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January 13, 2026

PWS ID: 25200626
Racine Waterworks
MC - Racine County

Jim Sullivan, City Administrator
730 Washington Avenue, Room 201
Racine, WI 53403

Subject: Sanitary Survey Report and Notice of Noncompliance of the Racine Water System

Dear Jim Sullivan:

The purpose of a sanitary survey is to evaluate the system's source, facilities, equipment, operation, maintenance, and management as they relate to providing safe drinking water. The sanitary survey is also an opportunity to update the Department's records, provide technical assistance, and identify potential risks that may adversely affect drinking water quality.

On October 6, 2025, Dave Barkhahn conducted the first phase of a sanitary survey that looked at the storage structures and booster stations in the distribution system of your water system, Racine Waterworks. During the first phase of the sanitary survey Joel Brunner and Dr. Anjuman Islam were present. On December 10, 2025, Dave Barkhahn, McCrea Baker, Serene Tomaszewski, and Brooke Porter conducted a second phase of a sanitary survey of your water system, that looked at the treatment plant and administrative requirements of the water system. During the second phase of the sanitary survey Joel Brunner, Mike Weisbrod, and Dr. Anjuman Islam were present. At the completion of the survey, Joel, Mike, and Anjuman were briefed on the preliminary findings. This report outlines the final findings, discusses problems that need to be addressed, and timelines for corrective action where appropriate.

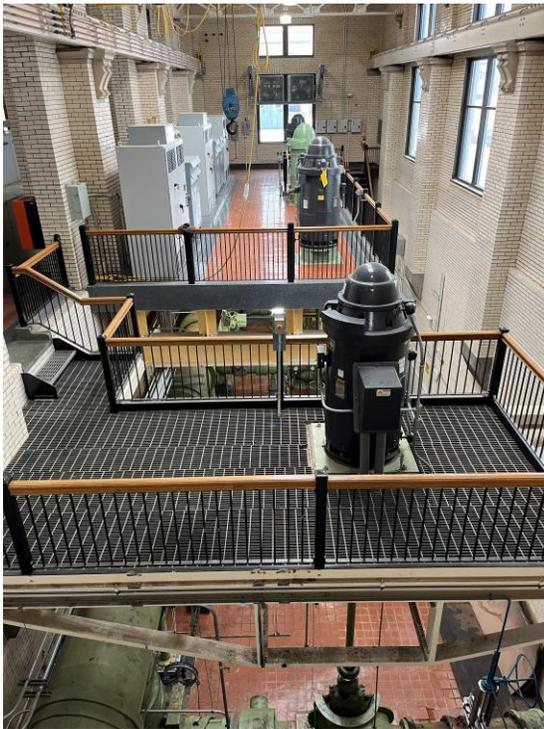
We are asking that a plan for corrective action, including a work schedule be completed by February 27, 2026. A proposed corrective action plan and schedule is included below. Please contact me to discuss this before February 27, 2026, if you can justify extending the deadline.

System Summary

The city of Racine is in east central Racine County, about 22 miles south of the city of Milwaukee. The city of Racine is bordered on the east by Lake Michigan, on the west by Interstate Highway I-94, on the south by the Racine/Kenosha County line, and on the north side by 4½ Mile Road. The Racine waterworks is owned and operated by the city and serves about 105,100 people. Racine Waterworks is a surface water system that pumps and treats water from Lake Michigan. Racine buys some water from Somers to serve a small subdivision on the south side of the distribution system at County Line Road and Meachem Road. Racine sells water to Caledonia (population of 25,491) through 10 metered locations. Caledonia gets about 2/3 of its water from Racine. In addition to serving the City of Racine (population of 77,775), the water system also serves Mount Pleasant (total population of 28,636, but not all are served by Racine), Elmwood Park (population of 501), North Bay (population of 206), and Sturtevant (population of 7,067).

Conventional Treatment

There are three intake pipes that draw raw water from Lake Michigan. The pipes are 24-, 36-, and 54-inches in diameter. The 24- and 36-inch pipes are cast iron. The 54-inch pipe is reinforced concrete. The intake pipes are in water that is about 23-39 feet deep. Water flows from the intake pipes to two shore wells at the end of Hubbard Street. The shore wells are 26 feet and 10 feet in diameter and 40 feet deep. Potassium permanganate is added at the intakes for zebra mussel control. From the shore wells, water moves through an eight-foot square concrete tunnel to a suction well immediately south of the pumping station. Four low-lift pumps take water from the suction well and pump to the mixing and flocculating basins in front of the filtration building. The pumps have capacities of one 25 million gallons per day (MGD) (constant speed) and three 8-25 MGD (with VFD controlled motors). Emergency power for the entire water treatment plant facility is provided by three 1,500 kW diesel generators. There are two primary mixing chambers (Basins 1 and 2) that each have baffles which aid in achieving the turbulence needed for the even distribution of the primary coagulation chemical (Polyaluminum Chloride) and the coagulant aid cationic polymer (CatFlocLS) in the water. From the mixing chambers, the water flows to the five flocculation chambers. Here the water is agitated by slow rotating paddles (Basin 4 and 5) so that the small floc and other particles suspended in the water will come in contact with each other to form larger and heavier particles. From the mixing and flocculating basins, the water flows to the four sedimentation basins. Two are bi-level structures (Basins 4 and 5) while the other two are single level (Basins 1 and 2). Basin 3 is strictly used for sludge storage year-round. After passing through the settling basins, the water passes to the 16 rapid sand filters. Wash water for all the filters is pumped from one of two 7,100 gpm pumps taking suction from the clear well below filter #13. The backwash water is directed to a backwash holding tank (retention basin) before being recycled to the head end of the plant. The sludge is disposed of into storage basins 3, 4, and 5 and then removed annually by a contractor for landfill disposal. There are revolving surface wash arms on each filter. The finished water from the filters goes into five clear wells below and then flows by gravity into the ultra-membrane filtration building through a pipe in the clear well.



Low-lift Pumps



Refurbished Filters



Filters Before Being Refurbished

Membrane Treatment

The membrane filtration building is south of Hubbard Street and east of the generator building. Construction of the membrane filter system was approved November 10, 2003. The membrane filters consist of 7 treatment trains, with 6 cassettes in each train. There are 69 modules in each cassette that can each be removed individually. The water is then pulled through the submerged membranes by permeate pumps and into a 2.4-million-gallon reservoir on the lakeshore side of the plant. One membrane treatment train is backwashed each day. The backwash water from the membranes is recycled back to the shore well by gravity. A periodic Clean-In-Place procedure is also used to clean the membranes. A sodium hypochlorite solution and/or a citric acid solution is used. The cleaning solutions are neutralized prior to discharging to the sanitary sewer. The conventional treatment plant has an overall capacity of 60 MGD, while the ultra-membrane filtration plant has a capacity of 52.5 MGD. Just prior to the high-lift pumps, fluoride and orthophosphate are added to the treated water. Fluoride is added for dental health protection and orthophosphates (Carus 4105) are added for corrosion control. The utility can add gas chlorine at nine different locations throughout the treatment plant for disinfection. Not all locations are used during normal operations. There are four high-lift pumps with a combined pumping capacity of 70 MGD, one 25 MGD (constant speed), and three 6-30 MGD pumps (with VFD controlled motors). The high-lift pumps then pump the finished water into the distribution system.



Permeate Pumps



Membrane Cassette

Distribution System

The distribution system consists of seven elevated tanks, five booster stations, three pressure zones, and about 2,517,833 feet of water mains. The total elevated storage capacity in the distribution system is 11 million gallons. In 2024, the average daily pumpage was 15,076,303 gallons, and the maximum daily pumpage was 23,316,000 gallons.



Braun Road Booster Station



Broadway Tank



Coolidge Avenue Tank



Highway 20 Booster Station



Louis Sorenson Tank



Newman Road Booster Station



Newman Road Tank



Perry Avenue Booster Station



Perry Avenue Tank



Renaissance Tank



Summit Avenue Tank

Elevated Tanks

Site Description	Street Address	Size (Gallons)	Pressure Zone
Coolidge Ave	3200 Coolidge Ave	1,500,000	780.6'
Summit Ave	1600 Summit Ave	1,500,000	780.6'
Perry Ave	1500 Perry Ave	2,750,000	780.6' and 875.0'
Newman Road	1535 Newman Road	3,000,000	780.6' and 875.0'
Renaissance Tank	2201 West Road	750,000	875.0'
Broadway Tank	9800 Broadway Drive	250,000	875.0'
Louis Sorenson Tank	11317 Louis Sorenson Road	1,250,000	933.0'

Booster Stations

Site Description	Street Address	Pressure Zone	Pump hp
Summit Ave	1600 Summit Ave	780.6'	1@75, 2@150
Newman Road	1535 Newman Road	780.6' and 875.0'	6@250
Perry Ave	1506 Perry Ave	780.6' and 875.0'	6@250
Hwy 20	10012 Wahington Ave	933.0'	2@60, 2@150
Braun Road	10002 Braun Road	933.0'	2@60, 2@150

Significant Deficiencies

During the sanitary survey, no significant deficiencies were identified. Significant deficiencies indicate noncompliance with one or more Wisconsin Administrative Codes and/or represent an immediate health risk to consumers.

Deficiencies

During the sanitary survey, one deficiency was identified. Deficiencies are problems in the drinking water system that have the potential to cause serious health risks or represent long-term health risks to consumers. These deficiencies may indicate noncompliance with one or more Wisconsin Administrative Codes. Corrective action should be completed for these deficiencies as soon as possible.

Deficiency	Compliance Due Date	Code Citation
1. The screen on the vent at the Summit Avenue tank is in poor condition.	5/30/2026	811.64(8)(b and c)

Discussion and Schedule for Correction of Deficiencies:

- The most recent inspection report from Dixon Engineering shows that the screen on the vent at the Summit Avenue tank is in poor condition. The screen should be replaced by May 30, 2026.

Recommendations

During the sanitary survey, four recommendations were identified. Recommendations are problems in the water system that hinder your public water system from consistently providing safe drinking water to consumers.

Recommendation	Observations
1. The total water loss is not < 10%.	The 2024 PSC report shows a total water loss of 13%.
2. Some pump discharge piping may not be adequately protected from corrosion.	There are pressurized discharge pipes inside the finished water ground reservoir. The integrity of the pipes needs to be evaluated when the reservoir is inspected (every five years).
3. The water rates should be reviewed every 3-5 years.	The last water rate increase became effective October 26, 2020.
4. The Utility should evaluate the existing cybersecurity practices and make any needed improvements to reduce vulnerability to cyber-attacks.	Cyber-attacks have been striking critical infrastructure across the United States with increased frequency in recent years, including attacks to public water systems.

Discussion of Recommendations:

- The 2024 PSC report shows a total water loss of 13%. Although this is not excessive for a large system, we encourage the utility to continue in its efforts to reduce the amount of water loss. Currently, the utility studies 20% of the system each year for leaks and has been successful in reducing the total water loss.

- There are pressurized discharge pipes inside the finished water ground reservoir. The integrity of the pipes needs to be evaluated when the reservoir is inspected (every five years). Leaks in the pipes could go undetected.
- The department recommends that water rates be reviewed every 3-5 years and adjustments made as needed. Although the last water rate increase became effective October 26, 2020, it appears that the utility is in good financial standing. The rates will be reviewed again in the next year or two.
- The US EPA Water Cybersecurity Assessment Tool and Risk Mitigation Plan can be used to assess your existing cybersecurity practices and provides a risk management plan. The US EPA also offers cybersecurity technical assistance for water utilities to help water systems improve their cybersecurity practices. Additional information and resources on water system cybersecurity can be found at the US EPA Cybersecurity webpage. Please also review the email, letter, and video segment sent on December 17, 2025. Joel reports that the utility’s IT department is aware of risks and has taken steps to prevent intrusion of the utility’s computer network. The utility also completed the required Risk and Resilience Assessment.

Non-conforming Features

During the sanitary survey, one nonconforming feature was identified. Nonconforming features are things that existed in a water system before a code change became effective. These features were approved at the time of construction or installation but due to changes in the code, would not be approved for new installations. Correction of these features is not required until major changes or remodeling occurs, or a health hazard is identified. The following items were identified as nonconforming features.

Non-conforming Feature	Observations
1. The current code for roof vents on elevated tanks has new requirements.	The roof vent on the Coolidge Avenue tank does not meet current standards.

Discussion of Non-conforming Features:

- As required by s. NR 811.64(8)(c), Wis. Admin. Code, new vents installed on elevated tanks must terminate with a mushroom cap that is provided with an automatically resetting pressure-vacuum relief frost-proof mechanism. The skirted sides of mushroom caps must totally cover any screens when viewing the cap from the side.

Water Quality Monitoring and Reporting

Your water system has a very good overall record of compliance with monitoring and reporting requirements. All samples for chemical and radiological analyses were collected and collected within the proper monitoring period in the last three years. We appreciate your sampler's continued efforts in complying with these Safe Drinking Water Act requirements. There are no water quality concerns with the Racine water system.

A review of Department records shows an excellent history of bacteriological sampling for the last 3-year period. At least 100 samples are required from the distribution system each month. All distribution samples were collected. One initial total coliform positive sample was reported in June 2025 but all follow-up samples were reported to be free of total coliform bacteria. All samples were submitted to a certified lab for bacteriological analysis. Monthly samples are collected on separate days each month and at different locations throughout the system.

Lead and Copper Monitoring

Lead and copper samples were last collected in the first half of 2025 from 101 different valid sites in the water system. The 90th percentile for lead was 3.3 ug/L and the 90th percentile for copper was 270 ug/L. The action level for lead is 15 ug/L, and for copper, the action level is 1300 ug/L. We have reviewed your water system's lead and copper monitoring history. It appears that the sites used have been appropriate sites. The utility has 145 approved sites on their monitoring site plan. The next round of lead and copper sampling will be required in 2026. At least 50 samples will be required from June 1 – September 30.

The Federal Lead and Copper Rule Revisions (LCRR) required all public water systems to develop and submit a comprehensive service line material inventory to the DNR by October 16, 2024. The operators should continue to collect plumbing materials information from all services when meters are changed, when cross connection inspections are made, during construction projects, or any other time they enter customers' premises. In addition to the inventory previously submitted, annual updates can be made once more information is obtained. Utility records show that there are over 10,000 lead service lines and 394 galvanized service lines in the water system. The city of Racine was recently allocated \$40 million in Lead Service Line Replacement funding.

Optimal water quality parameters (OWQPs) and sampling requirements were recently assigned to Racine. Please review the letter dated December 1, 2025 for more details. The OWQP data will be reported via the "OWQP Portal".

Required Reports, Records, and Utility Programs

Detailed interior inspections of all water storage facilities are required at least once every five years. Every other inspection must be a complete drain down inspection. Inspection reports, including any photos or videos, are also required to be submitted to the department when the 5-year tank inspections are completed. It appears that the frequency of inspections of all storage facilities meets the code requirements.

Annual inspections are needed at all storage facilities of all screens on vents and overflows, and all gaskets on manway hatches. Documentation of the annual inspections is also needed. Documentation can be by entries in a logbook, a completed checklist, or with pictures of the screens and gaskets. Documentation of the annual inspections should be kept with utility records for periodic review by department staff. It appears that the annual storage facility inspections are being done, as required.

The monthly pumpage reports are required to be completely filled out and submitted to the department on or before the tenth day of the following month. In the last three years, all reports were submitted on time and all reports were completely filled out. The Distr. Sys. Disinfectant Residual V was reported as 0.5 for both the conventional and membrane filter systems. Since all distribution system chlorine residuals are greater than 0, this number should be 0. Joel will make the correction on all future reports.

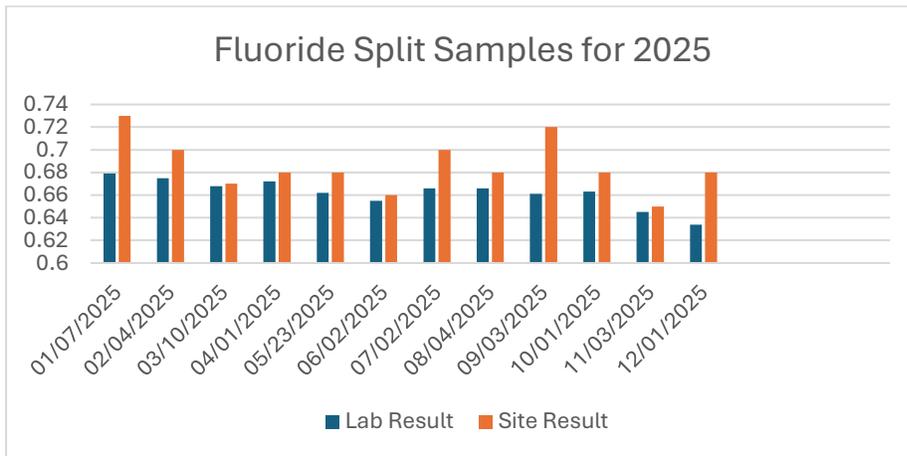
Our records show that the Utility has distributed the required Consumer Confidence Reports (CCRs). All reports were complete, and it appears that the reports were properly distributed. The completed certification forms were also sent. The CCRs must continue to be distributed before July 1 of every year. Please continue to send copies of the final reports and the completed certification forms. A copy of the 2024 CCR was received on June 9, 2025, and was approved.

Hydrant flushing and valve exercising programs are also required and it appears that the utility has done a good job with these programs. All hydrants are flushed each year. All flushed water is dechlorinated prior to being released to the environment. Valves are exercised every three years. All hydrant and valve maintenance records are kept on the utility's GIS program.

It appears that the city’s cross connection control ordinance is being properly enforced. The utility hired HydroCorp to do the inspections for the commercial and industrial customers. The meter department does the inspections at residential services. Detailed records are kept of each inspection and educational brochures are handed out with each inspection. It appears that cross connection inspections have been made at the required frequencies for all types of services. Please continue to have all high hazard devices tested, continue to make inspections, and continue to keep records of each inspection. Cross connection inspections play a very important role in ensuring that the quality of the city’s water supply is maintained.

The city has the required private well abandonment and permitting ordinance. There are no known private wells on properties that are served by Racine municipal water. There are some private wells in Mount Pleasant that are regulated by the Village of Mount Pleasant. If wells are located, the property owners must be made aware of the requirements in the local ordinances.

The fluoridation program for the Racine water system has an excellent history of sample submission for the last 12-month period. All monthly split samples were collected and were submitted to the State Lab of Hygiene, as required. The average residual for the most recent twelve monthly split samples submitted in the last year was 0.66 mg/L. This average is within the desirable range of 0.6-0.8 mg/L. The operators’ fluoride split sampling results have compared favorably to those obtained by the State Lab of Hygiene. This indicates the operators are doing a good job when performing the fluoride residual tests and that the testing equipment used to run these analyses is functioning properly. The operators are encouraged to keep up the good work with the fluoridation program. The graph below shows the results of the fluoride split samples that were sent to the State Lab in 2025.



Certified Operator

Chapter NR 114, Wisconsin Administrative Code, specifies the requirements for certified waterworks operators. To be fully certified for the Racine water system, the utility must employ at least one person that is a grade 1 operator in Distribution (D) and Surface Water (S). An operator in training is given a grade T status until proper experience is obtained and reported. The water system must also designate the operator in charge. To maintain their certification, all operators must attend continuing education classes and verify their credits when renewing their certificates.

Our records show that Joel Brunner is the operator in charge. Joel has Grade 1 certification in D and S. Joel’s certification is good until May 1, 2028, when he will need to renew with the proper number of continuing education credits. Our records also show a total of 30 operators for the Racine water utility. At least one grade 1 operator in S must be present whenever the treatment plant is in operation.

Water System Security

We recommend that you conduct a daily security check of your entire drinking water system to ensure that doors are locked and that windows are secured.

System Summary Information

A water system summary is attached. Please review it for accuracy. If there are changes that need to be made, contact Dave Barkhahn at (920) 413-9912.

Capacity Development Evaluation

This sanitary survey serves as an evaluation of the capabilities of your water system. This system has been determined to have adequate technical, managerial, and financial capacity to provide safe drinking water. The ability to plan for, achieve, and maintain compliance with applicable drinking water standards has been demonstrated.

The next sanitary survey of your system is scheduled to take place in 2028. Typically, your staff will be contacted prior to the survey to schedule a date that is convenient.

Required Action

Please respond by February 27, 2026, with notification that the deficiency has been corrected, or that you agree to correct the deficiency named in this letter by the due date, or with an alternative date for correcting the deficiency. Please also consider correcting the recommendations and nonconforming features discussed in this letter.

Thank you for your staff's assistance during the sanitary survey. If you have any questions, you can reach me by phone at (920) 413-9912, by e-mail at David.Barkhahn@Wisconsin.gov, or by postal mail at the address on this letterhead.

Sincerely,



David Barkhahn
Public Water Supply Engineer

Encl. Water System Summary

cc: Jesse Jensen, DNR Water Supply Supervisor
Dr. Anjuman Islam, Racine Water Utility Director
Joel Brunner, Racine Water Plant Superintendent
Mike Weisbrod, Racine Operations Supervisor
Chad Regalia, Racine Chief Engineer
McCrea Baker, DNR Public Engineering