$5,284*	\$4,226*
2014	\$902*	\$1,160*	\$5,508*	\$4,523*
2015	\$899*	\$1,146*	\$5,904*	\$4,549*
2016	\$1,021*	\$1,176*	\$6,597*	\$4,719*

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2016.

* Estimate is statistically different between All Small Firms and All Large Firms within year ($p < .05$).

EXHIBIT 6.11

Average Annual Firm and Worker Premium Contributions and Total Premiums for Covered Workers for Single Coverage, by Plan Type and Firm Size, 2016

	Worker Contribution	Employer Contribution	Total Premium
HMO			
All Small Firms (3-199 Workers)	\$1,391	\$5,309	\$6,700
All Large Firms (200 or More Workers)	\$1,113	\$5,400	\$6,513
PPO			
All Small Firms (3-199 Workers)	\$1,059*	\$5,532	\$6,590
All Large Firms (200 or More Workers)	\$1,296*	\$5,574	\$6,870
POS			
All Small Firms (3-199 Workers)	\$877	\$5,258	\$6,136
All Large Firms (200 or More Workers)	\$1,248	\$5,575	\$6,823
HDHP/SO			
All Small Firms (3-199 Workers)	\$830	\$5,386*	\$6,215*
All Large Firms (200 or More Workers)	\$986	\$4,604*	\$5,590*
ALL PLANS			
All Small Firms (3-199 Workers)	\$1,021*	\$5,408	\$6,429
All Large Firms (200 or More Workers)	\$1,176*	\$5,261	\$6,438

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimates are statistically different within plan type between All Small Firms and All Large Firms ($p < .05$).

EXHIBIT 6.12

Average Annual Firm and Worker Premium Contributions and Total Premiums for Covered Workers for Family Coverage, by Plan Type and Firm Size, 2016

	Worker Contribution	Employer Contribution	Total Premium
HMO			
All Small Firms (3-199 Workers)	\$7,526*	\$9,756*	\$17,282
All Large Firms (200 or More Workers)	\$4,345*	\$13,972*	\$18,318
PPO			
All Small Firms (3-199 Workers)	\$6,731*	\$11,406*	\$18,137
All Large Firms (200 or More Workers)	\$5,193*	\$14,090*	\$19,283
POS			
All Small Firms (3-199 Workers)	\$7,461	\$10,100*	\$17,561
All Large Firms (200 or More Workers)	\$5,657	\$13,886*	\$19,543
HDHP/SO			
All Small Firms (3-199 Workers)	\$5,249*	\$11,560	\$16,809
All Large Firms (200 or More Workers)	\$3,928*	\$12,781	\$16,709
ALL PLANS			
All Small Firms (3-199 Workers)	\$6,597*	\$10,949*	\$17,546*
All Large Firms (200 or More Workers)	\$4,719*	\$13,676*	\$18,395*

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimates are statistically different within plan type between All Small Firms and All Large Firms ($p < .05$).

EXHIBIT 6.13

Average Monthly and Annual Worker Premium Contributions Paid by Covered Workers for Single and Family Coverage, by Plan Type and Firm Size, 2016

	Monthly		Annual	
	Single Coverage	Family Coverage	Single Coverage	Family Coverage
HMO				
All Small Firms (3-199 Workers)	\$116	\$627*	\$1,391	\$7,526*
All Large Firms (200 or More Workers)	93	362*	1,113	4,345*
ALL FIRM SIZES	\$101	\$449	\$1,207	\$5,389
PPO				
All Small Firms (3-199 Workers)	\$88*	\$561*	\$1,059*	\$6,731*
All Large Firms (200 or More Workers)	108*	433*	1,296*	5,193*
ALL FIRM SIZES	\$103	\$464	\$1,237	\$5,569
POS				
All Small Firms (3-199 Workers)	\$73	\$622	\$877	\$7,461
All Large Firms (200 or More Workers)	104	471	1,248	5,657
ALL FIRM SIZES	\$84	\$566	\$1,011	\$6,791
HDHP/SO				
All Small Firms (3-199 Workers)	\$69	\$437*	\$830	\$5,249*
All Large Firms (200 or More Workers)	82	327*	986	3,928*
ALL FIRM SIZES	\$79	\$357	\$943	\$4,289
ALL PLANS				
All Small Firms (3-199 Workers)	\$85*	\$550*	\$1,021*	\$6,597*
All Large Firms (200 or More Workers)	98*	393*	1,176*	4,719*
ALL FIRM SIZES	\$94	\$440	\$1,129	\$5,277

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimates are statistically different within plan and coverage types between All Small Firms and All Large Firms ($p < .05$).

EXHIBIT 6.14

Average Monthly and Annual Worker Premium Contributions Paid by Covered Workers for Single and Family Coverage, by Plan Type and Region, 2016

	Monthly		Annual	
	Single Coverage	Family Coverage	Single Coverage	Family Coverage
HMO				
Northeast	\$129*	\$417	\$1,544*	\$5,007
Midwest	127*	490	1,523*	5,876
South	111	473	1,335	5,672
West	76*	444	917*	5,325
ALL REGIONS	\$101	\$449	\$1,207	\$5,389
PPO				
Northeast	\$121*	\$444	\$1,455*	\$5,324
Midwest	120*	443	1,445*	5,316
South	94*	482	1,123*	5,782
West	84*	469	1,010*	5,625
ALL REGIONS	\$103	\$464	\$1,237	\$5,569
POS				
Northeast	\$100	\$507	\$1,201	\$6,078
Midwest	84	626	1,006	7,510
South	87	609	1,045	7,309
West	67	497	808	5,965
ALL REGIONS	\$84	\$566	\$1,011	\$6,791
HDHP/SO				
Northeast	\$79	\$322	\$953	\$3,862
Midwest	90	361	1,081	4,332
South	85	352	1,018	4,220
West	54*	406	654*	4,876
ALL REGIONS	\$79	\$357	\$943	\$4,289
ALL PLANS				
Northeast	\$106*	\$400*	\$1,267*	\$4,805*
Midwest	108*	439	1,300*	5,262
South	93	457	1,111	5,482
West	73*	448	871*	5,372
ALL REGIONS	\$94	\$440	\$1,129	\$5,277

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimate is statistically different within plan and coverage type from estimate for all other firms not in the indicated region ($p < .05$).

EXHIBIT 6.15

Average Annual Premium Contribution Paid by Covered Workers for Single and Family Coverage, by Firm Characteristics, 2016

	Single Coverage	Family Coverage
Lower-Wage Level		
Less Than 35% Earn \$23,000 a Year or Less	\$1,115*	\$5,221
35% or More Earn \$23,000 a Year or Less	\$1,322*	\$6,081
Higher-Wage Level		
Less Than 35% Earn \$59,000 a Year or More	\$1,149	\$5,788*
35% or More Earn \$59,000 a Year or More	\$1,111	\$4,824*
Unions		
Firm Has At Least Some Union Workers	\$1,133	\$4,264*
Firm Does Not Have Any Union Workers	\$1,127	\$5,800*
Younger Workers		
Less Than 35% of Workers Are Age 26 or Younger	\$1,122	\$5,224
35% or More Workers Are Age 26 or Younger	\$1,199	\$5,832
Older Workers		
Less Than 35% of Workers Are Age 50 or Older	\$1,118	\$5,445
35% or More Workers Are Age 50 or Older	\$1,142	\$5,077
Funding Arrangement		
Fully Insured	\$1,077	\$6,302*
Self-Funded	\$1,163	\$4,637*
Firm Ownership		
Private For-Profit	\$1,191*	\$5,389
Public	\$782*	\$4,490*
Private Not-For-Profit	\$1,218	\$5,566
ALL FIRMS	\$1,129	\$5,277

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimates are statistically different from each other within firm size category ($p < .05$).

EXHIBIT 6.16

Distribution of Worker Premium Contributions for Single and Family Coverage Relative to the Average Annual Worker Premium Contribution, 2016

Premium Contribution Range, Relative to Average Premium Contribution	Single Coverage		Family Coverage	
	Premium Contribution Range, Dollar Amount	Percentage of Covered Workers in Range	Premium Contribution Range, Dollar Amount	Percentage of Covered Workers in Range
Less than 60%	Less than \$678	29%	Less than \$3,166	27%
60% to Less than 80%	\$678 to <\$903	12%	\$3,166 to <\$4,222	14%
80% to Less than Average	\$903 to <\$1,129	11%	\$4,222 to <\$5,277	18%
Average to Less than 120%	\$1,129 to <\$1,355	14%	\$5,277 to <\$6,332	14%
120% to Less than 140%	\$1,355 to <\$1,581	10%	\$6,332 to <\$7,388	6%
140% or More	\$1,581 or More	24%	\$7,388 or More	21%

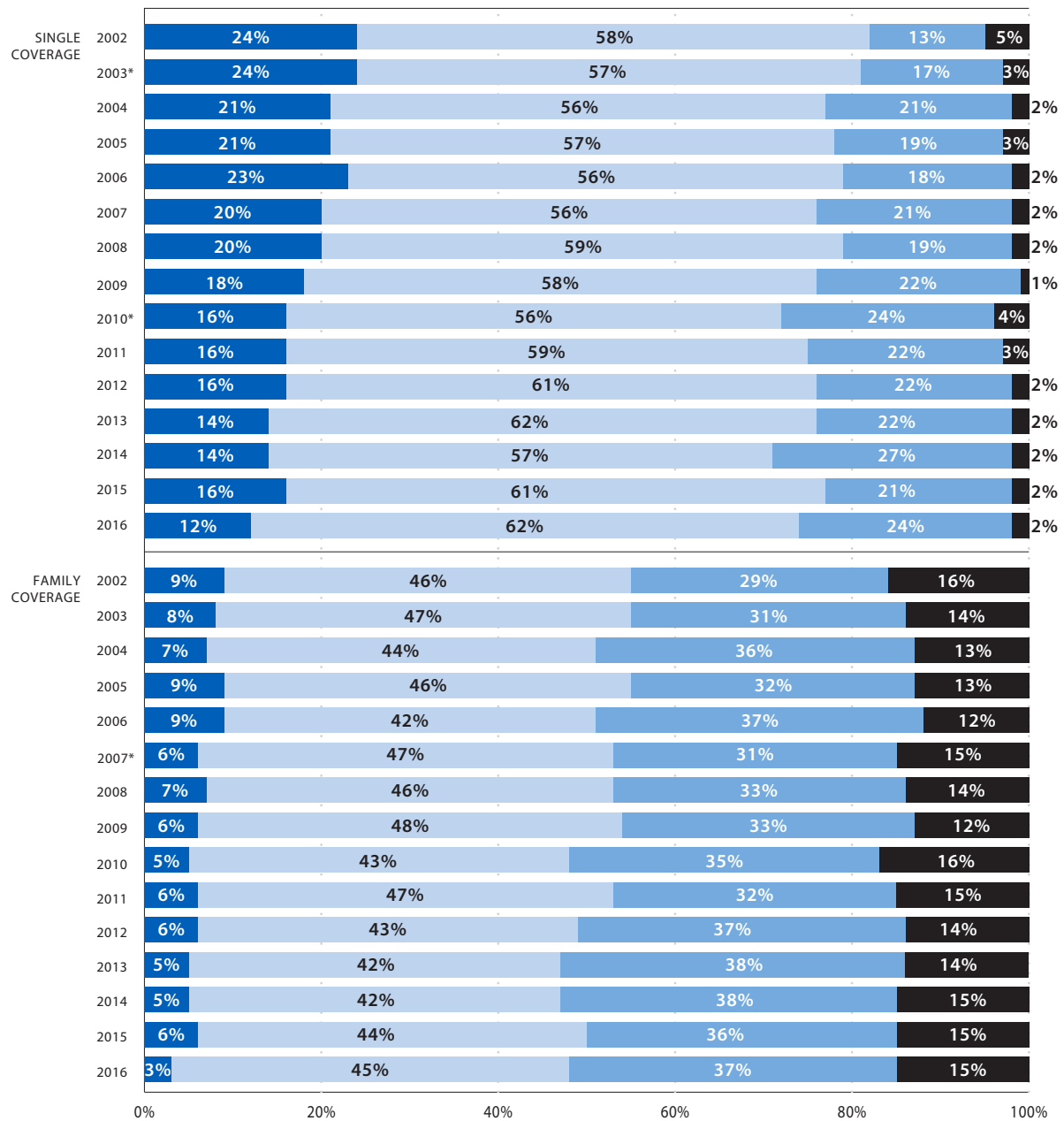
SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

Note: The average annual worker contribution is \$1,129 for single coverage and \$5,277 for family coverage. The worker contribution distribution is relative to the average single or family worker contribution. For example, \$903 is 80% of the average single worker contribution and \$1,355 is 120% of the average single worker contribution. The same break points relative to the average are used for the distribution for family coverage.

EXHIBIT 6.17

Distribution of Percentage of Premium Paid by Covered Workers for Single and Family Coverage, 2002-2016



SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2002-2016.

* Distribution is statistically different within coverage type from distribution for the previous year shown (p < .05).

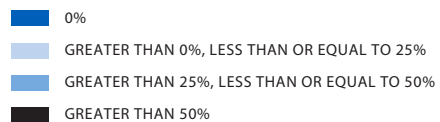
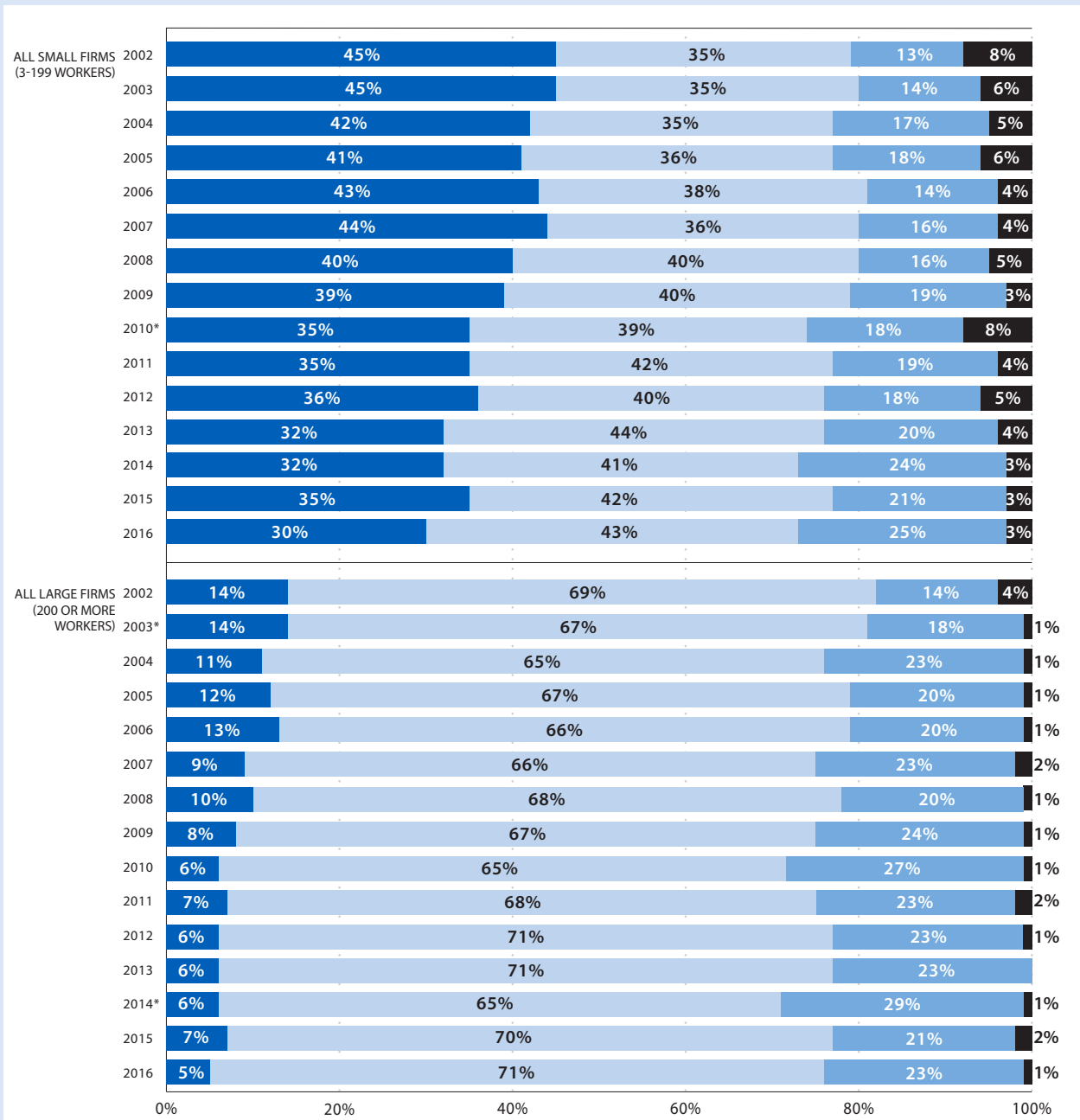


EXHIBIT 6.18

Distribution of Percentage of Premium Paid by Covered Workers for Single Coverage, by Firm Size, 2002-2016



SOURCE:

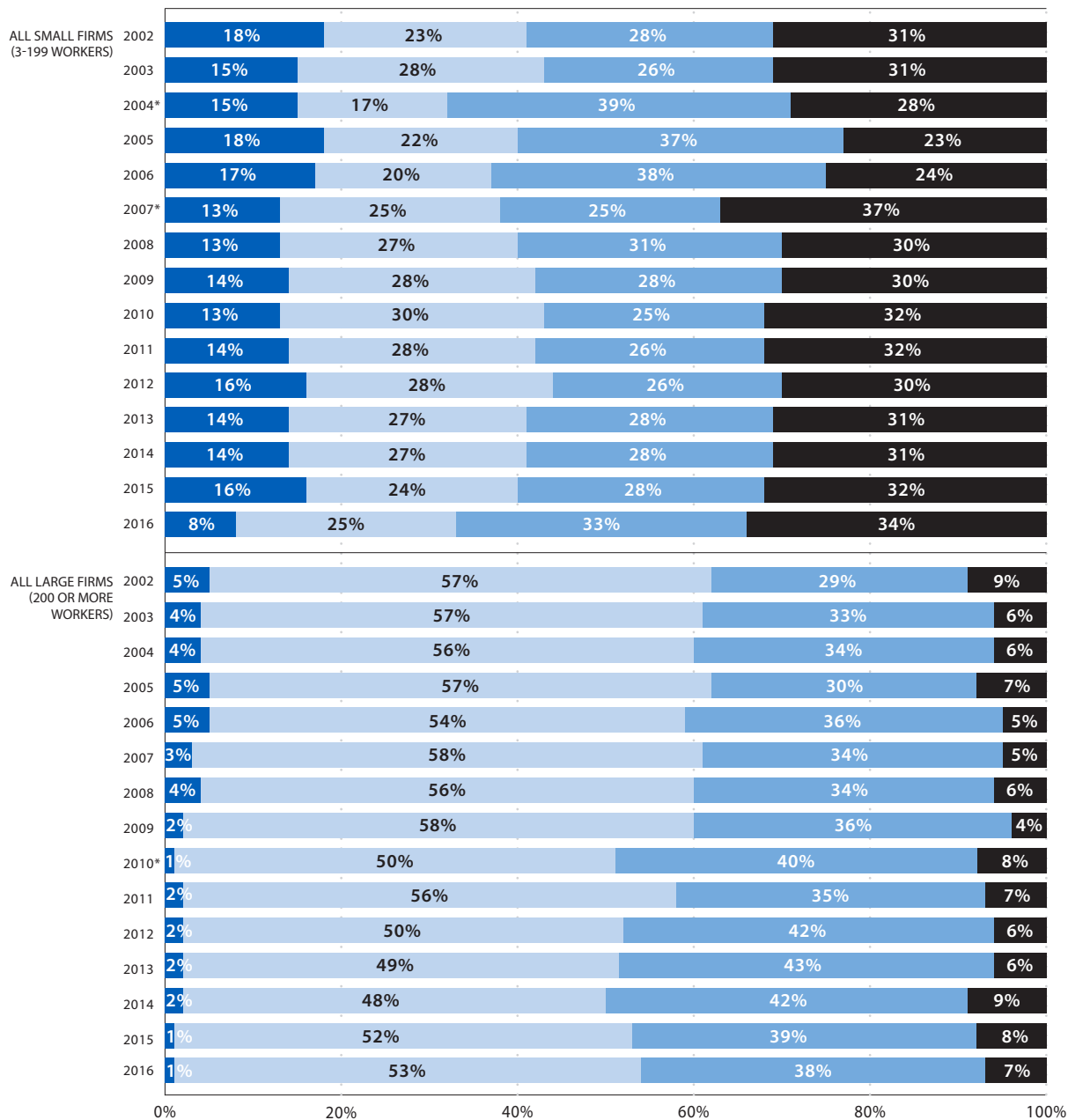
Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2002-2016

* Distribution is statistically different within firm size from distribution for the previous year shown (p < .05).

- 0%
- GREATER THAN 0%, LESS THAN OR EQUAL TO 25%
- GREATER THAN 25%, LESS THAN OR EQUAL TO 50%
- GREATER THAN 50%

EXHIBIT 6.19

Distribution of Percentage of Premium Paid by Covered Workers for Family Coverage, by Firm Size, 2002-2016



SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2002-2016.

* Distribution is statistically different within firm size from distribution for the previous year shown (p < .05).

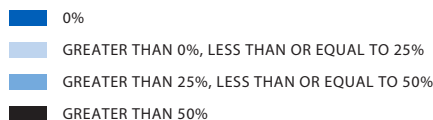
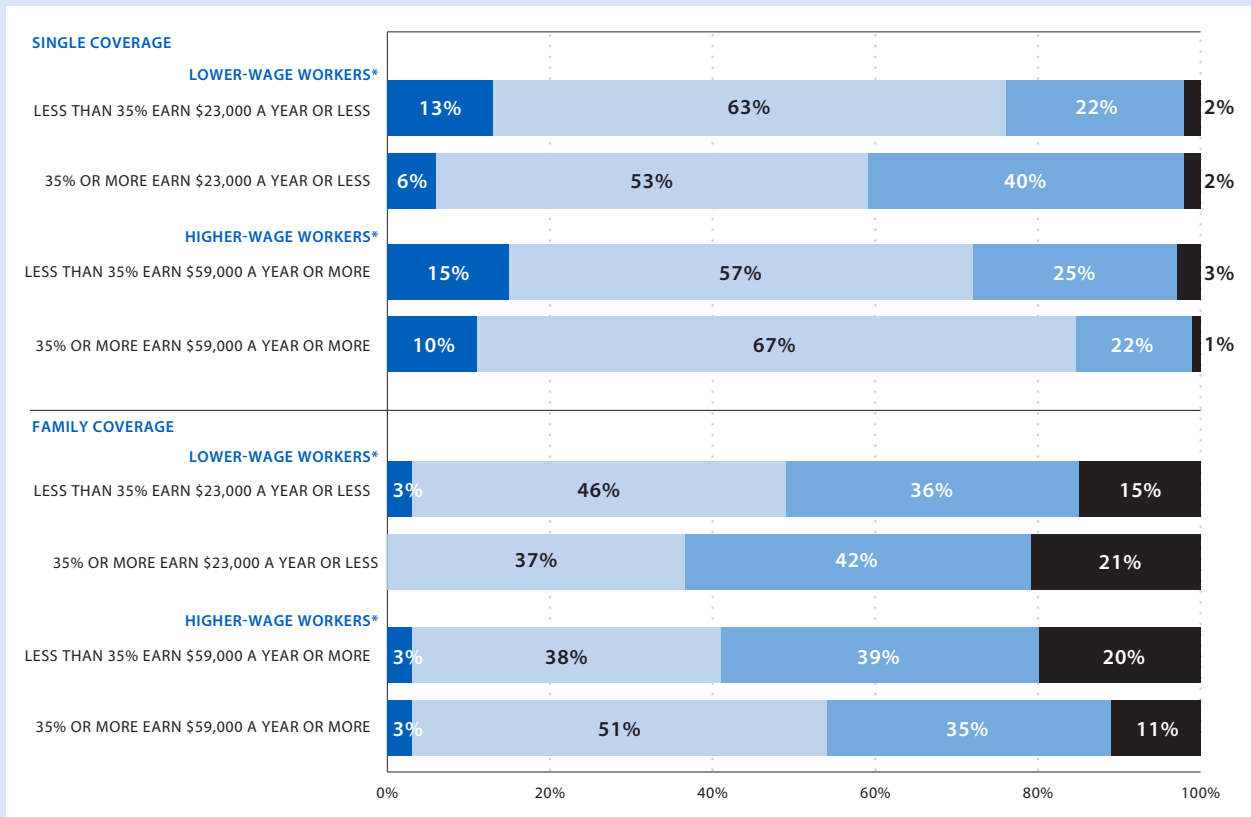


EXHIBIT 6.20

Distribution of the Percentage of Total Premium Paid by Covered Workers for Single and Family Coverage, by Firm Wage Level, 2016



SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

*Distributions for higher wage and lower wage firms are statistically different within coverage type (p < .05).

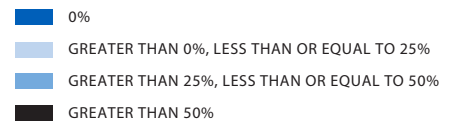


EXHIBIT 6.21

Average Percentage of Premium Paid by Covered Workers for Single Coverage, by Firm Characteristics and Size, 2016

	All Small Firms (3-199 Workers)	All Large Firms (200 or More Workers)	All Firms
Lower-Wage Level			
Less Than 35% Earn \$23,000 a Year or Less	17%	18%*	18%*
35% or More Earn \$23,000 a Year or Less	21%	24%*	23%*
Higher-Wage Level			
Less Than 35% Earn \$59,000 a Year or More	17%	20%*	19%
35% or More Earn \$59,000 a Year or More	18%	17%*	18%
Unions			
Firm Has At Least Some Union Workers	16%	18%	18%
Firm Does Not Have Any Union Workers	17%	19%	18%
Younger Workers			
Less Than 35% of Workers Are Age 26 or Younger	17%	18%	18%
35% or More Workers Are Age 26 or Younger	17%	21%	20%
Older Workers			
Less Than 35% of Workers Are Age 50 or Older	18%	19%	19%
35% or More Workers Are Age 50 or Older	16%	18%	17%
Funding Arrangement			
Fully Insured	17%	19%	18%
Self-Funded	17%	18%	18%
Firm Ownership			
Private For-Profit	19%*	21%*	20%*
Public	8%*	12%*	11%*
Private Not-For-Profit	12%*	20%	18%
ALL FIRMS	17%	19%	18%

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimates are statistically different from each other within firm size category ($p < .05$).

EXHIBIT 6.22

Average Percentage of Premium Paid by Covered Workers for Family Coverage, by Firm Characteristics and Size, 2016

	All Small Firms (3-199 Workers)	All Large Firms (200 or More Workers)	All Firms
Lower-Wage Level			
Less Than 35% Earn \$23,000 a Year or Less	40%	25%*	30%*
35% or More Earn \$23,000 a Year or Less	38%	33%*	35%*
Higher-Wage Level			
Less Than 35% Earn \$59,000 a Year or More	42%	28%*	33%*
35% or More Earn \$59,000 a Year or More	35%	24%*	27%*
Unions			
Firm Has At Least Some Union Workers	34%	22%*	23%*
Firm Does Not Have Any Union Workers	40%	29%*	34%*
Younger Workers			
Less Than 35% of Workers Are Age 26 or Younger	39%	25%*	29%*
35% or More Workers Are Age 26 or Younger	44%	31%*	34%*
Older Workers			
Less Than 35% of Workers Are Age 50 or Older	43%*	27%	32%*
35% or More Workers Are Age 50 or Older	35%*	24%	28%*
Funding Arrangement			
Fully Insured	40%	30%*	37%*
Self-Funded	35%	25%*	26%*
Firm Ownership			
Private For-Profit	41%	26%	31%*
Public	32%	25%	26%*
Private Not-For-Profit	37%	27%	29%
ALL FIRMS	39%	26%	30%

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimates are statistically different from each other within firm size category ($p < .05$).

EXHIBIT 6.23

Average Percentage of Premium Paid by Covered Workers for Single and Family Coverage, by Plan Type and Firm Size, 2016

	Single Coverage	Family Coverage
HMO		
All Small Firms (3-199 Workers)	22%	46%*
All Large Firms (200 or More Workers)	18%	24%*
ALL FIRM SIZES	19%	31%
PPO		
All Small Firms (3-199 Workers)	17%	39%*
All Large Firms (200 or More Workers)	19%	27%*
ALL FIRM SIZES	19%	30%
POS		
All Small Firms (3-199 Workers)	17%	43%*
All Large Firms (200 or More Workers)	19%	31%*
ALL FIRM SIZES	18%	38%
HDHP/SO		
All Small Firms (3-199 Workers)	14%	33%*
All Large Firms (200 or More Workers)	18%	23%*
ALL FIRM SIZES	17%	26%
ALL PLANS		
All Small Firms (3-199 Workers)	17%	39%*
All Large Firms (200 or More Workers)	19%	26%*
ALL FIRM SIZES	18%	30%

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimates are statistically different within plan and coverage types between All Small Firms and All Large Firms ($p < .05$).

EXHIBIT 6.24

Average Percentage of Premium Paid by Covered Workers for Single and Family Coverage, by Plan Type and Region, 2016

	Single Coverage	Family Coverage
HMO		
Northeast	22%	27%
Midwest	26*	39
South	22	31
West	15*	32
ALL REGIONS	19%	31%
PPO		
Northeast	20%	26%*
Midwest	22*	28
South	18	34*
West	15*	30
ALL REGIONS	19%	30%
POS		
Northeast	20%	33%
Midwest	17	40
South	19	44
West	14	32
ALL REGIONS	18%	38%
HDHP/SO		
Northeast	18%	24%
Midwest	19	26
South	17	25
West	12*	29
ALL REGIONS	17%	26%
ALL PLANS		
Northeast	20%	26%*
Midwest	21*	29
South	18	32*
West	14*	31
ALL REGIONS	18%	30%

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimate is statistically different within plan and coverage type from estimate for all other firms not in the indicated region ($p < .05$).

EXHIBIT 6.25

Average Percentage of Premium Paid by Covered Workers, by Plan Type and Industry, 2016

	Single Coverage	Family Coverage
HMO		
Agriculture/Mining/Construction	NSD	NSD
Manufacturing	23%	40%
Transportation/Communications/Utilities	18	20*
Wholesale	NSD	NSD
Retail	12	18
Finance	18	31
Service	21	33
State/Local Government	NSD	NSD
Health Care	20	40
ALL INDUSTRIES	19%	31%
PPO		
Agriculture/Mining/Construction	22%	36%
Manufacturing	22*	27*
Transportation/Communications/Utilities	17	23*
Wholesale	22	31
Retail	21	29
Finance	16	28
Service	19	34*
State/Local Government	13*	27
Health Care	18	31
ALL INDUSTRIES	19%	30%
POS		
Agriculture/Mining/Construction	NSD	NSD
Manufacturing	NSD	NSD
Transportation/Communications/Utilities	NSD	NSD
Wholesale	NSD	NSD
Retail	NSD	NSD
Finance	NSD	NSD
Service	13%	32%
State/Local Government	NSD	NSD
Health Care	22	44
ALL INDUSTRIES	18%	38%

Continued on next page

EXHIBIT 6.25 *Continued from previous page*

Average Percentage of Premium Paid by Covered Workers, by Plan Type and Industry, 2016

	Single Coverage	Family Coverage
HDHP/SO		
Agriculture/Mining/Construction	NSD	NSD
Manufacturing	15%	22%
Transportation/Communications/Utilities	14	19*
Wholesale	18	38
Retail	25*	33
Finance	20	24
Service	17	28
State/Local Government	6*	16*
Health Care	14	28
ALL INDUSTRIES	17%	26%
ALL PLANS		
Agriculture/Mining/Construction	21%	33%
Manufacturing	20	27
Transportation/Communications/Utilities	16	22*
Wholesale	20	36
Retail	20	31
Finance	18	27
Service	19	32
State/Local Government	11*	23*
Health Care	18	33
ALL INDUSTRIES	18%	30%

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimate is statistically different within plan and coverage type from estimate for all other firms not in the indicated industry category ($p < .05$).

NSD: Not Sufficient Data.

EXHIBIT 6.26

Among Firms Offering Family Coverage, Percentage of Firms Using Various Approaches to Family Premium Contributions, by Firm Size, 2016

	Firm contributes the same dollar amount for family coverage as for single coverage	Firm contributes a larger dollar amount for family coverage than single coverage	Some other approach	Varies by class of employees
FIRM SIZE				
3-24 Workers	48%	42%	6%	4%
25-199 Workers	39	51	8	2
200-999 Workers	20*	65*	9	5
1,000-4,999 Workers	7*	78*	8	7
5,000 or More Workers	6*	75*	7	11*
All Small Firms (3-199 Workers)	45%*	45%*	7%	3%
All Large Firms (200 or More Workers)	18%*	67%*	9%	6%
ALL FIRMS	44%	46%	7%	3%

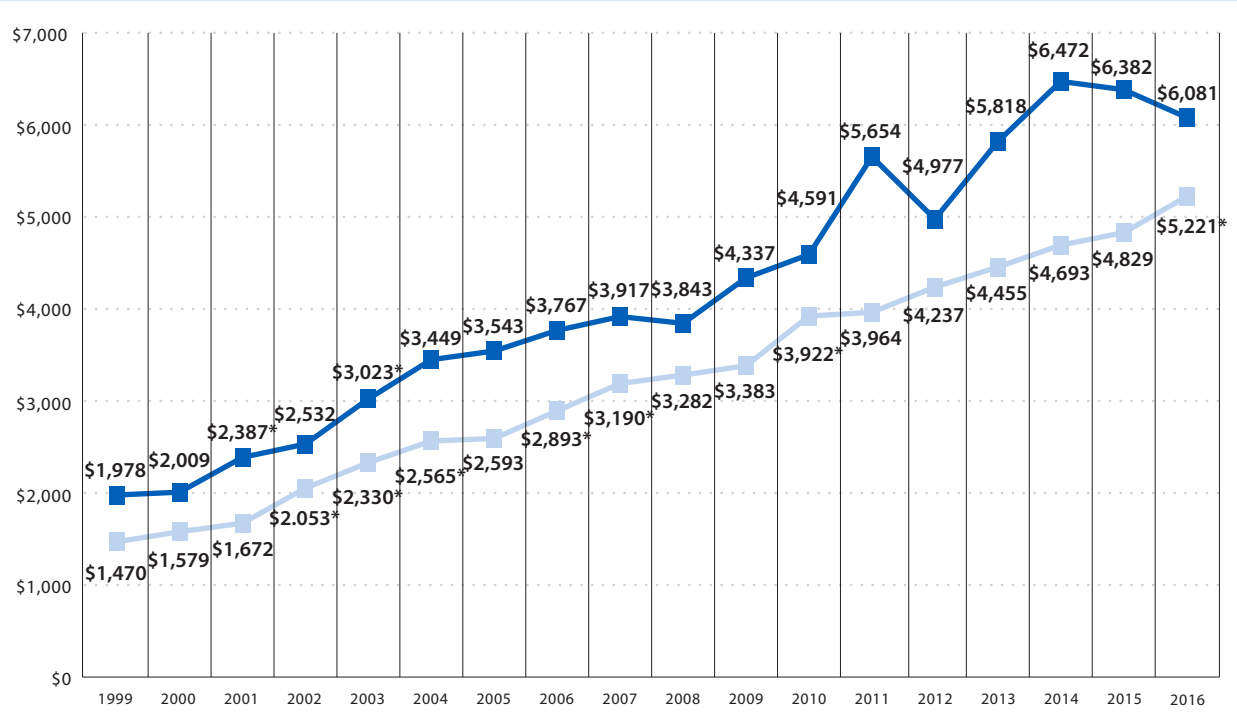
SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimate is statistically different within response selection from all other firms not in the indicated firm size category ($p < .05$).

EXHIBIT 6.27

Average Annual Worker Contributions for Covered Workers with Family Coverage, by Firm Wage Level, 1999-2016



SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999-2016.

*Estimate is statistically different from estimate for the previous year shown (p < .05).

NOTE: Lower wage level is defined as the 25th percentile of workers' earnings for the indicated year. Firms with many lower wage workers are those where 35% or more earn \$23,000 a year or less.

- LESS THAN 35% ARE LOWER-WAGE LEVEL
- 35% OR MORE ARE LOWER-WAGE LEVEL

EXHIBIT 6.28

Among Firms Offering Health Benefits, Percentage of Firms That Require Employees Who Use Tobacco to Contribute More to the Premium or Cost-Sharing, by Firm Size and Region, 2016

	Tobacco Users Contribute More to Premium or Cost-Sharing
FIRM SIZE	
All Small Firms (3-199 Workers)	14%
All Large Firms (200 or More Workers)	16%
REGION	
Northeast	4%*
Midwest	24
South	16
West	12
ALL FIRMS	15%

SOURCE:

Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 2016.

* Estimate is statistically different within response selection from all other firms not in the indicated firm size or region ($p > .05$).

Note: Four percent of firms offering health benefits self-reported that not smoking is a condition of employment.