TABLE OF CONTENTS

DRAFT 5/02/2011

6.0 WATER DEMAND MANAGEMENT INFORMATION

The Local and Regional Water Supply Planning Regulation (9 VAC 25-780-110) requires the Plan to address conservation as a part of overall water demand management in accordance with practices for more efficient water use, water conservation measures through reduction of use, and practices to reduce water loss.[1] Water conservation as part of overall water demand management for the MRPDC, Cumberland Plateau, and LENOWISCO regions is described in the following sections.

Information on water demand management was obtained in large measure through a written survey of the communities and water suppliers in the MRPDC, Cumberland Plateau, and LENOWISCO regions. For the Cumberland Plateau region, the survey was reviewed with representatives of water suppliers during a regional water round table meeting with water suppliers, hosted by the Planning District Commission (PDC). Surveys were completed at the meeting by the localities in attendance. Other localities in the planning area were contacted by phone or received a copy of the survey. For the LENOWISCO region, the survey was reviewed with representatives of water suppliers during a meeting with water suppliers and local officials. The majority of the surveys were completed during the meeting and the remainder was returned within a week. A follow-up survey was distributed to address additional aspects of water demand management.

Please note that the survey responses reflect the water suppliers' and localities' interpretations of the survey questions. Where possible, responses were reviewed and validated with existing data or known practices.

6.1 Practices for More Efficient Use

As required by 9 VAC 25-780-110, the Plan includes information that describes practices for more efficient use of water that are used within the region. The type of measures described may include, but are not limited to, the adoption and enforcement of the Virginia Uniform Statewide Building Code (VUSBC) sections that limit maximum flow of water closets, urinals and

[1] 9 VAC 25-780-110 A.

DRAFT 5/02/2011

appliances; use of low-water use landscaping; and increases in irrigation efficiency. This section describes current practices in the region for more efficient water use.

6.1.1 Building Codes

The VUSBC is a state regulation promulgated by the Virginia Board of Housing and Community Development (Board). The Board is appointed by the Governor of Virginia for the purpose of establishing minimum regulations to govern the construction and maintenance of buildings and structures. The provisions of the VUSBC are based on nationally recognized building and fire codes published by the International Code Council, Inc. The 2003 editions of the International Codes are incorporated by reference into the VUSBC.

6.1.1.1 MRPDC

The following jurisdictions in the region have adopted the VUSBC: the City of Bristol; the counties of Bland, Carroll, Grayson, Smyth, Washington, and Wythe; and the towns of Abingdon, Damascus, Fries, Glade Spring, Hillsville, Independence, Marion, Rural Retreat, Saltville, and Troutdale. The VUSBC requires 1.6 gallon-per-flush toilets and limits the maximum allowable flow rates for showerheads and faucets to 1.5 gallons-per-minute. The codes are enforced by each County's Building Official. In addition, each County enforces the codes in the towns within the County.

6.1.1.2 Cumberland Plateau

One locality in the planning area reported having approved an ordinance that adopted the VUSBC sections that limit maximum flow of water closets, urinals, and appliances.

Adoption of building code sections may not lead to more efficient use of water. For example, a recent article on plumbing codes and water efficiency noted that showerheads are limited to 2.5 gpm under the federal Energy Policy Act; however, the regulation does not limit the number of showerheads installed in any one shower, and multiple showerhead systems are reported as the fastest-growing trend in the home building industry.[2]

[2] Pape, Thomas E., "Plumbing codes and water efficiency: What's a water utility to do?" *Journal American Water Works Association, 100 (5),* pages 101-103, 2008.

DRAFT 5/02/2011

6.1.1.3 LENOWISCO

Two towns in the planning area reported having approved an ordinance that adopted the VUSBC sections that limit maximum flow of water closets, urinals, and appliances. Both localities implement the building codes through the County Building Official.

Adoption of building code sections may not lead to more efficient use of water. For example, a recent article on plumbing codes and water efficiency noted that showerheads are limited to 2.5 gpm under the federal Energy Policy Act; however, the regulation does not limit the number of showerheads installed in any one shower, and multiple showerhead systems are reported as the fastest-growing trend in the home building industry. [2]

6.1.2 Other Practices for Water Use Efficiency

6.1.2.1 MRPDC

In addition to adopting the VUSBC, the WCSA and Town of Saltville implement additional water use practices for more efficient water use. The WCSA implements a block rate structure, which increases with water use, and does not offer irrigation credits for sewer service requiring irrigators to invest in irrigation meters. The Town of Saltville has an ongoing Leak Detection Analysis Plan. The Town of Saltville did not provide a copy of this plan; therefore, specific details regarding the plan are not available at this time. There are no other ordinances or policies in place regarding more efficient water use for the City of Bristol; the counties of Bland, Carroll, Grayson, and Wythe; or the towns of Fries, Independence, and Rural Retreat.

6.1.2.2 Cumberland Plateau

1. Adoption of ordinances for water efficient landscaping.

   None known.

2. Policies by Homeowner's Associations regarding use of low-water use landscaping.

   None known.

3. Adoption of ordinances that declare wasteful water use to be unlawful.

   None known.

DRAFT 5/02/2011

4. Implementation of practices to increase irrigation efficiency.

   All responding water suppliers in the region indicated that they require residential customers to be metered. No water suppliers reported that sewer credits were offered during irrigation months.

5. Implementation by water suppliers of water use efficiency measures.

   None known. This is not meant to imply that water suppliers are inefficient in the use of water. Their water use is focused on core competencies of water purification and distribution, for which most operations are guided primarily by public health concerns.

6. Partnership by water suppliers in the WaterSense program.

   None known.

7. Partnership by landscape irrigation professionals in the WaterSense program.

   None known.

6.1.2.3 LENOWISCO

1. Adoption of ordinances for water efficient landscaping.

   None known.

2. Policies by Homeowner's Associations regarding use of low-water use landscaping.

   None known.

3. Adoption of ordinances that declare wasteful water use to be unlawful.

   One locality reported adoption of an ordinance that declares wasteful water use to be unlawful. The ordinances stipulate that water service may be discontinued after five days notice if the wasteful water use is not corrected.

DRAFT 5/02/2011

4. Implementation of water practices to increase irrigation efficiency.

   Nearly all water suppliers in the region indicated that they require customers to be metered. Water from public water suppliers in the planning area used for irrigation is metered. Most water suppliers do not offer sewer credits during irrigation months.

5. Implementation by water suppliers of water use efficiency measures.

   None known. This is not meant to imply that the water suppliers are inefficient in the use of water. Their water use is focused on core competencies of water purification and distribution for which most operations are primarily guided by public health concerns.

6. Partnership by water suppliers in the WaterSense program.

   None known.

7. Partnership by landscape irrigation professionals in the WaterSense program.

   None known.

6.2 Water Conservation Measures through Reduction of Use

As required by 9 VAC 25-780-110, the Plan includes information describing the water conservation measures used within the region to conserve water through the reduction of use. The types of measures described may include, but are not limited to, technical, educational and financial programs. This section describes current water conservation measures in the region through reduction of use. Water conservation information describes measures to reduce water use within the planning area over the long-term. These measures do not include short-term water supply emergency practices or shortage practices.

6.2.1 Technical Programs

6.2.1.1 MRPDC

The following have adopted ordinances or have technical programs in place to address water conservation practices through reduction of use: Bland County, Wythe County, Town of Hillsville, Town of Marion, and the WCSA. Technical programs to address water conservation

DRAFT 5/02/2011

through reduction of use include, but are not limited to, adjusting standard operating procedures to improve water conservation and installation of low-flow and/or no-flow fixtures (faucets, showers, urinals) in facilities or in local government buildings/facilities to improve water savings to the locality through reduction of use.

In 2004, Bland County installed low-flow and/or no-flow fixtures in local government buildings/facilities. Wythe County adopted an ordinance (No. 1996-4) to address water conservation practices through reduction of use. A copy of the ordinance was not provided and specific details are not available at this time.

On October 22, 1986, the Town of Hillsville adopted ordinance number 167-40 to address water conservation through the reduction of use as well as to address water emergencies. In addition, the Town of Hillsville amended their standard operating procedures for filter backwash to improve water conservation. Filter wash cycles are as long as possible while still meeting VDH requirements. Finally, the Town of Hillsville installed low-flow urinals in their WTP as well as the Town Hall.

In the Town of Marion, contractors install low-flow or no-flow fixtures in all new construction in the area. In addition, Marion has upgraded the majority of toilets and shower heads in local government buildings to low-flow fixtures.

While Washington County has not adopted an ordinance to address water conservation practices through reduction of use, the WCSA identified approximately 200 miles of galvanized pipe in their distribution system as a significant source of non-revenue or unaccounted for water. The WCSA believes that the galvanized pipe accounts for approximately half of their 37 percent non-revenue water and proposes to replace the pipe by or before the year 2020. In addition, the WCSA amended their standard operating procedures for filter backwash in their water production facilities to improve water conservation and installed low-flow and/or no-flow fixtures in all facilities.

Carroll County, Smyth County, City of Bristol, City of Galax, Town of Fries, Town of Independence, Town of Rural Retreat, Town of Saltville, and the Town of Wytheville currently

DRAFT 5/02/2011

do not have technical programs in place to address water conservation through the reduction of use.

6.2.1.2 Cumberland Plateau

1. Ordinances in place that address water conservation practices through reduction of use.

   None known.

2. Alteration of water suppliers' standard operating procedures to improve conservation.

   None known. Many standard operating procedures used by water suppliers have been implemented with a primary goal of protection of public health. This includes regulatory guidelines for backwashing filters, recycle of flow, and maintenance of disinfectant residual within the distribution system.

3. Installation of low-flow or no-flow faucets, showers, or urinals in water suppliers' facilities that result in water savings through reduction of use.

   None known.

4. Installation of low-flow or no-flow faucets, showers, or urinals in local government facilities that result in water savings through reduction of use.

   None known.

5. Use of Clean Water State Revolving Funds (CWSRF) or Drinking Water State Revolving Funds (DWSRF) to upgrade or retrofit new or existing public facilities irrigation equipment, with a result of water savings through reduction of use.

   None known.

6. Existence of dual pipe distribution system to distribute reclaimed water for non-potable water use.

   None known. Most wastewater treatment facilities in the planning region utilize non-potable water for process operations at the facility.

DRAFT 5/02/2011

7. Availability of "yard taps" to customers to monitor outdoor water use.

   All residential service connections throughout the planning region are required by the water suppliers to be metered. The cost of water to the customer has resulted in customer-directed monitoring of water consumption for outdoor use.

   In most localities where sewer service is available, sewer billing is based on metered water consumption. In some cases, this is thought to have resulted in customer requests for separate meters for outdoor water use, to avoid sewer charges for usage that is not directed to the wastewater treatment facilities. In turn, outdoor water use is then monitored directly by the customer.

6.2.1.3 LENOWISCO

1. Ordinances in place that address water conservation practices through reduction of use.

   None known. All water conservation ordinances currently in place address water conservation measures for short-term water supply emergency or shortage practices.

2. Alteration of water suppliers' standard operating procedures to improve conservation.

   None known. Many standard operating procedures used by water suppliers have been implemented with a primary goal of protection of public health. This includes regulatory guidelines for backwashing filters, recycle of flow, and maintenance of disinfectant residual within the distribution system.

3. Installation of low-flow or no-flow faucets, showers, or urinals in local government facilities that result in water savings through reduction of use.

   None known.

4. Installation of low-flow or no-flow faucets, showers, or urinals in local government facilities that result in water savings through reduction of use.

   None known. One school renovation project in process has included infrared-sensor activated flush valves on urinals and water closets. These appliances do not explicitly

DRAFT 5/02/2011

reduce water use per flush; however, their use reduces damage to valves that result in leaking or "stuck" valves (with associated unnecessary water wastage). Approximately ten school buildings and government facilities in the planning region will be renovated or replaced in the next decade.

5. Use of CWSRF or DWSRF to upgrade or retrofit new or existing public facilities irrigation equipment, with a result of water savings through reduction of use.

   None known.

6. Existence of dual pipe distribution system to distribute reclaimed water for non-potable water use.

   None known. Most wastewater treatment facilities in the planning region utilize non-potable water for process operations at the facility.

7. Availability of "yard taps" to customers to monitor outdoor water use.

   Nearly all service connections throughout the planning region are required to be metered by the water suppliers. The cost of water to the customer has resulted in customer-directed monitoring of water consumption for outdoor use.

   In localities where sewer service is available, sewer billing is based on metered water consumption. This has led to customer requests for separate meters for outdoor water use, to avoid sewer charges for usage that is not directed to the wastewater treatment facilities. In turn, outdoor water use is then monitored directly by the customer.

6.2.2 Educational Programs

6.2.2.1 MRPDC

Bland County, Carroll County, Washington County, Wythe County, City of Bristol, City of Galax, Town of Damascus, Town of Fries, Town of Independence, Town of Hillsville, Town of Rural Retreat, Town of Saltville, and Town of Wytheville have not developed or implemented public education programs that address water conservation through reduction of use.

DRAFT 5/02/2011

6.2.2.2 Cumberland Plateau

Much of the educational effort in the planning region on water conservation has resulted due to recent drought conditions that impacted local suppliers and residents. Two water suppliers offer tours of water production facilities to the public. Seven localities/water suppliers include mailings sent with bills, and five issue special mailings as warranted. A number of localities reported including water information on their website as warranted. Two water suppliers offer water conservation information upon request. Four water providers issued press releases to educate consumers. Seven water suppliers reported existence of informal educational efforts.

6.2.2.3 LENOWISCO

Much of the educational effort in the planning region on water conservation has resulted from recent drought conditions that impacted local suppliers and residents.

Ten water suppliers offer tours of water production facilities to the public. Eight localities/water suppliers include mailings sent with bills, and eleven issue special mailings. The special mailings have addressed the impact of drought on water supplies, and the value of customer conservation efforts. Six localities include website information, addressing water conservation as warranted. Three water suppliers provide seminars for students, such as in-school or 4-H, during which water use is addressed. Three water suppliers offer water conservation information upon request. Five water suppliers reported existence of informal educational efforts.

6.2.3 Financial Programs

6.2.3.1 MRPDC

The WCSA and the Town of Hillsville currently implement financial programs to address water conservation through reduction of use. Financial programs include, but are not limited to, implementing a water conservation rate structure that encourages reduction of water use by increasing water rates with increasing water usage.

The WCSA implements a block rate pricing structure for customers. The WCSA billing structure allows the first 1,000 gallons of water per month for a minimum charge of $15.50. Consumption exceeding 1,000 gallons but less than 4,000 gallons is charged an additional $2.90 per thousand gallons and consumption exceeding 4,000 gallons is charged an additional $3.30

DRAFT 5/02/2011

per thousand gallons. The Town of Hillsville also implements a block rate pricing structure charging a higher rate for all usage of more than 100,000 gallons per month. Additional details on the Town's billing structure are not available at this time.

Bland County is in the process of developing and implementing a financial program to address water conservation through reduction of use. Carroll County, Wythe County, City of Bristol, City of Galax, Town of Damascus, Town of Fries, Town of Independence, Town of Rural Retreat, Town of Saltville, and Town of Wytheville have not developed or implemented financial programs that address water conservation through reduction of use.

6.2.3.2 Cumberland Plateau

1. Implementation of conservation rate structure (increasing water rate with increasing water use).

   None Known. All water suppliers in the planning region reported using a rate structure that had a uniform rate per volume consumed. The average residential water bill is significantly higher in the planning region than the state average. The average water bill within the planning region is $36.30 for 5,000 gallons usage per month. This amount is based on averaging the in-town and out-of-town rates reported by water suppliers in the planning district. By contrast, the average water bill within Virginia was $29.06 for 5,000 gallons usage per month (source: 19th Annual Water and Wastewater Rate Report, 2007, averaging the mean charges for inside and outside municipal rates).

   Additional practices in the planning area that address water conservation include rigorous termination of water services for non-payment, reported by all water suppliers. Termination of water most commonly occurs after a delinquency period exceeding thirty days.

2. Provisions of rebates or tax breaks to encourage reduced water use by customers.

   None known.

DRAFT 5/02/2011

3. Offering incentive programs to replace or retrofit water fixtures and appliances to reduce water use.

   None known.

6.2.3.3 LENOWISCO

1. Implementation of conservation rate structure (increasing water rate with increasing water use).

   No known. All water suppliers in the planning region reported using a rate structure that had a uniform rate per volume consumed. The average residential water bill is significantly higher in the planning region than the state average. The average water bill within the planning region is $30.69 for 4,200 gallons usage per month (source: LENOWISCO Planning District Commission Utility Rate Survey 2008, averaging the mean charges for in-town and out-of-town rates). By contrast, the average water bill within Virginia was $29.06 for 5,000 gallons usage per month (source: 19th Annual Water and Wastewater Rate Report, 2007, averaging the mean charges for inside and outside municipal rates).

   Additional practices in the planning area that address water conservation include rigorous termination of water services for non-payment, reported by sixteen of seventeen water suppliers. Twelve of the suppliers terminate service after a delinquency period of thirty days or shorter.

2. Offering incentive programs to replace or retrofit water fixtures and appliances to reduce water use.

   None known.

3. Provision of rebates or tax breaks to encourage reduced water use by customers.

   None known.

DRAFT 5/02/2011

6.3 Practices to Reduce Water Loss

As required by 9 VAC 25-780-110, the Plan includes information that describes practices to address water loss in the maintenance of water systems to reduce unaccounted for water loss. The types of items described may include, but are not limited to, leak detection and repair and old distribution line replacement. This section describes practices to reduce water loss in the region.

Water loss may be real (such as from a leak) or apparent (due to meter under registration, unauthorized consumption). Due to ambiguity in application of the term "unaccounted for water loss," the American Water Works Association Water Loss Committee defines water loss as the difference between volume of water input to the distribution system and the volume of authorized consumption (this is reviewed in the publication AWWA M36 Water Audits and Leak Detection). Water utilization may also be described as revenue water (the authorized consumption that is billed) and non-revenue water (unbilled authorized consumption, apparent losses, and real losses). All water is accounted for in either description.

6.3.1 Source and/or Service Connections

6.3.1.1 MRPDC

The following have source and service meter connections: Wythe County, Smyth County, the towns of Hillsville, Marion, Saltville, Troutdale, and Wytheville, and the WCSA. Wythe County reads both source and service meters on a monthly basis.

Smyth County reads source meters on a daily basis and all service meters are read automatically on a monthly basis. Smyth County has a meter replacement program in place and replaces approximately 10 percent of meters each year.

The Town of Hillsville reads source meters on a monthly basis and service meters on a bi-monthly basis. In addition, the Town of Hillsville is currently installing new touch read meters. The project is approximately 50 percent complete as of January 2008.

Service connection meters in the Town of Marion are read automatically on a monthly basis.

DRAFT 5/02/2011

The Town of Saltville reads both source and service meters on a monthly basis. If a defective meter or part is identified when the meter is read, then the meter or part is replaced immediately.

The Town of Troutdale reads source meters daily and service meters on a monthly basis. Meters are replaced on an as needed basis.

The Town of Wytheville reads source and service meters on a monthly basis and maintenance is completed as necessary. In addition, compound meters are tested once a year and all other meters upon request. Meters are replaced as needed or at least every 15 years.

The WCSA reads source meters daily and service meters are read automatically on a monthly basis. In addition, large diameter meters (2-inches) are calibrated every year and small meters (3/4-inches) are randomly tested.

The following have only service meter connections: Bland County, Carroll County, City of Galax, Town of Damascus, Town of Fries, Town of Rural Retreat, and BVU. Bland County, Carroll County, Town of Damascus, Town of Rural Retreat, and BVU all read meters on a monthly basis. Carroll County has a dedicated employee in charge of meter maintenance. BVU replaces larger meters every two to three years and recently budgeted funds to replace 2500 smaller meters.

The City of Galax reads service meters on a bi-monthly basis and has established a meter maintenance program.

6.3.1.2 Cumberland Plateau

All water suppliers responding to the survey reported that meters are required on residential services. Source meters are required for regulatory reporting purposes. All water suppliers reported meter reading on a monthly basis. Most water suppliers periodically test and calibrate meters. Most water suppliers use system meters that indicate flow to specific zones of the water distributions system and allow comparison between water supplied and water consumed within specific portions of the distribution system. Two water suppliers meter the volume of water taken from hydrants for purposes other than emergency fire suppression. One water supplier

DRAFT 5/02/2011

meters the volume of water intentionally removed from the distribution system to maintain water quality ("blow offs").

6.3.1.3 LENOWISCO

Nearly all water suppliers surveyed reported that meters are required on residential services. Source meters are required for regulatory reporting purposes. One water supplier reported meter reading on a quarterly basis, but all other water suppliers read meters monthly. Seven water suppliers periodically test and calibrate meters. Nine water suppliers use system meters that indicate flow to specific zones of the water distributions system and allow comparison between water supplied and water consumed within specific portions of the system. Seven water suppliers meter the volume of water taken from hydrants for purposes other than emergency fire suppression.

6.3.2 Leak Detection

6.3.2.1 MRPDC

The following implement operating strategies for leak detection and/or regularly schedule water audits to reduce water loss: Bland County, Carroll County, Wythe County, Town of Hillsville, Town of Marion, Town of Saltville, BVU, and WCSA. Bland County is in the process of implementing a leak detection using VDH funds. Carroll County, Wythe County, Town of Hillsville, and Town of Wytheville all calculate water loss percentages on a monthly basis. The WCSA conducts annual water audits using both the American Water Works Association (AWWA) and International Water Association (IWA) methodology. When water meters are read in the Town of Saltville, they are evaluated for leaks and problems identified are repaired as soon as possible.

The Town of Marion continuously monitors the system for leaks using leak detection devices and line replacement program. In the past, the Town of Marion has installed large industrial meters using town funds and replaced water lines using funds from the VDH. In addition, the Town of Marion notifies customers of potential leaks when a leak or possible leak is identified during regularly schedule meter reading. The customer is given 10 days from notification to repair the leak. Finally, the Town of Marion publishes articles periodically in their quarterly newsletter.

DRAFT 5/02/2011

In 2007, BVU completed a study of their Carter Street service zone using a $10,000 grant. BVU also recently completed a Leak Detection Study of their water system. Additional details regarding the Carter Street Study and Leak Detection Study were not provided.

In an effort to educate their customers on reducing water loss by identifying leaks, BVU sends out a monthly newsletter to their customers. The WCSA is planning to develop and implement an educational program.

6.3.2.2 Cumberland Plateau

None of the localities in the Cumberland Plateau region are known to have ordinances in place that require water users to repair leaking fixtures, appliances, or plumbing.

As an operational parameter, nearly all water suppliers reported using real time information about their systems, and all systems use supervisory control and data acquisition (SCADA) or telemetry. Abnormal changes in tank levels result in review for lost water due to leaks. Several water suppliers track pump runs with tank levels to indicate the probability that increased demand is due to a leak in the distribution system, and whether a leak detection and repair crew should be dispatched.

Most water suppliers with treatment facilities reported having conducted a usage review at their WTP(s) during the past year. Most water suppliers inspect and test fire hydrants regularly, and respond to requests from fire companies to repair hydrants.

Funding from the DWSRF has been used to develop and implement water audit and leak detection practices in several localities. These projects include "Water Distribution System Accountability," Buchanan County PSA (2005); "Russell County Water and Sewer Authority Leak Detection Study," (2006); "Pocahontas Water Accountability and Leak Detection," (2007); "Distribution System Accountability/Regional Inter-tie Study," Tazewell County PSA (2007); "Swords Creek Telemetry and Meter Project," Russell County Board of Supervisors (2006). Additional funded projects to improve water distribution systems include "Dante Water System Improvement PER," Russell County Water & Sewer Authority (2003); and "Russell County Water and Sewer Authority Water System Hydraulic Analysis," (2004).

DRAFT 5/02/2011

6.3.2.3 LENOWISCO

One locality reported adoption of an ordinance that requires water users to repair leaking fixtures, appliances, or plumbing. The enforcement activity is that water service may be discontinued after five days notice.

As an operational parameter, all water suppliers reported using real time information about the system. Abnormal changes in tank levels result in review for lost water due to leaks. Several water suppliers track pump runs with tank levels to indicate the probability that increased demand is due to a leak in the distribution system, and whether a leak detection and repair crew should be dispatched.

Nearly all water suppliers with treatment facilities reported having review water usage at their WTP(s) during the past year. The majority of water suppliers inspects and tests fire hydrants regularly, and responds to requests from fire companies to repair hydrants.

Funding from the DWRSF has been used to develop and implement water audit and leak detection practices in several localities. Expressly titled "Leak Detection" studies and projects have been funded in Nickelsville (2003), Gate City (2004), Dungannon (2007), and Pound (2007). Additional funded projects for Big Stone Gap (2006) and the Scott County Public Service Authority (2006) studies addressed water use and analysis.

6.3.3 Line Replacement

6.3.3.1 MRPDC

The following jurisdictions have adopted an ordinance or have policies in place requiring water users to repair leaking fixtures, appliances, or plumbing or implement strategies for repair of water mains, service connections, fire hydrants, valves, etc. to reduce water loss: Carroll County, Wythe County, Town of Hillsville, Town of Marion, Town of Saltville, Town of Wytheville, City of Galax, BVU, and WCSA.

Carroll County completes water loss reports each month and water plant operators constantly monitor the system for leaks.

DRAFT 5/02/2011

Wythe County provides replacement funds annually to complete repairs or replace water lines in designated areas. Repairs are completed when reported or discovered. In addition, Wythe County adopted ordinance number 1996-4 requiring water users to repair leaking fixtures, appliances, or plumbing. A copy of the ordinance was not provided and additional details are not available at this time.

The Town of Hillsville water mains and service connections are repaired when leaks are identified. In addition, fire hydrants are flow tested once per year.

The Town of Marion typically allocates approximately $200,000 for water and sewer projects each fiscal year through their five year Capital Improvement Plan (CIP).

The Town of Saltville adds a one dollar fee to every water bill for capital improvements, which include repairs and new projects. The Town of Saltville also adopted an ordinance, which allows the town manager to disconnect a customer's service if they fail to make proper repairs.

The Town of Wytheville budgets for projects to replace infrastructure, water mains, lines, fire hydrants, valves, etc. each year. The Town of Wytheville is able to determine areas where lines need to be replaced from monthly water loss reports. In addition, hydrants are evaluated and flow tested to make sure they are operating correctly.

The City of Galax performs routine maintenance and repairs leaks when discovered.

BVU budgets over $400,000 per year for waterline replacement, which includes water lines, valves, service connections, and hydrants. In addition, the conditions of all fire hydrants are checked on a regular basis.

The WCSA maintenance department's primary responsibility is the repair of leaking water mains and service lines. The WCSA implements a system-wide master meter program which monitors water flowing into each metered district on a weekly basis. The WCSA has also installed more than 20 pressure reducing valves in their 900 miles water distribution system to reduce system pressures and leakage rates. Finally, the WCSA has installed a SCADA system to identify system failure as quickly as possible and minimize tank overflows.

DRAFT 5/02/2011

6.3.3.2 Cumberland Plateau

There are no known ordinances in place that require water users to repair leaking fixtures, appliances, or plumbing.

Water suppliers track water accountability on a monthly basis, and budget for corrective maintenance activities.

Five water suppliers dedicated funds in their capital improvement plans toward water line replacement. Half of the water suppliers record a description of each leak or break (type of leak, pipe material and age, conditions), and most water suppliers maintain a written summation of leaks and breaks.

Water suppliers address water leaks with specific responses. All water suppliers report having emergency call out procedures for water outages, breaks, and leaks. Most water suppliers reported removing old lines from service upon installation of a replacement line, and all suppliers relocate taps when a new line is installed. Nearly all water suppliers in the planning area replace a joint of water line after a specified number of repairs on that joint (such as between three and ten leak repairs).

6.3.3.3 LENOWISCO

Five water suppliers dedicated funds in their annual budgets toward water loss activities. The majority of water suppliers budgeted for corrective maintenance activities.

Water suppliers address water leaks with specific responses. Twelve water suppliers report having emergency call out procedures for water outages, breaks, and leaks. Eight water suppliers reported removing old lines from service upon installation of a replacement line, and eleven suppliers relocate taps when a new line is installed. Eleven water suppliers in the planning area replace a joint of water line after a specified number of repairs on that joint (most commonly between three and ten leak repairs).

Several water suppliers have instituted valve maintenance and exercising programs. In addition to reducing water loss due to valve leaks, these programs reduced water loss during leak detection and repair activities by enabling rapid isolation of the leak and stopping water flow.

DRAFT 5/02/2011

6.3.4 Unauthorized Connections

6.3.4.1 MRPDC

The following have practices in place to identify unauthorized water connections: Carroll County, Wythe County, Town of Hillsville, Town of Wytheville, and the WCSA. Carroll County Fire Department and County employees monitor fire hydrants for illegal use; and in Wythe County any use by the fire department is reported within 24 hours and all other use requires a permit. The Town of Hillsville indicated that practices and policies are in place to track unauthorized connections; however, specific details are not available at this time. The Town of Saltville implements policies to track unauthorized connections. In the Town of Wytheville, town employees regularly monitor fire hydrants for unauthorized connections. The WCSA meter department and maintenance department monitor their water system for construction activity where unauthorized connections may occur. In addition, the WCSA recently began a fire line connection audit to locate and correct illegal connections.

6.3.4.2 Cumberland Plateau

Unauthorized connections may be permanent or temporary. They may also result from inappropriate modification of an authorized connection or an unauthorized connection made on an authorized connection.

Temporary connections are often made to fire hydrants. Nearly all of the water suppliers limit hydrant use to water system personnel and fire department personnel. Two localities have a written hydrant use policy and three water suppliers allow non-emergency use from hydrants if metered.

A common inappropriate modification of an authorized connection is a straight pipe that has been inserted in the place of the meter. This may occur after the meter has been removed due to non-payment for service, or may result from an attempt to bypass the meter. Water suppliers' efforts to track this type of modification are informal, and include periodic evaluations of meter connections.

DRAFT 5/02/2011

An example of an unauthorized connection made on an authorized connection is a domestic use connection on a fire-service line in a commercial, industrial, or institutional facility. This type of unauthorized connection is very difficult to track.

6.3.4.3 LENOWISCO

Unauthorized connections may be permanent or temporary. They may also result from inappropriate modification of an authorized connection or an unauthorized connection made on an authorized connection.

Temporary connections are often made to fire hydrants. Twelve of the localities limit hydrant use to water system personnel and fire department personnel. Four localities have a written hydrant use policy and seven water suppliers allow temporary use from hydrants if metered.

A common inappropriate modification of an authorized connection is a straight pipe that has been inserted in place of the meter. This may occur after the meter has been removed due to non-payment for service, or may result from an attempt to bypass the meter. Water suppliers' efforts to track this type of modification are informal, and include periodic evaluations of meter connections.

An example of an unauthorized connection made on an authorized connection is a domestic use connection of a fire-service line in a commercial, industrial, or institutional facility. This type of unauthorized connection is very difficult to track.

6.3.5 Dedicated Funding in Capital Improvement Plans

6.3.5.1 MRPDC

Many of the water suppliers in the MRPDC region include dedicated funding for replacement of existing infrastructure in Capital Improvement Plans.

6.3.5.2 Cumberland Plateau

Most water suppliers in the Cumberland Plateau region include dedicated funding for replacement of existing water infrastructure over time in formal plans.

DRAFT 5/02/2011

6.3.5.3 LENOWISCO

Seven water suppliers in the LENOWISCO region include dedicated funding for replacement of existing water infrastructure over time in formal plans.

6.3.6 Educational Programs to Reduce Water Loss

6.3.6.1 MRPDC

None of the localities in the MRPDC region are known to have developed or implemented educational programs to reduce customer-side water loss.

6.3.6.2 Cumberland Plateau

None of the localities in the Cumberland Plateau region are known to have developed or implemented educational programs to reduce customer-side water loss. Two water suppliers provide water conservation information upon request. As noted above, water rates are believed to be a sufficiently high portion of the median household income to encourage water customers to reduce non-beneficial use on the customer side of the meter.

6.3.6.3 LENOWISCO

None of the localities in the LENOWISCO region are known to have developed or implemented educational programs to reduce customer-side water loss. Three water suppliers provide water conservation information upon request. As noted above, water rates are believed to be a sufficiently high portion of the median household income to encourage water customers to reduce non-beneficial use on the customer side of the meter.

6.3.7 Additional Water Loss Practices

6.3.7.1 MRPDC

There are no other known additional water loss practices in the MRPDC region.

6.3.7.2 Cumberland Plateau

Pressure regulation - All water suppliers reported that their maximum distribution pressure exceeds 100 psi, and only two of the water suppliers reported their systems operate with pressure

DRAFT 5/02/2011

that does not exceed 150 psi. The high system pressures are due to the topography of the service areas.

Water loss is positively correlated with system pressure. Nearly all water suppliers operate pressure reducing valves/stations (PRVs) to reduce pressure appropriately. Half of the water suppliers require customers to maintain an individual pressure reducing device on the customer side of the meter.

All water suppliers reported access to distribution system mapping, many of the water systems have been modeled hydraulically, and one water supplier reported using AWWA's water loss analysis computer program. One water supplier maps the location and estimated volume of leaks and breaks in its distribution system.

6.3.7.3 LENOWISCO

Pressure regulation - Only two water suppliers reported that their distribution pressure is less than 100 psi, and less than one-third of the water suppliers operate with pressure less than 150 psi. This is due to the topography of the service areas.

Because water loss is positively correlated with system pressure, most suppliers operate pressure reducing valves/stations (PRVs) to reduce pressure appropriately.

Nearly all water suppliers reported access to distribution system mapping, many of the water systems have been modeled hydraulically, and two water suppliers reported using AWWA's water loss analysis computer program. Several water suppliers map the location and estimated volume of leaks and breaks in their distribution systems.

DRAFT 5/02/2011