REGION 5
CHICAGO, IL 60604

REPLY TO ATTENTION OF
ECW-15J

VIA ELECTRONIC MAIL
RETURN RECEIPT REQUESTED

Anjuman Islam, Director
Racine Waterworks
100 Hubbard St., Racine, WI 53402
Anjuman.Islam@cityofracine.org

Subject: U.S. EPA Safe Drinking Water Act Inspection Report

Dear Anjuman Islam:

On February 18-20, 2025, the U.S. Environmental Protection Agency conducted a compliance evaluation inspection of the Racine Waterworks public water system ("System"), PWSID WI2520062, located in Racine, Wisconsin. The purpose of the inspection was to make observations about the site conditions, operation, and monitoring of the System to evaluate compliance with the Safe Drinking Water Act ("SDWA") and regulatory requirements. Please see the enclosed copy of our inspection report.

EPA appreciates the opportunity to work with you to provide drinking water that meets or exceeds national drinking water standards. If you have taken any additional information or actions in response to areas of concerns identified or you have an update, please provide a response within 30 days after receipt of the inspection report.

If you have questions or concerns, please contact Jim Adamiec of my staff at (312) 886-0815 or adamiec.james@epa.gov.

Sincerely,
Maraldo, Dean
Digitally signed by Maraldo, Dean
Date: 2025.04.05 07:30:39 -05'00'

Dean Maraldo
Supervisor, Section 3
Water Enforcement and Compliance Assurance Branch

Enclosure(s):

EPA Inspection Report

Cc:

Steve Elmore, Wisconsin DNR
Adam DeWeese, Wisconsin DNR
Kyle Burton, Wisconsin DNR
Beth Goldowitz, Wisconsin DNR
Dean Maraldo, EPA
Taylor Jerger, EPA
Stacy Meyers, EPA
Sasha Letuchy, EPA
Joel Brunner, City of Racine

Inspection Entry Date/Time:	February 18, 2025 / 0730	**Announced:** Yes
Inspection Exit Date/Time:	February 20, 2025 / 1156	**Access:** Granted
Weather:	Cold, clear, icy	
Media:	Water	
Statute(s)/Program(s):	Safe Drinking Water Act, Wisconsin Administrative Code	
Type of Inspection:	CEI – Compliance Evaluation	
In-Person Inspection:	Yes	

System Name:	Racine Waterworks
System Physical Address:	100 Hubbard St., Racine, WI 53402
City	Racine
State	Wisconsin
Facility/Site Identifier:	110000419324
County/Borough/Parish:	Racine
Facility GPS Coordinates:	42.736886, -87.780819

PWS ID:	WI2520062

Persons Participating in Inspection:

Name	Title/Organization	Phone	Email	Present in Opening Conf.	Present in Closing Conf.	Present during Site Walkthrough
Jim Adamiec	Lead Inspector / EPA	312-886-0815	Adamiec.james@epa.gov	Yes	Yes	Yes
Amanda Cross	Inspector / EPA	312-353-1149	Cross.amanda@epa.gov	Yes	Yes	Yes
Tony Ratarasarn	Inspector / WDNR	262-574-2134	Thanintr.Ratarasarn@wisconsin.gov	No	Yes	Yes
Daniel Pociask	Meter Sup. / Racine	262-497-4877	Daniel.pociask@cityofracine.org	Yes	Yes	No
Mike Weisbrod	Ops. Sup. / Racine	262-822-6932	Mike.weisbrod@cityofracine.org	Yes	Yes	Yes
Chad Regalia	Chief Engineer	262-497-4611	Chad.ragalia@cityofracine.org	Yes	Yes	No
Joel Brunner	Plant Superintendent / Racine	262-939-2966	Joel.brunner@cityofracine.org	Yes	Yes	Yes
Jerome Cannon	Construction Supervisor / Racine	262-497-4615	Jerome.cannon@cityofracine.org	Yes	Yes	No
Steve Stiles	CICS Tech / Racine	262-995-4977	Steve.stiles@cityofracine.org	Yes	Yes	No
Anjuman Islam	Executive Director / Racine	262-270-0420	Anjuman.islam@cityofracine.org	Yes	Yes	No

Lead Inspector:

Jim Adamiec	JAMES ADAMIEC Digitally signed by JAMES ADAMIEC Date: 2025.04.04 13:13:00 -05'00'		
	Region 5	Adamiec.james@epa.gov	312-886-0815

Supervisor Review:			
Dean Maraldo	Maraldo, Dean Digitally signed by Maraldo, Dean Date: 2025.04.05 07:30:54 -05'00'		
	Region 5	Maraldo.dean@epa.gov	312-353-2098

SECTION I – INTRODUCTION

This Section describes the site entry, authority and purpose of the inspection, and the system.

Site Entry and Inspection Objectives

Lead inspector, Jim Adamiec, arrived at Racine Waterworks (the "System"), located at 100 Hubbard Street, Racine, Wisconsin, 53402, at 3:00 PM CST of February 18, 2025, for an announced inspection. Jim Adamiec presented credentials to all system personnel and informed them that this was a Region 5 inspection to determine compliance with the Primacy Agency requirements and the Safe Drinking Water Act (SDWA). The inspection was conducted under the authority of the SDWA Section 1445. This report is based on information supplied by Racine Waterworks representatives, observations made by the Region 5 inspectors, and records and reports maintained by the System and Region 5 including: direct observations made by the Region 5 inspectors, photographs taken by Region 5 inspectors, physical evidence collected by the Region 5 inspectors, measurements taken by Region 5 inspectors, verbal or written statements made by System representatives during or subsequent to the on-site inspection, and materials, processes, data, photographs, or documents shown, demonstrated, or submitted to the Region 5 inspectors, by Racine Waterworks representatives during or subsequent to the on-site inspection. In addition, information gathered prior to or subsequent to the inspection from a review of EPA, State, and public records may be included in this report.

The scope of the inspection was an onsite review of the water source, facilities, equipment, operation, maintenance, and monitoring compliance of a public water system (PWS) to evaluate the adequacy of the PWS, its sources and operations, and the distribution of safe drinking water. Prior to the inspection, EPA provided notice of the inspection via email to Anjuman Islam. In the inspection notice, EPA requested records. A list of these records can be found in Appendix B. None of the information in this report or in any of the records provided by the system were identified as confidential business information (CBI).

System Description

According to Wisconsin's Drinking Water Watch website and database, the System is owned by the City of Racine and serves a population of approximately 105,000 people. It is a community water system as defined by 40 C.F.R., Part 141 Subpart A. Wisconsin Department of Natural Resources maintains the Drinking Water Watch database which provides a record of the System's owner, operator, and size. EPA did confirm the above information from *SDWIS/Drinking Water Watch* with the *system.*

The System is a surface water system serving municipalities, schools, residential and industrial users, and others. The source water is surface water from three intakes in Lake Michigan.

System Information

Racine Waterworks representatives supplied additional information during a staff interview and throughout the inspection. This information is organized into discussion topics and the topics are designated with a reference number. Each entry then indicates whether the discussion topic is an Area of Concern (AOC). AOCs are further discussed in Section VI.

Reference #: IN-001	**Topic:** Staffing and Operations	**AOC:** No

Racine Waterworks is divided into several departments including construction, engineering, meter, operators, maintenance, and lab. These departments are supported by various manager, clerical, IT, and accounting staff. The System employs seven full-time drinking water operators and the treatment plant has at least one certified operator on site at all times. While on shift, operators rotate their duties between the SCADA control rooms, lab, and treatment plant. The System has gone through some historical turnover, but continuity and institutional knowledge of the system has been retained by experienced staff who have been with the System for many years. The System is currently fully staffed.

Reference #: IN-002	**Topic:** Source and Intakes	**AOC:** No

The drinking water source is surface water from Lake Michigan. The System relies on warnings from WDNR to alert them to any emergency conditions on the lake, such as spills. There are three intakes in constant use and located several hundred feet apart. Two of the intakes use cribs. Intake diameters are 24", 36", and 54". Each intake has an underwater inspection once per year while the intake is in use. Based on the inspection results, the intakes are periodically cleaned of sediment, typically every three to five years.

The intakes are occasionally affected by frazzle. The last frazzle incident was in 2022 and resulted in some reduced flow, but all three intakes were able to continue operating. The System has a Standard Operating Procedure (SOP) directing operators of the steps to take in response to frazzle, and this is regularly distributed to operators in advance of cold weather events.

Potassium permanganate is added to control zebra mussel growth but is never fed while sampling for total organic carbon. Raw water quality is analyzed in the System's lab every four hours and there is also an inline analyzer for raw water turbidity and potassium permanganate.

The 54" intake leads into shore shaft A, and from there, into shore shaft B. The 24" and 36" intakes lead directly into Shore Shaft B. Within shore shaft B, the water is combined and moves by gravity to the low lift suction well underneath the low lift pump house. Four low lift pumps then push the water into the treatment plant.

Shore shafts were not inspected during the facility walkthrough due to snowy conditions and accessibility constraints on the day of the inspection.

Reference #: IN-003	**Topic:** Coagulation/Flocculation/Sedimentation	**AOC:** No

The four low lift pumps used to move water into the treatment plant are used on a weekly rotation. Three of the pumps are variable speed with capacities from 8-25 MGD, and one is fixed speed with a capacity of 25 MGD. The low lift pumps move water from the suction wells into the east or west side of the plant. On both sides of the plant, the primary coagulant, polyaluminum chloride (PACL), and a coagulant aid polymer are added in the rapid mix risers, followed by flocculation tanks and settling basins. The flocculation tanks, located inside the pretreatment building, use either a horizontal paddle wheel or a four-stage vertical turbine mixer. Water then moves into sedimentation basins utilizing either conventional or lamella plate settling.

They System utilizes five sedimentation basins, numbered one through five. Basin three is used for sludge storage only, which is periodically emptied to a landfill. The basins were updated in the 1990s. The basins are designed to have redundancy and once a year they are taken out of service for maintenance on a rotating basis.

Reference #: IN-004	**Topic:** Filtration and Disinfection	**AOC:** No

Settled water then overflows the weirs in the sedimentation basin where gas chlorine is injected for disinfection. This is one of several points in the plant where chlorine can be added. Chlorine feed rates and targets are adjusted as

needed based on field measurements of chlorine residuals. Chlorine residuals are relatively constant and usually adjusted seasonally. Raw water turbidity widely fluctuates, and operators typically respond to high NTU values by increasing the coagulation and flocculation chemical dosages.

Water then flows by gravity onto the conventional dual media filtration beds. There are 16 conventional filter beds in total, consisting of eight small, four medium, and four large capacity filters with capacity ranges between 2.25 MGD and 7.5 MGD. The filters media is 1' anthracite, 2' sand, and a clay underbed.

Following the conventional filters, water enters a 2.575 MG clearwell, directly below. The clearwell is fully underground and is comprised of five sections that can be isolated if needed, but this has rarely been done. From the clearwell, an enclosed pipe cuts through the CT reservoir, also called the east reservoir, carrying the water to an ultra-membrane filtration plant. The ultra membrane filtration plant was built in 2005 in response to the cryptosporidium outbreak in nearby Milwaukee, which uses the same source water. Racine did not experience a similar outbreak but added the extra filtration capacity as a precaution.

The ultra-membrane filtration plant consists of 7 trains and a capacity of 52.5 MGD. In winter, this capacity is reduced to roughly 34 MGD. These filters use pumps to pull the water from outside the membrane through a fiber with 0.02 micron pores and into center of the unit before it is discharged into a 2 MG baffled CT reservoir. Before and after the CT reservoir, there are additional feed points where chlorine gas can be mixed in.

Reference #: IN-005	**Topic:** Chemical Additions	**AOC:** No

Chemicals used in the treatment plant include PACL coagulant, cationic polymer, phosphoric acid for pH adjustments, and granular hypochlorite for bed disinfection. Following the CT reservoir, orthophosphate, a corrosion inhibitor, hydrofluorosilicic acid (fluoride), for dental hygiene, and gas chlorine, for disinfection, can all be added. Chemical feed rates are generally adjusted automatically by the SCADA system in proportion to the total water flow rate.

The System's target fluoride level is 0.7 ppm, which they raise from the source's naturally occuring level of about 0.15 ppm. Finished water samples are collected from a sample point located after the high service pumps, just prior to the distribution system, and are analyzed at the onsite lab.

All chemical feed pumps have redundant units and common spare parts, such as hoses, are kept on hand for routine or unexpected repairs. Each chemical feed pump is inspected weekly.

All operators are given chlorine safety training and System policy requires operators to notify a manager prior to entering the chlorine storage room. Chlorine gas alarms are tested quarterly.

Reference #: IN-006	**Topic:** Service Area and Distribution System	**AOC:** No

Four high lift pumps move water from the treatment plant to the distribution system. The high lift pumps have redundancy, and their usage is cycled seasonally.

The System's service area includes the retail customer of the city of Racine, Mount Pleasant, Sturdevant, North Bay, and Elmwood Park. Water is also sold to the Village of Caledonia, a wholesale customer, through four interconnections. The System also maintains a relationship with the Village of Somers. Somers is not connected to the System's water, but the System owns the pipes within Somers. Somers is considered a separate water source and they could not use Racine water without adding additional infrastructure.

The distribution system includes 4,000 hydrants and 7,000 valves and consists of approximately 450 miles of water main, five booster pump stations, five elevated storage tanks, and two standpipes. Additionally, there is one inactive tank, the Mall tank, that has not been used in four or five years. It has been valved off from rest of the system and is expected to be decommissioned. The total combined storage capacity within the distribution system is 11 MG.

The distribution system is divided into three pressure zones, dictated at least in part by the elevation gains within the city of Racine as the distance away from Lake Michigan increases. The first pressure zone, 780', includes the Summit Ave. and Coolidge Ave. 1.5 MG elevated storage tanks. The second pressure zone, 875', includes two elevated tanks, the .75 MG Renaissance and the .25 MG Broadway elevated tanks, and is supplied by two booster pump stations and ground reservoirs, the 3.0 MG Newman Rd. and 2.75 MG Perry Ave assets. The third pressure zone, 933', includes one elevated storage tank, the 1.25 MG Louis Sorenson Tank and is supplied by the Highway 20 and Braun Rd. booster pump stations. System pressure is monitored using gauges on the discharge side of pumps, storage tank levels, and SCADA readings. Water pressure is about 80 PSI leaving the plant and about 60 PSI within the distribution system. The system conducted a pressure study around 2018, but the results were not requested or reviewed onsite by EPA.

System pipe age dates back to the 1880s and is under constant replacement. The average age of the pipes is from the 1970s, a date that trends upwards as more and more pipes are replaced over time. The most common pipe material is cast or ductile iron. New pipes are predominantly PVC, with the largest mains being steel or concrete.

Reference #: IN-007	**Topic:** System Maintenance	**AOC:** No

Maintenance tasks are tracked using both paper and electronic documents completed by both supervisors and staff operators. Most tasks are completed in-house. Maintenance tasks include starting backup generators, changing generator or pump oil, replacing filter cartridges, recording sump run times, servicing security gates, storage tank screen replacements, and others.

The location and maintenance of valves, hydrants, and other System assets is tracked using Geographic Information System (GIS). Small maintenance projects such as valve exercising are updated in GIS in real time, while large projects such as main replacements are periodically sent to a consultant to make updates. To make updates in real time, distribution system staff use laptops in the field.

Hydrants are given an annual inspection each fall for winterization. Thes inspections include visual checks, drainage verification, and operation as needed. Flushing is triggered by main breaks, customer complaints, chlorine test results, or new construction projects. Valves are exercised in spring and fall at a rate of 20% of the System's total per year. System staff identified one area in the west side of the distribution system as having low water use because water mains in that area were recently installed and demand has not yet caught up. This area is not routinely sampled for disinfectant byproducts because the System's DBP sites were chosen prior to construction in that area. Piping in that area is looped and regularly flushed to avoid stagnation.

The System experiences about 70-80 main breaks per year, mostly during winter due to temperature changes. Main break repairs are initiated when the water plant operator or person on call notify the distribution crew. The distribution crew then goes onsite, isolates, excavates, and repairs the line as needed. Prior to returning the line to service, it is disinfected with a chlorine solution and flushed until hydrants run clear. Boil orders and bacterial samples are not utilized for typical main breaks. Factors such as break history, pipe age, street repairs, pipe material, and pipe size all factor into the System's decision of when to fully replace a water pipe.

Water storage structures are inspected by an outside contractor, Dixon Engineering. Inspections are completed annually with an ROV or visual inspection and there is a full drawdown inspection every five years.

Long term maintenance projects are incorporated into the System's capital improvement plan. The plan is reviewed at least annually and budget items are presented to the water commission one year in advance. The System also has an Asset Management Plan (AMP) to aid in developing long term maintenance plans.

Reference #: IN-008	**Topic:** Lead and Copper	**AOC:** No

The System does have lead pipes on both the public and private side of the utility. There are about 11,000 lead service lines, 2/3 of which are full lead, and 1/3 of which are partial lead. The System estimated this number based on construction records for public lines, best guesses based on the age of the house for private lines, and direct observations whenever possible. GIS is used to map the locations of lead lines and an inventory is publicly available online. The city began a lead line replacement program in 2016 and has a goal to replace all lead lines by 2031. Until April 2024, the system used a chemical corrosion control blend of orthophosphate and polyphosphate. The system then switched to orthophosphate only, at a dosage of 2.0 ppm based on the recommendation from a 2019-2020 corrosion control study. During the System walkthrough, EPA inspectors observed the rig used for the corrosion control study. Although it is no longer in use, lead pipes from the distribution system were still present on the rig.

Reference #: IN-009	**Topic:** Backup Power	**AOC:** No
The system has two electrical power connections from their utility provider with one of those serving as a backup. In the event of a power outage, three backup diesel generators provide enough power to run the entire treatment plant. Several days of worth of diesel fuel is stored onsite. The generators are automatically turned on if a one-minute power loss is detected by SCADA. Some of the remote sites away from the treatment plant also have generators, while the Renaissance, Broadway, and Louis Sorenson booster pumps and storage tanks have only an uninterruptable power source (UPS). The UPS functions as a battery, providing power to communication and SCADA equipment only. All emergency generators undergo routine maintenance and load testing. They have not been used in a real-world scenario since 2019, during which time, the plant was able to continue normal operations without any disruption in service.		

Reference #: IN-010	**Topic:** Treatment Capacity	**AOC:** No
Maximum capacity of the treatment plant is 52.5 MGD compared to 2024's average usage of 15.1 MGD and maximum single day usage of 23.5 MGD.		

Reference #: IN-011	**Topic:** Meter Calibration	**AOC:** No
All meters in use at the System, including master meters and meters associated with pumps, are periodically calibrated by a consultant, M.E. Simpson Co. Turbidimeters are calibrated in house using benchtop comparisons.		

Reference #: IN-012	**Topic:** Cross Connection Control	**AOC:** No
The system does have a cross-connection control program. The System surveys residential components while a consultant, HydroCorp, surveys commercial customers and creates a final report.		

Reference #: IN-013	**Topic:** AWIA	**AOC:** N/A
While onsite, EPA inspectors reviewed the System's cybersecurity practices and their compliance with America's Water and Infrastructure Act, including their Risk and Resiliency Assessment and Emergency Response Plan. Details of these activities are documented in a separate report.		

SECTION II – OBSERVATIONS

This section describes the various areas of the water system toured by EPA and the observations made by visually inspecting sites and assets.

Areas

EPA conducted a tour of the system and visually inspected the following areas:

Area	Description
Chemical Feed and Storage	Assorted bulk and day tanks for chemical storage and feed
Low lift pumps	Four pumps used to move water into the treatment plant
Coagulation/Flocculation/Sedimentation	Pretreatment area of the plant
Filters	Includes both conventional and ultramembrane filtration trains
Clearwell	A water storage tank located downstream of the conventional filters
SCADA	Supervisory Control and Data Acquisition process used to monitor conditions throughout the System
Interconnect with Caledonia	A connection point where water leaves Racine and is sold to a customer
Distribution System Storage and Booster Pumps	Including the Perry Avenue booster pump and elevated water tower and Coolidge Avenue water tower

Observations

The EPA inspection team made observations by visually inspecting the areas identified above. All observations are grouped by the areas inspected and designated with a reference number. Each entry then indicates whether the observation is an AOC. AOCs are further discussed in Section VI. A photograph log can be found in Appendix A. Observations may not be in sequential order in which they were observed.

Area: Chemical Feed and Storage	
Reference #: OB-001	**AOC:** No
On the afternoon of February 19, 2025, EPA inspectors began a walkthrough of the System starting with the area of the System referred to as "Bunker Hill" by plant personnel. Here, potassium permanganate ($KMnO_4$) storage tanks and redundant feed pumps were observed. The tanks included a 1,550-gallon mix tank and a 585-gallon day tank. EPA inspectors continued to observe additional chemical treatment points throughout the walkthrough. Storage tanks are placed within secondary containment or are double walled with a stainless-steel interior and fiberglass exterior. PACL is stored in two 400-gallon storage tanks. A 30-day supply of PACL is stored onsite. Chemical feed rates are automatically adjusted by the SCADA system based on flow rates, although the rates can be adjusted as needed. Chemical Safety Data Sheets (SDS) are kept onsite with copies located in both the central office and the point of use. The SDS is reviewed by System staff annually.	
Photo(s): Appendix A Photo 1, 6	
Reference #: OB-002	**AOC:** No
Gas chlorine is mixed with finished water in a solution feed as it is injected into the treatment stream. The feed line is equipped with a backflow prevention device upstream. All gas chlorine used within the plant is stored in the same storage room within one-ton cylinders. There were four cylinders in the room; one in use, one full cylinder on standby, and two empty cylinders. The room is walled off from the rest of the plant, contains an observation window, panic door, room heat, and ventilation. Ventilation systems are automatically activated by opening the door	

and a fan is located less than 12” from the floor. System alarms are connected to SCADA. Additionally, there is a visual and audible alarm outside of the room.
Photo(s): Appendix A Photo 13
Reference #: OB-003 **AOC:** Yes
Due to the System’s design of a centralized central chlorine gas storage room and multiple feed locations, the distance between the feed point and storage location is not minimized. Utility schematics indicate that there are six feed points for chlorine and extensive piping is required to reach these areas. The System has taken steps to reduce the risk associated with piping in the treatment plant. Chlorine piping is color coded red, labeled, and kept under vacuum pressure. Storage cylinders are equipped with emergency shutoff valves. Chlorine gas detection alarms have been placed within the plant and are routinely maintained. During the inspection, the System was in the process of updating these alarms and had so fare replaced four out of the five alarms in the plant.
Citation: NR 811.39(3)(a): Chemical feed equipment shall be located near points of application to minimize length of feed lines.
Photo(s): Appendix A Photo 5
Reference #: OB-004 **AOC:** Yes
Some of the piping in the plant used for PACL was mislabeled as conveying ferric, which was previously run through those pipes but has not been used at the System since 2018.
Citation: NR 811.28(6): In order to facilitate identification of piping in waterworks, it is recommended to use a unique color scheme or labeling.
Photo(s): Appendix A Photo 7

Area: Low Lift Pumps
Reference #: OB-005 **AOC:** No
EPA inspectors observed the four low lift pumps inside the treatment building. The pumps are equipped with flow meters, effluent pressure gauges, air relief valves, and check valves. Raw water lines here, and elsewhere in the plant, are covered with green insulation.
Photo(s): Appendix A Photo 2, 3
Reference #: OB-006 **AOC:** Yes
All four low lift pumps had corrosion around the base of the pump.
Citation: NA
Photo(s): Appendix A Photo 4

Area: Coagulation/Flocculation/Sedimentation
Reference #: OB-007 **AOC:** No
All of the pretreatment assets were observed during the walkthrough, including both sides of the treatment plant and sedimentation basins with both conventional and inclined plate settling. The rapid mix and flocculation trains are located inside the pretreatment building. The Sedimentation basins are free standing structures not within any

building but still within the fenced area of the treatment plant. Both PACL and polymer were being added during the inspection.
Photo(s): Appendix A Photo 8
Reference #: OB-008 **AOC:** Yes
The roof access hatch to sedimentation basin #4 did not have a gasket seal. One side of the hatch base had a ladder and wooden support. Between the wooden side support and the hatch lid, there was a gap large enough for the EPA inspector's hand to fit. The water in sedimentation basin #4 is not finished water but it has had polymer and PACL added and has gone through mixing in the flocculation tanks.
Citation: NR 811.47(7)(d)6: Covers or superstructures are required at all plants.
Photo(s): Appendix A Photo 9

Area: Filters
Reference #: OB-009 **AOC:** Yes
The conventional filters appeared to be in poor condition. Directly above the filter beds, the paint on the roof was peeling off in strips with some segments dangling over the open water of the filters. System staff noted that they were concerned about possible lead contamination from any flaking paint that could fall into the filter basins. Within the filters themselves, the media appeared to have irregular settling despite a regular backwash routine, indicating that the media may need to be replaced. Components of the superstructure had some rust spots where coatings had been worn away. Safety handrails separated the filters from the central aisle but did not extend around all four sides of the filters. The filter building is designed so that roof runoff is directed into a gutter pipe. At points near the edge of the building, the exterior gutter pipe enters the building and runs vertically along the interior wall. If leaking, runoff from the gutter pipe could flow along the flat flor and into the exposed filter beds. The System is in the process of rehabilitating all 16 conventional filters. At the time of the inspection, bed 15 and 16 were out of service because they were being rebuilt while the remainder of the filters were in operation. While filters are down for the rebuilding, plant capacity may be reduced by up to 25%. The rehab will include media replacement and structural repairs. System representatives stated that prior to repairs, the condition of the filters was not causing and water quality issues, but that some components were known to be nearing the end of their useful life. The filter bed rehab project is expected to be completed in 2026 and is expected to remediate the current poor condition.
Citation: NR 810.03: The water supplier shall be responsible for ensuring that the public water system is operated and maintained to provide an adequate quantity of safe drinking water to include performing maintenance and replacement of equipment when necessary to keep the facilities in good operating condition.
Photo(s): Appendix A Photo 10
Reference #: OB-010 **AOC:** No
Around 7:30 AM on February 20, 2025, a filter backwash was observed at filter 11. Filters 1-12 are classified as small or medium filters and are backwashed at a frequency of every 10 days or 8' of head loss. Filters 13-16 are classified as large filters and are backwashed and every 12 days or 8' of head loss. Backwashes can be initiated automatically or manually. The duration of backwashes varies depending on turbidity readings.
Photo(s): Appendix A Photo 4

Reference #: OB-011	**AOC:** No
Each individual filter is monitored for turbidity with an automatic analyzer every ten seconds. The System then reports the maximum turbidity value for each hour interval. The combined filter effluent reading is taken directly after the convention filter units, prior to the membrane filters.	
Photo(s): Appendix A Photo NA	

Reference #: OB-012	**AOC:** No
Each filter bed has a physical gauge and SCADA connection to record individual filter effluent (IFE) values. EPA inspectors recorded several values using the physical gauges and later confirmed that they met the values being displayed on the SCADA system in real time. The recorded values included: Filter 9: 0.029 NTU Filter 10: 0.033 NTU Filter 11: 0.046 NTU Filter 12: 0.021 NTU	
Photo(s): Appendix A Photo NA	

Reference #: OB-013	**AOC:** No
The system uses seven ultramembrane filtration trains and each of these is made of six cassettes, a cartridge like insert containing the filter material. The membrane filters are maintained according to the manufacturer's recommendations, including a backwash every 35 minutes, a maintenance clean once a week, clean in place with a high chlorine solution every 90 days, and a citric soak. During the inspection, six out of the seven membrane trains were in operation.	
Photo(s): Appendix A Photo NA	

Area: Clearwell	
Reference #: OB-014	**AOC:** No
Due to its location underground, the condition of the clearwell was difficult to assess during the inspection. System staff provided a clearwell inspection report and opened an access hatch located far above the water level, and from there, no areas of concern were identified.	
Photo(s): Appendix A Photo 11	

Area: SCADA	
Reference #: OB-015	**AOC:** No
SCADA can be accessed from several points throughout the treatment plant but is typically monitored from a main control room. In this room, inspectors observed digital alarm logs, chemical feed rates, tank levels, turbidity, and pump operation in real time. High lift pump discharge pressure was recorded as 79.3 PSI and finished water chlorine residual was 1.31 ppm. Handwritten shift notes and paper logs were also observed.	
Photo(s): Appendix A Photo NA	

Area: Lab	
Reference #: OB-016	**AOC:** No

The walkthrough included a tour of the System's lab where inspectors observed sample collection points, safety equipment, and chemical storage and expiration dates. The lab is used to monitor raw water parameters, conduct bacterial analysis, and measure residual fluoride.	
Photo(s): Appendix A Photo 12	

Area: Interconnect with Caledonia	
Reference #: OB-017	**AOC:** No
The interconnect with Caledonia was in an underground vault. The vault was covered by a locked access hatch. The interconnect is metered.	
Photo(s): Appendix A Photo 15	
Reference #: OB-018	**AOC:** Yes
Standing water was observed in the interconnect vault between Racine and Caledonia. The standing water level was below the level of the piping within the vault. System staff reported that Caledonia periodically sent their employees to check on vaults and pump out standing water.	
Citation: NR 811.72(2)(b): Means to allow drainage: Chambers shall be drained to the ground surface where they are not subject to flooding by surface water or high groundwater. If electrical power is available, sump pumps discharging above grade may also be approved by the department.	
Photo(s): Appendix A Photo 14	

Area: Distribution System - Storage and Booster Pumps	
Reference #: OB-019	**AOC:** No
Inspectors observed the Perry Avenue tank and booster station and elevated water tower and Coolidge Avenue water tower. Both the ground level storage tank (standpipe) at Perry Avenue and the elevated water tower at Coolidge Avenue were secured with locked doors and security fencing. Overflows for each tower were fitted with a fine mesh screen. The towers can be drained by using an isolation valve and adjacent hydrant. There were no concerns noted with the physical condition of assets or buildings at either location. System staff conduct walkthroughs of all pump stations at least once a week to check gauges and perform visual inspections. Mechanical pressure gauges in basement of the booster pump buildings showed that water pressure was 66 PIS leaving Perry Avenue and 62 PSI leaving Coolidge. The sample tap for finished water at the Perry Avenue building was smooth nosed.	
Photo(s): Appendix A Photo 16-19	
Reference #: OB-020	**AOC:** Yes
The sample tap for the Coolidge Avenue tank effluent had a threaded connection, representing a potential cross connection.	
Citation: NR 811.64(16)(a): Storage facilities shall have a smooth-end sampling faucet installed in the connecting main or riser pipes of elevated tanks, standpipes, and reservoirs, if design permits.	
Photo(s): Appendix A Photo 20	

SECTION III – RECORDS

The section identifies the records EPA reviewed during the inspection. Copies of records were either requested and provided to EPA prior to the onsite visit, provided to EPA during the onsite visit or just reviewed while on site. See Appendix B for full list of records that were requested or received. All records are designated with a reference number. Each entry then indicates whether the record reviewed is an AOC. AOCs are further discussed in Section VI. Records may not be in sequential order in which they were reviewed. Additional records reviewed offsite are not detailed in the tables below.

Record: Utility Schematic and Process Diagrams	**AOC:** No
Reference #: RR-001	
EPA inspectors reviewed printed copies of engineering plans and a process flow chart describing the flow of water through the treatment plant.	
Copy of Document Obtained Prior, During or After the Inspection: Yes	

Record: Organizational Chart for Racine Waterworks	**AOC:** No
Reference #: RR-002	
EPA inspectors reviewed a printed copy of the System's management structure, departmental divisions, and staffing levels.	
Copy of Document Obtained Prior, During or After the Inspection: Yes	

Record: AWIA Records	**AOC:** NA
Reference #: RR-003	
EPA inspectors reviewed the System's Risk and Resiliency Assessment (RRA) and Emergency Response Plan (ERP) compiled in accordance with America's Water and Infrastructure Act (AWIA). This review is detailed in a separate report.	
Copy of Document Obtained Prior, During or After the Inspection: No	

Record: Sample Schedule and Site Plan	**AOC:** No
Reference #: RR-004	
EPA inspectors briefly reviewed the System's LCR monitoring site plan and 2025 sample schedule, printed from the WDNR website.	
Copy of Document Obtained Prior, During or After the Inspection: Yes	

Record: Water Loss Audits	**AOC:** No
Reference #: RR-005	
EPA inspectors reviewed digital records of the System's water loss audits from 2021 – 2022 and verified how calculations were made. Total water loss was near 15% for all years.	
Copy of Document Obtained Prior, During or After the Inspection: No	

Record: Customer Complaint Logs	**AOC:** No
Reference #: RR-006	
EPA inspectors reviewed the System's digital customer complaint logs from January 2020 – January 2025. The log includes the reason for the complaint and the response or corrective action taken by System personnel.	
Copy of Document Obtained Prior, During or After the Inspection: Yes	

Record: Main Break Logs	**AOC:** No
Reference #: RR-007	
EPA inspectors reviewed the System's digital main break logs for 2024-2025 and discussed the practice of repairing lines and restoring service to affected customers.	
Copy of Document Obtained Prior, During or After the Inspection: Yes	

Record: Valve and Hydrant Exercising Practices	**AOC:** No
Reference #: RR-008	
The System does not have a written plan describing valve and hydrant exercising. However, a summary memo was produced for each of these programs and was reviewed by EPA inspectors. The memos describe the frequency and reasons for completing these activities. EPA inspectors also reviewed the System's GIS database where System staff displayed historical data, such as flushing date, location, and maintenance, for each valve or hydrant.	
Copy of Document Obtained Prior, During or After the Inspection: No	

SECTION IV – SAMPLING AND FIELD MONITORING ACTIVITIES

No samples or field measurements were collected during this inspection.

SECTION V – CLOSING CONFERENCE AND FOLLOW UP

This section describes the closing conference and records requested or provided following the inspection.

Closing Conference

Jim Adamiec, lead Inspector, held a closing conference with System personnel around 11:15 pm on February 20, 2025, for the inspection. During the closing conference, Jim Adamiec discussed the observations and Areas of Concern identified during the inspection. Areas of Concern have not yet been evaluated for a formal compliance determination.

Communication Log

EPA received additional information following the inspection.

Date	Type	Point of Contact	Description (Including Documents Name, if applicable)	Contain PII	Contains CBI
2/20/25	Email	Chad Regalia	Pipe Age	No	No
2/25/25	Email	Joel Brunner	Clearwell inspection documents	No	No

SECTION VI – AREAS OF CONCERN SUMMARY

This section provides a summary of AOCs identified during the inspection. All AOCs are grouped by the areas inspected, when relevant. The presentation of AOCs does not constitute a formal compliance determination or violation. AOCs may not be in sequential order.

Observation Identifier	Area	AOC Summary	Citation
OB-003	Chemical Feed and Storage	Chlorine feed lines run through the plant and are not positioned to minimize the distance between the storage point and feed location.	NR 811.39(3)(a)
OB-004	Chemical Feed and Storage	PACL piping mislabeled as ferric.	NR 811.28(6)
OB-006	Low Lift Pumps	Corrosion around the base of the low lift pumps.	NA
OB-008	Pretreatment	The roof cover to sedimentation basin #4 was not sealed.	NR 811.47(7)(d)(6)
OB-009	Filters	The conventional filters appeared to be in poor condition.	NR 810.03
OB-018	Interconnect with Caledonia	Standing water was observed in the interconnect vault between Racine and Caledonia.	NR 811.72(2)(b)
OB-020	Distribution System	The Coolidge Ave elevated tanks had a threaded sample tap.	NR 811.64(16)(a)

LIST OF APPENDICES

A. Photo Log
B. Documents Requested and Received

APPENIX A: PHOTOLOG

1: R0010086.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 2:26 PM[1]
Description: Bunker Hill potassium permanganate tanks. Mix tank (1,550 gal) on the left and day tank (585 gal) on the right.

2: R0010087.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 2:41 PM
Description: Low lift pump room, main floor.

[1] This and all photos in this document are in Eastern Standard Time. The inspection was completed in Central Standard Time.

APPENIX A: PHOTOLOG

3: R0010088.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 2:51 PM
Description: Low lift pump room, basement overview.

4: R0010089.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 2:52 PM
Description: Close up photo of the base of low lift pump #3 with visible corrosion.

APPENIX A: PHOTOLOG

5: R0010090.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 3:05 PM
Description: West pre-basin raw water line chlorine injector with backflow prevention.

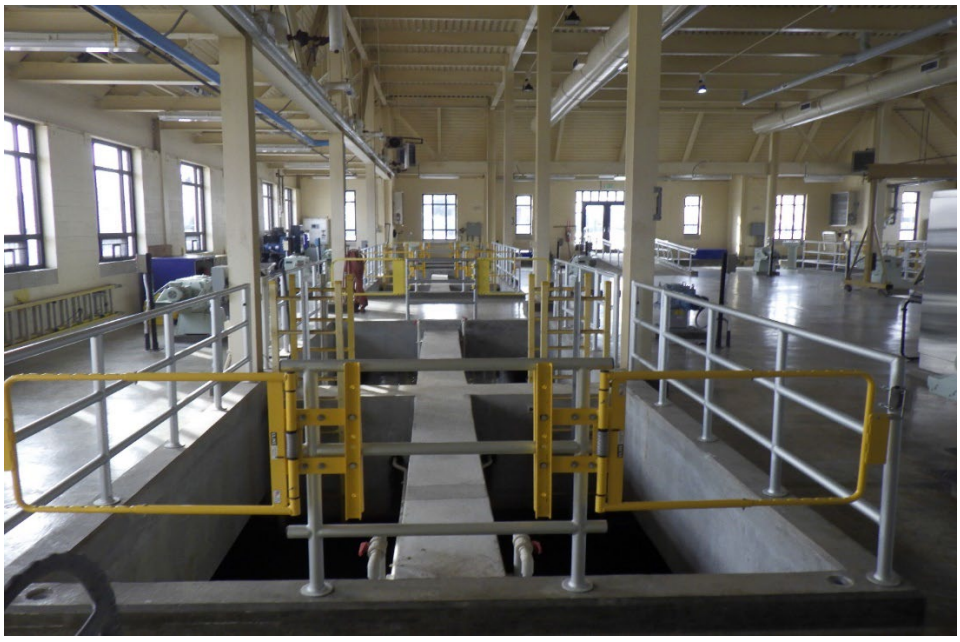
6: R0010091.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 3:26 PM
Description: Bulk chemical storage room. Fluoride in the foreground and PACL in the background. All chemicals are located in secondary containment.

APPENIX A: PHOTOLOG

7: R0010092.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 3:42 PM
Description: Pre-basin 2, chemical feed point labeling.



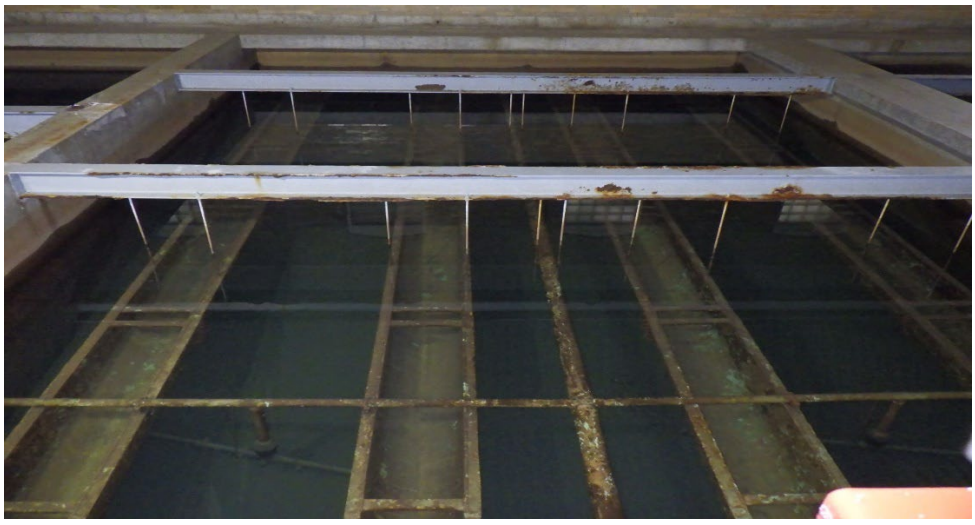
8: R0010093.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 3:53 PM
Description: Pretreatment basin #1 overview photo. Basin capactiy is 20 million gallons.

APPENIX A: PHOTOLOG

9: R0010094.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 4:02 PM
Description: Basin #4, east end access hatch. Acces hatch is missing a gasket around the edge. Basin #4 contains raw water.



10: R0010095.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 4:13 PM
Description: Filer #3 overview. Capacity is approximately 0.45 million gallons per day. The filter was operational at the time of the inspection.

APPENIX A: PHOTOLOG

11: R0010096.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 4:34 PM
Description: Clearwell #1 access hatch.

12: R0010097.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 4:58 PM
Description: Plant laboratory overview.

APPENIX A: PHOTOLOG

13: R0010098.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/19/2025 5:08 PM
Description: Overview photo of the chlorine bulk storage room. Feed equipment located on the left wall in the photo.

14: R0010099.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/20/2025 9:29 AM
Description: Charles Rd and 3-Mile Rd meter pit which is also the interconnect with Caledonia. Standing water was observed in the bottom of the pit.

APPENIX A: PHOTOLOG

15: R0010100.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/20/2025 9:29 AM
Description: Caledonia meter pit hatch.

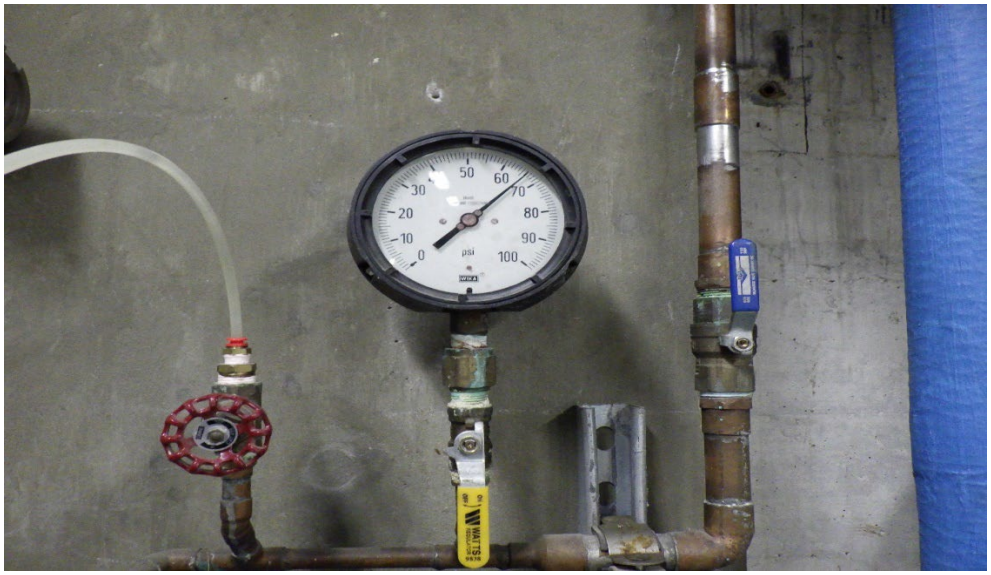
16: R0010101.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/20/2025 9:51 AM
Description: Parry Avenue booster pump station and tank.

APPENIX A: PHOTOLOG

17: R0010102.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/20/2025 9:54 AM
Description: Overview photo of the inside of Parry Ave booster pump staion. Pump #4 in the foreground and pumps #5 and #6 in the background.



18: R0010103.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/20/2025 10:02 AM
Description: System pressure guage in the Parry booster station basement.

APPENIX A: PHOTOLOG

19: R0010104.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/20/2025 10:06 AM
Description: Sample tap in the Parry booster station basement.

20: R0010105.JPG

Location: Racine Public Water System
Photographer: Amanda Cross
Date/Time: 2/20/2025 10:24 AM
Description: Coolidge Tower sample tap with visible threads

APPENDIX B: DOCUMENTS REQUESTED AND RECEIVED

SDWA PWS Inspection Document Request List

Copy Requested [i]	*Onsite Review Requested* [ii]	*Received / Reviewed* [iii]	*Document*
General			
☒	☐	☒	Schematic diagram of water treatment plant
☒	☐	☒	Description of the drinking water treatment process from source through distribution, including a list of all system components (e.g. wells, filters, storage tanks, booster stations, other treatment equipment, backup power sources, etc.) and their current operational status
☒	☐	☒	List of chemicals utilized in the water treatment process & distribution system
☒	☐	☒	Name, make, model of the field chlorine testing kit(s) used by the system
☐	☒	☒	Maintenance plans developed by the system, including any Treatment Plant Operation & Maintenance Manuals, Daily/weekly/annual checklists completed by operators, Asset Management Plan, and SOPs
☒	☐	☒	Public notifications from the last 3 years
☐	☒	☒	Customer complaint log for the last year
☒	☐	☒	Most recent storage tank inspections and findings
☐	☒	☒	Operational Logbooks / Record System
☒	☐	☒	Sanitary Survey Responses (to the most recent sanitary survey)
☐	☒	☒	Valve Exercising Plan
☐	☒	☒	Water Loss audit, report, and/or records (the three most recent)
☐	☒	☒	Water main break log (the most recent 12 months)
☒	☐	☒	Water Quality Monitoring Calendar
☐	☒	☒	Chlorine residual data (all distribution results for the most recent month)
Bacterial / Disinfection Records			
☐	☒	☒	Hydrant Flushing / Inspection Plan

APPENDIX B: DOCUMENTS REQUESTED AND RECEIVED

Copy Requested [i]	*Onsite Review Requested*[ii]	*Received / Reviewed*[iii]	*Document*
☒	☐	☒	Loss of Pressure Boil Water Order for past year
☒	☐	☒	Monthly Operating Reports (MORs) submitted to the primacy agency for the past year
LCR			
☐	☒	☒	Lead and Copper tap sampling letter and instructions to sampling customers (most recent)
☐	☒	☒	Consumer notices of lead tap water monitoring results (most recent)
☐	☒	☒	Lead and Copper public education notices and certifications (most recent)
☐	☒	☒	Lead and Copper public notifications (if applicable) delivered and certification (most recent)
America's Water and Infrastructure Act (AWIA)			
☐	☒	☒	Risk and Resiliency Assessment (RRA) and Emergency Response Plan (ERP)
Surface Water Turbidity Data (1 Year, Requested During Inspection)			
☒	☐	☐	Combined filter effluent monitoring data for the turbidity analyzer which represents the combined filter effluent, as applicable
☒	☐	☐	Results of benchtop turbidity analysis for combined filter effluent, as applicable
☒	☐	☐	Individual flow data for each of the filters
☒	☐	☐	A description of the filter backwash cycle, if the cycle is automatic or manual, the trigger for the cycle
☒	☐	☐	Records of the start/finish times for filter backwashes performed during the time period above

Notes:

[iii] Please provide an electronic copy to EPA
[iii] Please have the record available for inspectors to review during the inspection