



# Charlestown Water

## System:

*Now and in the Future*



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*What's in our water?*



## *Foreword*

This pamphlet is designed to help educate Charlestown water customers on our water source and distribution system, as well as the state of the water company.

It is our hope that after reading this pamphlet, our customers will have an understanding of the quality of the water, steps taken to improve water quality, the challenges we still face, budget constraints and the next steps in the eventual total rehabilitation of the Charlestown water system.

This pamphlet has been written in terms that can be understood by anyone outside the drinking water industry. All the material contents are taken from studies, best practices, testing labs, and from state and federal agencies responsible for the safety of drinking water.

We have depended upon the experts with knowledge of our water works for the content and plans to update the infrastructure of the 72 year-old water distribution system to modern standards.

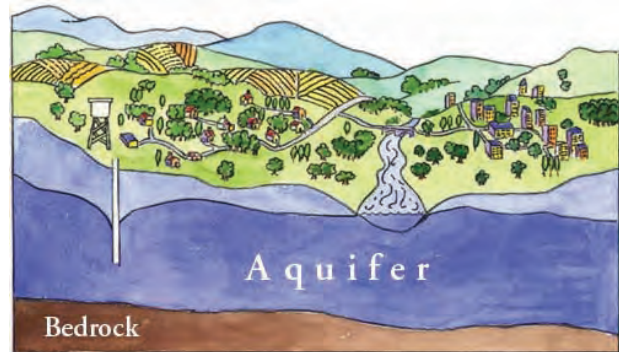
The Board of Public Works

Mayor Bob Hall  
David Flowe  
George Roberts

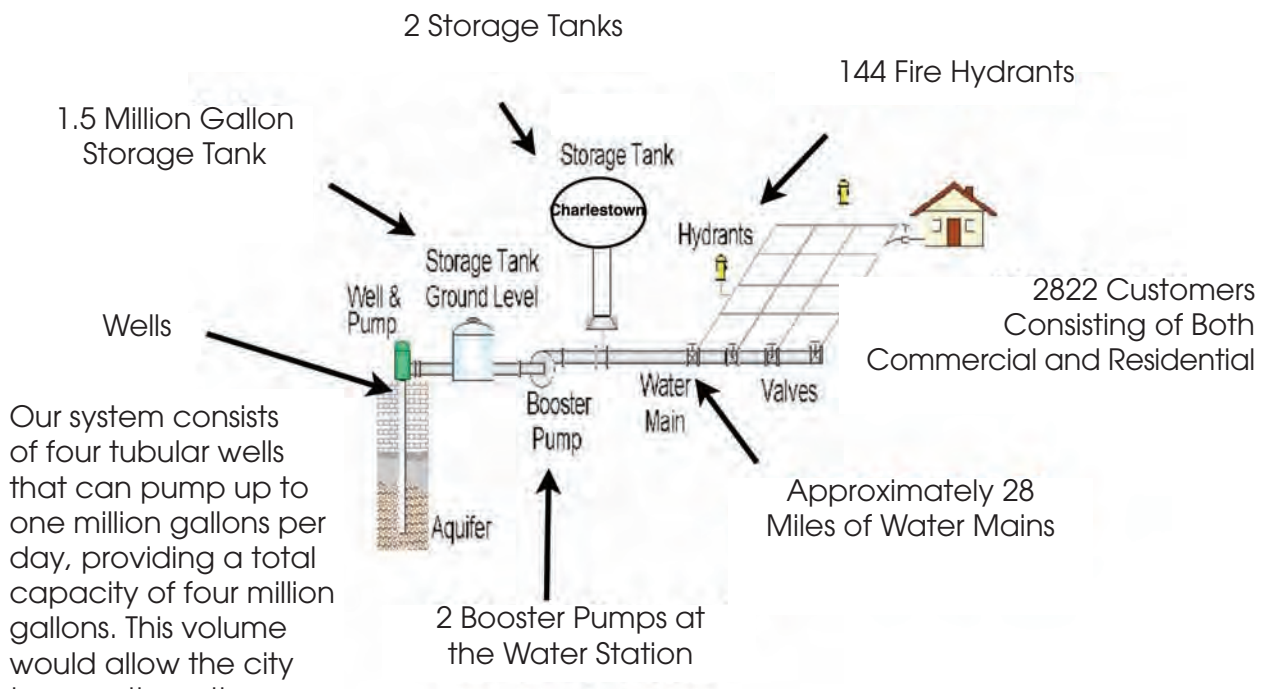
# Where Does Our Water Come From?

Charlestown gets its water from an aquifer that runs underground and borders the Ohio River.

It has its own natural filtration system of sand and gravel that eliminates the impurities that come from surface water. This is a process that occurs continually. The aquifer supplies an enormous water capacity for our system.



# The Charlestown Water System



Our system consists of four tubular wells that can pump up to one million gallons per day, providing a total capacity of four million gallons. This volume would allow the city to grow three times its current size and still have plenty of water to supply all of our citizens.

Charlestown citizens have had a 72 year history with this water and water system. Charlestown's residents experience a high quality of life that includes healthy living and safe water supply.

# *Is Charlestown's Drinking Water Safe?*

## **What Law Keeps My Drinking Water Safe?**

Congress passed the Safe Drinking Water Act (SDWA) in 1974, to protect public health by regulating the nation's public drinking water supply and protecting sources of drinking water. SDWA is administered by the U.S. Environmental Protection Agency (EPA) and the Indiana Department of Environmental Management (IDEM).

## **Where Can I Find Information About Charlestown's Water System?**

Since 1999, Charlestown, along with other water companies, is required to provide annual Consumer Confidence Reports to their customers. These reports, due by July 1 of each year, contain information on contaminants found in the drinking water, possible health effects, and the water source. There has been no history of contaminants in Charlestown's water.

Charlestown must promptly inform water system customers if your water has been contaminated by something that can cause immediate illness. We have 24 hours to inform customers of violations of EPA standards that have the potential to have serious adverse effects on human health as a result of short-term exposure. If such a violation occurs, we will announce it through the media, and will provide information about the potential adverse effects on human health, steps the system is taking to correct the violation, and the need to use alternative water supplies (such as a boiled or bottled water) until the problem is corrected.

We will inform our customers about violations of less immediate concern in the first water bill sent after the violation, in a Customer Confidence Report, or by mail within a year. In 1998, states began compiling information on individual systems, so you can evaluate the overall quality of drinking water in your state. Additionally, EPA must compile and summarize the state reports in an annual report on the condition of the nation's drinking water.

## *How Often is Our Charlestown Water Supply Tested?*

The EPA has established pollutant-specific minimum testing schedules for all public water systems. Tests for chloride, fluoride and phosphates are run daily. Tests for iron, manganese, and bacteria are run monthly.

If a problem is detected, immediate retesting requirements go into effect along with strict instructions about how the system informs the public. Until the system can reliably demonstrate that it is free of problems, the retesting is continued.

## What Causes Discolored Water?

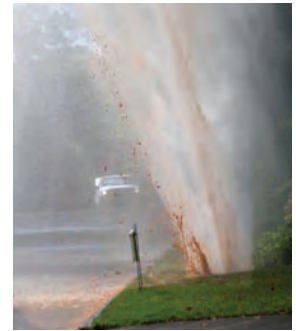
Over the 72 years this water distribution system has been in operation, manganese has built up inside the water mains.



Build-up inside the waterlines

### Water Pressure Changes

Significant water pressure changes occur in the water lines when a water main breaks, the fire department uses hydrants to extinguish fires, or the hydrants are flushed.



This loss of pressure and the recharging of the water rushing back into the lines acts like a scouring pad to break the accumulated manganese free inside the lines. This creates a large concentration of manganese that travels through the system.

When someone turns the water on inside their home, this manganese concentration is captured through their lines and the discolored water appears.

Customers who live in areas with dead-end lines are more prone to experience this because the water has no other outlet.

Until the lines are clear of this build up, the dead-end lines are looped back in the system, and more hydrants are added, we will continue to experience occasional discoloration.

*Ongoing identification and correction of these areas will be discussed later in this publication.*



## *Is Discolored Water Unique to Charlestown?*

No. Occasional discolored water certainly is not unique to Charlestown. Many water companies throughout the region, state and nation deal with this nuisance.

**It happens both with systems that utilize filtration and with those that do not utilize filtration.**

**An Evening News article dated May 15, 2007,** cites customer complaints made to Indiana American Water Company at a rate hearing last year in Jeffersonville. “Ida Callahan...came to Kye’s armed with two glass bottles — one that had been sanitized and one that had held tap water. When the tap water evaporated out of the bottle it left a milky residue, she said. ‘That’s why I won’t drink it, it’s dirty.’”

Also from the Evening News, October 28, 2008, Indiana America warns customers about discolored water occurring during times of flushing. The release states, “The routine work is being done as part of an annual main-flushing program that improves water service by flushing or cleaning mineral deposits and sediment from water mains... The company does not foresee incidences of discoloration, but ***if this does occur***, the company recommends customers let their cold water run to clear before using it again and refrain from doing laundry during that time.”

In summary, Indiana American Water Company has a filtration plant that has been in use since 1999. Even with filtration, they experience the same issues with water discoloration, especially at times of flushing, as do other communities including Charlestown.

**Charlestown must comply to all the same testing and regulations as those required of Indiana American Water Company, and their water, like ours, meets the same safe drinking standards outlined in this publication.**

# What is Manganese and What Effect Does it Have on the Body?

Manganese is a naturally-occurring, gray-white element that can be found everywhere – in the air that we breathe, the soil in which we grow our crops, and the water that we drink.

Manganese is an essential nutrient for humans and animals alike. It is essential for proper coordination between brain and body.

Our greatest exposure to manganese is usually from food. The largest quantities of manganese are found in avocados, nuts and seeds, seaweed, and whole grains. This mineral may also be found in blueberries, egg yolks, legumes, dried peas, pineapples, and green leafy vegetables.

Adults commonly consume 0.7 milligrams to 10.9 milligrams every day from the food that we eat with even higher amounts of manganese associated with vegetarian diets. Many multi-vitamins contain manganese to supplement our manganese consumptions.

Although manganese is an essential nutrient at low doses, chronic exposure to high doses may be harmful.

SUPPLEMENT FACTS		
Serving Size: One tablet		
	Amount Per Serving	% Daily Value
Total Carbohydrate	< 1 g	< 1%*
Vitamin A (40% as beta-carotene)	3500 IU	70%
Vitamin C	60 mg	100%
Vitamin D	400 IU	100%
Vitamin E	22.5 IU	75%
Vitamin K	25 mcg	31%
Thiamin (B1)	3 mg	200%
Riboflavin (B2)	3.4 mg	200%
Niacin	40 mg	200%
Vitamin B6	4 mg	200%
Folic Acid	400 mcg	100%
Vitamin B12	12 mcg	200%
Biotin	300 mcg	100%
Pantothenic Acid	10 mg	100%
Calcium (elemental)	250 mg	25%
Iron	9 mg	50%
Iodine	150 mcg	100%
Magnesium	40 mg	10%
Zinc	15 mg	100%
Selenium	45 mcg	64%
Copper	2 mg	100%
Manganese	2 mg	100%
Chromium	100 mcg	63%
Molybdenum	25 mcg	33%
Potassium	99 mg	3%
Nickel	5 mcg	**
Tin	10 mcg	**
Silicon	5 mg	**
Boron	150 mcg	**
Guarana Seed Powder	110 mg	**
Caffeine	90 mg	**

\*Percent Daily Values are based on a 2,000 calorie diet.  
\*\*Daily Value not established.



## *How Much Manganese is Too Much?*

In order to enhance consumer acceptance of water resources throughout the country, EPA recommends reducing manganese concentration to or below 0.05 milligrams per liter (parts per million), which is the EPA'S Secondary Maximum Contaminant Level for manganese. This level is established based on staining and taste considerations – not health risks.

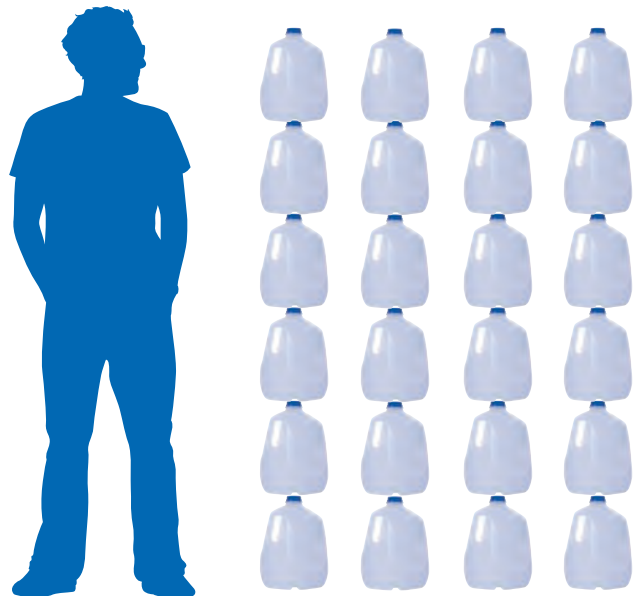
The EPA issued a Lifetime Health Advisory (HA) for manganese. This type of advisory is developed by EPA only for chemicals such as manganese, that are not likely to cause cancer to humans. The Lifetime HA established by the EPA represents only that portion of an individual's total exposure to manganese that is attributed to drinking water and is considered protective of non-cancer-causing adverse health effects over a lifetime of exposure.

The EPA estimated that, assuming a body weight of approximately 154 pounds, an intake of 10 milligrams of manganese per day is safe for a lifetime of exposure.

## *How Much Charlestown Water Would I have to Drink to Ingest 10 Mg of Manganese?*

If we assume that Charlestown water always contains manganese at a level of 0.11 milligrams per liter based on a monthly average, you would have to consume about 24 gallons of water every day to ingest 10 milligrams of manganese. Even if you could drink that much water, the EPA would consider the amount of manganese you consumed as being SAFE!

**You cannot drink enough Charlestown water to ingest manganese to a level that is harmful to your health.**



## *Where Are We Today?*

Since 2000, there have been major improvements to and millions of dollars invested in the Charlestown water system.

In 2000, more than 50% of the fire hydrants did not work, and had not worked for many years. This prevented any effective flushing of the system. These were replaced or repaired. Others have been added through the years, and more are still needed in order to have the necessary capabilities to effectively flush the lines.

In 2000, nearly 60% of the water meters were inoperable. They were replaced with electronic meters.

In 2001, a polyphosphate was added to the water system to reduce further manganese build-up in the lines. This did not remove existing build-up, but did help stop the issue from further progressing.

In 2002, water mains in Pleasant Ridge were replaced. Prior to this time, it was common to have two to three water line breaks daily, with more than 80% occurring in Pleasant Ridge. Today, we average about ten per month instead of the 70 – 80 once experienced.

There have been miles of mains replaced in the last ten years and many more to go.

In 2002, it was common to receive 10-15 calls per day about discolored water. Today, in normal operations, we receive less than that in three months, unless there is a large water main break, flushing, or significant loss of pressure in the mains that affects the whole system. In these cases, more customers are affected.

In 2006, a new elevated storage tank was built. This tank helps maintain consistent pressure and reduces the drastic fluctuations that cause discolored water.

In 2008, the city applied for and received a grant to have a company investigate our raw water supply in terms of the water quality and quantity; develop alternative solutions to the city's long-term water needs; and recommend actions that might be taken to further improve the quality and quantity of water to our current and future customers. The study and testing, which took place in 2009, has been valuable in formulating a strategy of well use and distribution needs.

# CLEARITAS



## *What's Next?*

We have been working with the Indiana Department of Environmental Management (IDEM) to access the same \$500,000 grant obtained from Congress in 2007, in order to improve the Charlestown water system. The funds are now in place, and we are awaiting IDEM approval of the engineering report. We expect to obtain this funding.

Improvements will be made to our well field along the river and at the high service booster station. Improvements include replacing old pumps, installing state-of-the-art control systems and emergency generators, and well rehabilitation. The ground storage tank at the high service booster station will be rehabilitated, eliminating another source of manganese build-up within the system.

A new feed system will be installed at the booster station and well field that will begin introducing a product called **Clearitas** (formerly RE-Ox), which will allow us to efficiently remove the build-up of manganese and iron that has accumulated in our water mains.

**Clearitas is a non-hazardous solution that removes corrosive deposits such as iron, manganese, and calcium scale.** It will be used to penetrate and remove the build-up in the water mains and storage tanks to improve the overall quality of the water. This is a tasteless, odorless, colorless, and non-hazardous product that has been used successfully in a number of communities.



# CLEARITAS



A community that has seen great success in resolving the same discolored water issue associated with manganese is Patriot, Indiana.

Patriot's manganese levels were greater than six times that of Charlestown. The introduction of Clearitas to the Patriot system three years ago, has allowed the city to effectively manage manganese build up and improve overall water service to water customers. After approximately three years of use and an effective flushing program, Patriot's water department has virtually eliminated discolored water complaints and has helped to pioneer the use of this product for high level manganese treatment in water systems.

It is expected that Charlestown can also experience this same success as the systems are virtually identical.

Another component of this work will be the installation a backup generator for the electrical system at the well field. The 1.5 million gallon storage tank will also be rehabilitated. Finally, we will install a state-of-the-art computerized model of the entire system, as well as a computerized system to monitor and operate the well field, storage tanks, and distribution system. When completed, these upgrades will result in creating greater efficiency, and will assist in the development of an optimum flushing' method and schedule.

This will be another major step in making improvements to reduce and eliminated our discolored water.

## *Treatment versus Filtration*

The water from our wells is clear as it comes from the wells. It becomes discolored as mains are disrupted and water flows through them into your home. This is the situation that must be addressed.

Charlestown previously considered constructing a green sand filtration plant at a total project cost well in excess of 1.7 million dollars. In addition to the initial costs, on-going operation, maintenance and replacement costs would have necessitated considerable rate increases. Costs associated with the plant operation (manpower, electricity, chemicals, replacing filter media, etc.) would constantly increase from year to year necessitating additional rate increases.

Rather than constructing an expensive filtration plant, which would not have alleviated the discolored water issue, we looked at alternatives that would be more cost-effective to solve the discolored water problems in the lines.

Currently, Charlestown does not find it advantageous to build a multi-million dollar water filtration plant and raise water rates accordingly to pay for the construction of the plant and the ever-increasing costs of operation, maintenance and replacement expenses associated with a water filtration plant.

As stated earlier, the issue is the build-up in the water mains and a filtration plant will not resolve that.

***Why not just build a water filtration plant?***

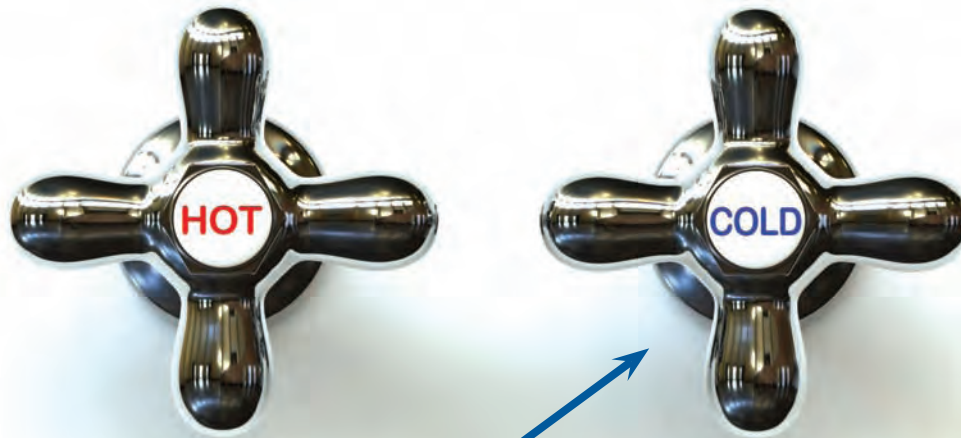
***Simply stated, because building a plant will require raising water rates and won't solve the discolored water problem.***



## *Frequently Asked Questions*

### **What do I do if I get discolored water?**

As explained in early chapters, the manganese concentration is temporary. To clear your lines, turn on only the COLD water faucets in your house until your water clears. Be sure NOT to use the hot water faucet, as it will draw the discolored water into your water heater.



To clear your lines,  
turn on the COLD  
water faucets

### **What if my laundry is stained by discolored water?**

When your water clears, rewash your clothes using one of two products - Super Iron Out or OxiClean. Many people use these products with every wash to keep their whites white. Both are available at most retail outlets.

### **What if my water has a sulphur smell?**

Strong smells like this are associated with your water heater. You may want to flush your water heater.

## *A Word from the Water Billing Company*

Charlestown Clerk Treasurer Donna Coomer has recently announced the addition of online payments for your water, sewer and sanitation bills. One of the main goals of this project is to introduce a way to allow payments by credit card. This service is offered in addition to the automatic debit service currently being offered. Auto-debit allows the billing office to deduct your monthly bill from your checking account automatically each month.

Also new in the last year, is the introduction of a new billing system. By allowing Boyce Systems to process the utility bills, we have streamlined the process, resulting in cost savings. Now customers receive an easy to read, full-page bill, complete with a return envelope.

We would like to offer some water conservation tips:

### **FIX**



### **ADJUST**



### **CONSERVE**



- Adjust sprinklers so only your lawn is watered and not the house, sidewalk or street.
- Run your clothes washer and dishwasher only when they are full. You can save up to 1,000 gallons per month.
- Monitor your water bill for unusually high use. Your bill and water meter are tools that can help you discover leaks. \*
- We're more likely to notice leaks indoors, but don't forget to check outdoor faucets, sprinklers and hoses for leaks.
- Fix that leaky faucet. It's simple and inexpensive, and you can save 140 gallons per week.

\*Due to the variance of the number of days in a billing cycle, it is possible that your utility could vary by \$10 - \$15 each month. This can occur for a number of reasons.

First, some months are longer than others. When you have two long months together, such as December and January, your bill will be higher in comparison to a month such as February, in which there are fewer days in the billing cycle.

Secondly, despite all efforts to read the meters at the same time each month, there are occasions when weather or other unforeseen circumstances prevent this. For these reasons, the number of days in a billing cycle can vary from 26 or 27 to as many as 31 or 32. Just a few days can make a significant difference in your bill. For instance, your average bill may be \$100 for a typical 30 day read. If the billing cycle was only 27 days, your bill would be approximately \$90.18, and for a billing cycle that is 32 days, your bill could be as much as \$106.88. These variances are common and to be expected.

If you have questions about this information or need further information on billing, please contact the water department at 812-256-2427.

For more tips, please visit [www.wateruseitwisely.com](http://www.wateruseitwisely.com).



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## Ten Fun Facts About Water

1. Approximately 400 billion gallons of water are used in the United States each day.
2. More than 25% of bottled water comes from a municipal water supply, the same place that tap water comes from.
3. In one year, the average American residence uses more than 100,000 gallons of water (indoors and outside).
4. It takes seven and a half years for the average American residence to use the same amount of water that flows over the Niagara Falls in one second (750,000 gallons).
5. American residents use about 100 gallons of water per day.
6. Americans use more water each day by flushing the toilet than they do by showering or any other activity.
7. The average faucet flows at a rate of two gallons per minute. You can save up to four gallons of water every morning by turning off the faucet while you brush your teeth.
8. Taking a bath requires up to 70 gallons of water. A five-minute shower uses only 10 to 25 gallons.
9. A running toilet can waste up to 200 gallons of water per day.
10. It takes more than ten gallons of water to produce one slice of bread.



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