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May 8, 2026

Wisconsin Department of Natural Resources
Bureau of Drinking Water and Groundwater
141 NW Barstow St Ste 180
Waukesha, WI 53188-3789
ATTN: Dave Barkhahn

Subject: Request for Approval – Revision to Powdered Activated Carbon (PAC) Injection Location at Racine Water Treatment Plant, Racine Water Utility, Wisconsin

Dear Dave,

On behalf of the Racine Water Utility, this letter serves as notification and request for approval of a proposed revision to the powdered activated carbon (PAC) injection point at the Racine Water Treatment Plant, located in the City and County of Racine, Wisconsin.

Purpose of the Modification

The existing PAC system is currently included within our permit, but has not been placed into operation since its original construction and installation around 2000. Due to the 2025 taste and odor (T&O) concerns expressed by Utility customers, the Racine Water Utility desires to place the PAC system back into operation. This letter serves as notification to WDNR of the operational status of their PAC system. The proposed injection point modification is intended to address taste and odor (T&O) concerns in the treated water while also ensuring the long-term integrity and operational reliability of downstream membrane treatment processes. Long-term contact between PAC and membrane systems has been shown to be detrimental to membranes and we desire to increase the Contact Time (CT) between the PAC and the raw water, thereby requiring this injection point relocation. Seasonal episodes of geosmin and 2-MIB and related compounds have periodically impacted finished water quality, and operational experience indicates that the current PAC application point provides limited contact time and inconsistent removal efficiency under these conditions as well as potential long-term degradation of the membrane system integrity.

Description of Existing Configuration

Under the existing configuration, PAC has the capability to inject immediately upstream of membrane filtration. While effective for short-term T&O control, this configuration has the potential to increase membrane fouling and surface abrasion.

Proposed Revision

The Racine Water Utility proposes to relocate the PAC injection point to the raw water main prior to the sedimentation basins, thereby providing increased contact time for adsorption of taste and odor compounds while reducing direct PAC exposure to the membrane system. The CT from the settled riser box area to mixing basins 1 and 2, where coagulant is added and the PAC effectiveness essentially reduced, would be 2.0 minutes at historical average flow (17.1 MGD) and 1.1 minutes at historical maximum flow (29.4 MGD). Key elements of the proposed revision include:

- PAC injection upstream of the sedimentation basins to maximize adsorption efficiency and contact time.
- Continued PAC dosing control based on raw water T&O monitoring and jar testing results.
- Removal of spent PAC through existing sedimentation/filtration processes prior to membrane treatment.
- No change to maximum approved PAC dose or chemical formulation.
- No anticipated adverse impact to treated water compliance or plant capacity.

The existing PAC runs in the blue flexible pipe as shown in Figure 1. Racine Water Utility proposes to replace the 10 lineal feet of flexible 4-inch piping with rigid PVC piping and extend a vertical 2-½- inch flexible pipe from the 4-inch PAC feed line to the existing injector connection shown in Figure 2.

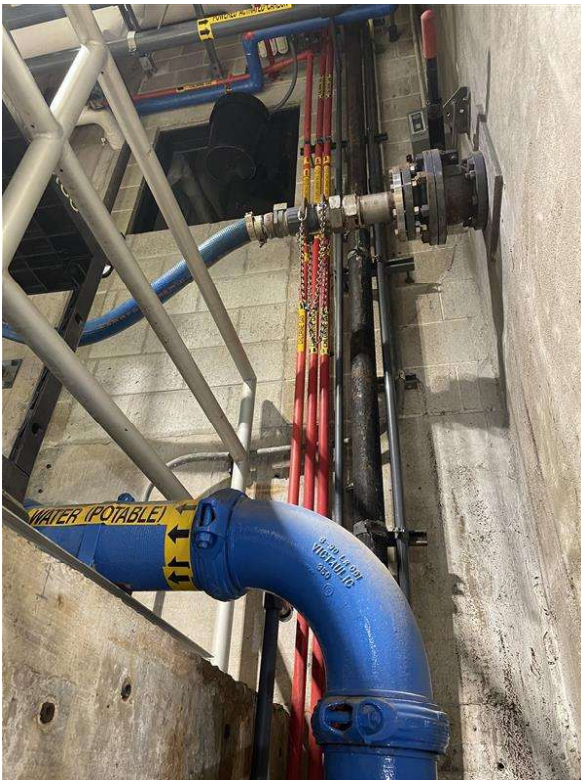


Figure 1 – Existing PAC Feed Piping



Figure 2 – Existing Filter Aid Polymer (FAP) Injection Tap on the Raw Water Line.

The Filter Aid Polymer addition is not currently utilized by the Racine Water Utility and this injection point can be repurposed.

The proposed injection point would be located approximately as shown in Figure 3.

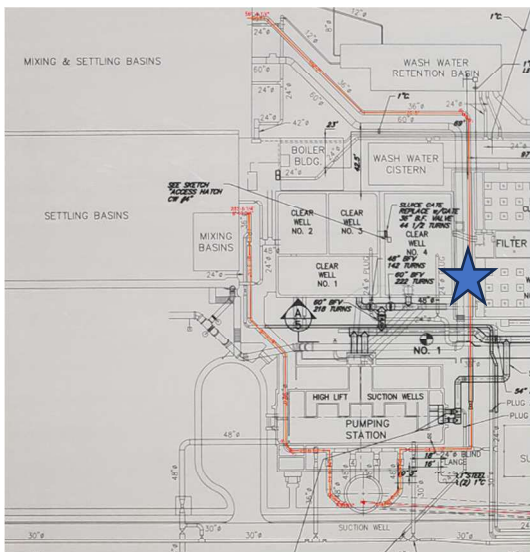


Figure 3 – Proposed Injection Point Schematic Location

Benefits of the Revision

The proposed modification is expected to:

- Improve consistency and effectiveness of taste and odor control.
- Reduce particulate loading and abrasion on membrane surfaces.
- Align PAC application with best practices for facilities utilizing membrane filtration.
- Provide a cost-effective solution by Utility staff to complete the modifications, which involve installing 10 to 15ft of vertical piping and repurposing an existing, currently decommissioned, Filter Aid Polymer (FAP) injection point.

Regulatory Considerations

This modification represents a process configuration change only and does not alter approved treatment capacity, source water, chemical type, or maximum chemical feed rates. The Racine Water Utility respectfully requests WDNR concurrence that this revision is acceptable and may be implemented under the existing facility approval, or guidance if a formal plan approval addendum is required.

Conclusion

We appreciate WDNR's continued support and oversight of the Racine Water Utility's drinking water system. Please contact Chris Tippery, CDM Smith Senior Project Manager at 414-203-3936 or tipperycj@cdmsmith.com should additional information, drawings, or operational details be required for your review.

Sincerely,

Anjuman Islam

[Anjuman Islam \(May 8, 2026 09:06:12 CDT\)](#)

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