



## 2010 Water Quality Report

### Message from the Director

Greetings and thank you for making Stafford County home for your family and business. Our Board of Supervisors is committed to providing you with the highest quality of life through their established priorities of reducing the tax burden, improving public safety, providing top-notch education, implementing the voter-approved Transportation and Parks bonds, and enhancing economic development. We hope that your experience in Stafford is pleasant, comfortable and safe. As a responsible and accountable government, we pride ourselves on being open and proactive in our communications with our citizens, and are pleased to present you with this annual Water Quality Report for calendar year 2010.

This report will show you how we fulfill our goal of providing high quality, reliable and cost-effective water services that meet all state and federal requirements. The Department of Utilities operates and maintains two water treatment facilities, 586 miles of water lines, 14 water storage tanks, and more than 4,700 fire hydrants. Together these systems produced and delivered an average of 9.7 million gallons of water each day in 2010. To enhance our services even more, a third reservoir is under construction. The Rocky Pen Run Reservoir is scheduled to be completed by 2013. For details, see page 6.

Utilities staff work diligently to keep the water flowing to your faucets. But an excellent water service system does more than that, it also provides enough water for our Fire and Rescue responders to use in emergencies, adds to the beauty of our parks, and enhances our appeal to businesses that are looking to locate in a community with a strong infrastructure system in place. An excellent water system improves our quality of life.

We are committed to providing you with the best possible service, and we encourage you to call us if you have any questions. You may reach us at 540.658.8620, or visit us online at [www.staffordcountyva.gov/utilities](http://www.staffordcountyva.gov/utilities).

Thank you again for making Stafford your home, and remember, please use water wisely!

*Harry Critzer*

Director, Stafford County Department of Utilities

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### Source Water Assessments

In 2002, the Virginia Department of Health conducted assessments of our two water reservoirs at Abel and Smith lakes to determine how susceptible they were to contamination. Since both are surface water reservoirs open to the environment and both have specific land use activities and potential sources of contamination within a 5-mile radius of the raw water intakes, both reservoirs were determined to be highly susceptible to contamination. We must work together to properly dispose of trash, waste oil and other hazardous materials so that they do not enter streams, storm drains or other possible routes of contamination to our reservoirs.





Construction on the foundation for the dam for the Rocky Pen Run Reservoir began in 2010.

### Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised individuals, such as those undergoing chemotherapy, have undergone organ transplants, have HIV/AIDS or other immune system disorders, and some elderly people 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 at (800) 426-4791.

## Definitions

**AL — Action Level:** the concentration which, if exceeded, triggers a treatment requirement or other requirements which a water system must follow.

**CDC — Centers for Disease Control**

**EPA — United States Environmental Protection Agency**

**MCL — Maximum Contaminant Level:** the highest level of a contaminant allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology.

**MCLG — Maximum Contaminant Level Goal:** the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

**MRDL — Maximum Residual Disinfectant Level:** the highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

**MRDLG — Maximum Residual Disinfectant Level Goal:** the level of a drinking water disinfectant below which there is no known or expected health risk. MRDLGs do not reflect the benefits of

the use of disinfectants to control microbial contamination.

**NTU — Nephelometric Turbidity Units:** a measure of the amount of light dispersed as it passes through a column of water. Low turbidity is important because particulate matter in water can provide hiding places for bacteria which can impair disinfection of the water.

**pCi/L — Picocuries per liter:** unit of measure of radioactivity

**Ppb — Parts per billion:** measure of concentration equal to 1 cent in \$10 million or about 1 minute in 1,902 years or the first 15 inches or so of a trip to the moon.

**Ppm — Parts per million:** measure of concentration equal to 1 cent in \$10,000 or about 1 minute in 694 days.

**SMCL — Secondary Maximum Contaminant Level:** the level above which aesthetic qualities of the water such as its taste, odor, color or appearance may be affected.

**TT— Treatment Technique:** required process intended to reduce the level of a contaminant in drinking water.

## Lead and Copper

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Stafford County Utilities is responsible for providing high quality drinking water, and we have no lead service lines, but we cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 15 to 30 seconds or until it becomes cold or reaches a steady temperature before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at <http://www.epa.gov/safewater/lead>.

Abel Lake Water Treatment Facility  
Table of Detected Contaminants

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| Regulated Contaminants (samples taken from the water distribution system)   |                                                                                                                |                                                 |                                                                                       |                                                                                         |                                                    |                                         |                                                |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------|------------------------------------------------|
| Parameter                                                                   | Average Results                                                                                                | Range of Results                                | Units                                                                                 | MCL                                                                                     | MCLG                                               | In Compliance?<br>Yes / No              | Source                                         |
| Haloacetic Acids (HAA5s)                                                    | <b>32</b><br>(highest 4-qtr. compliance avg.)                                                                  | <b>19 - 46</b><br>(for individual sample sites) | ppb                                                                                   | Average of last 4 quarters less than or equal to 60 ppb                                 | None                                               | Yes                                     | Byproduct of drinking water disinfection       |
| Trihalomethanes (TTHMs)                                                     | <b>42</b><br>(highest 4-qtr. compliance avg.)                                                                  | <b>20 - 65</b><br>(for individual sample sites) | ppb                                                                                   | Average of last 4 quarters less than or equal to 80 ppb                                 | None                                               | Yes                                     | Byproduct of drinking water disinfection       |
| Barium                                                                      | <b>0.019</b>                                                                                                   | 1 test performed                                | mg/l                                                                                  | 2                                                                                       | 2                                                  | Yes                                     | Naturally present in the environment           |
| Chloride                                                                    | <b>2.8</b>                                                                                                     | 1 test performed                                | mg/l                                                                                  | 250                                                                                     | None                                               | Yes                                     | Naturally present in the environment           |
| Sodium                                                                      | <b>24.2</b>                                                                                                    | 1 test performed                                | mg/l                                                                                  | No limit                                                                                | None                                               | Yes                                     | Naturally present in the environment           |
| Sulfate                                                                     | <b>37.6</b>                                                                                                    | 1 test performed                                | mg/l                                                                                  | 250                                                                                     | None                                               | Yes                                     | Naturally present in the environment           |
| Fluoride                                                                    | <b>0.92</b>                                                                                                    | <b>0.56 - 1.50</b>                              | ppm                                                                                   | 4                                                                                       | 4                                                  | Yes                                     | Added to water to promote strong teeth         |
| Nitrate + Nitrite                                                           | <b>0.17</b>                                                                                                    | 1 test performed                                | ppm                                                                                   | 10                                                                                      | 10                                                 | Yes                                     | Erosion of natural deposits, fertilizer runoff |
| Total Organic Carbon (TOC)                                                  | The running annual average of quarterly TOC percent removals ranged from 1.08 to 1.16                          |                                                 | None                                                                                  | Treatment Technique: Running annual avg. of quarterly TOC % removals must be $\geq 1.0$ |                                                    | Yes                                     | Naturally present in the environment           |
| Chlorine (samples taken from the water distribution system)                 |                                                                                                                |                                                 |                                                                                       |                                                                                         |                                                    |                                         |                                                |
| Parameter                                                                   | Highest 12-Month Running Annual Average                                                                        | Range of Results (individual sites)             | Units                                                                                 | MRDL                                                                                    | MRDLG                                              | In Compliance?<br>Yes / No              | Source                                         |
| Chloramines                                                                 | <b>1.3</b>                                                                                                     | <b>0 - 3.5</b>                                  | ppm                                                                                   | 4.0                                                                                     | 4.0                                                | Yes                                     | Added as water disinfectant                    |
| Metals (samples taken from the customer's tap)                              |                                                                                                                |                                                 |                                                                                       |                                                                                         |                                                    |                                         |                                                |
| Parameter                                                                   | Action Level                                                                                                   | MCLG                                            | Test Results                                                                          | Number of sampling locations above the EPA Action Level                                 | In Compliance?<br>Yes / No                         | Source                                  |                                                |
| Lead                                                                        | 90% of all test results must be 15 ppb or less                                                                 | 15 ppb                                          | Results from 2010 <3 ppb to 8.0 ppb; 100% of the 31 samples taken were 15 ppb or less | 0                                                                                       | Yes                                                | Corrosion in household plumbing systems |                                                |
| Copper                                                                      | 90% of all test results must be 1.3 ppm or less                                                                | 1.3 ppm                                         | Results from 2010 100% of the 31 test results were 0.130 ppm or less                  | 0                                                                                       | Yes                                                | Corrosion in household plumbing systems |                                                |
| Unregulated contaminants (samples taken from the water distribution system) |                                                                                                                |                                                 |                                                                                       |                                                                                         |                                                    |                                         |                                                |
| Parameter                                                                   | Recommended / Proposed Levels                                                                                  |                                                 | MCLG                                                                                  | Units                                                                                   | Highest level detected                             | Source of Contaminant                   |                                                |
| Bromodichloromethane                                                        | None - included in TTHMs                                                                                       |                                                 | None                                                                                  | ppb                                                                                     | <b>2.8</b>                                         | Byproduct of disinfection               |                                                |
| Chloroform                                                                  | None - included in TTHMs                                                                                       |                                                 | None                                                                                  | ppb                                                                                     | <b>0.0014</b>                                      | Byproduct of disinfection               |                                                |
| Turbidity (samples taken from filtered water at the treatment facility)     |                                                                                                                |                                                 |                                                                                       |                                                                                         |                                                    |                                         |                                                |
| Parameter                                                                   | MCL                                                                                                            |                                                 | Units                                                                                 | Max. Detected                                                                           | Lowest Percentage of Monthly Samples Meeting Limit | In Compliance?<br>Yes / No              | Source                                         |
| Turbidity                                                                   | Treatment Technique (TT) - at least 95% of all samples taken each month must be 0.3 NTU or less; 1 NTU maximum |                                                 | NTU                                                                                   | <b>0.27</b>                                                                             | 99.9% of all samples taken were 0.3 NTU or less    | Yes                                     | Soil erosion from runoff                       |

1. Tests were performed for an additional 40 possible contaminants which were NOT DETECTED.

2. Lead, copper, and total coliforms are reported to the Health Dept. on a County-wide basis. Levels in the table are also County-wide (not each service area).

Smith Lake Water Treatment Facility  
Table of Detected Contaminants

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| Regulated Contaminants (samples taken from the water distribution system)   |                                                                                                                |                                          |                                                                                       |                                                                                         |                                                    |                                         |                                                |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------|------------------------------------------------|
| Parameter                                                                   | Average Results                                                                                                | Range of Results                         | Units                                                                                 | MCL                                                                                     | MCLG                                               | In Compliance?<br>Yes / No              | Source                                         |
| Haloacetic Acids (HAA5s)                                                    | 26<br>(highest 4-qtr. compliance avg.)                                                                         | 12 - 30<br>(for individual sample sites) | ppb                                                                                   | Average of last 4 quarters less than or equal to 60 ppb                                 | None                                               | Yes                                     | Byproduct of drinking water disinfection       |
| Trihalomethanes (TTHMs)                                                     | 42<br>(highest 4-qtr. compliance avg.)                                                                         | 17 - 59<br>(for individual sample sites) | ppb                                                                                   | Average of last 4 quarters less than or equal to 80 ppb                                 | None                                               | Yes                                     | Byproduct of drinking water disinfection       |
| Barium                                                                      | 0.013                                                                                                          | 1 test performed                         | mg/l                                                                                  | 2                                                                                       | 2                                                  | Yes                                     | Naturally present in the environment           |
| Chloride                                                                    | 13.8                                                                                                           | 1 test performed                         | mg/l                                                                                  | 250                                                                                     | None                                               | Yes                                     | Naturally present in the environment           |
| Sodium                                                                      | 26.8                                                                                                           | 1 test performed                         | mg/l                                                                                  | No limit                                                                                | None                                               | Yes                                     | Naturally present in the environment           |
| Sulfate                                                                     | 39.1                                                                                                           | 1 test performed                         | mg/l                                                                                  | 250                                                                                     | None                                               | Yes                                     | Naturally present in the environment           |
| Orthophosphate                                                              | 0.29                                                                                                           | 1 test performed                         | mg/l                                                                                  | No limit                                                                                | None                                               | Yes                                     | Naturally present in the environment           |
| Fluoride                                                                    | 0.89                                                                                                           | 0.49 - 1.21                              | ppm                                                                                   | 4                                                                                       | 4                                                  | Yes                                     | Added to water to promote strong teeth         |
| Nitrate + Nitrite                                                           | 0.12                                                                                                           | 1 test performed                         | ppm                                                                                   | 10                                                                                      | 10                                                 | Yes                                     | Erosion of natural deposits, fertilizer runoff |
| Total Organic Carbon (TOC)                                                  | The running annual average of quarterly TOC percent removals ranged from 1.04 to 1.44                          |                                          | None                                                                                  | Treatment Technique: Running annual avg. of quarterly TOC % removals must be $\geq 1.0$ |                                                    | Yes                                     | Naturally present in the environment           |
| Chlorine (samples taken from the water distribution system)                 |                                                                                                                |                                          |                                                                                       |                                                                                         |                                                    |                                         |                                                |
| Parameter                                                                   | Highest 12-Month Running Annual Average                                                                        | Range of Results (individual sites)      | Units                                                                                 | MRDL                                                                                    | MRDLG                                              | In Compliance?<br>Yes / No              | Source                                         |
| Chloramines                                                                 | 1.3                                                                                                            | 0.6 - 3.6                                | ppm                                                                                   | 4.0                                                                                     | 4.0                                                | Yes                                     | Added as water disinfectant                    |
| Metals (samples taken from the customer's tap)                              |                                                                                                                |                                          |                                                                                       |                                                                                         |                                                    |                                         |                                                |
| Parameter                                                                   | Action Level                                                                                                   | MCLG                                     | Test Results                                                                          | Number of sampling locations above the EPA Action Level                                 | In Compliance?<br>Yes / No                         | Source                                  |                                                |
| Lead                                                                        | 90% of all test results must be 15 ppb or less                                                                 | 15 ppb                                   | Results from 2010 <3 ppb to 8.0 ppb; 100% of the 31 samples taken were 15 ppb or less | 0                                                                                       | Yes                                                | Corrosion in household plumbing systems |                                                |
| Copper                                                                      | 90% of all test results must be 1.3 ppm or less                                                                | 1.3 ppm                                  | Results from 2010 100% of the 31 test results were 0.130 ppm or less                  | 0                                                                                       | Yes                                                | Corrosion in household plumbing systems |                                                |
| Unregulated contaminants (samples taken from the water distribution system) |                                                                                                                |                                          |                                                                                       |                                                                                         |                                                    |                                         |                                                |
| Parameter                                                                   | Recommended / Proposed Levels                                                                                  |                                          | MCLG                                                                                  | Units                                                                                   | Highest level detected                             | Source of Contaminant                   |                                                |
| Bromodichloromethane                                                        | None - included in TTHMs                                                                                       |                                          | None                                                                                  | ppb                                                                                     | 8.5                                                | Byproduct of disinfection               |                                                |
| Chloroform                                                                  | None - included in TTHMs                                                                                       |                                          | None                                                                                  | ppb                                                                                     | 37                                                 | Byproduct of disinfection               |                                                |
| Turbidity (samples taken from filtered water at the treatment facility)     |                                                                                                                |                                          |                                                                                       |                                                                                         |                                                    |                                         |                                                |
| Parameter                                                                   | MCL                                                                                                            |                                          | Units                                                                                 | Max. Detected                                                                           | Lowest Percentage of Monthly Samples Meeting Limit | In Compliance?<br>Yes / No              | Source                                         |
| Turbidity                                                                   | Treatment Technique (TT) - at least 95% of all samples taken each month must be 0.3 NTU or less; 1 NTU maximum |                                          | NTU                                                                                   | 0.3                                                                                     | 100% of all samples taken were 0.3 NTU or less     | Yes                                     | Soil erosion from runoff                       |

1. Tests were performed for an additional 40 possible contaminants which were NOT DETECTED.

2. Lead, copper, and total coliforms are reported to the Health Dept. on a County-wide basis. Levels in the table are also County-wide (not each service area).



Upgrades to the Aquia Wastewater Treatment Facility continued throughout 2010 to meet more stringent nutrient removal requirements and expand the facility's treatment capacity to 10 million gallons per day.

## Potential Sources of Water Contaminants

The Abel Lake and Smith Lake reservoirs are currently the sources of public water in Stafford County. Almost 86 square miles of land drains into these reservoirs. As the water travels over the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. 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 water 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, urban 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, urban storm water runoff and septic systems; or
- **Radioactive contaminants** which can be naturally occurring or can be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may be expected to contain at least small amounts of some of these contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. We must test the water to ensure that any contaminants present are below the maximum levels set by EPA. We test for color, iron, manganese, turbidity, organics and other materials. We add fluoride to promote healthy teeth, and the water is disinfected to protect against waterborne disease. You can obtain additional information and learn about potential health effects by calling the Environmental Protection Agency's Safe Drinking Water Hotline at (800) 426-4791.

## Volatile Organic Compounds

Stafford County is required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards. In keeping with National Primary Drinking Water Regulations, we are required to inform you that tests for Volatile Organic Compounds were delayed from the 2nd quarter of 2010 to the 3rd quarter of 2010. Although the testing was delayed, the results from the 3rd quarter tests indicated that there were no contaminants in the water and Stafford County's drinking water continued to meet healthy standards. We have taken measures to ensure that all future required sampling in our water distribution system is done in accordance with state drinking water regulations and on time. As required by the National Primary Drinking Water Regulations, we will continue to keep you informed of the quality of your drinking water. For more information, please call the Department of Utilities at 540.658.8620.

## Contact Information

Stafford Department  
of Utilities  
20 PGA Drive  
Suite 201  
Stafford, VA 22554  
540.658.8616  
[www.staffordcountyva.gov](http://www.staffordcountyva.gov)

#### We Want To Hear From You!

Today, we face many water-related issues including protection of our water resources, timely renewal and replacement of aging pipes, planning to meet current and future water needs, and upgrades to our treatment facilities to meet increasingly stringent water quality requirements. As these issues are discussed, input from citizens and our water customers is needed. Please attend meetings of the Board of Supervisors and the Utilities Commission in the Stafford Administration Center to keep abreast of important issues and to voice your thoughts. Visit [www.staffordcountyva.gov](http://www.staffordcountyva.gov) for meeting dates and times. You may also call us at 658-8620 to discuss issues that are important to you and the community.

## Rocky Pen Run Update

The proposed Rocky Pen Run Reservoir, which will be located near Celebrate Virginia, is scheduled to be operational by 2013. The overall project consists of a river intake pumping station, an earthen dam, a state-of-the-art water treatment facility, two large distribution pipelines, and significant environmental mitigation. Construction is currently underway on the foundation of the dam and soon to start will be the water treatment facility and dam. This overall project is the product of years of planning, permitting, and significant work on the part of the Stafford Utilities Department, County staff, and local, state, and federal regulatory agencies. This endeavor is projected to serve the water needs of Stafford County well into the middle of the 21st century.



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