

Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

How Safe Is My Drinking Water?

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A national investigation and consulting firm of forensic experts in more than 50 targeted disciplines to provide scientific analysis, testing and expert testimony in litigation and insurance claims.

What Law Keeps My Drinking Water Safe?



- Congress passed the Safe Drinking Water Act (SDWA) in 1974 to protect public health
- This is performed 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 its state partners



Highlights of the Safe Drinking Water Act



- Sets enforceable health standards for contaminants in drinking water
 - Currently there are 91 regulated contaminants in drinking water
- Requires public notification of water systems violations and annual reports
- Includes provisions specifically designed to protect underground sources of drinking water



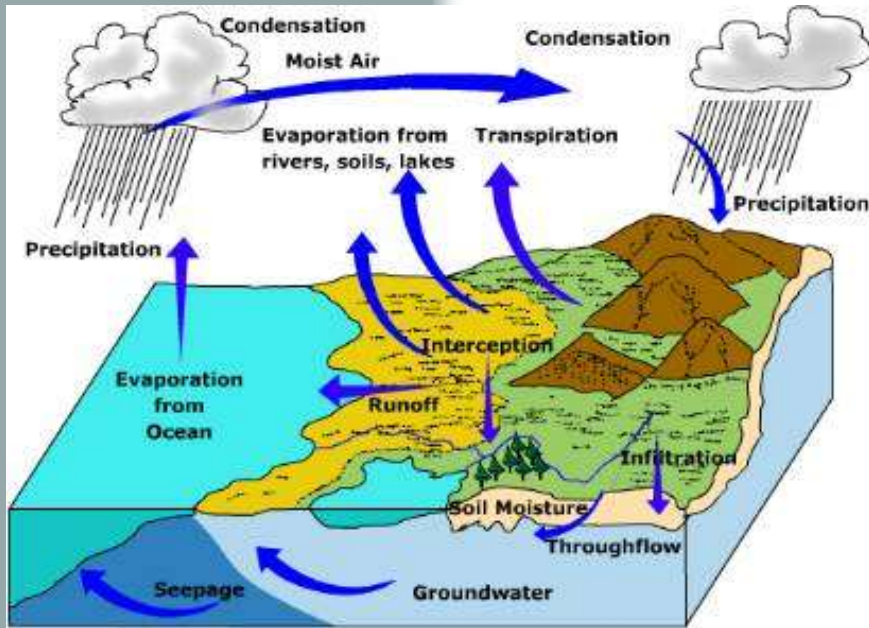
Highlights of the Safe Drinking Water Act



- Establishes a multi-billion-dollar state revolving loan fund for water system upgrades
- Requires an assessment of the vulnerability of all drinking water sources to contamination
- The SDWA Amendments stress efforts to protect source water



Drinking Water, Where Do We Get It?



- All drinking water is obtained from some part of the hydrological system; either rivers, lakes or ground water

- For over 150 million Americans, drinking water is supplied from ground water
- Over 40 million Americans obtain their drinking water from 15 million private wells utilizing groundwater as the source

Drinking Water, Where Do We Get It?



- There are over 200,000 public water systems in the U.S. of which 60,000 are called Community Systems
 - 80% of the community water systems have ground water as a source



- There are over 140,000 small Non-community Systems
 - 97% of the Non- community water systems have ground water as a source

What Is A Public Water System?

Public Water Supply Program



- **Public Water System (PWS)**
as one that serves piped water to at least 25 persons or 15 service connections for at least 60 days each year
- **Community Water System (CWS)**
public water systems that serve people year-round in their homes
 - Most people in the U.S. get their water from a community water system
- **Non-Community Water System (Non CWS)**
public water systems that do not serve the same people year-round

What Is A Public Water System?

- There are two types of non-community systems:

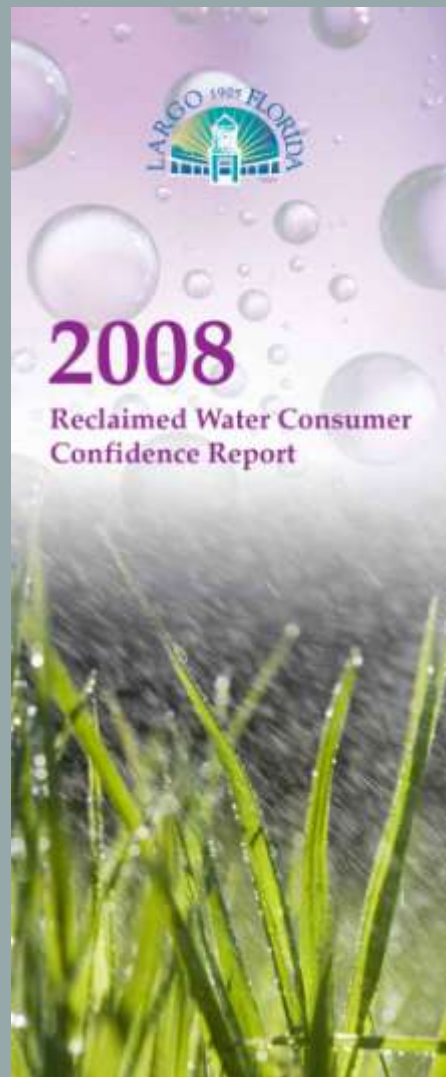


- **Non-Transient Non-Community Water System.** A non-community water system that serves the same people more than six months of the year, but not year-round.
 - For example, a school with its own water supply is considered a non-transient system.

- **Transient Non-Community Water System.** A non-community water system that serves the public but not the same individuals for more than six months
 - For example, a rest area or a campground may be considered a transient system.



Where Can I Find Information About My Local Water System?



- Since 1999, water suppliers have been required to provide annual Consumer Confidence Reports to their customers.
 - reports are due by July 1 each year
 - contain information on contaminants found in the drinking water, possible health effects, and the water's source
- Water suppliers must promptly inform you if your water has become contaminated by something that can cause immediate illness.

Notification of Violations of EPA Water Quality Standards



- Water suppliers have 24 hours to inform their 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, the water system must announce it through the media and provide information about the
 - potential adverse effects on human health
 - steps the system is taking to correct the violation
 - the need to use alternative water supplies (such as boiled or bottled water) until the problem is corrected



Notification of Violations of EPA Water Quality Standards (Continued)

- Systems are required to inform customers about violations of less immediate concern in the first water bill sent after the violation, in a Consumer Confidence Report, or by mail within a year
- In 1998, states began compiling information on individual systems
 - Information is available to the consumer
 - Information is provided to allow evaluation of the overall quality of drinking water in each state

Notification of Violations of EPA Water Quality Standards (Continued)



- EPA is required to compile and summarize the state reports into an annual report on the condition of the nation's drinking water.
 - To view the most recent annual report, see <http://cfpub.epa.gov/safewater/ccr/index.cfm>
 - To view the Consumer Confidence Report (CCR) Rule, see <http://cfpub.epa.gov/safewater/ccr/index.cfm>

Is My Water Supply Tested?



- EPA has established pollutant-specific minimum testing schedules for public water systems.
 - Frequency is based on the number of “taps” and the regulated substance being tested
- 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

Is My Water Supply Tested? (Continued)



- A study performed in 2001 by the EPA* indicated that one out of every four community water systems failed to conduct testing or report the results for the monitoring required to verify the safety of their drinking water

- Conducting the required monitoring and reporting is crucial to ensure that problems will be detected and corrected.

*(EPA 816-R-02-020)

http://water.epa.gov/type/groundwater/uic/upload/2004_5_3_uicv_techguide_uic_tech_overview_uic_regs.pdf

Is My Water Supply Tested? (Continued)

- A network of government agencies monitor tap water suppliers and enforce drinking water standards to ensure the safety of public water supplies
 - These agencies include EPA, state departments of health and environment, and local public health departments



- Nevertheless, problems with local drinking water can, and do, occur!

What Problems Can Occur?

- Improperly disposed-of chemicals, animal and human wastes, wastes injected underground, and naturally occurring substances have the potential to contaminate drinking water.

- Likewise, drinking water that is not properly treated or disinfected, or that travels through an improperly maintained distribution system, may also pose a health risk

- Some typical examples are microbial contamination, chemical contamination from fertilizers, and lead contamination



What Problems Can Occur?

Safe Drinking Water Act - Protecting America's Public Health

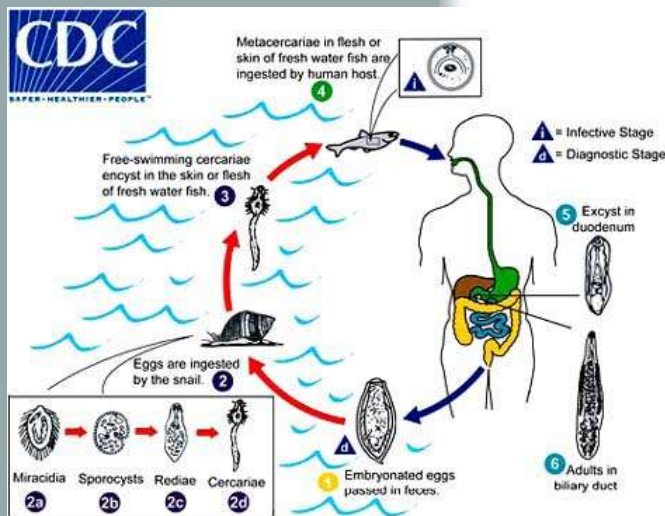


http://www.epa.gov/safewater/publicoutreach/pdfs/poster_landscape_11x17version.pdf

What Problems Can Occur? (Continued)

- **Microbial Contamination**

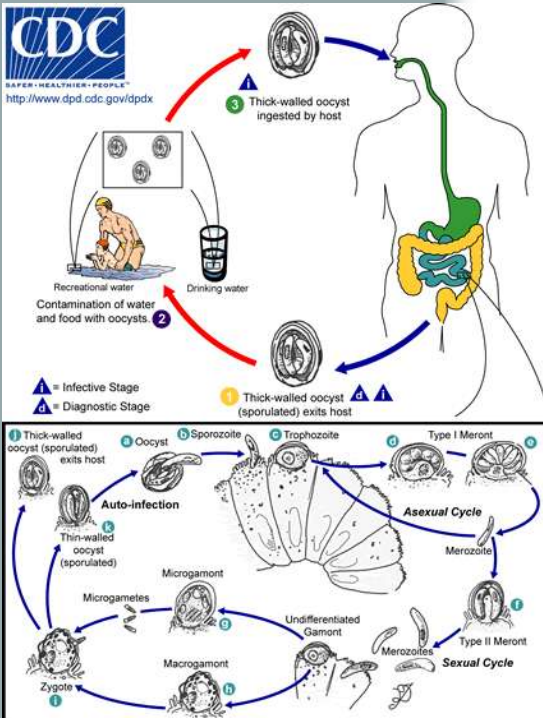
- Microbial contamination of drinking water can pose a potential public health risk in terms of acute outbreaks of disease
- The illnesses associated with contaminated drinking water are mainly gastro-intestinal in nature, although some pathogens (disease-causing microorganisms) are capable of causing severe and life-threatening illness



What Problems Can Occur? (Continued)

- **Microscopic Parasites**

- The pathogen *Cryptosporidium*, caused a serious outbreak of cryptosporidiosis occurring in 1993 in Milwaukee, Wisconsin
 - Cases were misdiagnosed as viral gastroenteritis or "intestinal flu"
- This outbreak caused more than 400,000 persons to be infected with the disease, and caused at least 50 deaths
 - This was the largest recorded outbreak of waterborne disease in United States history



What Problems Can Occur? (Continued)

Contaminant	Maximum Contaminant Level Goal (MCLG) (mg/l)	Maximum Contaminant Level (MCL) or Treatment Technique (TT) (mg/L)	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)
Cryptosporidium	Zero	99.99% removal/inactivation	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)
Giardia lamblia		99.99% removal/inactivation	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)
Heterotrophic plate count	N/A	No more than 500 bacterial Colony Forming Unit (CFU)	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. Lower concentration of bacteria in drinking water, the better maintained the water system is. Water quality indication organism.
Legionella	Zero	No limit but if Giardia removed / inactivated so will Legionella	Legionnaire's Disease, a type of pneumonia
Total Coliforms (including fecal coliform and E. Coli)	Zero	No more than 5.0% samples total coliform-positive in a month	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present
Turbidity	N/A	1 nephelometric turbidity unit (NTU)	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness
Viruses (enteric)	Zero	99.99% removal/inactivation	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)

What Problems Can Occur? (Continued)

- **Chemical Contamination**

- Nitrate, a chemical most commonly used as a fertilizer, poses an immediate danger to infants when it is found in drinking water at levels exceeding the national standard
 - State and federal laws set the maximum allowable level of nitrate-nitrogen in public drinking water at 10 milligrams per liter (10 parts per million).



What Problems Can Occur? (Continued)



- Water naturally contains less than 1 milligram of nitrate-nitrogen per liter and is not a major source of exposure.

- Higher levels indicate that the water has been contaminated.

- Common sources of nitrate contamination include fertilizers, animal wastes, septic tanks, municipal sewage treatment systems, and decaying plant debris.



What Problems Can Occur? (Continued)

- Infants who are fed water or formula made with water that is high in nitrate can develop a condition that doctors call methemoglobinemia.
 - The condition is also called "blue baby syndrome" because the skin appears blue-gray or lavender in color. This color change is caused by a lack of oxygen in the blood.
 - All infants under six months of age are at risk of nitrate poisoning.
 - Infants most at risk for blue baby syndrome are those who are already sick, and while they are sick, consume food that is high in nitrates, or drink water or formula mixed with water that is high in nitrates



What Problems Can Occur? (Continued)



- Some scientific studies have found evidence suggesting that women who drink nitrate-contaminated water during pregnancy are more likely to have babies with birth defects.
- Nitrate ingested by the mother may also lower the amount of oxygen available to the fetus.

What Problems Can Occur? (Continued)



- People who have heart or lung disease, certain inherited enzyme defects, or cancer may be more sensitive to the toxic effects of nitrate than others.



- In addition, some experts believe that long-term ingestion of water high in nitrate may increase the risk of certain types of cancer.

What Problems Can Occur? (Continued)

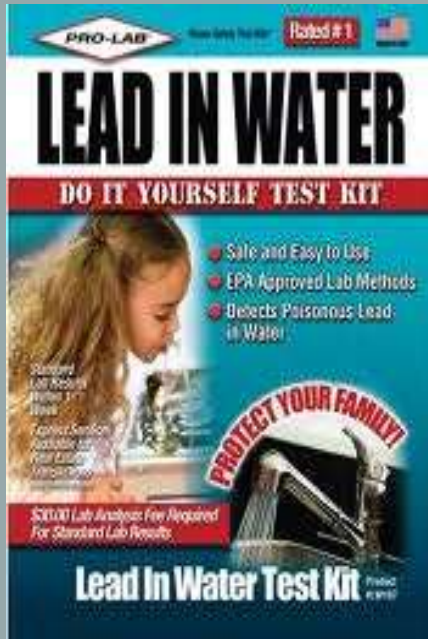
- **Lead Contamination**

- Lead, a metal found in natural deposits, is commonly used in household plumbing materials and water service lines.

- Lead is considered the number one health threat to children

- The effects of lead poisoning can last a lifetime and are not reversible

- delays in physical and mental development
 - damage to the nervous system
 - deficits in attention span and learning abilities



What Problems Can Occur? (Continued)

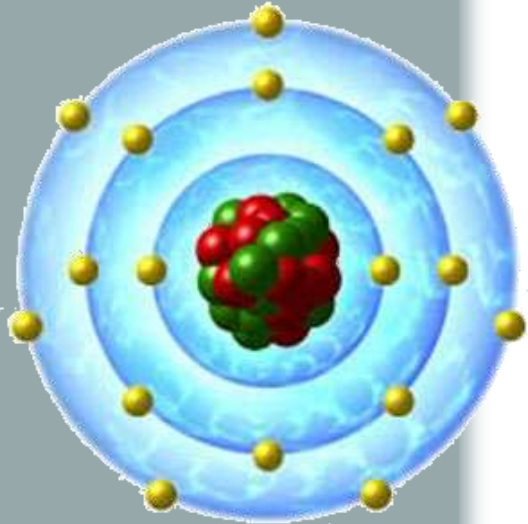
- **Disinfection Byproducts (DBPs)**

- DBPs form when disinfectants used to treat drinking water react with naturally occurring organic and inorganic materials in water.

- DBPs result from use of chlorine as a disinfectant.

- The DBPs are

- **Trihalomethanes (THMM)** chloroform, bromoform, bromodichloromethane, and dibromochloromethane
 - **Haloacetic acids (HA)** monochloro-, dichloro-, trichloro-, monobromo-, dibromo-

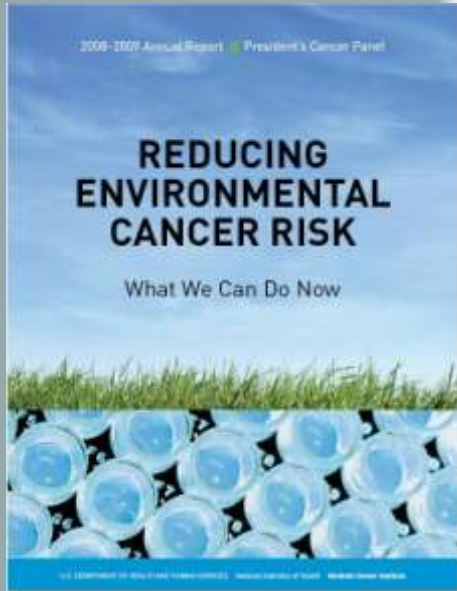


What Problems Can Occur? (Continued)



- EPA has regulated DBPs since 1979 to address health risks posed by a potential association between chlorinated drinking water and cancer.
- The Agency first regulated TTHMs in 1979 at 100 ppb, or microgram per liter ($\mu\text{g}/\text{L}$), for systems serving more than 10,000 people.
- The Agency revised this rule when it issued the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) in December of 1998.

What Problems Can Occur? (Continued)



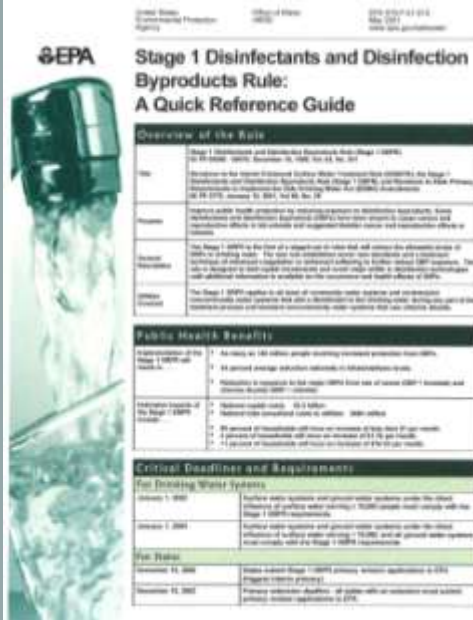
- DBP reproductive & developmental health effects
 - Epidemiology studies: miscarriage, stillbirth, birth defects, low birth weight.
 - Toxicology studies
 - Toxicology screening studies suggest that some DBPs may be reproductive/developmental hazard
- DBP cancer health effect risks
- DBP levels at some sites regularly exceed MCL

What Problems Can Occur? (Continued)

- The Stage 1 DBPR was the first of a staged set of rules that will reduce the allowable levels of disinfectants and disinfection byproducts (DBPs; including TTHMs) in drinking water.

- DBP Maximum Contaminant Level (MCL) :
 - TTHM 80 ug/L as a running annual average (RAA)
 - HAA5 60 ug/L as an RAA
 - Bromate 10 ug/L as a RAA

- This standard had to be met by the end of 2002 for systems serving 10,000 people and by the end of 2004 for systems serving less than 10,000 people.



What Problems Can Occur? (Continued)

- EPA proposed the Stage 2 DBPR in August 2003. This rule will reduce peaks of TTHMs, HAs and other DBPs (Chlorite and Bromate) in the distribution of a drinking water system.
 - EPA believes that this regulation will further decrease potential cancer, reproductive, and developmental risks. EPA intends to finalize the Stage 2 DBPR in 2005.
 - This rule will apply to all community water systems and non-transient non-community water systems that add a primary or residual disinfectant other than ultraviolet (UV) light or deliver water that has been disinfected by a primary or residual disinfectant other than UV.

**Stage 2 DBPR
IDSE Standard Monitoring Factsheet**

WHAT IS THE STAGE 2 DBPR?

The U.S. Environmental Protection Agency (EPA) published the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) on January 6, 2003. The Stage 2 DBPR builds on existing requirements by requiring water systems to meet additional indirect DBP requirements (MCLG) in each monitoring site in the distribution system to better protect public health.

WHAT IS THE IDSE PROVISION OF THE STAGE 2 DBPR?

The Stage 2 DBPR includes a provision requiring all community water systems (CWS) and only non-transient non-community water systems (NTNCWS) serving more than 15,000 people to conduct an initial distribution system evaluation (IDSE). NTNCWS serving less than 15,000 are exempt from IDSE requirements, but will need to comply with the Stage 2 DBPR compliance monitoring requirements. The goal of the IDSE is to characterize the distribution system and identify monitoring sites where customers may be exposed to high levels of total trihalomethanes (TTHM) and haloacetic acids (HAA5). These are the sites to comply with the IDSE requirements. Standard monitoring, System Specific Study, All-Disinfection (AD3), and Any-Residual (AR3) Water. The Standard Monitoring option requires the system to collect 1 year of TTHM and HAA5 data at a specified frequency and location to characterize TTHM and HAA5 levels in the distribution system. In addition to this data, the system must use additional Stage 2 DBPR compliance data monitoring to test and evaluate for Stage 2 DBPR compliance monitoring. Any water system subject to standard monitoring to meet the IDSE requirements of the Stage 2 DBPR. This document only provides information regarding the Standard Monitoring option.

STANDARD MONITORING REQUIREMENTS

Systems opting to conduct Standard Monitoring will need to:

- Step 1: Prepare and submit a Standard Monitoring Plan for the sites specified in Table 1 below.
- Step 2: Collect one year of Standard Monitoring in the distribution system.
- Step 3: Prepare and submit the IDSE Report.
- Step 4: Prepare a Stage 2 DBPR compliance monitoring plan.

Table 1: Standard Monitoring Compliance Dates

System Population	Standard Monitoring Start Date	Standard Monitoring End Date	Standard Monitoring Start Date	Standard Monitoring End Date
15,000 to 100,000 people or 10,000 to 100,000 gallons per day (GPD) of distribution system capacity	October 1, 2004	October 31, 2005	January 1, 2005	April 1, 2005
10,000 to 15,000 people or 10,000 to 100,000 GPD of distribution system capacity	October 1, 2005	March 31, 2006	July 1, 2005	October 1, 2005
10,000 to 15,000 people or 10,000 to 100,000 GPD of distribution system capacity	October 1, 2005	September 30, 2006	January 1, 2006	October 1, 2006
10,000 to 15,000 people or 10,000 to 100,000 GPD of distribution system capacity	April 1, 2006	March 31, 2007	July 1, 2006	October 1, 2007

Questions?

Thank you for having me!

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