



WATER QUALITY REPORT FOR 2011

City of Milwaukie
WATER DEPARTMENT

Where Our Water Comes From

Our water comes by way of the Troutdale Gravels Aquifer located over 200 feet below ground. This Aquifer provides water for communities on both the North and South side of the Columbia River. The Troutdale Aquifer encompasses about 300 square miles and extends from northern Clark County in Washington State to south of Milwaukie and from East of Troutdale to the Willamette River. The land mass above the aquifer and the

PLEASE SEE WATER SOURCE ON PAGE 3



Dear Water Customer.

The City of Milwaukie Water Department is proud to announce that our tap water is as safe as any drinking water supply in the nation. Our water meets or exceeds all water quality standards as set by Oregon Public Health Division, Drinking Water Program (DWP) and the EPA.

The City of Milwaukie has been in the water business since June 3rd of 1903 with the formation of a Water Commission. 1913 was a landmark year with the City of Milwaukie Council declaring its intent to purchase all water companies within the city limits. Since then the City of Milwaukie has taken over 10 separate water companies with Wichita Water District to be the last in 1986. Council voted in January of 1936 to build the first "City Owned" well at a cost of \$7,100.00. That well is still in production and produces over a half a million gallons per day. The last well was constructed in 2008 at a cost of approximately \$500,000.

The City of Milwaukie drinking water infrastructure is a very complex network of pipes, valves, tanks, treatment plants, pumps and controls. The ageing of these components (assets) must be taken into account as we strive to deliver high quality water at a cost that can maintain and enhance our infrastructure. Our two treatment plants were constructed in 1990 and even with the best possible preventative maintenance our costs are climbing due to age and obsolescence. The concrete 1.5 million gallon tank at 40th and Harvey was constructed in 1948 at a cost of \$89,000.00. The elevated tank cost \$320,000 to build in 1962 and now to properly strip and paint the cost is about the same. Our energy cost has risen from 7 cents per kilowatt an hour in 2007 to over 10 cents in 2011. Water production electricity cost for 2011 was in excess of \$174,133, that equates to 16 cents for every unit of water (748gal) consumed. Please keep in mind that every time you see energy costs increase the cost of water delivery to your home, job or school increases. We strive to use the most cost effective, energy efficient methods possible to produce and deliver our high quality product.

Please take the time to consider everything that happens to allow your glass to fill every time you turn on the faucet. The Milwaukie Water staff continues to find ways to deliver water in the most cost effective, responsible, safe, and reliable way possible without sacrificing quality, safety, security and service.

This report includes work done in 2011, current and upcoming projects for 2012, and the results of water quality analysis. The report will also discuss where our water comes from, how you help to protect the water, conservation tips and a few of the most frequently asked questions.

Thank you for taking the time to read this year's report and letting us know how we can improve. This report is available on the City of Milwaukie web page under Departments, Public Works, and Water. There you will find more information and answers to frequently asked questions and the video "Liquid Assets" that will provide a great overview of the current state of our nation's infrastructure. Meetings that deal with drinking water and related issues are held throughout the year and are announced in the monthly newsletter THE PILOT. If you have questions regarding information in this report please contact me. Thank you for taking the time to read the 2011 Water Quality Report.

Don Simenson
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Maintaining the Water Supply System

Our thanks go out to management and City Council for reestablishing one full-time utility worker position. The Water Department team is now comprised of one Supervisor, one Utility 2 (working foreman), 3 Utility Workers, one Water Quality Coordinator, and one Utility Specialist. In support of our team of seven is the Engineering, Streets, and to some degree all City of Milwaukie departments.

All divisions contribute to our success in serving the needs of our customers and the infrastructure. We constantly strive to provide the most cost effective service to the 20,900 Residents, 1,438 permitted businesses, schools and the system of pipes, pumps, motors and equipment. When someone calls to report a situation we respond as soon as possible to assess, repair or schedule the needed service. Public health, safety and property damage are always top priority.

One of the most visible projects for 2011 was high velocity flushing of the southeast third of the City's water system. This project was only possible due to the years of mapping and inventory of the water system that includes how all sectors are hydraulically linked. Flushing is not simply driving around and turning on fire hydrants. Months of preparation had to take place while keeping up on all current tasks. Figuring out the flow dynamics and how to handle all of the water being discharged while maintaining specific flow rates and pressure on each main line was a very difficult task.

Due to the Lake Road improvement project water crews had to figure ways to flush the system without allowing water to flow onto Lake road. The water crew would like to thank the Storm water, Wastewater and Engineering crews for assisting in the project. The project could not have taken place without their help.

The flushing project was a success and has paid off in many ways. Improved water quality, reduced colored water customer complaints, and knowledge gained of the system and flow characteristics. The water crew would like to continue this success in 2012 by velocity flushing the northeast and central sections of Milwaukie in 2012.

Plans to extend Light Rail to Milwaukie have increased

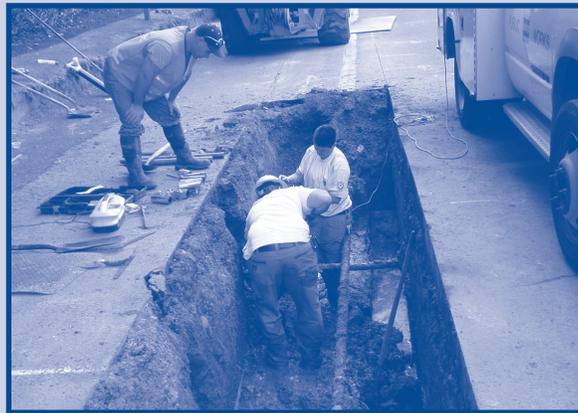
water staff work load for the last two years due to added plan reviews and locating water lines and valves that will be impacted by the project.

Maintaining our production assets such as the pumps, motors, generators, and reservoirs is a very important yet virtually unseen part of the daily work. We electronically monitor the entire water system every second of every day and maintain all of the production equipment and water quality monitors. All of the pumps and motors require preventive maintenance and condition monitoring.

Condition monitoring of electric motors includes the rate of pumping, testing and analyzing the vibration levels, temperature and power usage. By assessing the condition of motors on a regular basis we can schedule maintenance or replacement prior to a failure. Every water site in town is visited at least three times per week for inspection, maintenance and calibration of the water quality monitors.

Our two treatment plants have now been in operation for over 21 years and many of the electronic components can no longer be repaired due to obsolescence. Much of the disinfection equipment needed to be replaced at a cost of \$19,800.00 in 2011. Motor, starters, controls and protection circuit relays are all changing to more energy-efficient models. A motor starter that cost \$900 in 1990 is now over \$4,000. The efficiency gains are nice but do not keep up with the increasing cost of the components, labor or energy costs.

Our monitoring and control equipment is referred to as SCADA (Supervisory Control and Data Acquisition). The Milwaukie SCADA system reports all of the water drawn from wells, pressure readings, and the amount of water in our reservoirs. Problems with equipment, power failures, leaks or water levels are reported via electronic means to water staff that are on call 24-7. The SCADA system has over 300 alarm points that when activated must be acknowledged. On call staff is trained to handle every possible alarm scenario. All members of the water team are certified by the State of Oregon and must receive continuing education and training every two years to maintain certification.



Monitoring Our Water System and Making Sure It's Safe

Maintaining the quality of our drinking water is a major concern to the City of Milwaukie staff, citizens, and elected officials. The first part of the equation is always knowing what the quality standards are and testing the water. 2011 water analysis costs were in excess of \$26,000. Upcoming regulatory changes driven by improved methods for analyzing water are increasing the annual cost of monitoring our drinking water. 2011 samples included sampling for 46 synthetic organic chemicals that includes common herbicides and pesticides such as 2-4D, Glyphosate and Toxaphene. The results of the sample testing revealed that these chemical compounds are not present in the Milwaukie drinking water.

Our monitoring of water quality reaches far beyond our own wells. The industrial areas of Milwaukie have been the scene of historically poor disposal methods of industrial wastes. Several sites are under investigation by Oregon DEQ and are being cleaned up or monitored for migration off site. Most of these sites have monitoring wells that are actively sampled and all information about the types and levels of contaminants are compiled by independent contractors. The contractors are required to submit the findings to Oregon DEQ. DEQ reviews the findings and will approve the current work and monitoring plan

or request alternative work to aid in the monitoring or clean up to assure that our water remains safe. This information is part of the Source Assessment that is on file at the Johnson Creek Facility or on the Oregon DEQ web site.

Sampling of our water takes place continuously where the water enters the distribution system and samples are collected every week from many different locations. Samples are collected at all of the wells as raw water and analyzed to determine if there are any changes occurring. Water is again sampled after treatment to ensure proper operation and effectiveness of the treatment plants. Samples are collected out in the neighborhoods at sample stations, homes, businesses and schools to ensure that the water that arrives in your glass is safe and clean.

Milwaukie is required to submit lead and copper water samples every three years from a list of addresses established many years ago. We are happy to report that the information we gained from the 2010 sampling event clearly displayed that our drinking water does not leach lead and copper out of your plumbing fixtures and is not a problem within our water delivery system. Thank you to those of you that collected samples in 2010. We will be asking for your help in collecting Lead and Copper samples again in August and September of 2013.

City staff collected 290 water samples in 2011 for microbiological testing and found all samples to be negative for coliforms and E coli. Water sampling in the distribution system for Disinfection by Products (DBP's) reveal that our process and control procedures are effective. DBP's are chemical compounds that form when chlorine or other disinfectants react with natural organic matter in the water. Levels of these compounds in Milwaukie's water are so low that the EPA and DWP granted Milwaukie a waiver from increased monitoring and distribution system analysis. Milwaukie will continue to monitor quarterly for DBP's to insure process and controls are properly maintained. Samples are collected every quarter from each well site and from each treatment plant and tested for 57 different Volatile Organic Chemicals (VOC's). Our sample testing reveals that the water provided to your faucet does not contain any VOC's.

The City's Milwaukie water is clean, safe and meets or exceeds all state and federal requirements.



Water Crew members Jamie Clark (left) & Michael Cunningham at the water flushing event.

WATER SOURCE FROM PAGE 1

Columbia River's prehistoric paleo-channel (old-channel) serves to maintain water levels within the aquifer. The paleo-channel of the Columbia serves to draw water from the aquifer during periods of low water use, such as in the winter, and provides water to the aquifer in times of high volume pumping in the summer.

The City of Milwaukie reaches this source of water by means of 7 operating wells that range from 300 to nearly 500 feet deep. Milwaukie wells are located in several locations

around town.

Emergency water connections with Clackamas River Water and The City of Portland Water Bureau and a possible future connection with Oak Lodge Water are capable of supplying all the water we may need in an emergency. These interties allow the Milwaukie water system to assist other water systems when they need water in times of emergency or high level maintenance.

A busy year for the Water TEAM!

2011 was a very busy year that included over 10,000 tasks accomplished by water team members. The tasks included over 2,000 (1400 in 2010) customer service requests generated by the City Hall customer service group (Finance) and 1134 in-house work orders. Customer service requests include items such as 772 final or initial billing meter reads and turn water on or off 57 times for customer plumbing repairs. Other tasks include 1576 utility locate requests, 79 meter box clean outs, trim vegetation or repair, and 357meters replaced. Leak checks were preformed at 382 customer locations. The team also assisted the billing unit of the Finance department by placing 247 shut off notices for nonpayment, down from 618 in 2010. There were 58 services

turned off for nonpayment after receiving the shut off notice.

Just keeping up with who to bill can be a challenge as there were over 680 billing name changes due to people moving in and out. The steady customer change leads to checking meter reads every time someone moves into or out of a property. When you add up the customer changes and billing disputes there were over 775 on site checks made of meter readings. City Council approved the reinstatement of 1 full time utility worker position to aid in providing field service work. Mark Odell was selected to fill the position and completed over 261 fire hydrant work orders. The water team completed preventative maintenance on over 421 hydrants and made over 153 repairs.

An Assessment of the City of Milwaukie's Water

In 2004 a drinking water source assessment was conducted by Oregon DEQ and Oregon Health Division Drinking Water Program with assistance from Milwaukie staff. The assessment report indicates that the water system would be moderately to highly susceptible to a contamination event inside the drinking water protection area. The drinking water protection area is defined in the *Source Water Assessment Report* based on the distance water migrates toward a well over a specified period of time.

The presence of several high and moderate risk potential contaminant sources within the protection area was confirmed through a potential contaminant source inventory. Under a "worst case" scenario, where it is assumed that nothing is being done to protect groundwater quality at the

identified potential contaminant sources, the assessment results indicate that the water system would be highly susceptible to several of the identified potential contaminant sources. In 2010 the drinking water protection area around well 4 was reevaluated and the area was expanded slightly to the north and west.

In addition, the assessment results indicate that, at this time, the water system is considered susceptible to viral contamination. Viral contamination is typically caused by failed septic systems. You may view a copy of the source assessment at the Public Works and Community Development Facility located at 6101 SE Johnson Creek Blvd. If you would like your own copy one can be provided for a fee.

Unregulated Contaminants

The City of Milwaukie does not test for Cryptosporidium since it is rarely present in well water.

During testing, in December of 2003, our water revealed no Gross Alpha particle activity level.

One well did display a level of combined Radium 226/228 of 1.28 pCi. The U.S. Environmental Protection Agency (EPA) limit is 5 pCi.

The EPA is preparing regulations that

will specify a Maximum Contaminant Level for radon. Radon is a radioactive gas that occurs naturally in ground water and is released from water into the air during household use.

Sampling & Reporting Violations

There were no violations for 2011. City Staff failed to report the September 2010 Routine Coliform sampling results by the 10th of October, 2010. The Routine Coliform sampling results were reported on October 12th, 2010.

Key To Tables: The data presented in this report is from the most recent testing conducted in accordance with regulations. Not all contaminants are tested annually. All testing is accomplished within the EPA schedule.

ND: None Detected
 MCL: Maximum Contaminant Level
 MCLG: Maximum Contaminant Level Goal
 pCi/l: Picocuries per liter (a measure of radioactivity)
 PPM: Parts per million, or milligrams per liter (mg/l)
 ppt: Parts per trillion, or nanograms per liter
 ppb: Parts per billion, or micrograms per liter (µg/l)

Maximum Contaminant Level or MCL:

The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology.

Maximum Contaminant Level Goal or MCLG:

The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety.

Substance	MCL	MCLG	Results	Major Sources In Drinking Water	Possible Health Effects
Nitrate (NO3) (ppm)	10	n/a	0 to 3.5	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits.	Infants below the age of 6 months who drink water in excess of the MCL could become seriously ill and, if untreated, die. Symptoms include shortness of breath and blue baby syndrome.
Arsenic	10	n/a	0	Erosion of natural deposits: Runoff from orchards, glass, and electronics manufacturing production wastes.	Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
TTHM's Total Trihalomethanes	80	n/a	4	By-product of drinking water chlorination.	Some people who drink water containing Trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system and may have an increased risk of getting cancer.
Haloacetic acids HAA5	60	n/a	0	By-product of drinking water disinfection.	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
Combined Radium (pCi/L)	5	0	0 to 1.28	Erosion of natural deposits.	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
Total Coliform bacteria	Presence of coliform bacteria in 5% of monthly samples	0	0	Naturally present in the environment.	Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present.
Fecal coliform and E. coli	If a routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or E. coli positive	0	0	Human and animal fecal waste.	Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.

Substance	Units	Goal	Action Level	90 th Percentile*	Homes Exceeding Action Level	Complies?	Source of Contaminate?
Copper	ppb	1,300	1,300	0	0	Yes	Corrosion of household plumbing
Lead	ppb	0	1,500	2	0	Yes	Corrosion of household plumbing

* The 90th percentile is the highest result found in the 90% of the sample when they are listed in order from the lowest to the highest results. EPA requires testing for lead and copper at customers' taps most likely to contain these substances based on when the house was built. The EPA determined that if the sample results exceeded the Action

Level (AL), the City must take action in reducing the risk of leaching of lead and/or copper. As you can see by the table above, our water was well below the Action Level on our last round of testing in 2011. Our next testing is scheduled for the summer of 2013. Thanks to those that provide samples.

Additional Health Information

All of the water we drink, both tap water and bottled water, originates from a combination of rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it absorbs naturally occurring minerals and radioactive material. Water also picks up substances resulting from the presence of animals or from human activity.

Some of the contaminants that may be present in source water include:

- ✿ *Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.*
- ✿ *Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban storm runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.*
- ✿ *Pesticides and herbicides, which may come from a variety of sources such as agriculture, storm water runoff and residential uses.*
- ✿ *Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, storm water runoff and septic systems.*
- ✿ *Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production, mining activities or manufacturing. In order to ensure that tap water is safe to drink, the EPA prescribes regulations that limit the amount of certain contaminants in water provided by public systems.*

Keeping Our Water Safe

The City of Milwaukie works hard to prevent the “Worst Case” scenario and to protect our ground water resource and the water distribution system.

Milwaukie is currently extending its wastewater service area to reduce the viral threat from septic systems and works closely with Oregon DEQ and Federal EPA to monitor and cleanup past contaminated sites and to properly evaluate and render safe any new sites.

Contaminated sites include former gas stations, dry cleaners, industrial and residential properties with contaminants ranging from naphthalene, heating oil and industrial solvents. Oregon DEQ maintains a complete listing of these sites that can be viewed at www.oregon.gov/DEQ/WQ/index.shtml.

Help Protect Ground Water

You are in control of what chemicals are used in your yard and what falls onto your driveway. Limit your chemical use and the use of cleaners that are harmful to the environment. Clean up any oil or gas spills in your driveway, do not wash them into the street. Do not store fertilizers, pesticides and herbicides out doors. These chemicals should be stored in a weatherproof shed equipped with a floor. Properly discard old or unused chemicals including cleaners, solvents, paints and lubricants through the local METRO Hazardous Waste program. For more information go to www.oregonmetro.gov. Do you have a septic system? If so, please contact the City of Milwaukie Engineering staff and ask for information on connecting to sewer. Old septic systems are the leading cause of high nitrate levels that lead to viral contamination of the drinking water aquifer.

National Primary Drinking Water Regulation Compliance

In order to ensure our drinking water is safe, the United States Environmental Protection Agency sets regulations for drinking water. The City of Milwaukie is in full compliance with the National Primary Drinking Water Regulations.

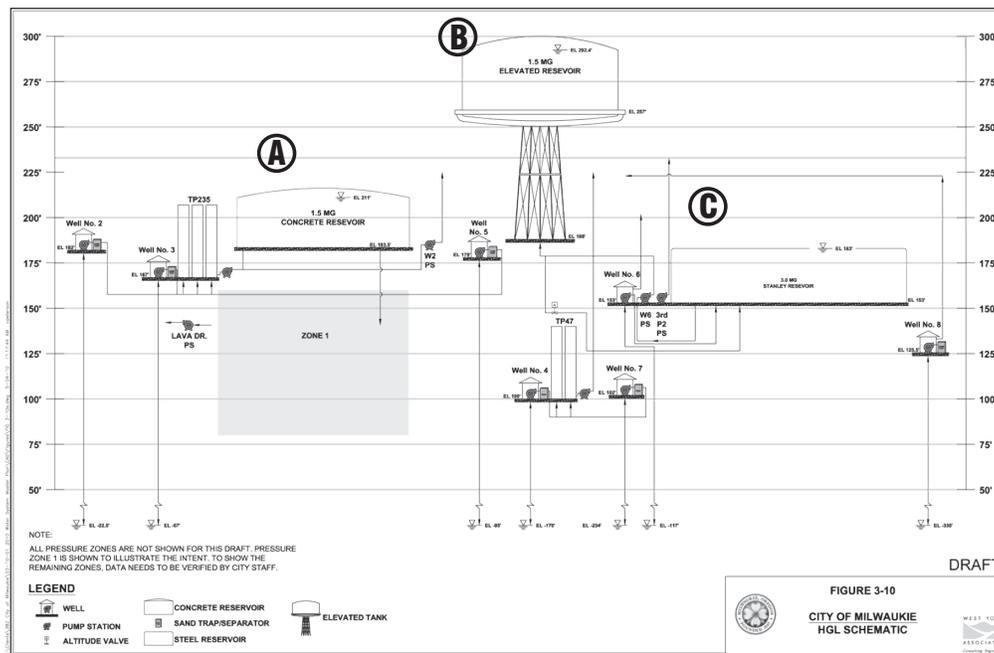
Drinking water, including bottled water, may be reasonably expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that

water poses a health risk.

However, some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants can be particularly at risk from infections.

These people should seek advice about drinking water from their health care providers.

EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline: 800-426-4791 and online at www.epa.gov/safewater.



Cross-Contamination

Cross-contamination is the leading cause of waterborne disease. Cross-Contamination occurs whenever the water contacts anything that is contaminated or objectionable. Wherever this can occur is called a “cross-connection.” As the water purveyor, we are mandated by State of Oregon Drinking Water rules (OAR 333-061-0020, 0070 through 0074) to eliminate or control all actual and potential cross-connections.

A cross-connection is any actual or potential connection between drinking water piping and any other substance. Examples of cross-connections include: residential irrigation, fire sprinkler systems, commercial beverage dispensers, boilers and garden hose spray attachments. If you would like to know if your home or commercial building is safe, please call our specialist at 503-786-7622 for a free safety survey.

If you know of any backflow assemblies at your property, please be sure to have them tested annually by a certified

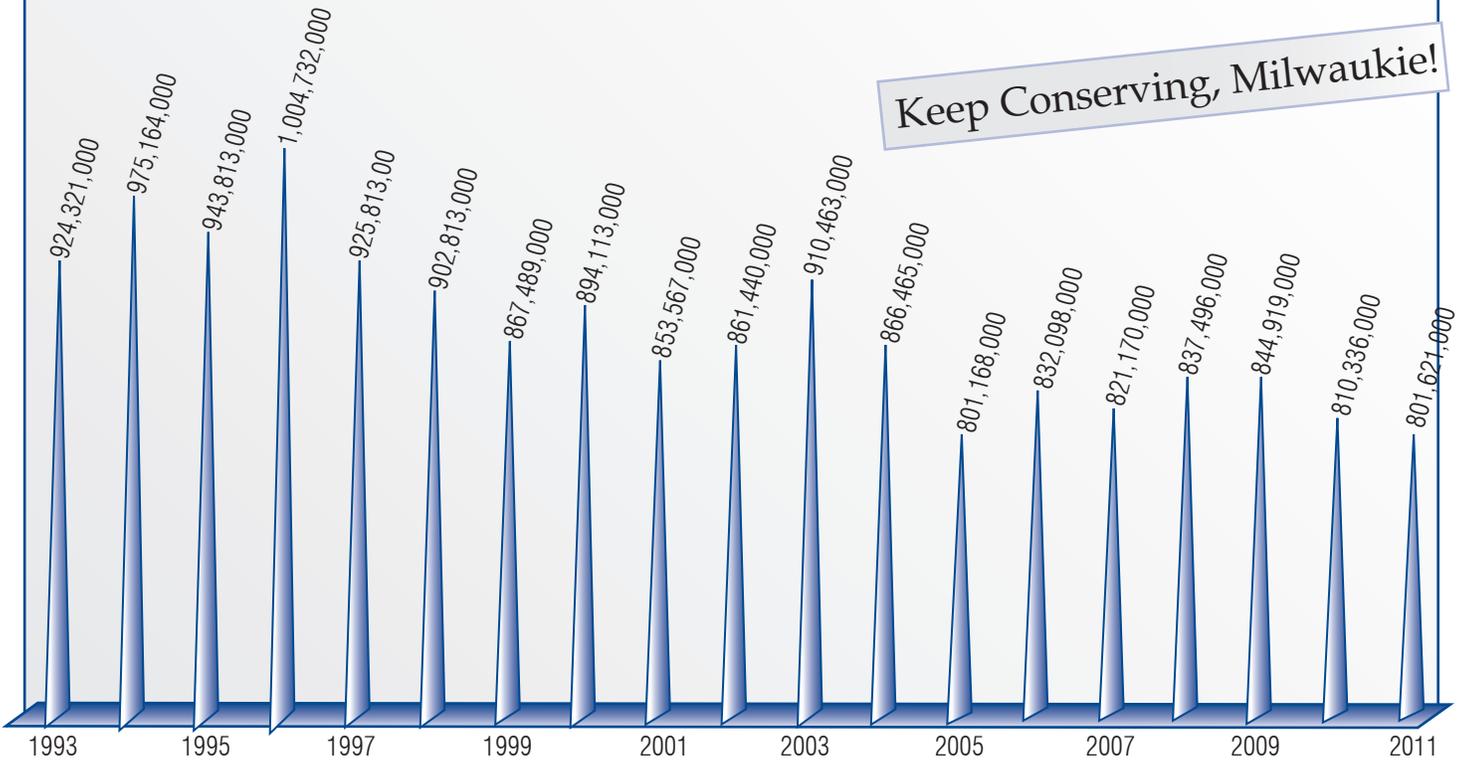
tester.

The Oregon Drinking Water Program (DWP) provides a current public list of OHA-certified Backflow Assembly Testers. The public can use this list to select and contact a Tester that is currently certified and has indicated availability and appropriate licensing to test assemblies for compensation. Only Oregon OHA-certified Testers can test assemblies in Oregon.

Certified public Backflow Assembly Testers on this list are required to obtain licensing through the Construction Contractor’s Board (CCB) or Landscape Contractor’s Board (LCB). DWP does not verify CCB or LCB licensing for individuals on this list of public testers. Customers should always verify the licensing of any contractor they hire by using the above links or by calling the CCB at 503-378-4621 or the LCB at 503-986-6561.

Annual Gallons Produced

Keep Conserving, Milwaukie!



Questions?

The City of Milwaukie will be happy to answer any questions you might have about the City's water operations or water quality. Ask for Don Simenson, Water Utility Specialist, for ques-

tions related to quality. Water Quality data for community water systems throughout the United States is available via the Internet at www.water.data.com and the State of Oregon's Drinking Water Home Page.

Water Quality Report for 2011

Check the City's web site for a copy of this report, and other water related information.



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