

Storage Tank Inspections and Maintenance

A Critical Barrier in Preventing Waterborne Disease Outbreaks



COLORADO
Department of Public
Health & Environment

Who are we?

- Colorado Department of Public Health and Environment
- Water Quality Control Division
- Local Assistance Unit

Zeenath
Khan



Margaret
Bauer



Joe
Sturgeon



Angela
Green Garcia



Elicia Vigil



Priscila
Lopez



Steve
Folle



Who - Coaches



Search: CDPHE water training opportunities

Free training opportunities provided by us

- Customized coaching and assistance

- Free one-on-one coaching at your facility to meet your specific needs.
- Training units are available, depending on time spent with the coach.
- [Online assistance request](#) or contact one of the drinking water training specialists, see list below.

- Monitoring and Operating for Regulatory Compliance

- 4-hour course, up to 0.4 training units awarded.
- Meets mandatory regulatory training (MRT) requirements for certified operators.
- Scheduled classroom or webinar delivery with live instructor.
- [Register by selecting your date.](#)

- Sanitary Survey Preparation

- 3.0-hour course, up to 0.3 training units awarded.
- Scheduled classroom or webinar delivery with live instructor.
- [Register by selecting your date.](#)

Name	Position	Email	Phone
General	N/A	cdphe.wqdwtraining@state.co.us	N/A
Angela Green Garcia	Drinking water coach - managerial and financial specialist	angela.garcia@state.co.us	720-610-7454
Kyra Gregory	Drinking water training specialist	kyra.gregory@state.co.us	303-908-7519
Priscila Lopez	Drinking water coach- Excellence program manager	priscila.lopez@state.co.us	720-512-9836
Elicia Vigil	Drinking water coach - Water Infrastructure Improvements for the Nation (WIIN) program manager	elicia.vigil@state.co.us	303-921-8086
Joe Sturgeon	Clean water coach	joseph.sturgeon@state.co.us	303-563-9957
Jessica Morgan	Liaison to the water and wastewater facility operators certification board	jessica.morgan@state.co.us	720-213-6539
Margaret Bauer	Grants project manager	margaret.bauer@state.co.us	303-692-2848
Steven Folle	Drinking Water Coach	steven.folle@state.co.us	720-818-2705

When to call the CDPHE?

Acute Hotline: 303-692-3308



Water Sample Result

- Nitrite > 1.0 mg/L as N
- Nitrate > 10.0 mg/L as N
- Positive Total Coliform result
- Positive E. coli result
- Surface water high turbidity or microbial removal failure at the entry point

When to call the CDPHE?

24-hour Incident Report Line
1-877-518-5608



- Pressure Loss
- Tampering - confirmed or suspected
- Waterborne disease outbreak
- All other waterborne emergencies
 - failure in key water treatment processes
 - disaster that disrupts supply or distribution system

Our mission : To protect public health

Our common goal: Protect and restore Colorado's water quality for public health, the environment, and future generations

- Protect the barriers to contamination
- Implement regulations and best management practices
- Know and work with your partners
- Ask the tough questions



Protecting our most vulnerable



Waterborne disease outbreaks can lead to death in
7 our most vulnerable.

What is a Waterborne Disease Outbreak?



- Two or more epidemiologically-linked persons experience similar illness after exposure to the same water source

Do outbreaks occur in Colorado?

Waterborne Disease Outbreaks in CO

Year	Type	Agent	#ill	Comments
2000	Drnk	Giardia	27	Mountain ranch (river/stream)
2001	Drnk	Giardia	12	Community water system
2006	Drnk	Giardia	6	Mountain stream
2008	Drnk	Salmonella	~1300	Municipal water
2007	Drnk	Norovirus	77	Hunting lodge
2011	Rec	Cryptosporidium	33	Water park
2012	Drnk	Chemical	26	HVAC cross conn.

Why do outbreaks occur?

Barriers Fail!!



Source Water



Treatment



Storage tanks



Distribution

Multiple barrier approach:

1. Protect source water
2. Provide treatment - filter and disinfect
3. Maintain water safety through storage & distribution
4. Monitoring to ensure us the barriers are working

Most Common Significant Deficiencies & Violations in 2023

1. Groundwater Source Protection (screens, gaskets, unsealed electrical, wellhead openings)
2. BPCCC Written Annual Report
3. Storage Tank Condition (Prior to entry point)
4. Storage Tank Condition (After entry point)
5. Bacteriological Sampling Plan deficiency - sample sites not representative
6. BPCCC program
7. BPCCC uncontrolled cross connection in DS
8. Proper Treatment Operation - Surface & GWUDI
9. BPCCC- inadequate backflow assembly testing compliance ratio
10. BPCCC - inadequate backflow Method inspection compliance ratio



Rank	Severity	Code	Description	Public Notice	Count	% of Total
1	Sig Def	S030	Groundwater Source Protection (screens, gaskets, unsealed electrical, wellhead openings)		115	9%
2	Violation	M613	BPCCC Annual Report - Missing or inadequate	Tier 3	113	9%
3	Sig Def	T310	Storage Tank Condition, Prior to Entry Point Location		108	9%
4	Sig Def	F310	Storage Tank Condition, After Entry Point Location		87	7%
5	Violation	R518	Bacteriological Sampling Plan deficiency - sample sites not representative	Tier 3	73	6%
6	Violation	M610	BPCCC Program	Tier 3	68	5%
7	Sig Def	D901	BPCCC - Uncontrolled cross connection in distribution system		59	5%
8	Sig Def	T119	Proper Treatment Operation - Surface Water or Ground water under the direct influence		48	4%
9	Violation	M614	BPCCC - Inadequate Backflow Assembly Testing Compliance Ratio	Tier 2	44	4%
10	Violation	M615	BPCCC - Inadequate Backflow Method Inspection Compliance	Tier 2	32	3%

How have sanitary defects in storage tanks affected Colorado?

Salmonella Typhimurium Cases, Alamosa, 2008

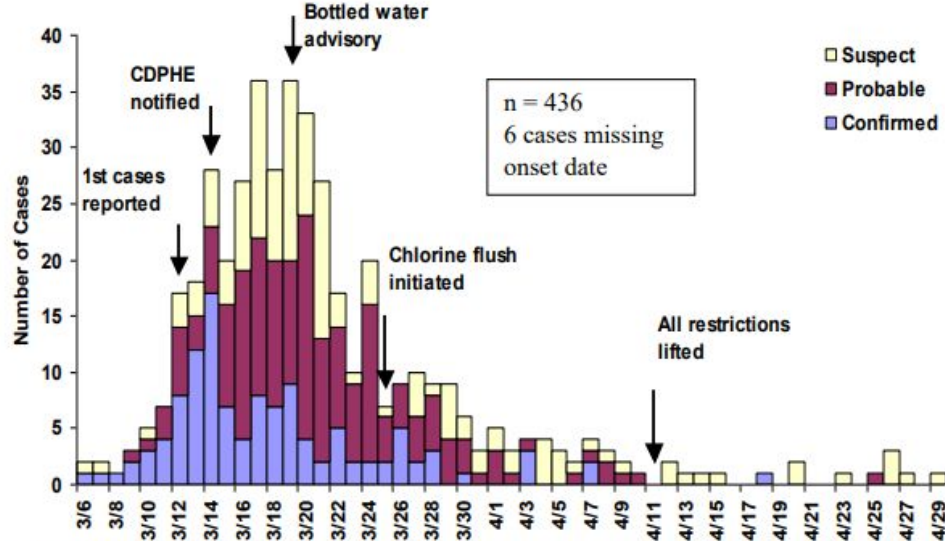
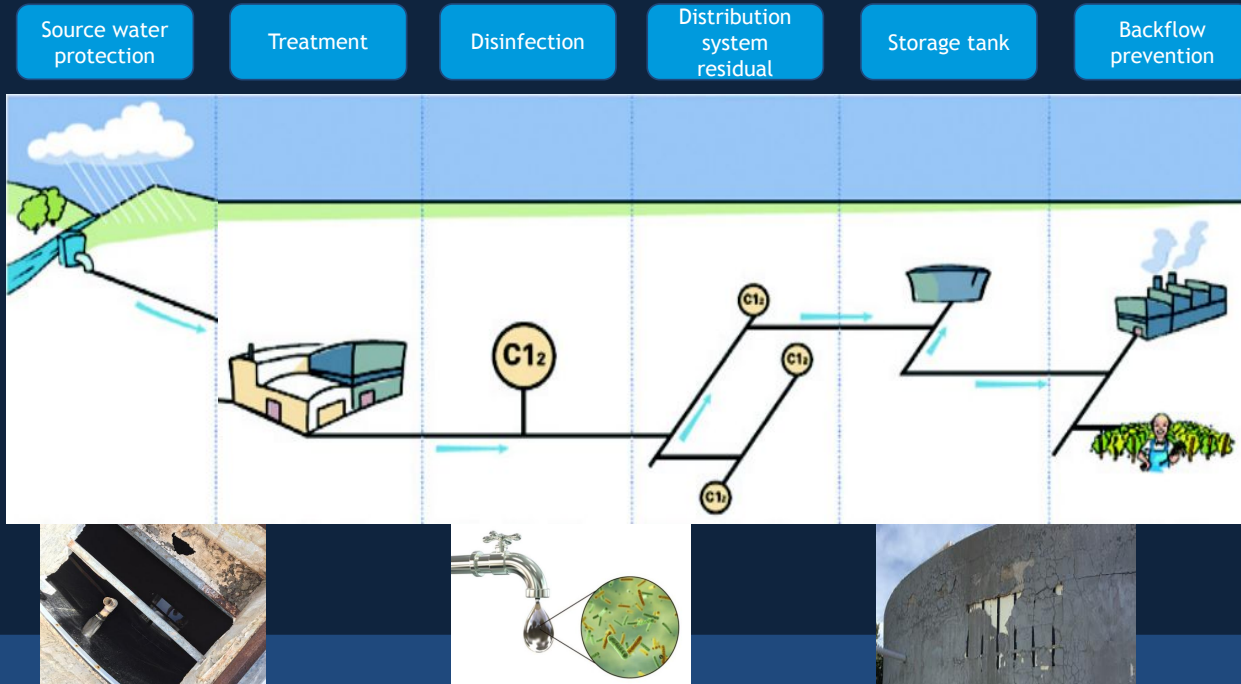


FIGURE 4: EPIDEMIC CURVE



Storage Tank Rule (Reg.11.28)

Maintaining barriers = protecting public health



Storage Tank Rule Overview

- All tanks after the entry point and not pressurized
- Main documents required
 1. Written Inspection Plan -overview of process
 2. Periodic Inspection - 2x/yr
 3. Comprehensive - every 5 years
 4. Follow up - Inspection Summary/Corrective Action Plan
- Handbook for Complying with the Storage Tank Rule
- Policy DW-010 The Sanitary Defect Policy



Handbook for Complying with the Storage Tank Rule

Colorado Department of Public Health and Environment
Water Quality Control Division
Colorado Safe Drinking Water Program



 COLORADO Department of Public Health & Environment	
WATER QUALITY CONTROL DIVISION SAFE DRINKING WATER PROGRAM POLICY	
POLICY TITLE: Sanitary Defect Applicability Policy	
SDWP policy number:	DW-010
Adoption date:	
Effective date:	April 1, 2016
Scheduled review date:	
Version:	1
Approved by: 	
Ken Palco, P.E. Safe Drinking Water Program Manager	

Written Inspection Plan

1. **Tank Inventory** - Inventory all tanks after the entry point
2. **Inspection Methods & Qualified Personnel**
 - Policy DW-015 Storage Tank rule Inspection Methods and Qualified Personnel
3. **Inspection Schedules**
 - Periodic = Twice a year
 - Comprehensive = Every five years
 - Alternative Inspection Schedule
4. **Timeline for Correcting Sanitary Defects**
 - develop and implement corrective action schedule
 - See handbook for specifics

Drinking water Storage Tank Rule

Water Quality ▼

Search or request records

Water quality engagement ➤

Regulations, policies, and guidance ➤

Funding - Grants and Loans ➤

[Drinking water consumer info](#)

Checklists and Templates

- [Inspection plan template](#)
- [Inspection summary instructions](#)
- [Comprehensive inspection checklist](#)
- [Comprehensive inspection checklist instructions](#)
- [Periodic inspection checklist](#)
- [Periodic inspection checklist instructions](#)

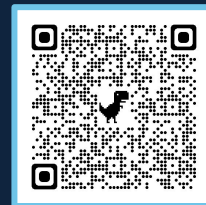
 **COLORADO**
Department of Public Health & Environment

Section 11.28 Storage Tank Rule,
Regulation 11 (5 CCR 1002-11)
Periodic Inspection Checklist

System Name & PWSID:	
Inspection Date:	
Inspector's Name:	
Inspector's Phone:	
Inspector's Email:	
SDWS Tank Name:	
SDWS Facility State ID:	
Inspection Start & Finish Time:	
Tank Level:	
Weather Conditions:	
List Sanitary Defects by Bolded Inspection Item # (see * footnote below):	

* These items are not required but are included for the sole benefit of the supplier of water.
* Bolded inspection items that are sanitary defects if answered "No": 16, 19, 20 & 27.
* Bolded inspection items that are sanitary defects if answered "Yes": 21, 28, 29 & 30.

Inspection Item:	Yes/No	N/A	Comments/Corrective Action Schedule/Action Taken/Corrective Action Completion Date:
1. Photographs taken during	☐ Yes ☐ No		If no, why not?



Written Inspection Plan

Tank Inventory Required Elements:

- tank type & construction materials
- volume in gallons
- dimensions
- location
- number of inlets, outlets, overflows, hatches, and vents
- coating used
- date put in service
- rehabilitation maintenance log



COLORADO
Department of Public
Health & Environment

APPENDIX A: Finished Water Storage Tank Inspection Plan

<<Supplier of Water Name>>

Purpose

Section 11.28(2) of the Colorado Department of Public Health and Environment ("department") Water Quality Control Commission's Colorado Primary Drinking Water Regulation, 5 CCR 1002-11 ("Regulation 11") requires that all suppliers of water that use finished water storage tanks to develop, maintain and implement a written plan for inspections of such tanks. The supplier's plan is subject to department review and revision during sanitary surveys. This plan does not need to be submitted to the department unless requested for a specific reason (e.g., during a survey the inspector found that the plan needed revisions so a follow-up review is needed). Please note that suppliers of water are not required to use this template and if used it can be modified to the supplier's specifications.

Public Water System (PWS) Name & PWSID:		
PWS Owner:		
PWS Administrative Contact:		
PWS Certified Distribution Operator:		
PWS Address:		
Primary Contact for Tank(s) Email:		
Primary Contact for Tank(s) Phone:		
This tank inspection plan includes: 1) an inventory of all finished water storage tanks, 2) description of the methods for performing and documenting periodic and comprehensive inspections that includes identification of qualified personnel to perform these inspections, 3) inspection schedules for performing these inspections and 4) timelines for correcting any sanitary defects that are identified during an inspection that the supplier of water will use to develop corrective action schedules.		
Signature of Owner or Administrative Contact:		
Date of Plan	Name	Signature

11.28(2) Written Plan for Finished Water Storage Tank Inspections Requirements

1. Distribution Storage Tank Inventory

Section 11.28(2)(a)(i) - Finished Water Storage Tank Inventory

For any inventory parameters that are not known, the supplier of water should indicate unknown in that field. The department encourages the supplier to do their best in obtaining as much information as possible for each finished water storage tank. If needed, the supplier may add more rows for additional tanks.

SDWIS ¹ Tank Name	SDWIS Tank ID#	Tank Type (e.g., elevated, buried, etc.) & Construction Materials	Volume (gallons)	Approximate Dimensions	Location	# Inlets, Outlets, Overflows, Hatches & Vents	Interior and Exterior Coating Systems	Date Put into Service	Major Maintenance & Rehab History (List dates/attach documentation*)
Tank 1	009	Above ground circular tank-steel	2,000,000	106 ft. diameter; 30 ft. height	555 West 55 th Ave, Citytown, CO	1 inlet/outlet, 1 overflow, 2 hatches, 4 vents	NSF certified EPO-Chem epoxy	1992	2022 tank rehab – and interior/exterior (see attached documentation)

¹ The Safe Drinking Water Information System (SDWIS) tank name and ID# can be obtained from the supplier's monitoring schedule which can be accessed from: <https://wqcdcompliance.com/schedules>. If problems such as missing tanks, please call 303-692-3556.

* The supporting tank rehabilitation and major maintenance history documentation for each service date is attached in Appendix 1.

Finished Water Storage Tank Inventory Page 1 of __1__

2. Inspection Methods and Qualified Personnel - Periodic

DW-Policy- DW015 - Storage Tank Rule Inspection Methods and Qualified Personnel

inspections by the certified operator.

Some examples of such individuals can include supplier owners, maintenance staff or other employee. The <<Citytown WA>> has designated the following entity to perform periodic inspections of the supplier's finished water storage tank(s) (the supplier may add additional rows as needed):

Qualified Periodic Inspection Personnel					
Name	Title	Affiliation	ORC Treatment Certification Level & Number (n/a if not a certified operator)	ORC Distribution Certification Level & Number (n/a if not a certified operator)	Tank Experience (Experience & Years)
Nicholas Griffin	Drinking water treatment and distribution ORC	Citytown Water Authority	A	4	Periodic inspections and maintenance of potable water storage tanks, 8 years
Joe Schmoe	Distribution operator I	Citytown Water Authority	D	1	Periodic inspections and maintenance of potable water storage tanks, 3 years
Jim Dandy	System maintenance worker	Citytown Water Authority	N/A	N/A	Periodic inspections and maintenance of potable water storage tanks, 1 year

2. Inspection Methods and Qualified Personnel - Comprehensive

Comprehensive Inspection Methods & Personnel				
SDWIS Tank Name	SDWIS Tank ID#	Contracted Commercial Entity or Supplier's Designated Qualified Personnel	Inspection Method*	Tank Experience (Experience & Years)
Tank 1	009	Nicholas G's Diving & Inspection INC.	Underwater	Nicholas G's Diving & Inspection INC. has 25 years of comprehensive tank inspections and tank cleaning. See attached Statement of Qualifications.

* Drained, Underwater, ROV or Description of Other

Contracted entities should be vetted based on qualifications. The supplier should ask for a statement of qualifications that provides a company overview including experience (e.g., tank and structural specialists and/or registered professional engineers on staff), services and capabilities including how the inspections will be documented, key personnel bios, project experience and any information on quality assurance and control. The supplier should ensure that the contracted entity is responsible for determining whether their tank(s) is a permit-required confined space under Occupational Safety and Health Administration Regulations Standards - 29 CFR 1910.146, and for having an understanding of the potential risks that are associated with entering a confined space and the available method(s) of mitigating those risks.

Statement of Qualifications for Contracted Entity attached: ☒ Yes ☐ No (If yes, see Appendix 3)

USE POLICY DW-015 FOR GUIDANCE ON INSPECTION METHODS AND QUALIFIED PERSONNEL

WATER QUALITY CONTROL DIVISION SAFE DRINKING WATER PROGRAM POLICY

POLICY TITLE:

Storage Tank Rule Inspection Methods and Qualified Personnel Policy

SDWP policy number: DW-015

Adoption date: April 15, 2021

Effective date: April 15, 2021

Scheduled review date: April 15, 2024

Version: 2

Approved by:



Ron Falco, P.E.

Safe Drinking Water Program Manager

5.0 Guidance: Inspection Methods and Qualified Personnel Examples

5.1 Acceptable Periodic Inspection Methods and Qualified Personnel

- (i) The supplier's Small Water System certified operator performed the periodic inspection of the supplier's one finished water storage tank by doing an inspection of the entire exterior of the tank including vent and screen, exposed sections of the foundation, overflow pipes and opening the access hatch. The operator documented the inspection using the department's periodic inspection checklist and included photographs of the access hatch gasket showing that it had no sanitary defects and that there were no visible contaminants inside the tank collar or on the water's surface. In addition, the operator's checklist indicated the identification of a sanitary defect with the vent screen as it was partially torn. The supplier's checklist reflected this defect (with a photograph), a corrective action to replace the screen and the completed corrective action date and attached photograph of the corrected screen.
- (ii) A periodic inspection was performed by an individual that is not the usual designated personnel. However, the supplier designated this individual as a qualified backup for the primary personnel, which was documented in the storage tank inspection plan. The backup personnel inspected the entire exterior of the tank including vent and screen, exposed sections of the foundation, overflow pipes and opened the access hatch. No sanitary defects were identified. The backup personnel documented the inspection using the department's periodic inspection checklist and included photographs that demonstrated no sanitary defects.

5.2 Unacceptable Periodic Inspection Methods and/or Unqualified Personnel

- (i) There are two weeks left in the year and the supplier's certified



3. Inspection Schedules

Inspection Schedules				
SDWIS Tank Name	SDWIS Tank ID#	~~Quarterly~~ Twice Per Year (Periodic) or Alternative	Every 5 Years (Comprehensive) or Alternative	Alternative Schedule Justification (Include written description of justification including the factors considered for each tank inspection or inspection activity with an alternative schedule. Include additional justification information in Appendix 5.)
Tank 1	009	Twice Per Year	Every 5 Years (last comprehensive inspection in 2022 - next inspection due in 2027)	

4. Timeline for Correcting Sanitary Defects

Section 11.28(2)(a)(iii) - Timelines for Correcting Sanitary Defects

Timelines to Correct Sanitary Defects

Section 11.28(2)(a)(iv) requires the supplier to establish timelines for correcting any storage tank sanitary defects that are identified during an inspection. The timelines are to be used for developing corrective action schedules. The supplier must at least address timelines for improper screening or protection on vents and overflows, inadequate hatches, and unprotected openings. The following table can be used to fulfill this requirement.

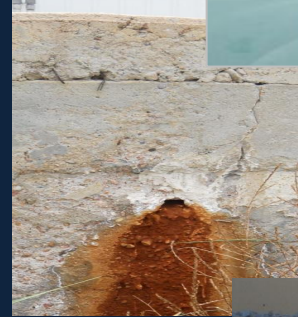
Sanitary Defect	Timeline (e.g. 'up to 2')	Time Units (days, weeks, or months)
Improper screening or protection on vents and overflows	<i>up to 1</i>	<i>month</i>
Inadequate hatch(es)	<i>up to 120</i>	<i>days</i>
Unprotected opening(s)	<i>up to 2</i>	<i>weeks</i>

You determine your timeline and fill in this information here



Periodic Inspection

- External visual inspection performed by the supplier
 - Vent screens, hatches, penetrations, gaskets
 - Screen openings can't exceed 0.07 inches (12 16 mesh)
 - Take pictures
 - Comment on any problems & make CAP



Periodic inspection [checklist](#)

- highlights sanitary defects

Periodic inspection [instructions](#)



Periodic Inspection Checklist



Department of Public
Health & Environment

Section 11.28 Storage Tank Rule, Regulation 11 (5 CCR 1002-11)

Periodic Inspection Checklist

System Name & PWSID:	
Inspection Date:	
Inspector's Name:	
Inspector's Phone:	
Inspector's Email:	
SDWIS Tank Name:	
SDWIS Facility State ID:	
Inspection Start & Finish Time*:	
Tank Level*:	
Weather Conditions*:	
List Sanitary Defects by Bolded Inspection Item # (see * footnote below):	

* These items are not required but are included for the sole benefit of the supplier of water.

*Bolded inspection items that are sanitary defects if answered 'No': 16, 19, 20 & 27.

Bolded inspection items that are sanitary defects if answered 'Yes': 21, 28, 29 & 30.

15. If #14 yes: Coating blistering, peeling, scaling, rusting or other failure?	☐ Y ☐ N	☐	
16. Tank penetrations properly sealed or protected with proper screening or valves?	☐ Y ☐ N		
17. Damage or corrosion to the exterior ladder and/or cage?	☐ Y ☐ N	☐	
18. Roof access openings closed and locked?	☐ Y ☐ N	☐	
19. Access opening sanitary seal/gasket: In place? Damage-free? Provides a water/ insect tight seal? Provides a barrier from contaminants?	☐ Y ☐ N	☐	
20. Vent(s) screened (24' mesh or a department approved alternative size)?	☐ Y ☐ N	☐	
21. Vent screens: Damaged? Foreign debris?	☐ Y ☐ N	☐	

Periodic Inspection Checklist

- Refer to Policy DW010 for definitions and criteria in determining a sanitary defect
- Bolded items indicate sanitary defects
- Must document corrective action schedule for found sanitary defect(s) and attach evidence of correction/repair

Inspection Item:	Yes/No	N/A	Comments/Corrective Action Schedule/Action Taken/Corrective Action Completion Date:
1. Photographs taken during the inspection?	☐ Y ☐ N		If no, why not?
SECURITY			
2. Outside tanks without a fence, is a security fence needed?	☐ Y ☐ N		Why or why not?
3. Fenced tanks: Locked or damage-free?	☐ Y ☐ N	☐	
4. Fenced tanks: Openings or forced entry?	☐ Y ☐ N	☐	
5. Vandalism, litter or graffiti?	☐ Y ☐ N		
6. Tanks with exterior ladder: ladder locked and secured?	☐ Y ☐ N	☐	
screening or valves:			
17. Damage or corrosion to the exterior ladder and/or cage?	☐ Y ☐ N	☐	
18. Roof access openings closed and locked?	☐ Y ☐ N	☐	
19. Access opening sanitary seal/gasket: In place? Damage-free? Provides a water/ insect tight seal? Provides a barrier from contaminants?	☐ Y ☐ N	☐	
20. Vent(s) screened (24' mesh or a department approved alternative size)?	☐ Y ☐ N	☐	
21. Vent screens: Damaged? Foreign debris?	☐ Y ☐ N	☐	

Comprehensive Inspection

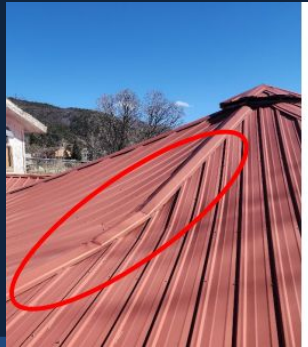
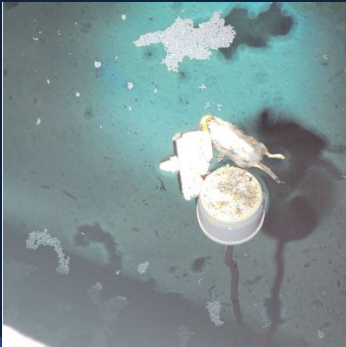
- Full internal and external inspection:
 - Sanitary defects, structural concerns, coating conditions, security and safety concerns



Comprehensive inspection [checklist](#)



Comprehensive inspection [checklist instructions](#)



Comprehensive Inspection

- Adjust water level to as low as possible and view the interior through a roof hatch with a flashlight
 - Enter storage tank after it is drained
 - Considered to be confined space entry by OSHA
 - Sediment/sludge exceeding 1”
 - excessive blistering, peeling, scaling, corrosion inside tank
 - daylighting
 - Disinfect tank prior to returning it to service
- Wet inspection when tank is full of water
 - Professionally certified diver or remote operated vehicle
 - Third party inspection, supplier must interpret inspection observations, identify and correct



Comprehensive Inspection Checklist



Health & Environment

Section 11.28 Storage Tank Rule
Regulation No. 11 (5 CCR 1002-11)

Comprehensive Inspection Checklist

System Name & PWSID:	
Inspection Date:	
Inspector's Name:	
Inspector's Phone:	
Inspector's Email:	
SDWIS Tank Name:	
SDWIS Facility State ID:	
Inspection Start & Finish Time*:	
Tank level*:	
Weather conditions*:	
List Sanitary Defects Identified by Inspection Item # (which are in bold)*:	

*These items are not required and are included for the sole benefit of the supplier of water.

* **Bolded inspection items that are sanitary defects if answered 'Yes':** 2, 3, 6, 7, 8, 9, 11, & 13.
Bolded inspection items that are sanitary defects if answered 'No': 10 & 12.

Inspection Item:	Yes/No	N/A	Comments/Corrective Action Schedule/Action Taken/Corrective Action Completion Date:
1. Photographs or video taken?	☐ Y ☐ N		If no, why not?
INTERNAL TANK INSPECTION			
2. Contamination in the tank (e.g. floating debris, insects, other animal contamination, roots, etc.)?	☐ Y ☐ N		
3. Water turbid, discolored, stale or foul?	☐ Y ☐ N		
4. Is stored water routinely turned over (stand pipe with valves or	☐ Y ☐ N		

- Refer to Policy DW010
- Do not forget to follow up with corrective actions!
- Note: While you may hire a contractor to physically conduct the inspection, it is the responsibility of the PWS to review & complete the inspection checklist/inspection summary

Following Inspection

- Read report/ watch video
 - ID San defects, supplier interprets findings
- Write inspection summary (Corrective Action Plan) within 60 days containing:
 - Date and type of inspection performed
 - Inspection findings and tank conditions
 - Any identified sanitary defects
 - Corrective action schedule for any found sanitary defects
 - Corrective action completed and dates



Response to Violations

In the event of a storage tank rule violation:

- Notify department with in 48 hours
- Distribute T3 public notice

In the event of a treatment technique violation:

- notify department within 48 hours
- distribute T2 public notice

In the event of a sanitary defect leading to finished water contamination

- call the 24-hour incident hotline immediately but no later than 24 hours
 - 1-877-518-5608
- animal carcass
- confirmed microbial contamination
- chemical contamination

What is a Sanitary Defect?

Definitions, Acronyms, and Abbreviations can be found in Regulation 11, Section 11.3

A defect that:

- Could provide a pathway of entry for microbial contamination into the distribution system; or
- Is indicative of a failure or imminent failure in a barrier that is already in place

Policy DW-010: Sanitary Defect

WATER QUALITY CONTROL DIVISION SAFE DRINKING WATER PROGRAM POLICY

POLICY TITLE: Sanitary Defect Applicability Policy	
SDWP policy number:	DW-010
Adoption date:	April 15, 2021
Effective date:	April 15, 2021
Scheduled review date:	April 15, 2024
Version:	2
Approved by:  Ron Falco, P.E. Safe Drinking Water Program Manager	

1.0 Purpose and Background

(iii) Storage tanks. Examples include:

- a. Overflow, vents, hatches, and other penetrations not configured, screened, or sealed properly. For example:
 - I. A tank penetration that is not adequately sealed or protected with proper screening or a valve
 - II. An access opening that does not have a sanitary seal including a metal on metal hatch
 - III. A sanitary seal gasket that is damaged and does not provide a water/insect tight seal
 - IV. The interior of an access hatch shows signs of structural deficiencies, irregularities or other failure
 - V. An air vent that is not down turned and/or does not include a non-corrodible screen that has openings less than 0.07 inches (typically 12 or 16 mesh screen)
 - Down turned vents can be candy cane, mushroom style, or where no portion of the vent screen is visible from a horizontal position (e.g. vent in the side of a hatch assembly with louver protecting the vent). Any vent cover must overlap so that no horizontal pathway exists. If the 0.07-inch screen is used within the vent assembly, then a screen that has openings that do not exceed 0.25 inches (typically 4 mesh screen) must be used to keep birds or other animals out of the vent assembly
 - VI. A vent screen that is damaged or is not in place
 - VII. A ground level overflow that is not screened or does not have a flap valve or screen/flapper is not intact
- b. Evidence of visible contamination inside the tank or the stored water is turbid, discolored, or other failure
- c. Sediment/sludge accumulation in the bottom of the tank that exceeds a depth of one inch
- d. The interior coating has excessive blistering, peeling, scaling



Search: CDPHE drinking water policies

Example Sanitary Defects

- Improper configuration & screening of vents
- Visible daylight through unprotected penetrations
- Improper hatches
 - Missing bolts, gasket/sanitary seal
- Sediment in bottom of tank exceeding 1 inch
- Separation of the wall from the roof
- Unprotected Overflow
 - Unscreened and/or flapper not seated
 - Ground level screen/flapper damaged or buried
- Evidence of visible contamination in tank
 - Algae, Insects, Debris, Dead animals

Example Sanitary Defects



Ground level overflow
flapper not seated



Vent - not
downturned; screen
damaged, screen
openings $>0.07''$

Example Sanitary Defects



Vent - Needs vent cover to overlap so that no horizontal pathway exists

Like this:



Vent cover overlaps so that no horizontal pathway exists

What's wrong here?



Vent downturned, and screened



Example Sanitary Defects



Unprotected tank
penetrations - metal
on metal



Evidence of visible
contamination in tank

Example Sanitary Defects



Evidence of
contamination

Dead animal!

Visible daylight
seen from
interior



Sediment in
bottom of tank
exceeding 1
inch



Takeaways

- Maintained finished water storage tanks free of sanitary defects are a CRITICAL BARRIER to contamination!
- Utilize CDPHE tools, templates, and resources to ensure compliance
- The tank inspection plan, inspection summaries, and related documentation are reviewed by the Department during sanitary surveys.
- Periodic inspections at least 2x/year; comprehensive at least every 5 years
- Pre- Entry Point tanks do not currently fall under the Storage Tank Rule (written inspections/inspection plan not required), BUT they must also be free of sanitary defects (see top sanitary survey sig. defs)
 - BMP: Recommended to inspect pre-EP tanks at same frequency as finished tanks

A silhouette of a water tower stands against a vibrant sunset sky. The sky is filled with soft, wispy clouds in shades of orange, yellow, and blue. The water tower is a dark, solid shape with a cylindrical tank and a small roof on top. It is supported by a lattice of legs. The text "THANK YOU!!" is overlaid in large, white, sans-serif capital letters across the upper part of the tower and the sky.

THANK YOU!!

QUESTIONS??

Contact Information

Requesting Coaching: go to CDPHE training site click on the link:
“Request free customized coaching and training assistance”

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