City of Houston
Department of Public Works and Engineering
Drinking Water Quality Report
2007

Houston's Water is rated Superior!

This report contains information about your drinking water and the treatment and monitoring performed to serve the highest possible quality of water to you.

You can be assured that **Superior Drinking Water** is being provided to you and millions of other customers in the Greater Houston Metropolitan Area. **Houston drinking water continues to meet and exceed all Federal and State standards for safe drinking water.** The City of Houston has maintained a **five-year record of providing safe and reliable drinking water of Superior Quality**. In addition, the city participated voluntarily in the **Partnership for Safe Drinking Water** to produce water of a quality better than most other water providers in the nation.

City of Houston Drinking Water Sources

Sources of drinking 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 in some cases, radioactive materials, and can pick up substances resulting from the presence of animal or human activity.

There is enough water in our distribution system at any given time to fill the Astrodome 2 ½ times. In 2007 Houston received 86% of its treated drinking water from its major surface water treatment plants. Surface water comes from the San Jacinto River through Lake Conroe and Lake Houston, and the Trinity River, through Lake Livingston. The remaining 14% comes from groundwater wells. These are deep wells with average depths greater than 750 feet, producing water from the Evangeline and Chicot Aquifers, and are not vulnerable to surface contamination.

Visit our web site for more information:

www.publicworks.houstontx.gov/utilities/drinkingwater.htm

Northeast Water Purification Plant Storage Tanks, 2007

Courtesy of City of Houston WaterWorks Museum + Education Center

H_2Ouston Drinking Water Operations Delivers!

Quality

We work hard to bring you one of the highest quality drinking water in the nation! Houston's drinking water is rated **"Superior"** by TCEQ, meaning we have exceeded its expectations of a water utility. This includes not only bringing you great tasting water but taking extra efforts to protect our water sources.

The City of Houston actively participates with the **American Water Works Association** (AWWA) and other agencies that research water quality issues. Such research helps us optimize and improve our drinking water operations.

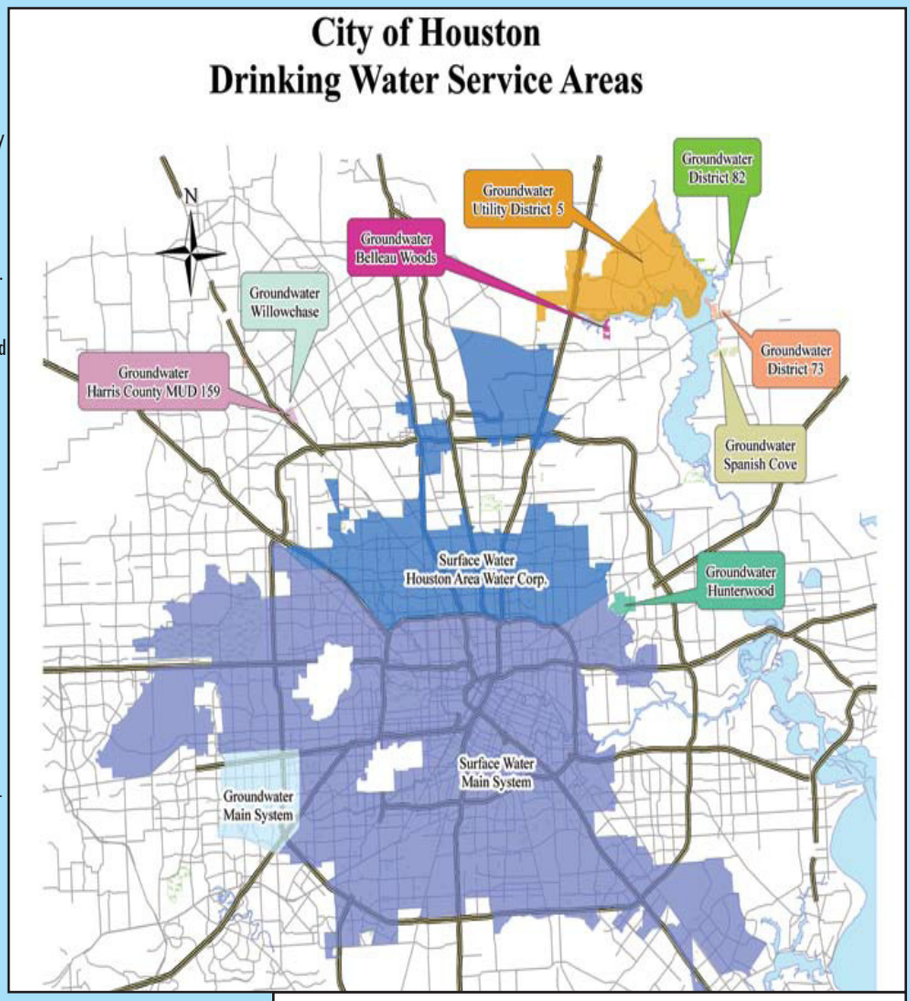
Reliability

The City of Houston's Waterworks has been in place since the early 1900's, ensuring dependable water service to our customers. This includes operating three water purification complexes and maintaining over 7,000 miles of water pipelines.

Recently, the City's of Houston's water purification plants have been nationally recognized among the most effective water plants in the nation. The East Water Purification Plant recently won the **Five-Year Directors Award** for achieving excellence in water purification maintenance. This award is given to utilities' which meet or exceed water quality standards established by the **Partnership for Safe Drinking Water**. This program ensures that preventive measures are being optimized at our treatment plants to increase performance and protection against microbiological contamination.

Service

The City of Houston operates a non-emergency help line-**311**. Customers can dial this number to notify us of any problems they may be experiencing and a water quality investigator will be dispatched within twenty-four hours to respond to and resolve the problem. In addition, Houston Drinking Water Operations operates a 24-hour control center to remotely monitor system conditions at all its facilities. This control center assists with responding to system problems before they affect the customers. Please dial 311 if you have any questions or concerns regarding your drinking water.



What type of water do you drink?

Locate your approximate area on the map provided. Identify the corresponding color of your area. Match the color of your area in the following tables. You can determine the quality of your water by comparing it to the MCL.

En Español

Este informe contiene información muy importante sobre de su aqua que bebe. Tradúzcalo, ó hable con alguien que lo entiende. Para mas información por favor llame Linea de Ayuda de Houston marcando 311.

Isolated Groundwater Systems*

CONTAMINANT (units)	MCLG	MCL	BELLEAU WOODS	SPANISH COVE	DISTRICT 82		HARRIS COUNTY MUD 159		UTILITY DISTRICT 5		HUNTERWOOD	WILLOWCHASE		DISTRICT 73		SOURCES OF CONTAMINANTS
					Avg	Max	Avg	Max	Avg	Max		Avg	Max	Avg	Max	
Alpha Emitters (pCi/L)	0	15	ND ('05)	ND ('05)	2.9 ('01)	3.2 ('01)	6.2 ('03)	6.2 ('03)	2.9 ('05)	5.0 ('05)	ND ('05)	4.3 ('02)	8.6 ('02)	5.2 ('02)	6.2 ('02)	Erosion of natural deposits
Arsenic (ppb)	0	10	< 2.0 ('05)	2.9 ('05)	< 2.0 ('05)	< 2.0 ('05)	2.2 ('03)	2.2 ('03)	< 2.0 ('05)	< 2.0 ('05)	7.4 ('03)	2.2 ('03)	2.2 ('03)	< 2.0 ('05)	< 2.0 ('05)	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium (ppm)	2	2	0.292 ('01)	0.3350 ('05)	0.139 ('04)	0.139 ('04)	0.257 ('03)	0.257 ('03)	0.252 ('05)	0.252 ('05)	0.276 ('03)	0.246 ('02)	0.246 ('02)	0.276 ('05)	0.309 ('05)	Discharge of drilling wastes; erosion of natural deposits
Beta/Photon Emitters (pCi/L)	0	50***	< 4.0 ('05)	5.8 ('01)	< 4.0 ('05)	< 4.0 ('05)	< 4.0 ('05)	< 4.0 ('05)	< 4.0 ('05)	7.1 ('05)	2.5 ('03)	< 4.0 ('00 - 02)	4.3 ('00 - 02)	4.6 ('02)	4.7 ('02)	Decay of natural or man made deposits
Copper (ppm)	1.3	90% below AL = 1.3	90% below 0.081 at customer tap-none exceeded AL ('99)	90% below 0.002 at customer tap-none exceeded AL ('03)	90% below 0.043 at customer tap-none exceeded AL ('00)		90% below 0.257 at customer tap-none exceeded AL ('99)		90% below 0.2440 at customer tap-none exceeded AL ('05)		90% below 0.15 at customer tap-none exceeded AL ('00)	90% below 0.1620 at customer tap-none exceeded AL ('05)		90% below 0.1190 at customer tap-none exceeded AL ('99)		Erosion of natural deposits; corrosion of household plumbing
Ethylbenzene (ppb)	700	700	< 0.5 ('05)	< 0.5 ('05)	< 0.5 ('05)	< 0.5 ('05)	< 0.5 ('05)	< 0.5 ('05)	1.2 ('05)	7.2 ('05)	< 0.5 ('05)	< 0.5 ('05)	< 0.5 ('05)	0.8 ('05)	1.5 ('05)	Discharge from petroleum refineries
Fluoride (ppm)	4.0	4.0	ND ('05)	0.1 ('05)	ND ('05)	ND ('05)	ND	ND	0.3 ('05)	0.3 ('05)	0.5 ('00)	0.1 ('05)	0.1 ('05)	0.1 ('05)	0.1 ('05)	Water additive which promotes strong teeth; erosion of natural deposits
Lead (ppb)	0	90% below AL = 15	90% below 2.1 at customer tap-none exceeded AL ('99)	90% below 1.0 at customer tap-none exceeded AL ('03)	90% below 1.4 at customer tap-none exceeded AL ('00)		90% below 3.8 at customer tap-none exceeded AL ('99)		90% below 2.2 at customer tap-none exceeded AL ('05)		90% below 4.0 at customer tap-one exceeded AL ('00)	90% below 3.2 at customer tap-none exceeded AL ('05)		90% below 2.2 at customer tap-one exceeded AL ('99)		Erosion of natural deposits; corrosion of household plumbing
Nitrate (ppm), as N	10	10	< 0.01 ('05)	< 0.01 ('05)	0.16	0.16	0.21	0.22	0.02	0.05	< 0.01 ('05)	0.20	0.20	0.02	0.04	Runoff from fertilizer use; erosion of natural deposits
Selenium (ppb)	50	50	< 3.0 ('05)	< 3.0 ('05)	< 3.0 ('05)	< 3.0 ('05)	3.9 ('03)	3.9 ('03)	< 3.0 ('05)	< 3.0 ('05)	< 3.0 ('05)	3.8 ('02)	3.8 ('02)	< 3.0 ('05)	5.7 ('05)	Erosion of natural deposits
Total Trihalomethanes (TTHMs) (ppb)	N/A	Running Annual Avg = 80	7.9 ('05)	< 8.0 ('05)	4.6 ('05)	9.2 ('05)	< 8.0 ('05)	< 8.0 ('05)	1.3 ('05)	12.8 ('05)	< 8.0 ('05)	2.4 ('05)	2.4 ('05)	< 8.0 ('05)	< 8.0 ('05)	By-product of drinking water disinfection
Toluene (ppm)	1	1	< 0.0005 ('05)	< 0.0005 ('05)	< 0.0005 ('05)	< 0.0005 ('05)	< 0.0005 ('05)	< 0.0005 ('05)	0.0011 ('05)	0.0063 ('05)	< 0.0005 ('05)	< 0.0005 ('05)	< 0.0005 ('05)	< 0.0005 ('05)	< 0.0005 ('05)	Discharge from petroleum factories
Combined Radium (pCi/L)	0	5	< 1.0 ('05)	< 1.0 ('05)	< 1.0 ('04)	< 1.0 ('04)	0.4 ('03)	0.4 ('03)	1.0 ('05)	1.1 ('05)	< 1.0 ('05)	0.4 ('02)	0.4 ('02)	0.6 ('02)	0.7 ('02)	Erosion of natural deposits
Total Xylenes (ppm)	10	10	< 0.0015 ('05)	< 0.0015 ('05)	< 0.0015 ('05)	< 0.0015 ('05)	< 0.0015 ('05)	< 0.0015 ('05)	0.0028	0.0028	< 0.0015 ('05)	< 0.0015 ('05)	< 0.0015 ('05)	0.0040 ('05)	0.0079 ('05)	Discharge from petroleum factories; discharge from chemical factories

Microbiological and Physical Quality*

CONTAMINANT (units)	MCLG	MCL	MAIN SYSTEM	UTILITY DISTRICT 5	SOURCES OF CONTAMINANTS
Total Coliforms	0	5% of monthly samples tested positive	1.1% Highest percentage of monthly samples	1.0% Highest percentage of monthly samples	Naturally present in the Environment
E. Coli	0	0	0	0	Human and animal fecal waste
Viruses, Giardia, Legionella	0	TT	ND	ND	Naturally present in the Environment
Turbidity (clarity) (NTU) Main System - Surface Water	N/A	95% of samples tested each month less than or equal to 0.3	0.05 Average Range = 0.00 - 0.55 98.9% was the Lowest monthly percentage of samples meeting the limit	N/A	Soil runoff

Unregulated Contaminants*

Unregulated contaminants are those for which the EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist the EPA in determining the occurrence of unregulated contaminants in drinking water and whether future regulation is warranted.

CONTAMINANT (units)	MAIN SYSTEM (Surface)		MAIN SYSTEM (Ground)		HOUSTON AREA WATER CORP. (Surface)		BELLEAU WOODS ('05)	SPANISH COVE ('05)	HARRIS COUNTY MUD 159 ('05)	UTILITY DISTRICT 5	WILLOW-CHASE ('05)	DISTRICT 73 ('05)	
	Avg	Max	Avg	Max	Avg	Max						Avg	Max
Chloroform (ppb)	17.5	43.5	2.1	6.1	15.1	29.1	0.8	< 0.5	< 0.5	3.3	< 0.5	1.8	3.5
Bromodichloromethane (ppb)	6.3	14.2	6.0	31.0	4.0	8.2	1.5	< 0.5	< 0.5	12.0	< 0.5	3.4	6.8
Dibromochloromethane (ppb)	1.5	9.9	4.9	20.0	1.7	2.0	2.0	< 0.5	< 0.5	29.0	< 0.5	2.6	5.2
Bromoform (ppb)	< 1.0	4.8	2.8	6.3	< 1.0	< 1.0	1.3	< 0.5	< 0.5	26.0	< 0.5	< 0.5	< 0.5
4-methyl-2-pentanone (MIBK) (ppb)	< 2.0	< 2.0	2.8	22.0	< 2.0	< 2.0	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene (ppb)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acetone (ppb)	< 10	< 10	< 10	< 10	< 10	< 10	30.0	< 10	< 10	< 10	< 10	< 10	< 10
2-Hexanone (ppb)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Residual Disinfectant Level

MAIN SYSTEM & HOUSTON AREA WATER CORPORATION (HAWC)	
MCL	4.0
MCLG	< 4.0
Average	Chlorine = 1.3 Chloramines = 2.2
Range of detected levels	Free Chlorine = 0.2 - 2.5 Chloramines = 0.5 - 3.9
Source of Constituent	Disinfectant used to control microbes

Stage 1 Disinfection By-Products

	MAIN SYSTEM	HAWC	MAIN SYSTEM	HAWC
	HALOACETIC ACIDS - HAAS (ppb)		TOTAL TRIHALOMETHANES - TTHMS (ppb)	
MCL	60 as Running Annual Average (RAA) of quarterly samples in distribution system		80 as Running Annual Average (RAA) of quarterly samples in distribution system	
Average	13.4	9.9	15.9	11.2
Range of detected levels	< 6.0 - 90.7	6.3 - 15.7	< 8.0 - 69.3	< 8.0 - 19.1

Initial Distribution System Evaluation for Disinfection By Products

Main System		
	HALOACETIC ACIDS - HAAS (ppb)	TOTAL TRIHALOMETHANES - TTHMS (ppb)
MCL	60	80
Average	24.2	27.9
Range of detected levels	< 6.0 - 54.0	< 4.0 -58.0
Source of Constituent	By-product of drinking water disinfection	By-product of drinking water disinfection

- The City of Houston uses chloramines for the disinfection of its drinking water. This protects public health by controlling central exposure to waterborne organisms known to cause infectious diseases in humans, while at the same time lowering regulated disinfection by-products. For certain sensitive uses such as kidney dialysis, chlorinated water must be treated before use.
- During 2006, the City of Houston collected more than 600,000 laboratory samples for containments in its source water, treated water and distribution system.
- Over 6000 bacteriological samples are collected every month from the City's distribution system.

Concerns:

- Arsenic - 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.
- Copper - Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor.
- Lead - Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

Measurement Definitions

Nephelometric Turbidity Unit (NTU): Turbidity is a measure of how clear the water looks.

N/A: Not Applicable

ND: Not Detected

pCi/L: picocuries per liter (a measure of radioactivity)

ppm: 1 part per million = 1 mg/L = 1 milligram per liter

ppb: 1 part per billion = 1 ug/L = 1 microgram per liter

1 ppm =1000 ppb

* **Calendar Year 2006 data unless otherwise specified.**

** **Includes groundwater and surface water sites.**

*** **EPA considers 50 picocuries per liter to be the level of concern for beta particles.**

**** **MCL compliance is based on annual average of samples.**

Main Water System

(Most City of Houston customers receive their drinking water from the Main System.)

CONTAMINANT (units)	MCLG	MCL	SURFACE WATER		GROUND WATER		HOUSTON AREA WATER CORP. (Surface)		SOURCES OF CONTAMINANTS
			Avg	Max	Avg	Max	Avg	Max	
Alpha Emitters (pCi/L)	0	15****	3.9 ('05)	10.8 ('05)	6.5 ('05)	20.7 ('05)	< 2.0 ('05)	< 2.0 ('05)	Erosion of natural deposits
Arsenic (ppb)	0	10	4.1 ('06)	4.1 ('06)	1.4	2.1	< 2.0 ('06)	< 2.0 ('06)	Erosion of natural deposits
Atrazine (ppb)	3	3	0.37	0.40	< 0.20 ('05)	< 0.20 ('05)	0.22	0.39	Runoff from herbicide used on row crops; commonly found in surface water at low levels
Barium (ppm)	2	2	0.0839 ('05)	0.2010 ('05)	0.1933 ('06)	0.2370 ('06)	0.063 ('06)	0.063 ('06)	Discharge of drilling wastes; erosion of natural deposits
Benzene (ppb)	0	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	Discharge from factories; leaching from gas storage tanks and landfills
Beta/Photon Emitters (pCi/L)	0	50***	5.6 ('05)	16.2 ('05)	6.2 ('06)	11.1 ('06)	< 4.0 ('05)	< 4.0 ('05)	Decay of natural or man made deposits
Copper (ppm)	1.3	90% below AL = 1.3	90% below 0.1920 at customer tap - none exceeded AL ('05) **		90% below 0.1920 at customer tap - none exceeded AL ('05)**		ND		Erosion of natural deposits; corrosion of household plumbing
Ethylbenzene (ppb)	700	700	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	Discharge from petroleum refineries
Fluoride (ppm)	4.0	4.0	0.87	0.90	0.34	0.67	0.70	0.70	Water additive which promotes strong teeth; erosion of natural deposits
Lead (ppb)	0	90% below AL = 15	90% below 4.2 at customer tap - none exceeded AL ('05)**		90% below 4.2 at customer tap - none exceeded AL ('05)**		ND		Erosion of natural deposits; corrosion of household plumbing
Nitrate (ppm), as N	10	10	0.58	1.0	0.09	0.25	0.63	0.63	Runoff from fertilizer use; erosion of natural deposits
Nitrite (ppm), as N	1	1	< 0.01 ('05)	< 0.01 ('05)	< 0.01 ('06)	< 0.01 ('06)	0.45 ('05)	0.45 ('05)	Runoff from fertilizer use; erosion of natural deposits
Selenium (ppb)	50	50	< 3.0 ('05)	5.9 ('05)	< 3.0 ('06)	4.9 ('06)	< 3.0 ('06)	< 3.0 ('06)	Erosion of natural deposits
Toluene (ppm)	1	1	< 0.0005	< 0.0005	< 0.0005	0.0005	< 0.0005	< 0.0005	Discharge from petroleum factories
Combined Radium (pCi/L)	0	5	< 1.0 ('05)	3.8 ('05)	< 1.6 ('06)	3.9 ('06)	< 1.0 ('05)	< 1.0 ('05)	Erosion of natural deposits
Combined Uranium (ppb)	0	30	17.1 ('05)	17.1 ('05)	3.5 ('06)	3.5 ('06)	ND ('05)	ND ('05)	Erosion of natural deposits
Total Xylenes (ppm)	10	10	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015	Discharge from petroleum factories; discharge from chemical factories

Terminology

- Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
- Maximum Contaminant Level (MCL): 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.
- Maximum Contaminant Level Goal (MCLG): 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.
- Maximum Residual Disinfectant Level (MRDL): 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.
- Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

2007 Drinking Water Quality Report

City of Houston
Department of Public Works & Engineering

Drinking Water and Your Health

Notice from the EPA

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. Contaminants may be found in drinking water that may cause taste, color, or odor problems. Presence of contaminants does not necessarily indicate that the water poses a health risk. In order to ensure that tap water is safe to drink, the EPA and the TCEQ enforce regulations that limit the amount of certain contaminants in water provided by public water systems.

Health-Related Notices

Special Notice for the Elderly, Infants, Cancer Patients, People with Weakened Immune Systems

At-risk citizens may be more vulnerable than the general population to certain microbial contaminants such as Cryptosporidium, in drinking water. Those potentially effected include; infants, some elderly or immunocompromised persons such as those who have undergone chemotherapy for cancer, those who have undergone organ transplants, those who are undergoing treatment with steroids, and people with HIV/AIDS or other immune system disorders. Those concerned should seek advice about drinking water from their physician or health care provider. More information about contaminants and potential health effects and additional guidelines on appropriate means to lessen the risk of infection by microbial contaminants can be obtained by calling the following:

- **Safe Drinking Water Hotline 1-800-426-4791**
- **City of Houston Department of Health and Human Services/Bureau of Epidemiology 713-794-9181**

If other people, such as tenants, receive water from landlords, or property owners, it is important that owners provide this notice by posting it in a prominent location or by hand or mail delivery.

Please feel free to copy this report. Visit our web site:

www.publicworks.houstontx.gov/utilities/drinkingwater.htm

Is Giardia or Cryptosporidium in our water supply?

Cryptosporidium and Giardia are waterborne pathogenic organisms. Both are naturally present in the intestines of most mammals including humans, and are passed into the environment through urban runoff or sewage disposal system failure. The diseases caused by Cryptosporidium or Giardia can lead to symptoms such as diarrhea, abdominal discomfort, fever, weight loss, malabsorption, or anemia. Although not life threatening to healthy adults, Cryptosporidium and Giardia can be fatal to infants, the elderly, pregnant women, and immunocompromised persons.

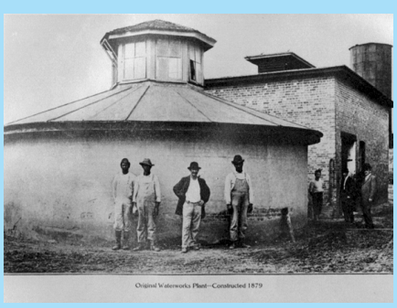
Neither Giardia nor Cryptosporidium is found in deep wells such as the City's, which are protected from surface water contamination. We routinely monitor our source water entering and treated water leaving our filtration plants for these two organisms. To date, we have detected no confirmed occurrences of either organism in any of our finished drinking water.

A Short History of the City of Houston's Drinking Water Operations

Not unlike many other nineteenth century land developers, Houston's founders, the Allen Brothers, advertised widely in 1836 to attract buyers for their infant village on the sparkling Buffalo Bayou. Water quality was an important element in those advertisements because access to pure water was as critical to life then as it is today.

In the early days of Houston's history, pure, clean water was not always readily accessible, therefore, citizens had to use a variety of methods to supply themselves with enough water to meet the needs of their families and businesses. They purchased barrels of spring water; they collected rainwater in cisterns; they filled home barrels with water from Buffalo Bayou water and they drilled shallow wells. None of these techniques proved sufficient for a growing community.

Aware that a more concerted effort was needed to supply water to its citizens, in 1878 city officials contracted with a New York business group to build a complete water system. The Water Works Company would pump clean water from Buffalo Bayou for human consumption and provide adequate water pressure for fire-fighting. Successful in its mission for a period, the company was soon sold to another group of local businessmen. For the next thirty years, increasing pollution in Buffalo Bayou and business decisions of the Water Works Company resulted in poor water quality for the citizens of Houston and provided early investigative reporters with many pages of newspaper copy.



Original Water Works - 1879
Courtesy of City of Houston E.B. Cape Center

In 1906, it was obvious that something had to be done to guarantee citizens that clean, potable water would be available every time they turned on their taps. The City of Houston purchased the Water Works Company and created the first City Water Department. For the last one hundred years, the department has consistently upgraded its facilities and continued to plan for the long-term future of the fourth largest city in the United States.

The modern City of Houston provides superior water to its customers that meets or exceeds all state and federal water requirements. Drinking Water Operations (which operates under the Public Utilities Division of the City's Department of Public Works and Engineering) constantly monitors the water that is treated and piped to its consumers and offers assurance that the water is safe for our customers.

Cover photo: Sunset at the Southeast Water Purification Plant. Taken by Mark Littleton, long time Drinking Water Operations employee and PWE Operations Manager. Mark passed away in early 2008. Our condolences continue to go out to his family and friends. He truly will be missed.

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