



August 24, 2022

MS. DENICE NELSON
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Via Email Only to denice.karen.nelson@jci.com

SUBJECT: Response to GETS Pre-Startup Data Package
JCI/Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI
BRRTS #02-38-580694

Dear Ms. Nelson:

On July 15, 2022, the Wisconsin Department of Natural Resources (DNR) received the *Groundwater Extraction and Treatment System (GETS) Pre-Startup Data Package* (the “GETS Pre-Startup Data Package”) for 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 of \$700 required under Wisconsin Administrative (Wis. Admin.) Code § NR 749.04(1) for DNR review and response.

The DNR reviewed the GETS Pre-Startup Data Package. This letter summarizes the DNR’s review, provides technical recommendations for future reporting and outlines the next steps; the first of which, is for JCI/Tyco to submit an addendum with requested information to the DNR within 30-days of the date of this letter.

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 fire suppressant training, testing, research and development of PFAS-containing aqueous film forming foams (AFFF) at the Site starting in the early 1960s.

JCI/Tyco’s site investigation is on-going, and additional work is needed to define the degree and extent of the PFAS contamination per Wis. Admin. Code § NR 716.11(3)(a). Using the available data, JCI/Tyco determined that groundwater with PFAS concentrations greater than 10,000 parts per trillion (ppt) is present beneath and to the east of the FTC property and that contaminated groundwater upwells and contributes to the PFAS contamination detected in surface water in Ditch B. Surface water concentrations in Ditch B are greater than 1,000 ppt downstream of the FTC, and this water eventually flows into the Bay of Green Bay in Lake Michigan.

Based on these findings JCI/Tyco designed an interim remedial action – the GETS – to capture and treat highly contaminated groundwater migrating from the FTC toward Ditch B. JCI/Tyco submitted the Remedial Action Design Report (RADR) for the GETS on February 26, 2021, and the DNR conditionally-approved the RADR on May 19, 2021. The GETS design includes nine groundwater extraction wells and a treatment system that will use oxidation, filtration, granular activated carbon (GAC) and ion exchange resins to remove PFAS from the extracted groundwater. The GETS is designed to capture groundwater in the unconsolidated aquifer at depths 20 to 50 feet below ground surface (bgs) in an area where the highest concentrations of PFAS were detected to date and where contaminated groundwater was documented to upwell into Ditch B. Treated water will be discharged into Ditch B at the point where it crosses Pierce Avenue; the discharge of the treated groundwater will be regulated under a

Wisconsin Pollutant Discharge Elimination System (WPDES) General Permit in accordance with Wis. Admin. Code § NR 205.08(1)(b).

JCI/Tyco submitted a Long-Term Monitoring Plan (LTMP) for the GETS on July 16, 2021 and the DNR approved the LTMP on October 7, 2021. The goal of long-term monitoring is to measure and document the environmental outcomes resulting from operation of the GETS; specifically, its effect on groundwater conditions and on surface water conditions in Ditch B. The GETS LTMP includes six primary elements:

- **Ditch B:** (1) PFAS sampling in surface water and streambed groundwater, (2) stage/water level measurements in surface water and streambed groundwater and (3) streamflow gauging.
- **Groundwater:** (4) PFAS sampling at monitoring wells, (5) PFAS sampling at extraction wells and (6) groundwater level measurements.

The GETS LTMP covers the pre-startup (baseline) monitoring through the first 2 years of operation. As part of the DNR's conditions of approval of the GETS RADR, JCI/Tyco was required to submit the baseline monitoring data to the DNR at least 15 days prior to startup of the GETS.

Summary of GETS Pre-Startup Monitoring

The GETS Pre-Startup Data Package documents the baseline monitoring that occurred between May 2021 and April 2022 and this data will be the point of comparison by which the outcomes and effectiveness of the GETS will be measured.

New Monitoring Points: New monitoring points (temporary and permanent) were constructed during the pre-startup phase. These included five temporary vertical aquifer profile (VAP) points installed near proposed well locations; seven shallow temporary points installed for purposes of developing a construction dewatering plan; eight extraction wells (the ninth extraction well [EX-1] was installed in 2020); 12 new groundwater monitoring wells; four staff gauges in Ditch B; and two stilling wells and seven temporary piezometers in the streambed of Ditch B. Boring logs and well construction diagrams were included in Attachment 1 for the newly constructed VAPs, extraction wells and monitoring wells (except for MW-EX-2, MW-EX-3, MW-EX-4, and MW-EX-5).

Monitoring: The following monitoring activities occurred during the pre-startup phase.

- **Ditch B: PFAS Sampling in Surface Water and Streambed Groundwater**
 - Surface water samples were collected four times (May, July, September and November 2021) at seven temporary piezometers (U10, U03, M09, M07, M04, M01 and L09) and monthly at the Ditch B Surface Water Treatment System located farther downstream.
 - Streambed groundwater samples were collected three times (July, September and November 2021) from five temporary piezometers (U03, M09, M07, M04 and M01) and twice (July and November 2021) from two temporary piezometer (U10 and L09).
- **Ditch B: Stream Stage and Water Levels and Streambed Groundwater Levels**
 - Water levels of the surface water and streambed groundwater were measured four times (May, July, September and November 2021) at seven temporary piezometers (U10, U03, M09, M07, M04, M01 and L09).
 - Surface water elevations were measured at four staff gauges near U10, M09, M01 and L09. (The total number of measurements is unclear; only the April 2022 data is presented on Figure 5.)

- Surface-water levels were measured continuously using electronic pressure transducers set in stilling wells near U10 and M09 (and at the Ditch B Treatment System – data not included).
- **Ditch B: Streamflow Gauging**
 - Streamflow was estimated at the Ditch B Surface Water Treatment System located downstream.
 - Streamflow is estimated by correlating flow to pressure; pressures are recorded continuously by a transducer in a stilling well placed in Ditch B.
- **Groundwater: PFAS Sampling¹ at Monitoring Wells**
 - Groundwater samples were collected once (August/September 2021) from seven shallow points and five VAPs prior to installation of new wells for the GETS.
 - Groundwater samples were collected once (April 2022) from 29 monitoring wells assigned to the long-term monitoring of the GETS.
- **Groundwater: PFAS Sampling¹ at Extraction Wells**
 - The nine extraction wells were not accessible during the baseline event; therefore, groundwater samples were collected once (April 2022) from monitoring wells adjacent to each extraction well.
 - In the future, these monitoring wells adjacent to the extraction wells are anticipated to be used only to measure water level and PFAS will be measured directly from the extraction wells.
- **Groundwater: Water Level Measurements**
 - Groundwater levels were measured at 36 monitoring wells in July 2022.
 - Groundwater levels were measured at 49 monitoring wells in April 2022.

Findings and Conclusions: JCI/Tyco concluded that the baseline monitoring data supported the design and long-term monitoring plan for GETS with the following refinements:

- PZ-3D had the highest PFAS concentration of the three piezometers sampled near PZ-22S; therefore PZ-3 will be used in the future to monitor PFAS in the deeper unconsolidated aquifer near PZ-22S.
- The monitoring well near EX-9 (PZ-53-40) had relatively low concentration of PFAS, which was unexpected. Therefore, JCI/Tyco plans to install another monitoring well between EX-7 and EX-9 to refine the understanding of how PFAS is distributed in this area and to wait to start pumping in EX-9 until this analysis is complete.

DNR Review

The DNR reviewed the GETS Pre-Startup Data Package and found that it provided the baseline monitoring data to the DNR at least 15 days prior to startup of the GETS. The package included most of the data outlined in GETS LTMP, with a few exceptions noted below. The DNR concurs with JCI/Tyco's findings and conclusions, but also provides JCI/Tyco with a few recommendations based on its technical review below.

The DNR requests that JCI/Tyco submit an addendum to the GETS Pre-Startup Data Package within 30-days of the date of this letter, which provides the following items or points of clarification:

¹ Other parameters including metals, volatile organic compounds and semi-volatile organic compounds were included in the baseline monitoring, as needed to characterize the water for treatment and discharge.

- Monitoring well construction and development forms for MW-EX-2, MW-EX-3, MW-EX-4, and MW-EX-5 were not included. *Provide the well construction and development forms for these wells.*
- Table 4 indicates that MW-EX-2 has a 10-foot well screen while the other piezometers paired with extraction wells have 5-foot screens. *Verify if MW-EX-2 has a 10-foot wells screen, and if so, provide a description as to why.*
- A summary of the Ditch B staff gauge measurements was not included (other than in Figure 5). *Include a summary table with all Ditch B staff gauge measurements in the addendum and in subsequent reporting.*
- The continuous pressure transducer data for Ditch B in Figure 4 is incomplete. Please add the following information into the report-out for this continuous monitoring:
 - *Include statement on how the transducer data is correlated to stage/elevation.*
 - *Provide all data collected during the baseline reporting period (i.e., data through April 2022).*
 - *Include the stage/elevation measured at Ditch Treatment System where flow rate in determined.*
- The water levels presented on Figures 5 and 6 do not match the water levels summarized in Table 4 for several well locations. *Verify and correct water levels as needed on the Tables and/or Figures.*
- There is a discrepancy in the concentration for groundwater collected from temporary VAP (SB-PZ-55) and from the permanent monitoring well that was subsequently constructed at this same location (PZ-55-64). Both samples were collected from approximately 50 to 64-ft bgs, but the concentration of perfluorooctanoic acid (PFOA) in the temporary VAP was 51,000 ppt whereas the concentration in PZ-55-64 was only 300 ppt. *Evaluate and provide explanation for the cause and significance of this discrepancy and determine if this difference impacts the design of EX-8.*

The following recommendations for future reports once the GETS is operational (i.e., these do not need to be included in the addendum):

- The available data suggests PFAS concentrations may be highest in discrete depth intervals in the unconsolidated aquifer. This has the effect of diluting concentrations when samples are collected from wells with longer wells screens (e.g., PZ-3D vs. PZ-22D) or missing the highest contaminated zone if a piezometer with a 5-foot well screen is not installed at the precise depth. *Recommend consideration of the well screen length and elevation when interpreting the distribution of the PFAS near EX-9.*
- Because the screens for the extraction wells are 5 to 10 feet longer than the paired piezometers, there may be differences in the PFAS concentrations for samples collected from the extraction well versus the paired piezometer. Because the extraction wells were unable to be sampled during the April 2022 monitoring event, the DNR *recommends collecting a PFAS sample at or around the start of pumping from each extraction well.*
- The flow rate in Ditch B is variable and subject to rapid changes; the continuous measurements from the pressure transducer readings appear to be a good approach to capturing the rapid change and range of flow conditions in Ditch B. For clarity in interpreting the effect that operation of the GETS has on flow rate in Ditch B, the DNR recommends updating the presentation of the data in future reporting. *A suggested approach: (1) plot the stage and transducer measurements at U10, M09 and Ditch B Treatment System on the same chart with flow rate measured at Ditch B Treatment System; (2) make a chart for each calendar year covering January 1st to December 31st - the DNR understands that there may be gaps in data during frozen conditions; and (3) present the yearly charts aligned vertically together on one page to the extent practicable.* Other approaches to data presentation are acceptable if the effect that the GETS has on stage and flow of surface water in Ditch B can be interpreted from the data.

- The PFAS concentrations in Ditch B streambed groundwater and surface water change significantly between U10 and L09 and varies over time. For clarity in interpreting the effect that operation of the GETS has on the PFAS concentrations in Ditch B the DNR recommends plotting the time series data for the streambed groundwater and surface water concentrations at each point using a consistent logarithmic scale. *An example that plots PFOA concentrations at six of the Ditch B monitoring points is attached for reference.* Other approaches to data presentation are acceptable if the effect that the GETS has on PFAS concentration in the surface water and streambed groundwater in Ditch B can be interpreted from the data.

Next Steps:

The following are next steps with respect to implementation of the GETS LTMP.

- Within 30 days of the date of this letter submit the addendum to GETS Pre-Startup Data Package with the items noted above.
 - The addendum can be a simple letter and attachments.
 - Form 4400-237 and a Wis. Admin. Code § NR 749 review fee are not required for the addendum.
- After operation of the GETS begins, submit Startup Progress Reports in accordance with the schedule approved in the GETS LTMP (i.e., weekly for first 8 weeks and monthly thereafter until startup is complete – anticipated to be approximately 6 months).
 - The DNR requests that JCI/Tyco discuss the format for reporting with the DNR in advance of the first Startup Progress Report to align expectations, and that JCI/Tyco incorporate the recommendations noted above in these reports.
 - Form 4400-237 and a Wis. Admin. Code § NR 749 review fees are not required for the Startup Progress Reports².

Please refer to Attachment C of the [May 18, 2021 Response to the GETS RADR](#) for a summary of the other submittal requirements for the GETS and notes as to whether Wis. Admin. Code § NR 749 review fees are required.

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

Attachments: Example: PFOA Concentrations Time Series Plots for Ditch B

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

² Although not required, if JCI/Tyco would like to receive a written response from the DNR on a Startup Progress Report, then JCI/Tyco may choose to pay a Wis. Admin. Code § NR 749 review fee for technical assistance and should include Form 4400-237 with the submittal for which a review is requested.

Example: PFOA Concentrations Time Series Plots for Ditch B

