



November 22, 2022

MS. DENICE NELSON  
JOHNSON CONTROLS, INC  
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MILWAUKEE, WI 53209

Via Email Only to [denice.karen.nelson@jci.com](mailto:denice.karen.nelson@jci.com)

SUBJECT: Response to Semi-Annual Operation, Maintenance, and Optimization Progress Report #6  
**Ditch B** Interim Action Treatment System (January 1, 2022 – June 30, 2022)  
JCI/Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI  
BRRTS #02-38-580694

Dear Ms. Nelson:

On October 27, 2022, the Wisconsin Department of Natural Resources (DNR) received the *Semi-Annual Operation, Maintenance, and Optimization Progress Report #6* (O&M Progress Report #6) for the Ditch B interim action at the above-referenced site (the "Site"). The report was submitted by Arcadis U.S., Inc. (Arcadis) on behalf of Johnson Controls, Inc. and Tyco Fire Products LP (JCI/Tyco) and was accompanied by the appropriate fee required under Wisconsin Administrative Code (Wis. Admin. Code) § NR 749.04(1) for DNR review and response.

The DNR reviewed JCI/Tyco's O&M Progress Report #6. Because the concentrations of perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in the surface water in Ditch B remain above the Wis. Admin. Code § NR 102.04 surface water criteria of 95 parts per trillion (ppt) for PFOA and 8 ppt for PFOS, the DNR recommends continued operation of the Ditch B treatment system. The O&M Progress Report #6 focuses on the operations and maintenance of the treatment system. However, because an objective of this interim action is to improve surface water conditions in Ditch B, the O&M Progress Reports should also include a more thorough evaluation of the effect that the system has on the PFAS concentrations downstream of the treatment system (Wis. Admin. Code § NR 724.17). This letter includes examples for how JCI/Tyco could complete and present this evaluation using the existing data.

## Background

JCI/Tyco is investigating and responding to the discharge of per- and polyfluoroalkyl substances (PFAS) to the environment at the JCI/Tyco Fire Technology Center (FTC), located at 2700 Industrial Parkway South in Marinette, Wisconsin. The discharge occurred as the result of training, testing, research and development of PFAS-containing aqueous film forming foams (AFFF) at the Site starting in the early 1960s.

A surface water drainage feature identified as Ditch B begins north of the FTC and flows east toward Pierce Avenue, where it turns and flows southeast and eventually discharges into the Bay of Green Bay in Lake Michigan. Elevated concentrations of PFAS were detected in the surface water of Ditch B - PFOS up to 190 ppt and PFOA up to 3,800 ppt. In October 2019, JCI/Tyco began an interim action to reduce the concentration of PFAS in the surface water in this ditch.

The interim action includes a treatment system located at 925 Pine Beach Road in Marinette, which is downstream from the FTC property and approximately 1,250 feet upstream from the mouth into Green Bay. The system captures surface water flowing in Ditch B and treats the captured water using suspended solids settling, bag filtration and granular activated carbon (GAC). The treated water is then discharged back to Ditch B under a Wisconsin Pollutant Discharge Elimination System (WPDES) General Permit (WI-0046566-07-0) and the associated coverage letter, which specifies the effluent criteria and monitoring requirements.

Operation of the Ditch B treatment system reduces the amount of PFAS that migrates downstream in the ditch; however, the system is currently only able to treat a maximum flow rate of 700 gallons per minute (gpm) and flow in the ditch can exceed 1,500 gpm during wet conditions. During times when the stream flow exceeds the operating capacity of the treatment system, some surface water flowing in Ditch B is not captured and therefore goes untreated as it migrates downstream.

### **NR 205 WPDES Permit**

The effluent from the Ditch B treatment system is regulated under WPDES General Permit No. WI-0046566-07-0 and the associated coverage letter (updated April 29, 2021). The DNR's Wastewater Program administers the WPDES permit and reviews the monthly electronic discharge monitoring reports submitted by JCI/Tyco. A review of the permit reporting is not included with this letter.

### **Summary O&M Progress Report #6**

#### Operation and Maintenance

JCI/Tyco's O&M Progress Report #6 covered the period from January 1 to June 30, 2022. Flow in Ditch B was variable, but continuous, such that the system required operation during the entire reporting period. The system was down for approximately 10 hours on June 16, 2022, due to a power outage and the system operated at a reduced flow rate (~400 gpm) for three weeks in January and February 2022 during repair activities.

Routine system maintenance during this period included removal of accumulated sediment, replacement of spent bag filters and replacement of spent GAC. The spent bag filters were collected in drums and disposed by End Point Solutions and the spent GAC was shipped to a Cabot Corporation facility in Pryor, Oklahoma to be reactivated and reused in the treatment system. Documentation of the handling of these waste materials was included in Appendix E. The sediment was stockpiled in the soil staging area on the FTC property for future disposal at a solid waste landfill.

During this reporting period, JCI/Tyco documented that the system removed approximately 1.37 pounds of PFOA and 0.12 pounds of PFOS from the surface water in Ditch B. Cumulatively, since initial startup in October 2019, the system has removed approximately 7.05 pounds of PFOA and 0.55 pounds of PFOS from the surface water. These mass estimates were calculated by JCI/Tyco based on the weekly measurements of volume treated and system influent and effluent concentrations.

#### Long-Term Monitoring

The concentrations measured weekly in the surface water coming into the treatment system were between 410 and 2,200 ppt for PFOA and between 41 and 160 ppt for PFOS (consistently *above* the Wis. Admin. Code § NR 102.04 surface water criteria surface water criteria of 95 ppt for PFOA and 8 ppt for PFOS). The concentration measured weekly in the treated water leaving the treatment system was between < 0.74 and 61 ppt for PFOA and between < 0.45 and 2.5 ppt for PFOS (consistently *below* the Wis. Admin. Code § NR 102.04 surface water criteria).

JCI/Tyco estimated the total flow in Ditch B during this 6-month reporting period to be 421 million gallons; whereas, the volume of water treated during this reporting period was reported to be 145 million gallons. Thus, an estimated 276 million gallons of water went untreated. Most of the untreated flow occurred when the flow rate in Ditch B exceeded the capacity of the treatment system. JCI/Tyco acknowledged in Section 7 of O&M Progress Report #6 that untreated surface water will result in high PFAS concentrations in surface water downstream of the treatment system. JCI/Tyco collected five monthly surface water samples immediately downstream of the treatment system at SW-39.

- During the approximately 80 days of the reporting period when the flow rate in Ditch B was within the capacity of the treatment system, the downstream surface water sampling results were between < 0.77 and 8.5 ppt for PFOA and < 0.52 ppt for PFOS.
- During the approximately 100 days of the reporting period when the flow in Ditch B exceeded the capacity of the treatment system, the downstream surface water sampling results were between 850 and 940 ppt for PFOA and between 61 and 67 ppt for PFOS.

JCI/Tyco highlighted that its Groundwater Extraction and Treatment System (GETS), once online, is designed to reduce the overall concentration of PFAS in surface water upstream of the Ditch B treatment system.

### **DNR Review of O&M Progress Report #6**

The DNR agrees that the Ditch B treatment system, as currently maintained, is removing PFAS from the *captured* surface water and is reducing the amount of PFAS in the environment. Data demonstrating these conclusions were included in the O&M Progress Report #6. However, because an objective of this interim action is to improve surface water conditions in Ditch B, the DNR reiterates that the O&M Progress Reports should include a more thorough evaluation of the PFAS concentration in the surface water downstream of the treatment system (Wis. Admin. Code § NR 724.17).

In the June 2022 response to JCI/Tyco's O&M Progress Report #5, the DNR provided examples of ways to estimate volumes of untreated water and resulting surface water concentrations in Ditch B. These examples demonstrate that a more thorough evaluation of surface water in Ditch B can be completed using the existing data. The DNR completed a similar evaluation using the data that JCI/Tyco included in O&M Progress Report #6 (Wis. Admin. Code § NR 724.17(4)(a)). Figures summarizing the evaluation are attached (**Figures A.1, A.2 and A.3**).

During the period of high streamflow that occurred between March 7 and June 13, 2022, the calculated downstream concentrations for PFOA and PFOS exceeded their respective Wis. Admin. Code § NR 102.04 surface water criteria and at times may have been higher than concentrations measured in the two samples collected during the period.

JCI/Tyco collected only two downstream surface water samples during the 100 plus days of high flow in Ditch B. These results were included in Figure 6 of the O&M Progress Report #6. The DNR's Figures A.2 and A.3 were modeled after Figure 6 but were supplemented with estimates of the weekly PFAS concentration in the downstream surface water. A side-by-side comparison of these figures is attached and shows how having only two surface water data points underrepresents the elevated surface water concentrations that occurred throughout this period of high flow, and demonstrates why a more thorough evaluation of surface water conditions is needed to evaluate of the *effectiveness of this interim action*.

### **Next Steps**

Because the concentrations of PFOA and PFOS in the surface water in Ditch B continue to be above the Wis. Admin. Code § NR 102.04 surface water standards, the DNR recommends that JCI/Tyco continue to operate the treatment system and submit semi-annual O&M Progress Reports (Wis. Admin. Code § NR 724.13(3)).

The DNR understands that one of JCI/Tyco's objectives for its new GETS, which is just coming online, is to decrease the PFAS concentrations in the surface water in Ditch B to the point where operation of the Ditch B treatment system is no longer needed. Results from the long-term monitoring for the GETS will be used to make that determination; currently, it is uncertain if and when this goal will be achieved. Thus, the following are next steps for evaluation of the interim actions for addressing PFAS in surface water in Ditch B:

- While the Ditch B treatment system continues to operate as an interim action to improve surface water quality in Ditch B, JCI/Tyco's O&M Progress Reports should include a more thorough evaluation of the PFAS concentrations downstream of the treatment system (Wis. Admin. Code § NR 724.17(3m)(e) and (f)). The examples provided above and in the DNR's June 2022 letter demonstrate how this evaluation could be achieved using the existing data.
- If the PFAS concentrations in surface water downstream of the Ditch B treatment system continue to be greater than the Wis. Admin. Code § NR 102.04 surface water standards for extended periods (after the GETS is up and running), then JCI/Tyco may need to evaluate additional interim actions to address the PFAS migration in Ditch B.

As a reminder, this Site is subject to an enforcement action and therefore all submittals to the DNR under Wis. Admin. Code chs. NR 700-799 and submittals directed by the DNR must be accompanied by an Wis. Admin. Code ch. NR 749 fee per Wis. Stat. § 292.94. These fees are not pro-ratable or refundable per Wis. Admin. Code § NR 749.04(1). If you have any questions about whether to include a fee with a submittal, please contact DNR staff prior to submitting a document without a fee.

If you have any questions about this letter, please contact me, the DNR Project Manager, at (608) 622-8606 or [Alyssa.Sellwood@wisconsin.gov](mailto:Alyssa.Sellwood@wisconsin.gov).

Sincerely,



Alyssa Sellwood, PE  
Complex Sites Project Manager  
Remediation & Redevelopment Program

Attachments	Sheet 1:	Figure A.1 – Ditch B Surface Water: PFAS Removal and Weekly Flowrate Figure A.2 – Ditch B Downstream Surface Water Concentrations: PFOA Figure A.3 – Ditch B Downstream Surface Water Concentrations: PFOS
	Sheet 2:	Comparison of DNR Figure's A.2 and A.3 to JCI/Tyco's Figure 6

cc: Jodie Peotter, DNR (via email: [Jodie.Peotter@wisconsin.gov](mailto:Jodie.Peotter@wisconsin.gov))

Figure A.1  
Ditch B Surface Water: PFAS Removal & Weekly Flowrate

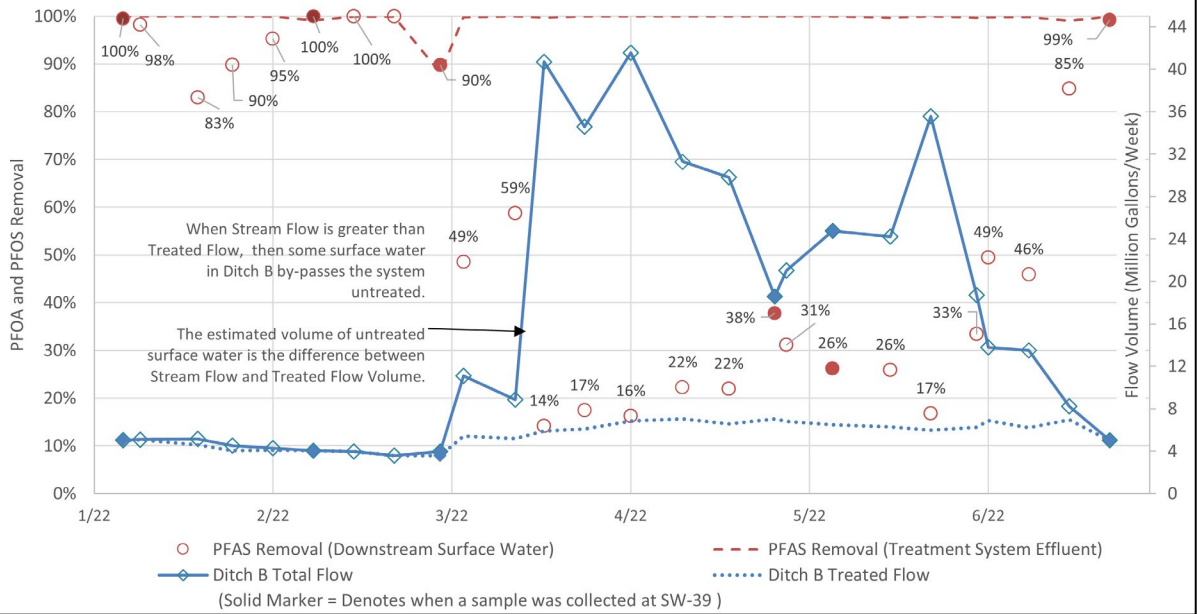


Figure A.2  
Ditch B Downstream Surface Water Concentrations: PFOA  
(Compare to Figure 6 in Progress Report #6)

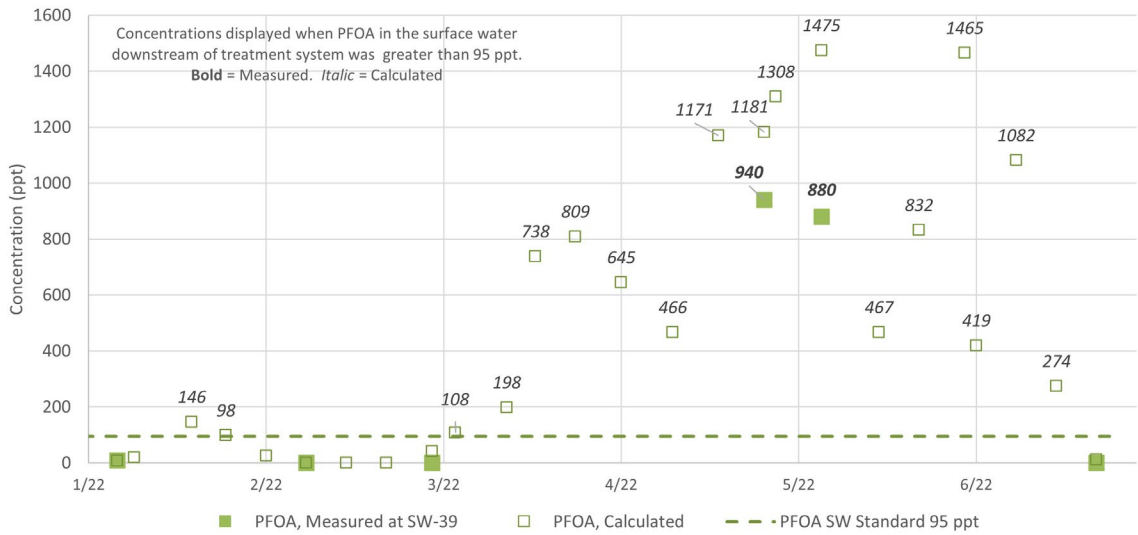


Figure A.3  
Ditch B Downstream Surface Water Concentrations: PFOS  
(Compare to Figure 6 in Progress Report #6)

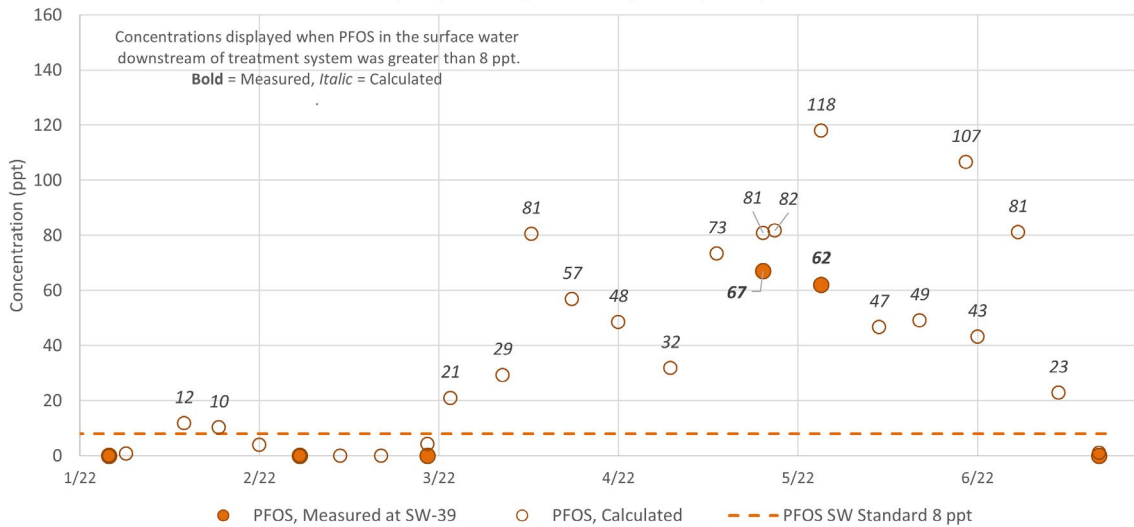


Figure A.2  
Ditch B Downstream Surface Water Concentrations: PFOA  
(Compare to Figure 6 in Progress Report #6)

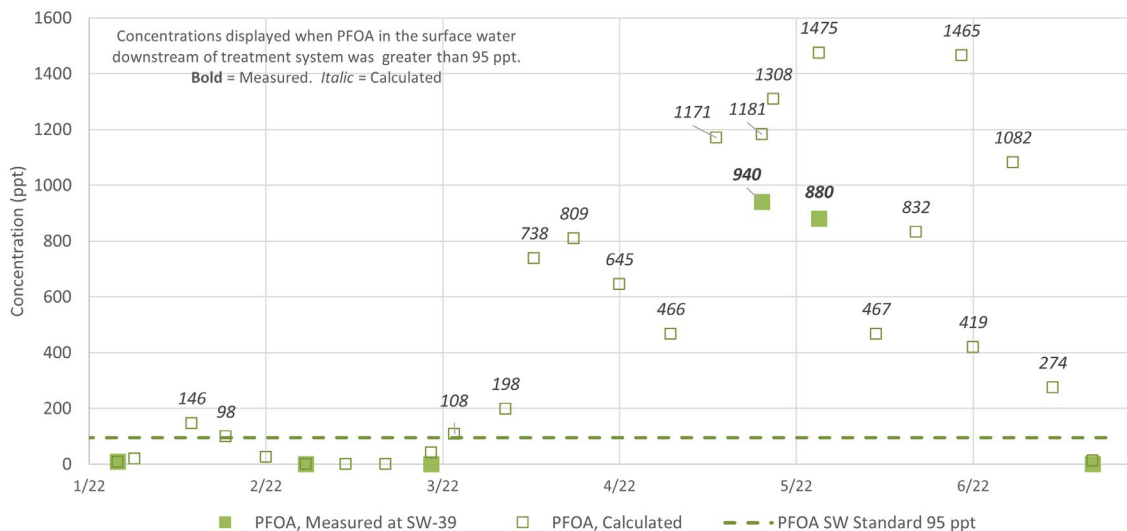
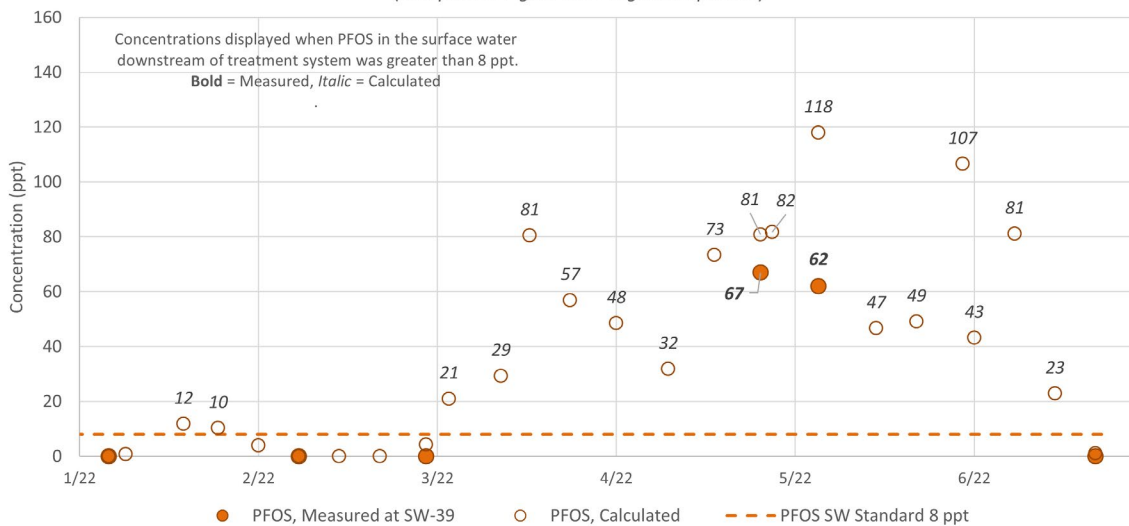


Figure A.3  
Ditch B Downstream Surface Water Concentrations: PFOS  
(Compare to Figure 6 in Progress Report #6)



**Abbreviations:**  
 PFOA = Perfluorooctanesulfonic Acid  
 PFOS = Perfluorooctanesulfonic Acid  
 ng/L = Nanograms per Liter  
 WPDES = Wisconsin Pollutant Discharge Elimination System

- Notes:**
1. Downstream surface water samples collected from SW-39 (downstream of Ditch B System).
  2. Downstream sample collection began in August 2021.
  3. When duplicate samples were collected, the higher result is shown.
  4. Surface water standard for PFOS of 8 ng/L based on waters except those that cannot naturally support fish and do not have downstream waters that support fish per NR 102.04 (8d).
  5. Surface water standard for PFOA of 95 ng/L based on non-drinking water bodies per NR 102.04 (8d).

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**DITCH B DOWNSTREAM SURFACE WATER CONCENTRATIONS**

**ARCADIS** | FIGURE 6