



October 29, 2021

MR. JEFFREY DANKO
JOHNSON CONTROLS, INC
5757 N. GREEN BAY AVENUE
MILWAUKEE, WI 53209

MR. SCOTT WAHL
TYCO FIRE PRODUCTS LP
1 STANTON STREET
MARINETTE, WI 54143

Via Email Only to jeffrey.howard.danko@jci.com and scott.wahl@jci.com

SUBJECT: Response to Operations, Maintenance, and Long-term Monitoring Plan (OM&M Plan)
Ditch A Interim Action Treatment System
JCI/Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI
BRRTS #02-38-580694

Dear Mr. Danko and Mr. Wahl:

On July 19, 2021, the Wisconsin Department of Natural Resources (DNR) received the *Operation, Maintenance, and Long-term Monitoring Plan* (“OM&M Plan”) for the Ditch A interim action at the above-referenced site, which was submitted by Arcadis U.S., Inc. (Arcadis) on behalf of Johnson Controls, Inc. and Tyco Fire Products LP (JCI/Tyco). The report was accompanied by the appropriate fee of \$425 required under Wisconsin Administrative Code (Wis. Adm. Code) § NR 749.04(1), for formal DNR review and response.

The DNR reviewed JCI/Tyco’s OM&M Plan for the Ditch A interim action and approves the plan upon receipt of the revisions discussed at the end of this letter.

Background

JCI/Tyco are 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 “Site”). The discharge occurred as the result of fire suppressant 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 A flows south through the FTC property, continues south to the Little River and eventually discharges to the Bay of Green Bay in Lake Michigan. Elevated PFAS concentrations were detected in the surface water of Ditch A on the FTC property; perfluorooctanesulfonic acid (PFOS) up to 1,100 parts per trillion (ppt) and perfluorooctanoic acid (PFOA) up to 6,000 ppt. In January 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 constructed adjacent to Ditch A on the southern boundary of the FTC property. The system captures surface water flowing in Ditch A at a check dam, 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 A downstream of the check dam 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 A treatment reduces the amount of PFAS that migrates downstream in the ditch. The system is designed to treat a maximum flow rate of 100 gallons per minute (gpm). The surface water in Ditch A occasionally freezes, runs dry or flows at a rate lower than 100 gpm, such that the system captures and treats most of the surface water migrating south in the ditch. There may be occasional high flow events or system downtime where surface water overtops the check dam and is not captured by the Ditch A system, and therefore goes untreated as it migrates downstream.

On April 20, 2021, the DNR responded to JCI/Tyco's three semi-annual operation and maintenance (O&M) progress reports for Ditch A that it had submitted with a fee to the DNR for review¹. In the response, the DNR directed JCI/Tyco to prepare and submit an OM&M Plan for the Ditch A treatment system, as required by Wis. Adm. Code §§ NR 724.13(2) and NR 724.17(2). The DNR also listed specific monitoring and reporting requirements to be included in the OM&M Plan and future progress reports for the Ditch A interim action.

Summary of OM&M Plan for Ditch A

JCI/Tyco's OM&M Plan for Ditch A includes the following elements:

- Background, contact information, and location details and figures.
- Description of the system components including figures of locations, piping and instrumentation diagrams, final drawings for the intake structure and equipment cut sheets.
- Description of normal operation and maintenance procedures, schedule and record keeping, summary of automated controls/alarms, and procedures for troubleshooting O&M problems.
- Description and record keeping for waste management.
- Summary of the monitoring and analysis for compliance sampling for the WPDES Permit.
- A long-term monitoring plan to document performance of the interim action relative to control of PFAS migration in the ditch. The long-term monitoring plan includes estimates of weekly stream flow, estimates of volume of water that goes untreated, estimates of the mass of PFAS that migrates downstream each month and monthly downstream-surface water sampling for PFAS.
- Approach to estimate the monthly mass of PFOA and PFOS removed by the system and the monthly mass of PFOA and PFOS that migrates downstream (Appendix B).
- Description of content to be included in the semi-annual OM&M reports.

DNR Review of OM&M Plan for Ditch A

The DNR reviewed the OM&M Plan and finds that it includes the elements required in Wis. Adm. Code §§ NR 724.13(2) and NR 724.17(2), and all but one of the specific monitoring and reporting required in DNR's April 2021 letter. The DNR approves the OM&M Plan if JCI/Tyco makes the following revisions to Appendix B.

¹ JCI/Tyco also submitted a semi-annual progress report on December 31, 2019, which covered the first 6 months of operations through June 2019. This submittal did not include a fee for DNR review and response.

Appendix B: Overtopping of Check Dam

In the April 2021 response, DNR specified that JCI/Tyco must calculate an estimate of PFOA and PFOS mass migrating downstream of the Ditch A treatment system for each month during the reporting period, and this calculation must account for any flow volume that migrates downstream untreated.

In Section 2.1 of the OM&M Plan it states, “In the event that the surface water level in Ditch A overtops the check dam, water levels recorded at the upstream stilling well will be used to estimate the overtopping volume per the methods described in Appendix B.”

However in Appendix B it goes on to state, “when surface water levels overtop the Ditch A check dam, the duration of the event and the depth of flow above the check dam will be recorded; however, the total overtopping flow volume will not be estimated.”

JCI/Tyco explained that overtopping events where flow goes untreated in Ditch A are infrequent; however, JCI/Tyco must still develop an approach to estimate the mass of PFOA and PFOS that migrates downstream during these events. An example of an acceptable approach for Ditch A is provided below. This approach assumes that overtopping events in Ditch A remain infrequent and short duration, such that an estimated flow volume based on typical observed flow rates in the ditch is sufficient.

- Estimate the total volume in gallons of uncaptured flow in Ditch A for each overtop event ($V_{\text{overtop,flow},n}$). Base estimate on the duration of overtopping event, depth of flow, and typical range of flow rates observed in Ditch A.
 - If $V_{\text{overtop,flow},n}$ is estimated to be 0 gallons, then JCI/Tyco must provide justification and evidence to support this estimate.
 - If flow past the check dam occurs during system downtime for maintenance, this must be included as an overtopping event in the calculation.
- Calculate the estimated PFOA and PFOS mass in the untreated flow volume migrating downstream for each overtopping event ($m_{\text{overtop},n}$). Calculate using the PFOA and PFOS concentrations measured in the most recent (or next closest) weekly influent sample ($C_{\text{in},n}$), or using the PFOA and PFOS concentrations measured in a surface water collected from location SW-40 ($C_{\text{SW-40},n}$) during the overtopping event (likely an additional sample from the routine monthly surface water sample).

$$m_{\text{overtop},n} = C_{\text{in},n}(V_{\text{overtop,flow},n}) \quad \text{or} \quad m_{\text{overtop},n} = C_{\text{SW-40},n}(V_{\text{overtop,flow},n})$$

- If multiple overtopping events occur per month than sum together each mass estimate to get a total overtop mass of PFOA and PFOS per month ($m_{\text{overtop,total}}$), where x is the number of distinct overtop events per month.

$$m_{\text{overtop,total}} = \sum_{n=1}^x m_{\text{overtop},n}$$

Appendix B: Corrections or Updates to other Equations

- In Appendix B, V_{system} is defined as the totalized daily flow volume in gallons, and $V_{100,n}$ and $V_{200,n}$ are defined as the hourly totalized volumes in gallons for the two treatment trains. Because $V_{100,n}$ and $V_{200,n}$ are hourly totalized volumes, they should not be multiplied by 60 as was presented in Equation 1. The correct formula to calculate the daily flow from the totalized hourly flows should be:

$$V_{system} = \sum_{n=1}^{24} (V_{100,n} + V_{200,n})$$

- The DNR interprets that JCI/Tyco intends to estimate stream flow to be equal to system flow when overtopping is not occurring. If this is correct, then simplify Equations 2 and 3 to be:

$$V_{Stream} = V_{System}$$

- Update Equation 4 to incorporate the estimated total overtop mass of PFOA and PFOS, where w is the number of weeks per month. (This update to Equation 4 also reflects the DNR's assumption that JCI/Tyco will estimate $V_{stream} = V_{system}$ under normal flow conditions).

$$m = \sum_{n=1}^w \overline{C_{out,n}} (V_{System,n}) + m_{overtop,total}$$

Next Steps

JCI/Tyco should revise Appendix B to address the changes noted above and submit the updated version of Appendix B to the DNR within 30 days of receipt of this letter. The DNR will append the revised Appendix B to the OM&M Plan to finalize the approved document. A fee is not required for submittal of this addendum.

The operations, long-term monitoring, and reporting for the Ditch A treatment system should continue to follow the approved OM&M Plan for Ditch A until such time that the interim action is approved to be shut down or the OM&M Plan is revised. While the system is operating, JCI/Tyco must revise the appropriate section of the OM&M Plan upon request of the DNR or if changes occur in the design, operation or maintenance of the interim action (Wis. Adm. Code § 724.13(4)).

The DNR appreciates your efforts to investigate and remediate this Site. If you have any questions about this letter, please contact me, the DNR Project Manager, at (608) 622-8606 or Alyssa.Sellwood@wisconsin.gov.

Sincerely,



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

cc: Ben Verburg, Arcadis (via email: ben.verburg@arcadis.com)
Bridget Kelly, DNR (via email: bridgetb.kelly@wisconsin.gov)
Jodie Peotter, DNR (via email: Jodie.peotter@wisconsin.gov)