

# *Water Treatment – Compliance and Safety*

**Maryland Center for Environmental Training**  
**301-934-7500**  
**[info@mcet.org](mailto:info@mcet.org)**  
**[www.mcet.org](http://www.mcet.org)**

## Water Treatment – Compliance and Safety

7 Contact hours

9 CC10 hours

How does compliance and safety impact the daily routine of water system operators? This course provides participants a wide variety of compliance related topics including: the induction and compliance of the Safe Drinking Water Act; proper sampling procedures and associated regulations; operator certification requirements; MDE permits and reporting; proper operator recordkeeping; and both OSHA and EPA requirements. These important topics have been compiled for the beginning operator as well as the experienced operator/manager.

- 1) Prepare proper water samples;
- 2) Interpret MDE permits and reporting requirements;
- 3) Implement proper recordkeeping; and
- 4) Comply with both OSHA and EPAWT requirements.

### Agenda:

8:00 AM to 8:30 AM	Introduction Hand out materials
8:30 AM to 10:00 AM	Safe Drinking Water Act, Regulations, OSHA and EPA
10:00 AM to 11:30 AM	Sampling procedures
11:30 AM to 12:30 PM	LUNCH
12:30 PM to 2:30 PM	Certifications requirements, MDE permits and reporting, recordkeeping
2:30 PM to 3:30 PM	Review; Questions
3:30 PM to 4:00 PM	Post-Test, evaluations

# Water Treatment - Compliance and Safety

MARYLAND CENTER FOR ENVIRONMENTAL TRAINING

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## Introduction

Overview

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## Training Session

- Before class starts, please sign in on the attendance sheet
- During class, please ask questions as we discuss the subject matter
- After class, please fill out a class evaluation form



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## Housekeeping

- Fill out registration forms, if applicable
- Please mute/silence cell phones and pagers
- Feel free to get up and leave classroom at any time (Rest rooms, make phone calls)
- 15-minute Breaks – every 1½ to 2 hours
- Lunch – 11:30 am to 12:30 pm
- End class about 3:30 pm

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## Ice Breaker

- Before we start, let's introduce ourselves.
  - Name,
  - What do you do, and
  - What are your training needs?

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## Instructor Expectations

- Be interactive
- Share experiences and needs
- ***Make this an enjoyable and informative experience!***

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## Ground Rules

- Participate, but do not dominate
- Use terms we all can understand
- Everyone is different, so show respect for others and their comments
- Listen with an open mind; understand what others have to say
- Express and defend opinions,

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## Agenda/Outline

- Introductions and class objectives
- Morning topics
  - Safe Water Drinking Act
  - Water Sampling
  - Operator Certification Requirements
  - MDE Regulations
- Lunch
- Afternoon topics
  - Record Keeping
  - OSHA Regulation
  - Risk Management Plans
  - Process Safety Management
- Exam review
- Final exam & closing

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## Safe Drinking Water Act (SDWA)



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## SDWA Outline

- History
- Definitions
- Current Regulations Overview
- Individual Rules

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## SDWA History

- SDWA promulgated in 1974
- Resulted from increased concern and awareness.
- Amended: 1986, 1996
- Establishes MCLs, (TT)<sup>3</sup>, monitoring, and reporting requirements
- Regulates >90 contaminants
  - Microbial
  - Chemical/Radiological




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## SDWA Definitions

- PWS: Public Water System
  - 15 or more connections
  - 25 or more people per day
  - at least 60 days per year
  - three subcategories
    - Community Water System
    - Non-Transient Non-Community Water System
    - Transient Non-Community Water System




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### SDWA Definitions (cont.)

- Community Water System (CWS)
  - A PWS that supplies water to the same residential population year-round.
  - Examples:
    - Cities
    - Towns
    - Rural Water Systems
    - Trailer Parks (not seasonal)




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### SDWA Definitions (cont.)

- Non-Transient Non-Community Water Systems (NTNCWS)
  - Regularly supplies water to at least 25 people at least 6 months per year but not to their residences



- Examples include:
  - Schools
  - Factories




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### SDWA Definitions (cont.)

- Transient Non-Community Water Systems
  - Provides water in a place where people do not stay for long periods of time
  - Examples include:
    - Restaurants
    - Rest stops
    - Campgrounds




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## SDWA Contaminants

- Divided into 2 categories:

- Microbial Contaminants

- Turbidity
    - Coliforms
    - Viruses
    - Protozoa



- Chemical & Radiological Contaminants

- Inorganic chemicals
    - VOCs
    - SOCs
    - DBP



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## Current Regulations Outline

- Regulations to decrease Microbial Risk

- LT1ESWTR
  - SWTR
  - Filter Backwash Rule
  - Total Coliform Rule

- Regulations to decrease Chemical /Radiological Risk

- Lead & Copper Rule
  - Stage 1/Stage 2 DPBR
  - 1986 Fluoride Rule
  - Phase I/II/III/V Rules
  - Arsenic Rule
  - Radionuclides Rule



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## SDWA Individual Rules

- LT1ESWTR

- Long Term 1 Enhanced Surface Water Treatment Rule
  - Applies to systems serving <10,000 people.
  - Sets Cryptosporidium removal and turbidity requirements
  - Requires disinfection benchmarking and covers on new finished water reservoirs

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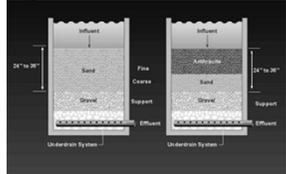
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## SDWA Individual Rules

- Filter Backwash Recycling Rule
  - Reduces risks from recycling contaminants removed during filtration
  - Affects systems that recycle spent filter backwash water, thickener supernatant, or liquids from dewatering



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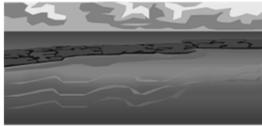
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## SDWA Individual Rules

- SWTR
  - Surface Water Treatment Rule
  - Protects against exposure to viruses, Legionella, Giardia and other pathogens by requiring certain types of treatment for surface water sources
  - GWUDI



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## SDWA Individual Rules



- Total Coliform Rule
  - Establishes monitoring requirements and MCLs for indicator bacteria



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## SDWA Individual Rules

- Lead & Copper Rule
  - Sets action levels for lead and copper that prompt corrosion control measures if exceeded
  - Sets monitoring, testing, reporting requirements



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## SDWA Individual Rules

- Stage 1 Disinfectants/Disinfection Byproducts Rule (DBP)
  - Increases requirements for some regulated DBPs
  - Sets new requirements for haloacetic acids, chlorite, and bromate

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## SDWA Individual Rules

- 1986 Fluoride Rule
  - Sets 4.0 mg/L MCL
  - Sets non-enforceable guideline of 2.0 mg/L for fluoride in drinking water



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## SDWA Individual Rules



- Phase I/II/IIB/V Rules
  - Protects consumers from chemical contaminants by establishing MCLs
  - Establishes monitoring and reporting requirements

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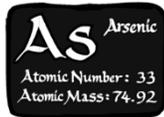
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## SDWA Individual Rules

- Arsenic Rule
  - Establishes monitoring requirements
  - Establishes MCL of 0.010 mg/L



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## SDWA Individual Rules

- Radionuclides
  - Sets uranium MCL
  - Revises monitoring requirements for combined radium 226/228, gross alpha particle and beta particle, and photon radioactivity



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## Two More Rules



- Public Notification Rule
  - Requires customer notification of violations
  - Specifies time frames based on seriousness of violation
- Consumer Confidence Report Rule
  - Required of all CWS
  - Yearly water quality report to customers

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## Bibliography

- EPA's Small Systems Web Site
  - <https://www.epa.gov/dwcapacity/learn-about-small-drinking-water-systems>
- EPA's Drinking Water Web Site
  - [www.epa.gov/safewater](http://www.epa.gov/safewater)
- Safe Drinking Water Hotline
  - (800) 426-4791
  - [Hotline-sdwa@epamail.epa.gov](mailto:Hotline-sdwa@epamail.epa.gov)
- Fact Sheets for Rules
  - <http://water.epa.gov/lawsregs/rulesregs/sdwa/#sdwafs>



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## Bibliography

- [www.epa.gov](http://www.epa.gov)
- EPA document, EPA 816-F-06-033, "Record Keeping Rules: A Quick Reference Guide"
- EPA document, EPA 816-R-03-017, Small Systems Guide to Safe Drinking Water Act Regulations"

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### Check Your Knowledge

- Which of these has 15 water connections and serves more than 25 people at least 60 days per year?
  - A. Private Well System
  - B. Connected Water System
  - C. Public Water System
  - D. Public/Private Well Service
- C. Public Water System

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### Check Your Knowledge

- A trailer park and a city are examples of:
  - A. Non potable water systems
  - B. Community water systems
  - C. Dangerous water connections
  - D. Private water systems
- B. Community Water System

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### Check Your Knowledge

- Restaurants and Rest stops are examples of
  - A. TNCWS
  - B. CWS
  - C. NTNCWS
  - D. SWTR
- A. TNCWS: Transient Non-Community Water System

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### Check Your Knowledge

- LT1ESWTR and SWTR apply to PWS that use:
  - A. Aquifers
  - B. Groundwater only
  - C. Hypochlorite systems
  - D. Surface water or GWUDI
  - D. Surface water or GWUDI

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### Check Your Knowledge

- This rule establishes monitoring requirements and MCLs for bacteria.
  - A. Total Coliform Rule
  - B. Arsenic Rule
  - C. Fluoride Rule
  - D. DBPR
  - A. Total Coliform Rule

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### Check Your Knowledge

- The Lead and Copper Rule deals with:
  - A. Sampling for nitrates
  - B. Source water
  - C. Corrosion control issues
  - D. Groundwater
  - C. Corrosion control issues

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### Check Your Knowledge

- What rule(s) is applicable to PWS that disinfect?
  - A. Arsenic Rule
  - B. Filter Backwash Rule
  - C. Radionuclides Rule
  - D. Stage 1 and Stage 2 DBPR
  - D. Stage 1 and Stage 2 DBPR

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### Check Your Knowledge

- SDWA stands for:
  - A. State Drinking Water Association
  - B. Safe Drinking Water Act
  - C. Station for Drinking Water Analysis
  - D. Sole Source Drinking Water Aquifer
  - B. Safe Drinking Water Act

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### Water Sampling



Video Presentation

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**Minimum Number of Routine Bacteriological Samples Required**

Type of System	Population Served	Minimum # of Routine Samples
Ground Water (GW)	25 – 1,000	1 sample per month or quarter
	1,001 – 2,500	2 samples per month or quarter
	2,501 – 3,300	3 samples per month or quarter

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**Minimum Number of Routine Bacteriological Samples Required**

Type of System	Population Served	Minimum # of Routine Samples
Surface Water (SW) or Ground Water Under the Direct Influence of Surface Water (GWUDI)	25 – 1,000	1 sample per month or quarter
	1,001 – 2,500	2 samples per month or quarter
	2,501 – 3,300	3 samples per month or quarter

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Population Served	# of Repeat Samples required per Positive Routine Sample
<b>25 – 1,000</b>	<b>3</b>
<b>1,001 – 2,500</b>	<b>3</b>
<b>2,501 – 3,300</b>	<b>3</b>

Repeat samples must be collected within 24 hours after MDE officials are notified of the routine positive coliform result.

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## Process Sampling

- Chlorine
- pH
- Alkalinity
- Iron
- Lead & Copper



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## Lead and Copper Sampling Procedures

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## Sampling Containers

Sampling containers for lead and copper are plastic and should be two 1-liter volume containers



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## First Draw Sample

All tap samples must be first-draw samples, taken from a kitchen or bathroom sink cold water tap.



This means that the water in the plumbing system should have stood motionless in the pipes for at least six hours.

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Fill out the sample label(s), indicating the date and time of sample collection, location, type of sample (first draw, service line, etc.), and the sampler's name.

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Before turning on the water to draw the sample, remove the cap from the container and position it under the faucet. Turn on the cold water tap and begin filling the container.

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Fill to the 1 liter mark on the bottle or to the neck. Turn off the water.



The sample container should be tightly capped. Blot the sample container with a paper towel to dry it off.

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It is recommended that you place the sample in a sealable plastic bag before shipping in a closed chest or box.

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Refrigeration is not necessary, but if ice is used in shipping, it is recommended that it be bagged separately to eliminate any contamination of the sample.



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## First Draw Samples

Samples must be delivered to the analytical laboratory within 14 days for proper testing



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## Check Your Knowledge

- When sampling you should:
  - A. Wash hands before sampling only.
  - B. Wash hands after sampling only.
  - C. Wash hands before and after sampling.
  - D. Never wash your hands because it could contaminate the sample.
  
- C. Wash hands before and after sampling.

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## Check Your Knowledge

- The temperature at which samples should be kept:
  - A. 10° C
  - B. Below freezing
  - C. Temperature never matters.
  - D. 4° C
  
- D. 4° C

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### Check Your Knowledge

- Required sampling types and frequencies for each system can be found in the:
  - A. Appropriations Permit
  - B. Consumer Confidence Report
  - C. Annual Sample Schedule
  - D. Capacity Management Plan
- C. Annual Sample Schedule

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### Check Your Knowledge

- Sampling containers should always be:
  - A. Rinsed with the sample water.
  - B. Filled to the top to prevent air leaking in.
  - C. Appropriate for the type of sampling.
  - D. Shaken thoroughly before shipping.
- C. Appropriate for the type of sampling.

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### Check Your Knowledge

- First Draw Samples are for \_\_\_\_\_ sampling?
  - A. Nitrate
  - B. Lead and Copper
  - C. Bacteriological
  - D. VOCs
- B. Lead and Copper.

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### Check Your Knowledge

- The only sample to go to the lab ASAP to be tested within 30 hours is:
  - A. Bacteriological
  - B. VOCs/SOCs
  - C. Radionuclides
  - D. TTHM/HAA5
  
- A. Bacteriological.

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### Check Your Knowledge

- Populations of 25 to 1000 people require bacteria sampling at:
  - A. 4/month or quarter
  - B. 3/month or quarter
  - C. 2/month or quarter
  - D. 1/month or quarter
  
- D. 1/month or quarter.

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### Operator Certification



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## Who Must Hold State Certification

COMAR 26.06.01

- You must be certified by the *Board of Waterworks and Waste System Operators* if you:
  - Make decisions regarding the control of flow, and processing of raw and finished water
  - Observe variations in operating conditions, and interpret meter and gauge readings and test results to determine processing requirements
  - In the absence of the superintendent, makes operating decisions based on the superintendent's directives.
  - Determine remedial action in emergencies

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Whether you operate a water plant that produces one million gallons per minute or 500 gallons per day, you must be certified and must receive approved training.



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## Duties Performed by an Operator

- Operation of mechanical and electrical equipment
- Maintenance of mechanical and electrical equipment
- Determining proper chemical dosages
- Performing lab analyses
- Keeping accurate records
- The list may never end!

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## Water Treatment Plant Classifications

- Class 1 > Disinfection
- Class 2 > Chemical Treatment
- Class 3 > Simple Iron Removal
- Class 4 > Complete Treatment
- Class 5 > Site Specific




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## Water Operator Certification Requirements

Class	Experience	Renewal Credits Temp Operator	Renewal Credits Operator
1	1-Year	24	16
2	1-Year	24	16
3	2-Years	45	30
4	3-Years	45	30
5	Determined by the Board		

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## Operator Training

- All certified operators in the State of Maryland are required continuing education credits to maintain their certifications. This training must be TRE approved by the Board of Waterworks & Waste Systems Operators.

*At least 50% of the TRE approved training credits must be "Process" approved.*

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## Check Your Knowledge

- Who must hold an operator's certification?
  - A. One who makes decisions regarding the control of flow, and processing of raw and finished water
  - B. One who observes variations in operating conditions, and interpret meter and gauge readings and test results to determine processing requirements
  - C. In the absence of the superintendent, makes operating decisions based on the superintendent's directives.
  - D. One who determines remedial action in emergencies
  - E. All of the above

E. All of the above

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## Maryland Department of the Environment Regulations



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## Sanitary Survey - Definition

"..an onsite review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation, and maintenance for producing and distributing safe drinking water."

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## Why Conduct Sanitary Surveys?



- Helps to ensure:
  - Public health protection
  - Compliance with regulations
- Proactive and preventive in nature

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## 8 Elements of A Sanitary Survey as Defined by EPA

1. Source
2. Treatment
3. Distribution System
4. Finished Water Storage
5. Pumps, Pumping Facilities, and Controls
6. Monitoring, Reporting, and Data Verification
7. System Management and Operation
8. Operator Compliance with State Requirements

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## “Multiple Barrier” Approach to Conducting Sanitary Surveys

*To ensure there are sufficient “Barriers” to prevent the passage of microorganisms into the distribution system...*



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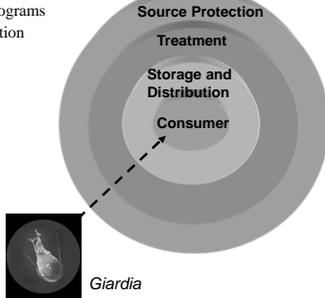
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## Multiple Barriers In Water Supply Protection

- Sources
  - Watershed management programs
  - Intake and wellhead protection
- Treatment
  - C/F/S
  - Filtration
  - Disinfection
- Storage
  - Disinfectant contact time
  - Screens
- Distribution
  - Pressure
  - Disinfection




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## Groundwater Appropriation Permit

*This permit governs  
the amount of water a  
system is authorized  
to pump from an  
aquifer.*

STATE OF MARYLAND  
DEPARTMENT OF THE ENVIRONMENT  
WATER MANAGEMENT ADMINISTRATION  
WATER APPROPRIATION AND USE PERMIT

PROJECT NUMBER: CO19710002(05)

EFFECTIVE DATE: JULY 1, 2001  
EXPIRATION DATE: JULY 1, 2013  
FIRST APPROPRIATION: OCTOBER 1, 1970

COMMISSIONERS OF DEPARTMENT

HEREINAFTER REFERRED TO AS THE "PERMITTEE", IS AUTHORIZED BY THE WATER MANAGEMENT ADMINISTRATION, HEREINAFTER REFERRED TO AS THE "ADMINISTRATOR" PURSUANT TO THE PROVISIONS OF TITLE 6 OF THE ENVIRONMENT ARTICLE, ANNOTATED CODE OF MARYLAND (1996 REPLACEMENT) VOLUNTARILY AS AMENDED, TO APPROPRIATE AND USE WATER OF THE STATE SUBJECT TO THE FOLLOWING CONDITIONS:

1. ALLOCATION - THE WATER WITHDRAWAL GRANTED BY THIS PERMIT IS LIMITED TO:  
A DAILY AVERAGE OF 200,000 GALLONS ON A YEARLY BASIS AND A DAILY AVERAGE OF 750,000 GALLONS FOR THE MONTH OF MAY/JUNE.
2. USE - THE WATER IS TO BE USED FOR A COMMUNITY WATER SUPPLY FOR THE TOWN OF DEPTON.
3. SOURCE - THE WATER SHALL BE TAKEN FROM THREE WELLS IN THE FINNY POINT FORMATION.
4. LOCATION - THE POINT(S) OF WITHDRAWAL SHALL BE LOCATED SOUTH OF BRIDGEVIEW AVENUE A FEET OF PARK LAKE WELLS #13, OFF PARK AVENUE & MD RT. 404 (MILL #1), AND OFF FIFTH & GAY STREETS (MILL #1), DEPTON, CAROLINE COUNTY, MARYLAND.

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## Semi-Annual Withdraw Report

*MDE requires each  
groundwater permit  
holder to complete and  
submit this report  
twice a year.*

MARYLAND DEPARTMENT OF THE ENVIRONMENT  
WATER MANAGEMENT ADMINISTRATION  
SOURCE PROTECTION AND APPROPRIATION DIV  
1803 MARSHWORTH BOULEVARD  
BALTIMORE, MARYLAND 21218

December 17, 2010

Regarding Water Appropriation and Use Permit CO19710002(06)

Make Name/Address Change Below

TOWN OF DEPTON  
ATTN: BOBBY W. GUYER, SR.  
610 DEPTON ROAD  
DEPTON, MD 21629

Dear Permittee:

As a condition of your Maryland Water Appropriation and Use Permit you are required to report your water withdrawal usage on a monthly basis and return this form no later than 30 days after the date on which it is received.

If you have any questions concerning this form, please telephone the Water Supply Program at (410) 537-3592.

2010 SEMI-ANNUAL SOURCE PROTECTION WITHDRAWAL REPORT

1. Check the method used to determine your withdrawal amount:  
( ) Flow Meter ( ) Elapsed Time Indicator  
( ) Other (Specify)
2. Enter the number of gallons of water withdrawn for each month.  
- If you have multiple intakes under this permit, please add together the monthly totals for all intakes.  
- Do not list questionable meter readings, meters pumped, or meters in "N" for each month with no withdrawal.

July 2010	12,461,000	October 2010	10,000,000
August 2010	11,601,000	November 2010	3,700,000
September 2010	10,873,000	December 2010	3,700,000
Total:		44,535,000	

3. Please sign and date this form.  
Submitted By: [Signature] Date: 1/17/2011  
Title: Director of Public Water Telephone Number: 410-537-3688

4. Make address corrections on the top of this form.  
Please contact this office if ownership has changed.

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Annual Drinking Water Quality Report For 2009  
Town of Potomac  
POTOMAC, MARYLAND

This document is prepared by the system's Public Health Officer (PHO) and is required by the Safe Drinking Water Act (SDWA) to be published annually. The PHO is responsible for ensuring that the information provided in this report is accurate and complete. The PHO is also responsible for ensuring that the information provided in this report is understandable to the public. The PHO is also responsible for ensuring that the information provided in this report is available to the public in a timely and accessible manner.

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## Consumer Confidence Report

The PHO is also responsible for ensuring that the information provided in this report is accurate and complete. The PHO is also responsible for ensuring that the information provided in this report is understandable to the public. The PHO is also responsible for ensuring that the information provided in this report is available to the public in a timely and accessible manner.

*EPA requires the CCR be published annually.*

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## Check Your Knowledge

- All permits should be:
  - A. Kept in a safe
  - B. In the operator's vehicle
  - C. Posted on a wall in the treatment facility
  - D. Digital copies on plant computer
  
- C. Posted on the wall in the treatment facility

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## Check Your Knowledge

- Capacity management plans are required when:
  - A. The system has an average daily discharge of 70% or higher of their permitted flow
  - B. The system has an average daily discharge of 80% or higher of their permitted flow
  - C. The system has an average daily discharge of 90% or higher of their permitted flow
  - D. The system has an average daily discharge of 100% or higher of their permitted flow
  
- B. The system has an average daily discharge of 80% or higher of their permitted flow

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### Check Your Knowledge

- Who's responsibility is it to ensure the consumer receives safe, non-contaminated drinking water?
  - A. The operator
  - B. The operator's boss
  - C. The operator's coworkers
  - D. The operator's therapist

**A. THE OPERATOR!!!**

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### Recordkeeping Requirements



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### Benefits of Record Keeping

- Management Tool
- Proper Operation and Maintenance
- Education/Training
- Resolve Customer Complaints
- Document Changes
- Facilitate Communication
- Financial Analysis/Planning

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### PWSs General Record Keeping 3 Year Requirements

- Correction of violations of primary drinking water regulations
- Public notices your system issues



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### PWSs General Record Keeping 5 Year Requirements

- Microbiological and turbidity analyses
- Variances or exemptions



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### PWSs General Record Keeping 10 Year Requirements

- Chemical analyses: disinfectant residuals, disinfection byproducts, nitrate/nitrite, inorganic, volatile organic, synthetic organic compounds
- Sanitary surveys and written reports and summaries



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### Additional Record Keeping Requirements by Rule

RULE	SYSTEM	DOCUMENT	KEEP
Consumer Confidence Rule	CWS	Consumer Confidence Reports	Min 3 years
Lead Copper Rule	CWS or NTNCWS with Lead Action Level Exceedance	Records of Public Education for Lead ALE	12 years

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### Additional Record Keeping Requirements by Rule

RULE	SYSTEM	DOCUMENT	KEEP
Lead Copper Rule	CWS or NTNCWS	Lead & Copper results, water quality parameters, source water sampling results, corrosion control recommendations/studies, public education materials, state determinations, schedules, letters, evaluations.	Min 12 years

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### Additional Record Keeping Requirements by Rule

RULE	SYSTEM	DOCUMENT	KEEP
Stage 1 DBPR	CWS or NTNCWS adding disinfectant or TNCWS using chlorine dioxide	Stage 1 DBPR Monitoring Plans	Min 10 years

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### Additional Record Keeping Requirements by Rule

RULE	SYSTEM	DOCUMENT	KEEP
Stage 2 DBPR	CWS or NTNCWS using a residual disinfectant except UV	Stage 2 DBPR monitoring plans and results	Min 10 years
LT1ESWTR	PWS using Surface Water or GWUDI	Disinfection profiling results (raw data/analysis) and benchmarking	Indefinitely

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### Additional Record Keeping Requirements by Rule

RULE	SYSTEM	DOCUMENT	KEEP
LT1ESWTR	PWS using Surface Water or GWUDI using conventional or direct filtration	Individual filter monitoring results	Min 3 years
LT2ESWTR	Subpart H PWS supplied by Surface Water or GWUDI	Results from initial and second round source water monitoring	Min 3 years

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### Additional Record Keeping Requirements by Rule

RULE	SYSTEM	DOCUMENT	KEEP
LT2ESWTR	Subpart H PWS supplied by Surface Water or GWUDI	Notice to state not conducting source water monitoring because you meet certain criteria.	Min 3 years

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### Additional Record Keeping Requirements by Rule

RULE	SYSTEM	DOCUMENT	KEEP
LT2ESWTR	Subpart H PWS supplied by Surface Water or GWUDI	Results of treatment monitoring (uncovered finished reservoirs) 40CFR141.722	Min 3 years

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### Filter Backwash Rule (PWS recycling filter backwash)

- Keep the records indefinitely:
  - copy of recycle notification submitted to state
  - list of all recycle flows and frequency returned
  - avg & min backwash flow rates through filters
  - avg & min duration (minutes) backwash process
  - typical filter run length & summary of how filter run length is determined
  - type of treatment for recycle flow
  - data on dimensions, loading rates, chemicals (type, dosage, frequency), rate of solids removal

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### Suggested Records to Keep



- Infrastructure historical/location information
- Equipment purchase/repair
- O&M log sheets
- Locations/dates of leak repairs
- Filter backwash logs, turbidity readings, coagulation records, corrosivity control
- Source production, static /pumping water levels, flow, water use
- Operator certifications, training records, correspondence with regulators, meter reading reports, financial information
- Resident complaint reports

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- [www.epa.gov](http://www.epa.gov)
- EPA document, EPA 816-F-06-033, "Record Keeping Rules: A Quick Reference Guide"
- EPA document, EPA 816-R-03-017, Small Systems Guide to Safe Drinking Water Act Regulations"

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## Check Your Knowledge

- Benefits of record keeping include all except:
  - A. Resolve customer complaints
  - B. Way to make sure nothing ever changes
  - C. Education and training
  - D. Financial analysis
- B. Way to make sure nothing ever changes.

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## Check Your Knowledge

- 3-Year requirements include records of corrections of violations and:
  - A. Letters from citizens
  - B. Filter backwash flow rates
  - C. Chemical analysis
  - D. Public notices
- D. Public Notices

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### Check Your Knowledge

- Of the following, which are 5-year requirements for record keeping?
  - A. Lead and Copper Rule documents
  - B. Sanitary surveys
  - C. Microbiological and Turbidity analyses
  - D. Chemical analyses  
  - A. Microbiological and Turbidity analyses

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### Check Your Knowledge

- Of the following, which are 10-year requirements for record keeping?
  - A. Chemical analyses
  - B. Microbiological analyses
  - C. Public notices
  - D. Consumer confidence reports  
  - A. Chemical Analyses

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### Check Your Knowledge

- Lead and Copper Rule documents must be kept for:
  - A. 3 years
  - B. 5 years
  - C. 10 years
  - D. 12 years  
  - A. 12 Years

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### Check Your Knowledge

- Stage 1 and Stage 2 DBPR records must be kept:
  - A. 3 years
  - B. 10 years
  - C. 12 years
  - D. Indefinitely
- B. 10 years

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### Check Your Knowledge

- Filter Backwash Rule records are kept:
  - A. Indefinitely
  - B. 12 years
  - C. 10 years
  - D. 5 years
- A. Indefinitely

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### Check Your Knowledge

- Which of these additional records should be kept?
  - A. Equipment purchases and repairs
  - B. O&M log sheets
  - C. Certification and training records
  - D. All of the above
- D. All of the above

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# OSHA Regulations



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## Hazard Communication



## Personal Protective Equipment



## Lockout/Tagout

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## Purpose of OSHA's Hazard Communication Standard

To ensure that employers and employees know about work hazards and how to protect themselves so that the incidence of illnesses and injuries due to hazardous chemicals is reduced.



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## Employer Responsibilities

- Identify and list hazardous chemicals in their workplaces
- Obtain Safety Data Sheets (SDS) and labels for each hazardous chemical, if not provided by the manufacturer, importer, or distributor
- Implement a written HazCom program, including labels, SDS, and employee training
- Communicate hazard information to employees through labels, SDS, and formal training programs

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## How Can Workplace Hazards be Minimized?

- The first step in minimizing workplace hazards is to perform a thorough hazard assessment
- Employers can rely on the evaluations performed by the manufacturers or importers to establish the hazards of the chemicals they use
  - This information is obtained from SDS and labels

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## Written HazCom Program Requirements

- Describes container labeling, SDS's, and employee training for each workplace
- List of the hazardous chemicals
- Make information regarding hazards and protective measures available to other employers onsite

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## How Must Chemicals be Labeled?

**Each container of hazardous chemicals entering the workplace must be labeled or marked with:**

- Identity of the chemical
- Appropriate hazard warnings
- Name and address of the responsible party



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## Safety Data Sheets

**Prepared by the chemical manufacturer or importer and describe:**

- Physical hazards, such as fire and explosion
- Health hazards, such as signs of exposure
- Routes of exposure
- Precautions for safe handling and use
- Emergency and first-aid procedures
- Control measures



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## Training

**Training is required for employees who are exposed to hazardous chemicals in their work area:**

- At the time of initial assignment
- Whenever a new hazard is introduced into their work area



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### What Training is Needed to Protect Workers?

- Explanation of the HazCom program, including information on labels, SDS, and how to obtain and use available hazard information
- Hazards of chemicals
- Protective measures such as engineering controls, work practices, and the use of PPE
- How to detect the presence or release of a hazardous chemical (using monitoring devices, observation, or smell)

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### Personal Protective Equipment Hazard Assessments

#### Personal Protective Equipment (PPE)

- Hard hat
- Safety Glasses (side shields, goggles, face shield, etc.)
- Gloves (leather, cotton, rubber, etc.)
- Shoes (leather, steel toe, dielectric sole, etc.)
- Traffic safety vests and clothing
- Ear protection (plugs, muffs, etc.)
- Life jacket or vest for work over water
- Seat belts
- Respiratory protection equipment (filter masks, respirators, etc.)

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### Personal Protective Equipment Hazard Assessments

#### Selecting Personal Protective Equipment

- 29 CFR 1910.132 Personal Protective Equipment
- Item (d), Hazard Assessment and Equipment Selection

“The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment.”

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## Personal Protective Equipment Hazard Assessments

Hazard Assessments have to be performed for all jobs and selected tasks before allowing employees to perform them. Some examples include:

- Welding / Cutting / Brazing (a task)
- Water Treatment Plant Operation (a job)
- Working On or Near Energized Electrical Circuits (a task).
- Automotive Garage (a job)

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## Control of Hazardous Energy What is considered Hazardous Energy?

- Contact with a moving or energized part of the machine
- Struck or caught between a falling part of the machine
- Any exposure to physical hazards :
  - Electrical
  - Heat
  - Chemical
  - Pneumatic
  - Hydraulic
  - Steam
  - Kinetic



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## Potentially Hazardous Energy....

- Kinetic Energy is energy in motion
  - Spinning flywheels
  - Moving fan belts
  - Moving armatures
  - Electrical circuits
  - Moving fluids
- Potential Energy is stored energy
  - Coiled springs
  - Air brakes/hydraulic/pneumatic
  - Raised loads



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## Lockout/Tagout Section 1910.147



- Standard
  - In effect in January 1990
  - Origin: National consensus & federal standards
- Lockout - Energy-isolating device to protect personnel
- Tagout - Tags to indicate energy-isolating device in use

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## Lockout/Tagout

- LOTO is required during servicing or maintenance operations:
  - When guards must be removed
  - When body is placed in contact with machine
  - When body is in danger zone
  - When setting up or adjusting equipment



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## Lockout/Tagout



- Standard requires:
  - Written procedures
  - Employee training
  - Periodic inspections of procedures
- Rule requires equipment to be off, disconnected, & locked or tagged out
  - OSHA Estimates 122 lives saved each year
  - 28,400 lost day injuries averted

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## Lockout/Tagout Employee Training



- Initial Training
- Retraining (Change equipment or procedure)
- Records of Certification
- Training based on type of employee
  - “Authorized” are responsible for implementing procedures and performing maintenance
  - “Affected or other” must recognize procedure and purpose of procedure

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## Lockout/Tagout Devices



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## Confined Space Safety

- Confined space is any space that has
  - Limited means of entry or exit
  - Is large enough for an employee to enter and perform work
  - Is not designed for continuous occupancy
- Confined spaces are either
  - Permit-required
  - Non permit-required

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### Confined Space FACTS

- Many confined space accidents result in fatalities
  - Often multiple fatalities
- These deaths could have been prevented

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### Equipment for Confined Space Entry

- Testing and monitoring equipment
- Ventilation equipment
- Communications equipment
- Lighting equipment
- Barriers and shield
- Ladders and other access equipment
- Rescue and emergency equipment

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### Trench Safety

- All trenches 5 feet or greater in depth must be protected from cave-in by sloping, shoring or shielding
- A ladder or other means for egress must be within 25 ft of trench workers
- A competent person must inspect the trench daily, before start of work and after any hazard increasing occurrence

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## Miss Utility



- Prior to any digging, notify Miss Utility **FIRST!**

800-257-7777

**It's the law!**

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## Traffic Control

- Barricades, traffic cones, signs and flashers should be used
- Approved means to divert traffic around the work site must be used
- All employees must wear high visibility clothing

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## Check Your Knowledge

- Which would not be considered a form of OSHA's Hazard Communication Standard?
  - a. MSDS
  - b. Labeling of containers
  - c. Hazard communication program
  - d. SDWA standards
  - d. SDWA standards

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### Check Your Knowledge

- The first step in minimizing workplace hazards is:
  - a. Purchase PPE
  - b. Perform a thorough hazard assessment
  - c. Fire Dept. inspection
  - d. OSHA inspection  
  - b. Perform a thorough hazard assessment

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### Check Your Knowledge

- Chemicals should be labeled with the name and address of the plant superintendent.
  - a. True
  - b. False  
  
  - b. False (Name and address of responsible party)

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### Check Your Knowledge

- Who prepares the SDS?
  - a. Chemical manufacturer
  - b. Manager
  - c. Importer of chemical
  - d. Operator  
  - a. Chemical Manufacturer
  - c. Importer of chemical

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### Check Your Knowledge

- When is training required for employees exposed to hazardous chemicals?
  - a. Apprenticing to become a manager
  - b. An initial assignment
  - c. A new hazard introduced
  - d. Both b & c
  - d. Both b & c

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### Check Your Knowledge

- What is the purpose of a Hazard Assessment?
  - a. To necessitate the need for PPE
  - b. Discovery of disgruntled employees
  - c. Performance appraisal evaluations
  - d. Fire Dept. inspections
  - a. To necessitate the need for PPE

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### Check Your Knowledge

- What is considered physical hazardous energy?
  - a. Poisonous & sound waves
  - b. Ice & snow
  - c. Fatigue & stress
  - d. Pneumatic & hydraulic
  - d. Pneumatic & hydraulic

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## Check Your Knowledge

- When is LOTO required?
  - a. During servicing or maintenance operations
  - b. When a new piece of equipment is purchased
  - c. During start up tests
  - d. Never
    - a. Service & maintenance

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## Risk Management Plans & Process Safety Management



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## RMP Background

- Required as part of the Clean Air Act 40 CFR 112 (r)
- Enacted in 1999, Amended in 2004



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## RMP Applicability

- Tank, drum, pipe or process at the facility contains extremely hazardous, toxic, or flammable substance above threshold quantity
- 40 CFR 68.130 lists threshold quantities

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## Extremely Hazardous Substances

- Falls under 40 CFR Part 68 Subpart F Regulated Substances for Accidental Release Prevention
- Includes chemicals like:
  - Bromine 10,000 lbs
  - Chlorine 2,500 lbs
  - Chlorine Dioxide 1,000 lbs
  - Hydrochloric Acid 5,000 lbs




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## RMP Program Levels

- Program 1
  - Process would not affect public in worst case
  - No accidents with offsite consequences in last 5 years
- Program 2
  - Includes all processes not covered by Programs 1 or 3
- Program 3
  - Processes not eligible for Program 1
  - Subject to OSHA's PSM standard or classified in NAICS codes

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## RMP Program Level Requirements

- **Program 1**

- Worst-case release analysis
- 5 year accident history
- Certify no additional prevention steps needed
- Coordinate emergency response with local responders



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## RMP Program Level Requirements

- **Program 2**

- Worst-case release analysis
- Alternative release analysis
- 5 year accident history
- Document management system
- Safety information
- Hazard Review
- Operating Procedures
- Training



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## RMP Program Level Requirements

- **Program 2 (cont.)**

- Maintenance
- Accident Investigation
- Compliance Audit
- Develop emergency response plan and program and coordinate with local responders



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## RMP Program Level Requirements

- **Program 3**

- Worst case release analysis
- Alternative release analysis
- 5 year accident history
- Document management system
- Process safety information
- Process hazard analysis
- Operating procedures



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## RMP Program Level Requirements

- **Program 3 (cont.)**

- Training
- Mechanical integrity
- Incident investigation
- Compliance audit
- Management of change
- Pre-startup review
- Contractors



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## RMP Program Level Requirements

- **Program 3 (cont.)**

- Employee participation
- Hot work permits
- Develop emergency response plan and program and coordinate with local responders



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## Elements of the RMP All Program Levels

- An executive summary
- The registration for the facility
- The certification statement
- Worst-case scenario analysis
- 5 year accident history
- Information concerning emergency response at the facility




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## Elements of the RMP – Program Levels 2 and 3

- All requirements for Program 1-- plus
  - At least one alternative release scenario analysis for each covered substance
  - Summary of the prevention program for each process

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## RMP Updating Requirements

Change that Occurs	Update, Correct or De-register Dates
No process changes	Update 5 years from last submission
Newly regulated substance first listed by EPA	Update within 3 years of the date EPA first listed




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### RMP Updating Requirements

Change that Occurs	Update, Correct or De-register Dates
Regulated substance first becomes present above threshold quantity in a new or existing process	Update on or before the threshold quantity is exceeded
Change occurs requiring a revised PHA or hazard review	Within 6 months of the change

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### RMP Updating Requirements

Change that Occurs	Update, Correct or De-register Dates
Change occurs that requires revised offsite consequence analysis	Within 6 months of the change
Change that alters the Program Level	Within 6 months of the change

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### RMP Updating Requirements

Change that Occurs	Update, Correct or De-register Dates
Accidental release that meets reporting criteria	Add to or correct accident history within 6 months of accident
Facility emergency contact information changes	Correct within 1 month of change

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## RMP Updating Requirements

Change that Occurs	Update, Correct or De-register Dates
Minor administrative change (clerical error)	Correct as soon as practical
No longer subject to requirements of RMP	Submit de-registration letter to EPA within 6 months of change that RMP is no longer required



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## Process Safety Management (PSM)

- What does PSM mean?
- What is the history?
- What are the objectives?
- Who does it apply to?
- What are the elements?



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## What does PSM mean?

- Process Safety Management
- OSHA 29 CFR 1910.119
- Written information about process chemicals, process technology, process equipment



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## What is the History of OSHA's PSM Requirements?

- Requirements for the management of hazards associated with processes using highly hazardous chemicals
- Employees have been and continue to be exposed to the hazards of toxicity, fires, and explosions from catastrophic releases of highly hazardous chemicals in their workplaces
- Intended to eliminate or mitigate the consequences of such releases
- Final rule effective on May 26, 1992.




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## Objectives of PSM

- Prevent unwanted releases
- Limits employee exposure
- All facets of design, operation, maintenance, and emergency response are evaluated




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## PSM Applies to:

- Processes which involve chemicals at or above threshold quantities (Chlorine 1500 lbs.)
- Flammable liquid/gas > 10,000 lbs except for heating/workplace fuel
- Does NOT apply to:
  - Retail facilities
  - Oil/gas drilling
  - Normally unoccupied remote facilities




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## PSM Elements



- Employee Involvement
- Process Safety Information
- Process Hazard Analysis
- Operating Procedures and Practices
- Employee Training
- Contractors
- Pre-Startup Safety
- Mechanical Integrity
- Non-routine Work Authorizations
- Managing Change
- Investigation of Incidents
- Emergency Preparedness
- Compliance Audits




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- Sacramento, Water Treatment Plant Operation, Volume 1, 4<sup>th</sup> Edition
- Sacramento, Water Treatment Plant Operation, Volume 2, 3<sup>rd</sup> Edition
- Small Water System O & M, 3<sup>rd</sup> Edition
- [wateroffice@csus.edu](mailto:wateroffice@csus.edu)
- AWWA, Water Treatment, 2<sup>nd</sup> Edition

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### Check Your Knowledge

- What year was the Risk Management Plan enacted?
  - a. 1974
  - b. 1989
  - c. 1999
  - d. 2004
- 1999

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### Check Your Knowledge

- The threshold quantity for chlorine that triggers RMP reporting is:
  - a. 150 lbs.
  - b. 1000 lbs.
  - c. 2000 lbs.
  - d. 2500 lbs.
- 2500 lbs.

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### Check Your Knowledge

- For each program level (1, 2 & 3), how many years of accident history must be reported :
  - a. 3 years
  - b. 5 years
  - c. 11 years
  - d. 15 years

b. 5 years

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### Check Your Knowledge

- What does PSM mean?
  - a. Positive Samples Monthly
  - b. Process Storage of Memory
  - c. Process Safety Management
  - d. Preventive Safety Maintenance

c. Process Safety Management

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### Check Your Knowledge

- What is the purpose of the PSM?
  - a. Process preventive maintenance
  - b. Process energy
  - c. Process hydraulics
  - d. Process chemicals & equipment

d. Process chemicals & equipment

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Questions

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Exam Review

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