Greenville Water System

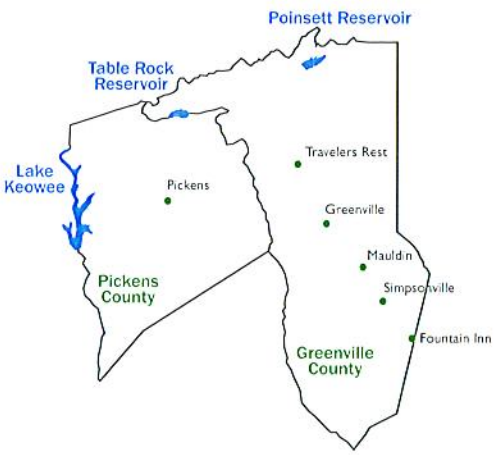
WATER QUALITY REPORT FOR 2009

GREENVILLE, SOUTH CAROLINA

GREENVILLE'S WATER MEETS ALL STANDARDS

The Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (DHEC) have established strict standards for drinking water. These criteria are designed to protect consumers from water-borne illnesses. In order to protect its customers, the Greenville Water System and DHEC collected over 29,000 samples and performed more than 100,000 tests for the parameters during 2009. The results of detected regulated compounds are detailed in the following pages. Also listed are regulated and unregulated compounds that were not detected.

Tests listed in this report were conducted by DHEC, by the Greenville Water System in its DHEC certified laboratories or by other certified laboratories. The System ensures your water quality by testing water samples collected during the treatment process and as the water is delivered to customers through approximately 2,695 miles of pipeline. The Water Quality Report indicates that the Greenville Water System's watershed protection practices and treatment procedures are highly effective. But more importantly, **our water is pure and safe to drink.**



WHERE DOES MY WATER COME FROM?

The Greenville Water System draws water from three sources: **Table Rock Reservoir** on the South Saluda River, **Poinsett Reservoir** on the North Saluda River and **Lake Keowee**.

Table Rock and Poinsett Reservoirs are both located in the foothills of the Blue Ridge Mountains in northern Greenville County. The Greenville Water System owns 100 percent of both watersheds. Additionally, the Water System regularly patrols and carefully maintains these uninhabited, pristine lands. The properties are further protected by a Conservation Easement with The Nature Conservancy. Lake Keowee is owned by Duke Energy. The Water System has an agreement with Duke to ultimately withdraw up to 150 million gallons per day (MGD) for our customers' water needs. Table Rock and Poinsett have the capacity to deliver up to 30 and 63 MGD, respectively.

DHEC conducted a Source Water Assessment on Greenville's three water sources. The document is available at www.scdhec.net/water or by calling (803) 898-4300. No sources of contamination were found in either the North Saluda or Table Rock watersheds. One hundred forty five potential contaminant sources were found in the 377 square mile watershed of Lake Keowee. The Greenville Water System has not detected any contaminants in the finished drinking water from the Lake Keowee source.

HOW IS MY WATER TREATED?

All water supplied by the Greenville Water System is filtered. The Adkins Filter Plant, a conventional filtration plant with a current capacity of 60 MGD, draws water from Lake Keowee. This plant uses coagulation, sedimentation, filtration and disinfection to treat the water. Alum is used in the coagulation step along with small amounts of sodium hydroxide for pH adjustment. Chlorine, combined with ammonia, is used for disinfection to protect against water-borne diseases and a polyphosphate is added for corrosion control. Fluoride is provided to prevent tooth decay.

A state-of-the-art filter plant was placed in service in July 2000, to provide filtration for all water drawn from the Table Rock and Poinsett Reservoirs. This 75 MGD plant is one of the largest in the United States to use Dissolved Air Flotation (DAF) in the treatment process. The DAF Plant uses an innovative flotation process for particle removal rather than sedimentation. Remaining processes and chemicals used are similar to those at the Adkins Plant.

All treatment plants are rigidly maintained and monitored by State Certified Environmental Systems Operators who are thoroughly trained to make routine chemical and physical tests for treatment control.

AWOP ACHIEVEMENT AWARD

The Area Wide Optimization Program (AWOP) was established by DHEC in order to encourage water treatment facilities to strive toward excellence in water treatment. We are proud to announce that both the DAF Plant and the Adkins Water Treatment Plant were honored with this prestigious award in 2001 – 2009.

PARTNERSHIP FOR SAFE WATER AWARDS

The Commissioners of Public Works for the Greenville Water System are pleased to announce that in 2009, both water treatment plants received the "Directors Award of Recognition" from the Partnership for Safe Water. The Partnership is a national volunteer initiative developed by the EPA, American Water Works Association, and other water organizations representing water suppliers striving to provide their communities with drinking water quality that surpasses the required Federal standards.

WHAT IF I HAVE QUESTIONS?

If you would like more information about water treatment techniques or about our water quality, contact the Greenville Water System's Laboratory at 864.241.7838. You can visit our web page at www.greenvillewater.com, or contact us by e-mail at laboratory@greenvillewater.com.

Este informe contiene informaccion importante sobre la calidad del agua en su comunidad. Hable por favor con alguien que puede traducirlo para usted.

GENERAL INTEREST WATER QUALITY – FINISHED WATER

DATA IS FROM 2009

Parameter		Low	Average	High
Alkalinity	mg/L	5.2	8.5	16
Calcium	mg/L	0.90	1.3	1.7
Conductivity	uS/cm	21	48	64
Hardness (total)	mg/L	3.1	5.1	6.7
Magnesium	mg/L	0.31	0.50	0.61
Potassium	mg/L	0.44	0.70	1.0
Phosphate (total)	mg/L	0.61	0.97	1.2
**Ammonia (total)	mg/L	0.23	0.53	0.80
Sodium	mg/L	5.9	7.8	9.2

mg/L = milligrams per liter (parts per million-ppm)
uS/cm = microSiemens per centimeter
**Excludes March when Ammonia is not used.

The tables below list all the regulated drinking water contaminants that were detected during the **2009** calendar year except where noted. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the tables contain data from testing done **January 1-December 31, 2009**. DHEC requires us to monitor for certain contaminants that are not expected to vary significantly from year to year. Some of the data, though representative of the water quality, may be more than one year old.

TERMS AND ABBREVIATIONS:

MCL (Maximum Contaminant Level):
The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the 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.

TT (Treatment Technique):
A required process intended to reduce the level of a contaminant in drinking water.

SU (Standard Units):
Unit of measure to indicate water acid/base scale (pH).

AL (Action Level):
The concentration of a contaminant which triggers treatment or other requirement which a water system must follow.

ppm (Parts per Million):
This is the same as Milligrams per Liter, or one penny out of $10,000.

ppb (Parts per Billion):
This is the same as Micrograms per Liter, or one penny out of $10,000,000.

NA (Not Applicable):
Does Not Apply.

ND (Not Detected):
Not detected or below detection limits.

NTU (Nephelometric Turbidity Units):
Units of measure to indicate water clarity.

MRDL (Maximum Residual Disinfectant Level):
The maximum permissible level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. MRDLs are enforceable standards.

MRDLG (Maximum Residual Disinfectant Level Goal):
The maximum level of a disinfectant in drinking water at which no known or anticipated adverse effect on the health of persons would occur and that allows for an adequate margin of safety. MRDLG's are nonenforceable public health goals.

LRAA (Locational Running Annual Average):
The average concentration at a particular location for 4 consecutive quarters.

PRIMARY DRINKING WATER STANDARDS—ALL DATA FROM 2009

Parameter	Unit	MCL	MCLG	Range	Highest Level Detected	Possible Sources	Violation
INORGANIC COMPOUNDS							
Fluoride	ppm	4	4			Drinking water additive	
DAF Plant (DHEC Data)				NA	0.69	*Fluoride added during*	NO
Adkins Plant (DHEC Data)				NA	0.84	*treatment to prevent*	NO
Distribution System (GWS Data)				ND - 1.04	Avg = 0.85	*tooth decay*	NO
Nitrate/Nitrite (as nitrogen)	ppm	10	10				
DAF Plant (DHEC Data)				NA	0.045	Erosion of natural deposits;	NO
Adkins Plant (DHEC Data)				NA	0.060	fertilizer runoff, By-products of nitrification	NO
Distribution System (GWS Data)				ND - 0.28	Avg = 0.04		
ORGANIC COMPOUNDS							
Total Trihalomethanes							
Distribution System	ppb	80	0	8.4 - 27.9	LRAA=15.9	By-products of disinfection	NO
Total Haloacetic Acids							
Distribution System	ppb	60	0	4.6 - 21.8	LRAA=16.5	By-products of disinfection	NO
TOC (Total Organic Carbon)				Percent Removal	Range		
DAF Plant (samples collected monthly)		TT	N/A	53% (35% required)	45 - 65%	Occurs naturally in the environment	NO
Adkins Plant (samples collected monthly)		TT	N/A	13% (35% required)	0 - 22%		NO
							Due to low raw water TOC levels, Adkins and DAF plants are in compliance
		MRDL	MRDLG				
DISINFECTANTS							
Chloramine	ppm	4	4	0.01- 3.0	Avg. = 2.0	Water additive to control	NO
Free Chlorine (March only)	ppm	4	4	0.09 - 2.9	Avg. = 1.7	microbes	

MICROBIAL & PHYSICAL CHARACTERISTICS

Parameter	Units	MCL	Results	Possible Sources	Violation
Total Coliform	% positive per month	Less than 5%	0.6% Maximum	Common in the environment; human and animal waste	NO
Turbidity		95% of samples	100% of plant samples are below MCL		
DAF Plant	NTU	< 0.3	Maximum = 0.07; Average = 0.05	Soil runoff	NO
Adkins Plant	NTU	< 0.3	Maximum = 0.07; Average = 0.05	Soil runoff	NO
Distribution System	NTU	NA	Average=0.11	Turbidity is a measure of water clarity and a good indicator that the treatment process is removing tiny particles	NA

LEAD & COPPER RULE

Parameter	Units	Action Level (AL)	90th Percentile Value	Sample Sites Exceeding Action Level	Possible Sources	Violation
Data is from Summer 2009						
Lead- Customer's plumbing	ppb	15	0.0	2	Corrosion of household plumbing	NO
Copper - Customer's plumbing	ppm	1.3	0.095	0	Corrosion of household plumbing	NO

UNREGULATED CONTAMINANT MONITORING RULE 2 (UCMR2)

N-Nitrosodimethylamine (NDMA)	Units	Average	Range	Sources
DAF Plant	ppb	ND	N/A	By- Product of Chloramination
Adkins Plant	ppb	0.0024	ND – 0.0048	
Distribution System	ppb	0.0035	0.0029 – 0.0041	

FINISHED WATER SECONDARY STANDARDS

Parameter	Units	MCL	Range	Average	Possible Sources
Chloride	ppm	250	2.7 - 7.9	4.5	Soil runoff
Color	color	15	ND	ND	Naturally occurring
Iron	ppb	300	ND	ND	Soil runoff, pipe material
Manganese	ppb	50	ND	ND	Soil runoff
pH	SU	6.5 - 8.5	6.9 - 8.5	7.5	Controlled at treatment plant
Solids (Total Dissolved)	ppm	500	18 - 52	35	Soil runoff
Zinc	ppm	5	ND - 0.13	0.08	Drinking water additive
Sulfate	ppm	250	4.8 - 7.5	5.8	Drinking water additive
Aluminum	ppm	0.05 - 0.20	ND	ND	Drinking water additive
Silver	ppm	0.10	ND	ND	Some home water treatment filters, mining operations

Tests were performed during 2009 (unless noted) for the following contaminants.
NONE WERE DETECTED.

Primary Inorganic Elements: Antimony; Arsenic; Barium; Beryllium; Cadmium; Chromium; Mercury; Nickel; Selenium; Thallium.

Synthetic Organic Compounds (SOCs): 1,2-Dibromo-3- Chloropropane (DBCP); 1,2-Dibromoethane (EDB); 2,4,5- TP (Silvex); 2,4-D; Alachlor (Lasso); Aldicarb (Temik); Aldicarb sulfone; Aldicarb sulfoxide; Atrazine; Benzo(a)pyrene; Carbofuran; Chlordane (Technical Chlordane); Dalapon; Di(2-ethylhexyl)adipate; Di(2-ethylhexyl)phthalate; Dinoseb; Diquat; Endrin; Glyphosate (Round-up); Heptachlor; Heptachlor epoxide; Hexachlorobenzene; Hexachlorocyclopentadiene; Lindane (gamma-BHC); Methoxychlor; Oxamyl (Vydate); Pentachlorophenol (PCP); Picloram; Polychlorinated biphenyls (PCBs); Simazine; Toxaphene.

Volatile Organic Compounds (VOCs): 1, 1, 1-Trichloroethane; 1, 1, 2- Trichloroethane; 1, 1-Dichloroethylene; 1, 2-Dichloroethane; 1, 2- Dichloropropane; 1, 3-Dichlorobenzene; 1, 4-Dichlorobenzene; Benzene; Carbon Tetrachloride; Chlorobenzene; cis-1, 2-Dichloroethylene; Ethylbenzene; M, P- Xylenes; Methylene Chloride; o-Xylene; Styrene; Tetrachloroethylene; Toluene; trans 1, 2-Dichlorcethylene; n1, 2, 4-Trichlorobenzene; Trichloroethylene; Vinyl Chloride.

Other Organic Compounds: 1, 1, 1, 2- Tetrachloroethane; 1, 1, 2, 2- Tetrachloroethane; 1, 1-Dichloroethane; 1, 1-Dichloropropene; cis-1,3- Dichloropropene; 1, 2, 3-Trichlorobenzene; 1, 2, 3-Trichloropropane (TCP); 1, 2, 4- Trimethylbenzene; 1, 2-Dichlorobenzene; 1, 3, 5-Trimethylbenzene; 1, 3- Dichloropropane; 2, 2-Dichloropropane; 2-Chlorotoluene; 4-Chlorotoluene; Bromobenzene; Bromochloromethane; Bromomethane; Chloroethane; Chloromethane; Dibromomethane; Dichlorodifluoromethane; Hexachlorobutadiene (HCBD); Isopropylbenzene; Naphthalene; N-Butylbenzene; N-Propylbenzene; P- Isopropyltoluene; Sec-Butylbenzene; Tert-Butylbenzene; trans-1, 3-Dichloropropene; Trichlorofluoromethane; Methyl Tert-Butyl Ether (MTBE)

Unregulated Compounds: 3-Hydroxycarbofuran; Aldrin; Butachlor; Carbaryl; Dicamba; Dieldrin; Methomyl; Metolachlor (Dual); Metribuzin (Sencor); Propachlor.

In Compliance with Treatment Techniques for: Giardia; Viruses; Cryptosporidium.

Radiological: Gross alpha; Gross beta (done in 2001).

The Greenville Water System was monitored for four consecutive quarters during 2001 for 12 parameters (listed below) required under the Unregulated Contaminant Monitoring Rule 1. **NONE WERE DETECTED**: 2,4-Dinitrotoluene; 2,6-Dinitrotoluene; Acetochlor; DCPA mon-acid; DCPA di-acid; 4,4'-DDE; EPTC; Molinate; Nitrobenzene;

The Greenville Water System was monitored for 2 quarters in **2009** for 25 parameters required under the Unregulated Contaminant Monitoring Rule 2. The following parameters were **NOT DETECTED**: Dimethoate; 2,2',4,4',5,5'-Hexabromobiphenyl; 2,2',4,4',5,5'-Hexabromodiphenyl ether; 2,2',4,4',5-Pentabromodiphenyl ether; 2,2,4,4,6 -Pentabromodiphenyl ether; Terbufos-sulfone; 2,2',4,4'-Tetrabromodiphenyl ether; 1,3-Dinitrobenzene; Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX); 2,4,6-Trinitrotoluene (TNT); N-Nitrosodiethylamine (NDEA); N-Nitrosodi-N-butylamine (NDBA); N-Nitrosodi-N-propylamine (NDPA); N-Nitrosomethylethylamine (NMEA); N-Nitrosopyrrolidine (NPYR); Acetochlor; Alachlor; Metoachlor; Acetochlor ESA; Acetochlor OA; Alachlor ESA; Alachlor OA; Metolachlor ESA; Metolachlor OA. Results for NDMA are found in the above UCMR2 table.

THE ENVIRONMENTAL PROTECTION AGENCY REQUIRES THAT ANNUAL WATER QUALITY REPORTS CONTAIN THE FOLLOWING STATEMENTS:

Giardia and *Cryptosporidium*

The Greenville Water System has conducted monthly testing of raw and finished water for these single celled organisms since 1994,with federal and state testing beginning in October 2006. Only a few of these organisms have ever been detected. During 2009, 1 *Giardia* cyst and no *Cryptosporidium* oocysts were detected from Lake Keowee raw water. No organisms were detected from Table Rock and Poinsett Reservoirs. *Cryptosporidium* is a one celled protozoan, too small to be seen without a microscope. It can be found in the feces of infected animals or humans. When present in sufficient numbers, it can cause symptoms that can include diarrhea, nausea and stomach cramps. Other sources of *Cryptosporidium* include unwashed hands, contaminated surfaces inside and outside the home, contaminated food and recreational waters. No precaution about our drinking water is currently needed for the general public. People with weakened immune systems should speak with their health care providers about how to protect themselves against *Cryptosporidium* from all sources.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800.426.4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and 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 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 organics, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water run off and septic systems.
- Radioactive contaminants, which can be naturally-occurring or 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 which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminates in bottled water which must provide the same protection for public health.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised 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* are available from the Safe Drinking Water Hotline (800.426.4791).

Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

LEAD & COPPER INFORMATION

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. Greenville Water System is responsible for providing high quality drinking water, but 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 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your drinking 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.

CONSERVE WATER AND SAVE MONEY. HERE'S HOW . . .

- Take a quick shower rather than a bath and save an average of 20 gallons of water.
- When brushing teeth or shaving, turn the water off and save more than 5 gallons per day.
- Keep your tap water cold in the refrigerator rather than running water until it is cold enough for drinking.
- Water your lawn no more than twice/week before 8 a.m., otherwise you can lose up to 30% of your water due to evaporation during midday hours.
- Avoid watering your lawn on windy days.
- Use a broom to clean your driveway and sidewalks instead of water.
- Excessive lawn irrigation wastes more water than any other residential use.
- When washing your car; use a bucket with soapy water. Use a nozzle on your hose for rinsing. This will control the flow of water.
- Place a cover on your pool or spa. Left uncovered, you can loose up to 1,000 gallons of water per month.

To find out more on water conservation, go to www.waterwiser.org and www.fightaquamania.com

HOW CAN I GET INVOLVED?

The Commissioners of Public Works, the elected officials who control the Water System, hold regular meetings on the second Monday of each month. These meetings are held at Greenville Water System, 407 West Broad Street, and begin at 8:30 a.m.

The public is welcome to attend.

www.greenvillewater.com