State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Tony Evers, Governor
Adam N. Payne, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

November 17, 2023

MS. DENICE NELSON
JOHNSON CONTROLS, INC
5757 N. GREEN BAY AVENUE
MILWAUKEE, WI 53209

Via Email Only to denice.karen.nelson@jci.com

SUBJECT: Response to *Additional Site Investigation Work Plan*
JCI/Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI
BRRTS #02-38-580694

Dear Ms. Nelson:

On Aug. 24, 2023, the Wisconsin Department of Natural Resources (DNR) received the *Additional Site Investigation Work Plan* (the "SI Work Plan") for the above-referenced site (the "Site") that was submitted by Arcadis U.S., Inc. (Arcadis), on behalf of Johnson Controls, Inc. and Tyco Fire Products LP (JCI/Tyco). The SI Work Plan was accompanied by the fee required under Wisconsin Administrative Code (Wis. Admin. Code) § NR 749.04(1) for DNR review and response. On Oct. 6, 2023, JCI/Tyco submitted an email with minor revisions to the SI Work Plan (attached). DNR included these revisions in its review of the SI Work Plan.

The DNR reviewed the SI Work Plan, which summarized JCI/Tyco's planned activities to continue the investigation of per- and polyfluoroalkyl substances (PFAS) at the Site and JCI/Tyco's response to the DNR's comments to the Apr. 2023 Site Investigation Status Report. The SI Work Plan included sampling to address data gaps, but some data gaps previously identified by the DNR may not be fully addressed in the upcoming proposed scope of work. In this response, the DNR identifies the areas where data gaps may remain and recommends actions JCI/Tyco can take to begin addressing those questions.

Background

JCI/Tyco is investigating and responding to the discharge of 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 activities and its progress to define the degree and extent of PFAS contamination at the Site are documented in seven prior reports[1].

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1 Reports documenting prior progress in the SI include:

- *Site Investigation Report* – Sept. 28, 2018 (Posted to BRRTS Oct. 4, 2018)
- *Data Summary Report* – Mar. 8, 2019 (Posted to BRRTS Mar. 13, 2019)
- *Southern Area Groundwater Evaluation Report* – Mar. 20, 2020 (Posted to BRRTS Apr. 10, 2020)
- *Interim Site Investigation Report* – May 15, 2020 (Posted to BRRTS Jun. 5, 2020)
- *Conceptual Site Model* – May 20, 2020 (Posted to BRRTS Jun. 5, 2020)
- *Air Pathway Site Investigation Report* – Submitted as App. A to the Site Investigation Work Plan – Feb. 11, 2022
- *Site Investigation Status Report* – Apr. 3, 2023

Additional work is needed for JCI/Tyco to meet the requirements of Wis. Admin. Code ch. NR 716 for a complete site investigation. The DNR has provided recommendations in prior correspondence to close data gaps and help JCI/Tyco make progress to achieve a complete site investigation. The most recent correspondence was provided to JCI/Tyco on June 23, 2023, and a technical meeting was held with JCI/Tyco and the DNR on July 24, 2023, to discuss the comments.

Summary of the SI Work Plan

JCI/Tyco's SI Work Plan included a response to each of the comments in the DNR's June 23, 2023 letter and outlined JCI/Tyco's planned activities for the next steps in the investigation. The locations listed below are shown on Figure 1 in the SI Work Plan, with revisions to I, L and H proposed in the Oct. 6, 2023 email (attached).

The scope in the SI Work Plan includes:

- Installation of vertical aquifer profiles (VAP) borings to evaluate overburden geology and PFAS concentration in groundwater at four locations (H, J, K and L).
- Installation of monitoring wells at three locations (H, K and L) based on the upcoming VAP results.
- Installation of five monitoring wells at four locations (A, C, E and F) based on the results from VAPs completed in 2022.
- Installation of three wells installed into weathered bedrock at three locations (D, G and I).

The DNR infers from previous correspondence with JCI/Tyco that the following activities have been or will be completed in 2023 and the results will be included with documentation of the investigation activities listed above.

- Three flow and gradient measurements in Ditches A, C, D, and E.
- One sample of surface water in the Menominee River.
- Two samples of surface water in Ditches A, C, D, and E and Green Bay.

DNR Review

The headings used to categorize data gaps identified in the DNR's June 2023 letter and which JCI/Tyco used to present its response to comments in the SI Work Plan are repeated in the comments below for continuity.

1. *Groundwater East and Below Ditch B:*

   The objective of the additional sampling that DNR recommended for this area is to identify zones that may act as preferential flow pathways in the unconsolidated aquifer east of Ditch B and confirm the PFAS levels in those zones. In the SI Work Plan, JCI/Tyco proposed to install a VAP boring at location "H" and up to two monitoring wells installed at different depths at this location based on the VAP results, with refinements to the location of "H" provided in the Oct. 6, 2023, email. The DNR concurs with JCI/Tyco's recent refinement of the location for "H" and recommends that JCI/Tyco make its final selection based on where PFAS is most likely to be detected (e.g., evaluation of data it previously collected in other VAPs in this area and groundwater data for samples collected by the city of Marinette during road projects). DNR may request additional VAPs if preferential flow pathways are not identified in the unconsolidated aquifer at proposed location "H."

2. *Groundwater Southeast of FTC:*

   Similar to the comment above, the objective to make progress toward a complete site investigation is to identify zones that may act as preferential pathways and to measure the PFAS concentrations in those zones. While this comment was partially addressed by the new wells and VAPs proposed in the SI Work Plan for this area, the locations where PFAS were detected in previous VAP samples should be considered when identifying new well locations. Elevated concentrations of PFAS were previously detected around 30 feet below ground surface (bgs) at VAP-PZ-73 and VAP-35. Rather than install a new VAP and well(s) at location "K," the DNR recommends JCI/Tyco consider monitoring wells, screened around 30 feet bgs, be installed near VAP-PZ-73 and VAP-35.

3. *Groundwater flow paths originating from the entire losing segment of Ditch A south of the FTC:*

   The two VAPs proposed at locations "J" and "L" coupled with completion of the recommended well near VAP-PZ-73 will help to further advance the understanding of the complex groundwater-surface water interactions and groundwater flow paths from Ditch A in this area.

   Recognizing that recent snapshots of data collected during the site investigation may not fully characterize the current or historical flow patterns from Ditch A and having confirmation that losing stream conditions exist where there are elevated concentrations of PFAS in sediment keep this an important pathway of consideration when interpreting data and scoping the site investigation activities in this area.

4. *Weathered bedrock layer following the slope and strike of bedrock south of the FTC:*

   There are currently insufficient number of bedrock wells to characterize flow in weathered bedrock south of the FTC. JCI/Tyco's proposed locations of bedrock monitoring wells "G" and "I" (as revised) will add monitoring points that help improve the understanding of the flow direction and if PFAS migration occurs in the weathered bedrock to the south from the FTC. It is of particular importance to investigate along the strike in bedrock that follows the elevation where the former production well at the FTC intersected the weathered bedrock layer.

5. *Surface water in Ditch B at SW-15:*

   The DNR understands that routine monitoring began in August 2023 at a location near surface water monitoring location SW-15 as part of the monitoring for the Ditch B treatment system and that this data will be reported in future semi-annual progress reports.

6. *West and Northwest of FTC:*

   The need for further characterization in this area has not been addressed in the SI Work Plan. JCI/Tyco's response to comments focused on how diffusion in groundwater does not explain why PFAS is present in groundwater west of Ditch A. With diffusion ruled out, it leads to the conclusion that the detections of PFAS in groundwater on the FTC property to the west of Ditch A are from other migration pathways or direct discharges of PFAS in this half of the FTC property. The extent of contamination resulting from discharge(s) at the FTC must be determined to complete the site investigation (Wis. Admin. Code § 716.11(4)). The DNR recommends JCI/Tyco consider installing additional NR 141 wells on the western portion of the FTC and to the west of the FTC property to determine the extent of contamination.

7. *Impacts at PZ-27-12:*

   A revised and corrected version of the sanitary sewer map for the city of Marinette was provided in the SI Work Plan and this map addressed the DNR's question and concern for this item at this time.

8. *Plume Stability:*

   The DNR concurs that JCI/Tyco can propose and use a network of monitoring wells to track plume stability over time with the understanding that the site investigation into nature, degree and extent will continue and that other wells may be added to the long-term monitoring program based on the findings from the additional investigation.

9. *Flow into Green Bay:*

   JCI/Tyco has indicated that the results from the surface water data collected from the Bay of Green Bay in 2023 and the additional groundwater sampling proposed in the SI Work Plan will be evaluated and used to update the conceptual site model and interpretations of the groundwater contaminant plume. This holistic evaluation of the data will be presented in the next status update to the site investigation. This response is noted and the DNR will be looking for plume maps that honor the data in the next site investigation status report.

10. *Principal Component Analysis:*

    The DNR contends that JCI/Tyco's principal component analysis (PCA) does not adequately justify excluding certain areas outside the current study area from further testing and evaluation in the site investigation. PCA can be a useful indicator for separating complex PFAS analytical data to a few groups of similar composition. However, proper use and interpretation of PCAs must consider compositional variations in AFFF sources used at the FTC, as well as differential partitioning and transformation of PFAS in aquifer media and the effects of transport through multiple pathways. JCI/Tyco did not fully share PCA work (e.g., input, code, post-processing, handling of non-detects) with DNR, and therefore the DNR was not able to fully evaluate the validity of the approach. If JCI/Tyco opts to advance the PCA as one part of its data analysis and interpretation in the site investigation, the sample data set should be expanded to include additional investigation areas discussed in the comments above and the DNR requests that the input data be supplied in future submittals.

Next Steps

Conduct the proposed site investigation activities and submit a site investigation status report to the DNR which document the results and conclusions within **60 days** after completion of the activities and receipt of the laboratory data (Wis. Admin. Code § NR 716.15(1)(a)). To make more efficient progress toward a complete site investigation, the DNR recommends that the additional or revised sample locations and evaluations suggested herein be completed in the upcoming work and that JCI/Tyco outline its recommendations for next steps or investigation activities at the conclusion of the documentation report (Wis. Admin. Code § NR 716.15(6)). A supplemental site investigation work plan can follow, but a clear presentation of recommendations will expedite the DNR's review and comment to the status report.

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, please contact me at Alyssa.Sellwood@wisconsin.gov or (608) 622-8606.

Sincerely,

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

Attachments: Oct. 6, 2023, Email with Revisions to the SI Work Plan

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

Sellwood, Alyssa A - DNR

From: Denice Nelson <denice.karen.nelson@jci.com>
Sent: Friday, October 6, 2023 2:10 PM
To: Sellwood, Alyssa A - DNR
Subject: Revisions to the FTC 2023 Additional Site Investigation work Plan

Hi Alyssa,

Per our discussions earlier this week the following revisions are being made to the site investigation work we have planned for this fall:

1. The proposed bedrock well at location "I" will be moved to the Madsen Rd right-of-way near the 550 ft bedrock contour. This location is west of PZ-75 near the crossing of the west branch of Ditch A with Madsen Rd.
2. Location "L" along Rader Road will be completed as a piezometer based upon VAP results.
3. We will evaluate the potential to adjust "H" to the west near the intersection of Prairie and 10th. It should be noted that the drainage along Prairie and 10th flows directly east toward the intersection of Lincoln and Prairie. This intersection is the planned location for a bedrock well (Location "D"). If the intersection of Prairie and 10th is inaccessible, the previously planned location of "H" near the intersection of Shin Wa Uk Dr and Lincoln will be moved to the north, to the intersection of Lincoln and Prairie.

Note that we are also further evaluating your other areas of comment, but wanted to get you the above as these actions are planned to take place.

We can discuss further on our call next week if you would like additional follow-up.

Have a good weekend-

Denice

Denice Nelson
Senior Director, Remediation and Strategy
Johnson Controls

+1 651 280 7259 cell
denice.karen.nelson@jci.com
www.johnsoncontrols.com
Twitter: @JohnsonControls • LinkedIn: Johnson-Controls

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Johnson Controls
5757 North Green Bay Avenue
Glendale, WI 53209
USA