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Our Ref: 30080617

Subject: Response to Comments – Conditional Approval of Groundwater
Extraction and Remediation System (GETS) Interim Remedial Action Design
Report (RADR), Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette,
Wisconsin

Dear Ms. Sellwood,

On behalf of Tyco Fire Products LP (Tyco), Arcadis U.S., Inc. (Arcadis) has prepared these Responses to Comments (RTC) made by the State of Wisconsin Department of Natural Resources (WDNR) on May 18, 2021, in reference to the Conditional Approval of the Groundwater Extraction and Treatment System (GETS) Interim Remedial Action Design Report (RADR), Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI (the Site), BRRTS #02-38-580694, dated February 26, 2021 (Conditional Approval).

Tyco appreciates the review and conditional approval of the GETS. The conditions set forth in the Conditional Approval Letter from WDNR on May 18, 2021 are generally acknowledged; however, there are some conditions, interpretations, or other comments that require additional dialogue. Only those comments that we feel require a response are presented herein.

Comments provided by the DNR are repeated below in *italicized font*, with Tyco's responses immediately following in regular font.

WDNR Review

The DNR's conditional approval is specific to the requirements of ch. NR 724 Wis. Adm. Code and does not constitute an approval of the engineering design or approvals for other permits or permissions that JCI/Tyco must obtain for construction and/or operations of the GETS.

Comment acknowledged. Tyco will obtain the applicable approvals of any other permits or permissions required before constructing or implementing the GETS.

While proposed as an interim remedial action, the GETS is expected to run for many years with regular performance monitoring, maintenance and pump replacement. (JCI/Tyco's estimates for PFAS mass removal from the GETS are based on model simulations for 30 years of operations.) JCI/Tyco will provide updates on operations in semi-annual progress reports submitted to the DNR.

Comment acknowledged. Tyco will provide updates on operations in semi-annual progress reports submitted to the WDNR. Additional details about monitoring and reporting are included below.

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The GETS is expected to remove PFAS mass from the environment and reduce the migration of PFAS away from the FTC. JCI/Tyco will monitor the PFAS mass removed by the GETS and the hydraulic capture zone where migration is controlled.

Comment acknowledged. Tyco will provide updates on operations in semi-annual progress reports submitted to the WDNR. Those reports will include tables and graphical plots to summarize estimates of PFAS mass extracted from each well and for the entire system (for the reporting period and cumulatively since system startup).

The GETS is expected to reduce the concentration of PFAS in groundwater in the remediation focus area; however, the reductions are not expected to achieve the Wisconsin Department of Health Services (DHS) Cycle 10 and 11 recommended groundwater standards for PFAS in the remediation focus area or the broader extent of the contaminant plume (see Figure B-8 in from the GETS RADR; Attachment A). JCI/Tyco will monitor the PFAS concentrations in groundwater over time in a defined network of Wis. Adm. Code ch. NR 141 groundwater monitoring wells.

Comment acknowledged. The GETS is expected to reduce the concentration of PFAS in groundwater in the remediation focus area which represents 95% of the total PFAS mass in the plume. Tyco will monitor the PFAS concentrations in groundwater in the remediation focus area over time in a defined network of Wis. Adm. Code ch. NR 141 groundwater monitoring wells.

Conditions of Approval

Complete the pre-startup monitoring program described in the Wis. Adm. Code § NR 724.17 Monitoring Plan provided as Appendix G of the GETS RADR, including the revisions specified in Attachment B.

Tyco initiated pre-startup monitoring activities as described in the Wis. Adm. Code § NR 724.17 Monitoring Plan provided as Appendix G of the GETS RADR, including some revisions specified in Attachment B of the Conditional Approval. Specific variances from revisions specified by WDNR are further described below.

Submit a revised Wis. Adm. Code § NR 724.17 Monitoring Plan by July 17, 2021 that includes a Commissioning Plan for the first 6 months of operations of the GETS and the other revisions specified in Attachment B.

Comment acknowledged. Tyco will submit a revised Wis. Adm. Code § NR 724.17 Monitoring Plan by July 17, 2021 that includes a Commissioning Plan for the first 6 months of operations of the GETS and some revisions specified in Attachment B of the Conditional Approval. Specific variances from revisions specified by WDNR are further described below.

Provide public notification prior to startup of the GETS that provides the remedial objectives, expected outcomes, and how the outcomes will be monitored and reported. The information provided to the public must align with the information in the approved GETS RADR per Wis. Adm. Code § NR 714.07.:

Comment acknowledged. Tyco updated the GETS factsheet for publication on tycomarinette.com and distribution and hosted a public meeting on June 29, 2021 to notify the public, consistent with the information submitted to the DNR in the GETS RADR (Wis. Adm. Code § NR 714.07) in conjunction with the updates for the Soil Interim RADR. In that meeting and subsequent fact sheet, Tyco clarified that 95% of the PFAS mass in the plume is within the targeted capture zone for the GETS and the timeline for operation was modeled for 30 years but actual time and volume of PFAS to be captured will be determined as the system is constructed, optimized, and operated.

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Submit a final Wis. Adm. Code § NR 724.13(2) operation and maintenance (O&M) plan with the Wis. Adm. Code § NR 724.15 construction documentation report within 120 days after initial startup of the GETS. Include documentation and plans for the management of PFAS-impacted media generated during construction and operations of the GETS.

Comment acknowledged. Tyco will submit a final Wis. Adm. Code § NR 724.13(2) operation and maintenance (O&M) plan with the Wis. Adm. Code § NR 724.15 construction documentation report within 120 days after initial startup of the GETS. The O&M Plan and Construction Documentation Report will include documentation and plans for the management of PFAS-impacted media generated during construction and operations of the GETS.

Include a Commissioning Plan to cover the first 6 months of operations of the GETS that describes JCI/Tyco's plans for sequencing the startup of the extraction wells and treatment system, the monitoring and decision framework for selecting the extraction well pumping rates and treatment parameters and any stop conditions or contingency plans based on monitoring results (Wis. Adm. Code § NR 724.13(2)).

Comment acknowledged. The Commissioning Plan will be included with the Monitoring Plan and will cover the first 6 months of operations of the GETS and be prepared and implemented to meet the requirements of Wis. Adm. Code § NR 724.13(2).

JCI/Tyco used its groundwater flow model to predict the effect that the GETS will have on the water balance, groundwater-surface water interactions and surface water flow in Ditch B. There is uncertainty with the predictions of the model, and while many of these uncertainties can be addressed by physical monitoring after startup of the GETS, additional work could be done with the groundwater flow model prior to startup to improve the understanding of these surface water interactions and to refine final design and initial operating parameters for the GETS.

Comment acknowledged. The Groundwater Flow Model will be updated with data collected in the various monitoring phases of GETS operations. As stated above, the volume of PFAS to be captured will be determined as the system is constructed, optimized, and operated.

Required Revisions to GETS Monitoring Plan (Attachment B to May 18, 2021 Letter)

Revision 1: Include a Commissioning Plan

Comment acknowledged. The Commissioning Plan will be included with the Monitoring Plan and will cover the first 6 months of operations of the GETS. It will describe plans for sequencing the startup of the extraction wells and treatment system, the monitoring and decision framework for selecting the extraction well pumping rates and treatment parameters and any stop conditions or contingency plans based on monitoring results (Wis. Adm. Code § NR 724.13(2)).

Revision 2: Update the Monitoring Well Network

- *Construct a new well near piezometer PZ-22S/-22D to a depth of approximately 52 ft bgs with a 5-foot well screen; include as part of sampling plans for water level gauging and baseline and semi-annual PFAS sampling.*
- *Add existing monitoring wells PZ-1S and PZ-15S into the baseline and quarterly PFAS sampling. Include both wells in the water-level gauging.*

- *Collect groundwater samples for PFAS from the five mini-piezometers proposed for Ditch B (TPZ-U03, TPZ-M09, TPZ-M07, TPX-M04, and TPZ-M01). Collect the samples concurrent with the surface water samples and the water-level measurements at these locations.*

Comment acknowledged. No new piezometer is planned at this time near PZ-22S/-22D. Based on a review of available logs for piezometers and borings near PZ-22S/D (i.e., PZ-7, SB-4, and SB-5), the base of the sand unit in this area is approximately 40 to 45 feet below ground surface (bgs). As such, PZ-22D, screened 31 to 41 feet bgs, is constructed with the bottom of the screen interval at or near the base of the sand unit. A well completed to a depth of 52 feet bgs would be constructed within the till unit, and monitoring in an aquitard is not expected to provide useful information for evaluating GETS performance.

As discussed with WDNR on June 25, 2021, three similarly constructed deep sand unit monitoring wells within the area of PZ-22D (i.e., PZ-22D, PZ-18D, and PZ-3) will be sampled during the baseline event. If PFAS concentrations from all three wells are similar, PZ-22D will be used going forward in the monitoring program to provide continuity with existing historical results from that well. If the PFAS concentrations at either of the other wells are significantly higher (e.g., more than 15%), the well with the highest concentration will be substituted for PZ-22D for the remainder of the monitoring program.

Based on the June 25, 2021 discussion with WDNR, PZ-1S will not be included in the monitoring program. PZ-1S is screened (36-41 ft bgs) in the low permeability till, below the sand unit. PZ-15S and PZ-15D will both be included in the routine water-level gauging list. Additionally, both PZ-15 wells will be included in the baseline and semi-annual sampling events.

Groundwater samples for PFAS will be collected from the five mini-piezometers located in Ditch B. Note that because the mini-piezometers must be removed in winter and replaced in the spring, sample locations cannot be exactly replicated from year to year, which will introduce ambiguity in long-term trend analysis.

Revision 3: Update the Sampling Frequency

- *Startup Phase: Increase the PFAS sampling frequency to monthly for each extraction well after pumping is initiated in that well.*
- *Startup Phase: Add a contingency plan to gauge water-levels in the mini-piezometers and sample groundwater and surface water in Ditch B when groundwater pumping from the GETS is stopped for 24-hours or more. The contingency sampling must be done in addition to the sampling scheduled to occur when the GETS is operating. (If multiple stoppages are needed in a month, only one contingency sample event is required for that monthly period.)*
- *Short-Term Phase: For wells scheduled to be sampled annually for PFAS, increase the sampling frequency to semi-annually.*

Comment acknowledged. During the Startup Phase, PFAS sampling at each extraction well will be increased to monthly after pumping is initiated in that well.

To assess how quickly system interruptions may affect conditions in Ditch B, a one-time supplemental rebound monitoring program will be implemented in the event of a planned system shut-down lasting 4 or more days. This program would be implemented no sooner than 1 month after the Complete System Stage of Startup (Section 3.3.3 of the Commissioning Plan). The rebound monitoring will include:

- Gauging surface water levels and relative groundwater levels at the five mini-piezometers in Ditch B to assess changes in the gradient between groundwater and surface water.
- Collecting a surface water PFAS sample at the influent of the Ditch B SWTS to assess potential changes in surface water concentrations.

The monitoring described above will be performed on a decreasing sampling frequency for up to one month. The number of events will be contingent on the length of the shutdown, based on the following schedule:

- One monitoring event 1 to 2 days prior to system shutdown
- On days 2, 4 and 7 days after shutdown
- Weekly after the first seven days for up to 3 weeks.

Note that the above rebound monitoring program will only be conducted once, if a planned shutdown is needed. If a planned shutdown is not needed, the rebound monitoring will not be conducted (i.e., the system will not be taken offline for an extended period expressly to complete the rebound program.)

For an unplanned shutdown, the priority will be to restart the system to maximize operating time; therefore, water levels will not be scheduled to be collected.

The sampling frequency will be increased to semi-annually for wells that are currently scheduled to be sampled annually for PFAS. The semi-annual sampling events will be completed a total of four times over the two year period of the Short-Term Phase.

Revision 4: Update the Reporting Schedule

- *Pre-Startup: Provide the DNR with a data package of the pre-startup monitoring results at least 15-days prior to initiating operations of the GETS. Include a summary of the flow and stage measurements for Ditch B in the submittal. Present the data in summary tables that can be updated with future monitoring data. Describe how results affect the basis of design or proposed operations for the GETS and use the data as baseline data from which to compare the monitoring results collected after startup of the GETS.*
- *Startup Phase: Provide the DNR with startup progress reports during the Startup Phase. Submit weekly for the first 8 weeks and monthly thereafter through the end of the Startup Phase (anticipated to end 6 months after initiating operations of the GETS). Include a summary of the O&M; any operational challenges, modifications or contingency actions taken during the reporting period; and any monitoring data collected/received during the reporting period. The startup progress reports do not require a Wis. Adm. Code ch. NR 749 review fee, and separate data notifications to DNR are not required if the data is included in the startup progress reports.*
- *Short-Term Phase: After completion of the Startup Phase, the DNR approves JCI/Tyco's request to submit the Wis. Adm. Code § NR 724.17 long-term monitoring data with the semi-annual O&M progress reports per Wis. Adm. Code § NR 724.13(3). JCI/Tyco should number the semi-annual progress reports sequentially starting with #1 for the first semi-annual report. JCI/Tyco is not required to use Form 4400-194 for the progress reports. The semi-annual progress reports must include the performance parameters approved for use in reporting outcomes from GETS.*
- *Long-Term Phase: It is likely that modifications to the monitoring program and some performance metrics will be needed based on the results from the short-term phase monitoring. At the completion of the short-term phase, submit an updated Monitoring Plan specific to the long-term phase of the monitoring.*

Continue to complete the short-term phase of the plan until the DNR reviews and approves the updates to the long-term monitoring plan.

Comment acknowledged. A data package of the pre-startup monitoring results will be provided to WDNR at least 15 days before GETS startup. The data package will minimally include the following:

- Summary tables of gauged water levels, validated analytical results, and flow and stage measurements.
- An updated well construction table (including extraction well and piezometer constructions).
- Soil boring logs and well construction logs associated with piezometer and extraction well installations.
- A description of how the results affect the design or proposed operations of the GETS.
- Laboratory analytical reports.

During the Startup Phase, weekly reports will be prepared for the first eight weeks of GETS operation. Each report will be submitted 10 days after the end of the week it describes. After the initial eight-week period, progress reports will be provided monthly, submitted 15 days after each monthly reporting period. Progress reports will include, as applicable to the reporting period, the following:

- Summary of the GETS OMM activities, optimizations, modifications, and contingency actions if taken.
- GETS operational data (e.g., influent/effluent rates and volumes, sample results associated with WPDES permitting).
- Summary tables of gauged water levels, validated analytical results, and stage measurements (collected at monthly or quarterly intervals, as detailed in the LTM Plan).
- Summary table and plot of continuous flow measurements collected at the existing Ditch B treatment system (to be provided monthly).
- Laboratory analytical reports.

During the Short-Term Phase, semi-annual O&M progress reports will be provided to WDNR in accordance with Wis. Admin. Code NR 724.17 and 724.13(3). Semi-annual progress reports are proposed to be provided to WDNR within 45 days of the end of each 6-month period. The progress reports will include the following:

- Cover letter and general Site information (Wis. Admin. Code NR 724.05(e)).
- Summary of the GETS OMM activities, optimizations, modifications, and contingency actions taken, if any.
- GETS operational data (e.g., influent/effluent rates and volumes; sample results associated with WPDES permitting).
- Summary tables, plots, and figures, as applicable, of gauged water levels, validated analytical results, and stage measurements (collected at monthly, quarterly, or semi-annual intervals, as detailed in the LTM Plan).
- Attainment or exceedance of applicable criteria and a preliminary analysis of the potential cause(s).
- Summary table and plot of continuous flow measurements collected at the existing Ditch B treatment system.

- Laboratory analytical reports.
- Additional performance parameters as detailed in the response to Revision 5.

An updated Long Term Monitoring Plan will be submitted to WDNR at the completion of the planned Short-Term Phase. Monitoring and reporting associated with the Short-Term Phase will continue for an additional six month-period or until WDNR reviews and approves the updated Long Term Monitoring Plan, whichever is the shorter time period.

Revision 5: Specify Performance Parameters and Tools for Reporting Outcomes from GETS

Specify the parameters and tools (e.g., calculations, figures, charts, tables) that will be used to document outcomes of the GETS in the semi-annual progress reports. These outcomes are specific to the changes in groundwater and surface water conditions that occur in response to the GETS interim action. (The parameters that JCI/Tyco must use to measure the performance of the treatment system will be defined in the WPDES Permit.) At the end of the short-term phase of monitoring, JCI/Tyco may propose revisions to the parameters and tools used to document outcomes when it submits the revised long-term monitoring plan.

Comment acknowledged. The parameters and tools that will be used to document outcomes of the GETS in the semi-annual progress reports have been summarized in Table 4 of the revised Monitoring Plan. In order to document PFAS reductions in Ditch B surface water and/or identify locations or conditions contributing to potential increases, Tyco will create tables summarizing PFAS concentrations detected in groundwater and surface water at mini-piezometers. Additionally, Tyco will create post-maps and trend plots illustrating PFOA and PFOS concentrations in groundwater and surface water at mini-piezometers over time. Tyco will also create graphical trend plots showing contemporaneous flow rates and PFOA and PFOS concentrations for both GETS effluent and Ditch B surface water.

To document PFAS trends in groundwater within the area of the GETS, Tyco will create tables to summarize groundwater PFAS concentrations at monitoring wells over time and graphical plots (as needed) to track concentration trends of specific PFAS constituents. Tyco will create figures (e.g., isoconcentrations and cross sections) showing concentrations of specific PFAS constituents in groundwater within the area of the GETS.

To document PFAS mass removal over time, Tyco will create a tabular summary of the average operating flow rate, run time, and volume of groundwater removed per month in each extraction well. Tyco will calculate and track (in tables and graphical plots) an estimate of PFAS mass extracted from each well for the reporting period and include updated cumulative estimated mass of PFAS extracted from each well since startup. Tyco will create a tabular summary of the total volume of groundwater extracted and treated per reporting period and cumulatively since GETS startup and a tabular summary of the influent and effluent concentrations of PFAS from the GETS during the reporting period.

Next Steps

JCI/Tyco is reminded that it must complete the site investigation per Wis. Adm. Code ch. NR 716 and develop remedial goals for the Site per Wis. Adm. Code ch. NR 722. One or more actions (in addition to the GETS) may be needed to achieve the remedial goals at the Site. Closure under Wis. Adm. Code ch. NR 726 is not achievable while active remedies like the GETS require operation and maintenance.

Comment acknowledged. Tyco recognizes that the site investigation must be completed before site closure can be achieved under Wis. Adm. Code ch. NR 726. Tyco further understands that closure cannot be achieved while active remedies, such as the GETS, continue to operate. Tyco looks forward to

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proceeding with the implementation of the GETS in coordination with WDNR and other stakeholders. We also plan to conduct additional site investigation during the implementation of the GETS to satisfy the requirements of Wis. Adm Code ch NR 722.

Sincerely,
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