



June 18, 2021

MR. JEFFREY DANKO
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MILWAUKEE, WI 53209

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

SUBJECT: Response to 3rd Revised Long-Term Potable Well Sampling Plan
JCI/Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI
BRRTS #02-38-580694

Dear Mr. Danko and Mr. Wahl:

On March 16, 2021, the Wisconsin Department of Natural Resources (DNR) received the third Revised Long-Term Potable Well Sampling Plan (Sampling Plan v.3) for 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.

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 "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.

Data collected to date by JCI/Tyco indicates PFAS contaminants have spread from the FTC and impacted private and public potable wells and surface water in the town of Peshtigo and surface water in the Bay of Green Bay in Lake Michigan. JCI/Tyco's site investigation into other transport pathways and into the degree and extent of contamination is still on-going.

JCI/Tyco has sampled 172 private and public potable wells in an area located generally east and southeast of the Site. The private drinking water well sampling area (PWSA), as currently defined, is within the town of Peshtigo and city of Marinette and is roughly bound to the north by University Drive, to the west by County Road B, to the south by Rader Road, and to the east by the Bay of Green Bay (Figure 1 – **Attachment A**).

In effort to eliminate the exposure pathway to PFAS in drinking water in the PWSA, JCI/Tyco provided Point of Entry Treatment (POET) systems for 43 potable wells¹ and offered bottled water to all users of private drinking water wells in the PWSA that responded to its outreach efforts. These are further described in JCI/Tyco's Comprehensive Alternative Water Management Plan dated March 2020.

¹ A total of 41 POET systems were listed in JCI/Tyco's March 2021 submittal and two new ones were added since that time.

Prior Potable Well Sampling Plans

JCI/Tyco first submitted a Long-Term Potable Well Sampling Plan (Sampling Plan) for the PWSA on March 8, 2018. The Sampling Plan outlines sampling schedules and sample results for potable wells and POETs in the PWSA. The Sampling Plan has been revised and updated on several occasions. All the documents are posted to BRRTS on the Web, including the following:

- Mar. 8, 2018: JCI submits first Long-Term Potable Well Sampling Plan
- Mar. 30, 2018: DNR provides comments to Sampling Plan
- Apr. 20, 2018: JCI/Tyco submits revised Sampling Plan v.1
- Feb. 19, 2020: DNR directs JCI/Tyco to update Sampling Plan by April 1st and October 1st of each year
- Apr. 1, 2020: JCI/Tyco submits revised Sampling Plan v.2
- Nov.16, 2020: DNR provides comments to revised Sampling Plan v.2
- Nov. 23, 2020: DNR asks JCI/Tyco to compare private wells results to Cycle 11 recommended standards
- Dec. 16, 2020: JCI/Tyco submits its Cycle 11 evaluation
- Jan. 12, 2021: JCI/Tyco responds to DNR's comments to Sampling Plan v.2
- Feb. 11, 2021: DNR responds to the Cycle 11 evaluation and identifies additional requirements
- Mar. 16, 2021: JCI/Tyco submits revised Sampling Plan v.3

These regular revisions are intended to keep the Sampling Plan up to date with respect to updates to the wells and POET systems included in the sampling program, updates to recommended PFAS standards, changes to relevant sampling and laboratory analytical methods for PFAS, and refinements to the understanding of the extent of contamination and observations of trends in PFAS concentration at the Site. Currently, the Sampling Plan is expected to be updated semi-annually in April and October of each year.

In its February 19, 2020 letter, the DNR directed JCI/Tyco to update the Sampling Plan to include the Expanded Site Investigation Area (ESIA), which extends beyond the boundaries of the PWSA. On June 1, 2020, JCI/Tyco notified the DNR that it would not perform the sampling of additional potable wells in the ESIA. Thus, on July 7, 2020, the DNR notified JCI/Tyco that the DNR would perform the potable well sampling required in the ESIA and seek cost recovery from JCI/Tyco. The DNR's sampling of potable wells in the ESIA is anticipated to wrap up by end of June 2021. Following this, the DNR will share the results, findings and conclusions from sampling in the ESIA with JCI/Tyco and provide direction on how to incorporate these findings and conclusions for the ESIA into JCI/Tyco's future updates to the Sampling Plan.

Cycle 11 Testing

On November 6, 2020, the Wisconsin Department of Health Services (DHS) recommended additional groundwater standards for PFAS, which brought the total number of PFAS compounds with recommended standards to 18 PFAS ("Cycle 11"). These 18 PFAS are included in the list of 36 PFAS compounds currently reported by the laboratory for this Site; however, in earlier phases of the sampling the laboratory may have only reported results for 6 or 14 PFAS compounds.

In early 2021, JCI/Tyco provided all potable wells in the PWSA the opportunity for immediate testing for 36 PFAS regardless of whether the well had a POET or of the schedule for the next sampling event as defined by the Sampling Plan. This testing allowed comparison of the potable well results to DHS's Cycle 11 recommended standards. If a potable well is or was tested as part of this sampling effort, the schedule for future sampling events is selected based on the criteria outlined in the Sampling Plan v.3.

At the time of issuing this response, DNR had been notified that JCI/Tyco had completed Cycle 11 testing for 138 of the 172 potable wells in the PWSA.

Summary of Sampling Plan v.3

JCI/Tyco's Sampling Plan v.3 includes a summary of sampling methods, a reporting schedule and the rationale for frequency of sampling for wells in the PWSA. The sampling program for a private well depends on past sampling results and whether a POET system was installed. Categories described in the Sampling Plan v.3 include the *Potable Well Program* which applies to any well without a POET and the *POET System Sampling and Maintenance Program* which applies to wells once a POET system is installed.

The DNR's understanding of JCI/Tyco's current Potable Well and POET System Sampling Programs is summarized below and in the tables in **Attachment B**.

- The **Potable Well Sampling Program** starts with quarterly sampling in the first year. Results are compared to Cycle 11 recommended groundwater standards. If results from one or more sampling events are equal to or greater than the Cycle 11 recommended groundwater standards, then sampling continues quarterly for one more year and then annually thereafter. If results remain below the Cycle 11 recommended groundwater standards, the well will be sampled semi-annually for 1 year, annually for the following year and biannually (every 2 years) thereafter. The sampling frequency reverts to annual if any long-term sampling results are equal to or greater than the Cycle 11 recommended groundwater standards.
- When a POET system is installed, then the potable well moves into the **POET System Sampling and Maintenance Program**. JCI/Tyco will sample the influent, mid-point and effluent water from the granular activated carbon (GAC) at the time of installation and then quarterly thereafter for 1 year (five total events). After this first year, the POET system will be maintained at a frequency based on when PFAS breakthrough in the GAC was detected and other site-specific factors (e.g., building use and influent concentrations). JCI/Tyco proposed that most POET systems move into a maintenance-only schedule after the first year of monitoring; this plan is summarized in Attachment B.

JCI/Tyco's Sampling Plan v.3 includes plans to notify each property owner, tenant (if applicable) and the DNR of the sampling results within 10 days of receipt of the laboratory data². JCI/Tyco Sampling Plan v.3 also states plans to provide the DNR with the electronic data the biweekly database updates once the results are validated and to submit quarterly reports to the DNR that include summary tables and figures.

DNR Review

The DNR reviewed JCI/Tyco's Sampling Plan v.3 and the January 12, 2021 response to comments to Sampling Plan v.2. The DNR thanks JCI/Tyco for addressing comments from Sampling Plan v.2, offering and completing the supplemental Cycle 11 testing for all wells in the PWSA, clarifying the sampling program and next sampling date for each well and refining its template cover letters used to transmit sampling results to each well user².

The DNR agrees with JCI/Tyco's plans for the 10-day notification of sample results to well users and the DNR and appreciates the submittal of biweekly updates to the electronic database after results have been validated. The DNR last received a summary report for the PWSA in June 2020, but it has not received the quarterly summary reports proposed by JCI/Tyco in Sampling Plan v.3. If JCI/Tyco continues to submit the 10-day notifications and biweekly database updates, then JCI/Tyco can provide an annual report instead of quarterly summary reports. Submit annual PWSA summary reports by July 31st of each year (starting July 31, 2021), which summarizes all available PFAS sampling results from potable wells and POET systems, and the POET maintenance activities completed since the last report.

² JCI/Tyco recently revised its data notification template cover letters to compare the sampling results to the Cycle 11 recommended standards and to provide a schedule for the next sampling and/or POET system maintenance event.

In its November 16, 2020 letter, the DNR asked JCI/Tyco to develop criteria for the sampling frequency based on whether the sampling results were above or below the laboratory reporting limit (RL). In Sampling Plan v.3, JCI/Tyco presented criteria based on whether the previous sampling results were above or below the Cycle 11 recommended groundwater standards. **The DNR agrees with JCI/Tyco's plans to use Cycle 11 recommended groundwater standards as the primary criteria to establish sampling frequency for potable wells and requires JCI/Tyco to update the sampling programs and the summary reports as described below.**

Updates to Sampling Programs

Incorporate the following updates into the next version of the sampling programs for the PWSA. These updates are also highlighted in the tables in **Attachment B**.

- Incorporate the DHS's Hazard Index (HI)³ into the evaluation of sampling results as follows:
 - Complete the HI calculation for all potable where PFAS < Cycle 11 recommended groundwater standards.
 - If the $HI \geq 1$, notify well users that an alternative drinking water source is recommended, offer and provide alternative water to those well users and apply the same sampling frequency as for wells having PFAS \geq Cycle 11 recommended groundwater standards.
 - If $HI < 1$, notify wells users in subsequent results notification letters that the HI was calculated to be less than 1 and continue to apply the sampling frequency for wells having PFAS < Cycle 11 recommended groundwater standards.
- Sample the influent to the POET systems to look for change in PFAS concentrations over time. Sample the wells biannually if PFAS < Cycle 11 recommended groundwater standards and $HI < 1$. Sample wells annually if PFAS \geq Cycle 11 recommended groundwater standards and/or $HI \geq 1$; these frequencies are consistent with those applied to the *Potable Well Program*.
- Sample the effluent prior to GAC changeout for wells where one or more influent samples in the previous four sampling events had PFAS \geq Cycle 11 recommended groundwater standards and/or $HI \geq 1$.

Updates to Summary Reports

Include the following evaluations in future potable well sampling summary reports:

- Add the Cycle 11 recommended groundwater standards to tables and highlight exceedances.
- Identify potable wells where PFAS < Cycle 11 recommended groundwater standards and $HI \geq 1$.
- Provide trend plots for wells where $HI \geq 0.1$ and identify wells with increasing or decreasing concentration trends. (The DNR recommends that JCI/Tyco plot the trends in concentration of PFOA + PFOS because results for these two compounds have been reported by the laboratory since testing began for the PWSA.)
- Prepare figures, like the one in **Attachment A**, which incorporate the following refinements:
 - Add "and/or $HI \geq 1$ " to the criteria for the 'yellow' category.
 - Distinguish which potable wells have a POET system.
 - Highlight wells with increasing concentration trends on the figures.
 - Prepare separate figures based on well depth zones: shallow, deep and unknown. (The DNR suggests using well depths of approximately 75 to 100 feet below ground surface to distinguish shallow from deep potable wells.)

³ On March 30, 2021, following JCI/Tyco's submittal of the Sampling Plan v.3, the DNR adopted [DHS's recommended HI approach](#) for evaluating the cumulative risk to human health from exposure to multiple PFAS compounds in drinking water.

- Summarize findings and conclusions and discuss any correlations that can be drawn from well location and/or depth and patterns observed in the PFAS concentration, signatures or trends. Future updates to the Sampling Plan should be based on these evaluations. Examples of future changes to Sampling Plan may include:
 - If increasing trends are identified in a well or influent to a POET system with PFAS < Cycle 11 recommended groundwater standards and HI < 1, then add criteria to sample the well (or influent) at the same frequency as wells having PFAS ≥ Cycle 11 recommended groundwater standards and/or HI ≥ 1.
 - If results are below certain criteria (e.g., laboratory RL) and a well is screened at a depth and location where increasing concentration trends are not observed or expected, then it may be reasonable to further reduce or stop sampling.

Next Steps and Conclusions:

The DNR thanks JCI/Tyco for its continued monitoring of potable wells and maintenance of POET systems in the PWSA and its timely sharing of data notifications to well users and the DNR. JCI/Tyco should implement the updates to the sampling programs as soon as practicable, but no later than October 1, 2021 when it submits the updated Sampling Plan (v.4). The annual potable well sampling summary report is due to DNR by **July 31, 2021** and the summary report should include the data evaluations described above. Additional written response to this letter, other than these two reports, is not needed.

As stated above, the DNR's sampling of potable wells in the ESIA is anticipated to wrap up by end of June 2021. Following this, the DNR will share the results, findings and conclusions from sampling in the ESIA with JCI/Tyco and provide direction on how to incorporate these findings and conclusions for the ESIA into JCI/Tyco's future updates to the Sampling Plan.

As a reminder, this Site is subject to an enforcement action and therefore all submittals to the DNR under Wis. Adm. Code chs. NR 700-799 and submittals directed by the DNR must be accompanied by an Wis. Adm. Code ch. NR 749 fee per Wis. Stat. § 292.94. These fees are not pro-ratable or refundable per Wis. Adm. 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.

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.

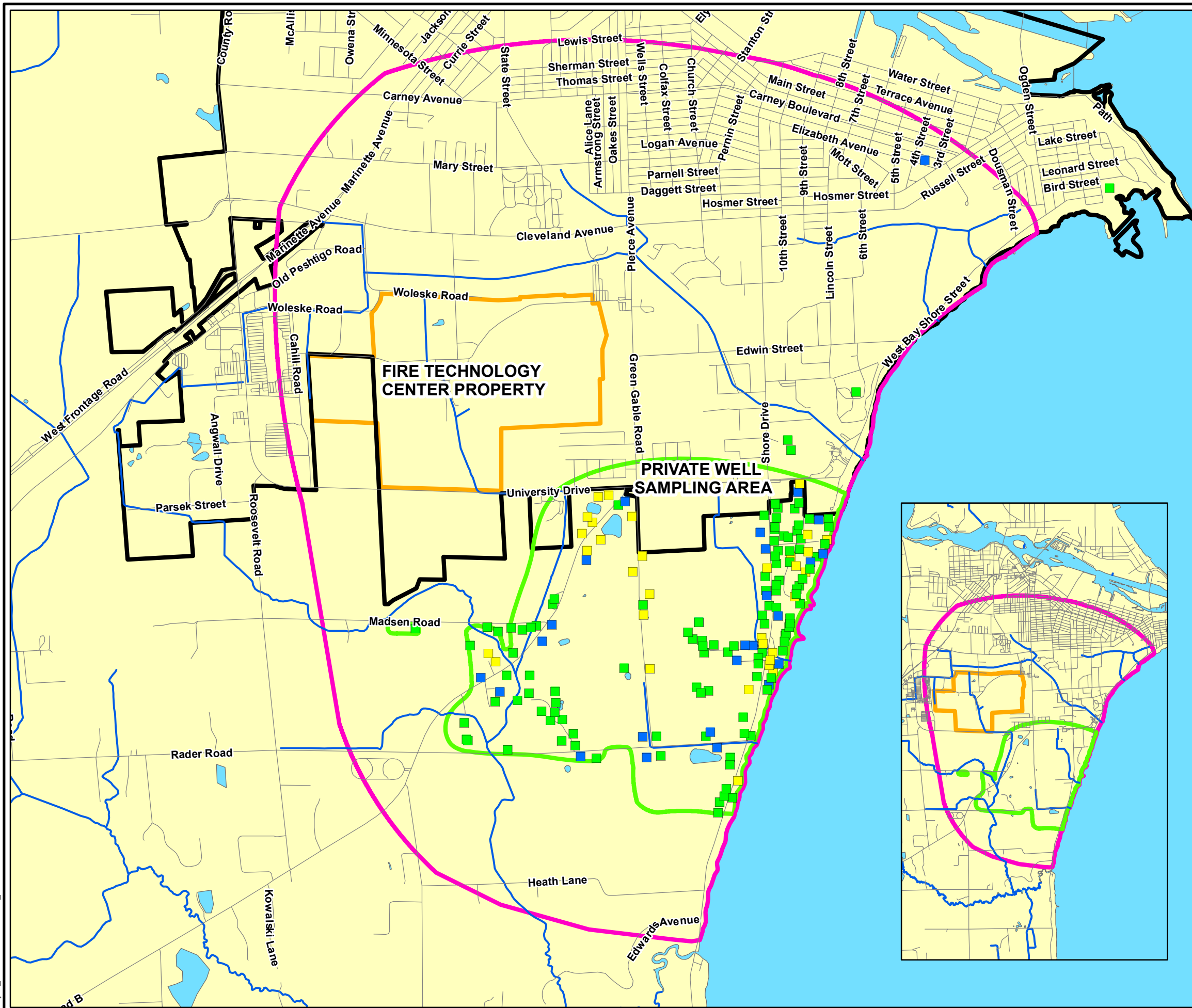
Sincerely,



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

Attachments: Attachment A: Figure of Potable Well Sampling Area from Sampling Plan v.3
Attachment B: Summary of Potable Well and POET Sampling Programs- Current and Updates

cc: Scott Potter, Arcadis (via email: Scott.Potter@arcadis.com)
Bridget Kelly, DNR (via email: bridgetb.kelly@wisconsin.gov)
Jodie Peotter, DNR (via email: Jodie.Peotter@wisconsin.gov)



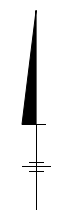
LEGEND:

DRINKING WATER WELL LOCATION

- PFAS NOT DETECTED ABOVE RL
- PFAS DETECTION BETWEEN RL AND ES
- PFAS DETECTION GREATER THAN ES

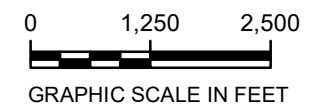
- APPROXIMATE SITE PROPERTY BOUNDARY
- APPROXIMATE MARINETTE CITY BOUNDARY
- PRIVATE WELL SAMPLING AREA
- INVESTIGATION AREA
- WATERBODY
- DITCH/STREAM
- ROAD

ES = WDHS RECOMMENDED ENFORCEMENT STANDARD
 RL = REPORTING LIMIT
 WDHS = WISCONSIN DEPARTMENT OF HEALTH SERVICES



3/16/2021

- NOTES:**
1. THE DATA REFLECTED IS THE HIGHEST VALUE DETECTED FROM THE VARIOUS EVENTS THROUGH FALL 2020.
 2. WELL LOCATIONS ARE APPROXIMATE
 3. DATA REPRESENTS HIGHEST HISTORICAL RESULTS FROM WELL; DATA COMPARED AGAINST CYCLE 11 PROPOSED GROUNDWATER STANDARDS; NOT ALL COMPOUNDS WITH PROPOSED CRITERIA WERE ANALYZED.



TYCO FIRE PRODUCTS LP
 MARINETTE, WISCONSIN

**PRIVATE DRINKING WATER
 WELL SAMPLING AREA**

ARCADIS | **FIGURE 1**

Potable Well Sampling Program (without POET system)
Sampling Plan v.3 and Updates to include in Sampling Plan v.4

Potable Well Sample Result	Year 1	Year 2	Year 3	Year 4+*
PFAS < Cycle 11 Recommended Groundwater Standards and HI < 1	Quarterly (or four events ¹)	Semi-annually	Annually	Biannually (Every 2 years)
PFAS ≥ Cycle 11 Recommended Groundwater Standards and/or HI ≥ 1 (in one or more prior sampling events)		Quarterly	Annually	Annually

Footnotes:

¹ If wells previously tested could not be sampled quarterly for four events, then those wells will be sampled semi-annually until they reach the four events after which they will start on the frequency described under Year 4+ based on the results.

Grey Highlights = Items not included in Sampling Plan v.3 that are to be added during the next update to the plan (Sampling Plan v.4).

HI: Hazard Index

PFAS: Per- and polyfluoroalkyl substances

POET: Point of entry treatment

POET System Sampling and Maintenance Program
Sampling Plan v.3 and Updates to include in Sampling Plan v.4

POET System Effluent ^{1,2,3} (First Year or More)	PFAS Potable Well (Influent) Result ⁴	PFAS Sampling ⁴						POET System Maintenance ³		
		Influent		Mid-Point		Effluent ⁵		GAC Changeout	UV Lights and Quartz Sleeve	Sediment Filters
		v.3	v.4	v.3	v.4	v.3	v.4			
Breakthrough before 3 mos.	< Cycle 11, HI < 1	--	Biannually	--	--	--	--	Every 2-3 mos.		
	≥ Cycle 11, HI ≥ 1		Annually				Every 2-3 mos.			
Breakthrough before 6 mos.	< Cycle 11, HI < 1	Every 3 mos.	Biannually	Every 3 mos.	--	Every 3 mos.	--	Every 3 mos.	Every 12 mos.	Every 3 mos.
	≥ Cycle 11, HI ≥ 1		Annually				Every 3 mos.			
Breakthrough between 6 and 12 mos.	< Cycle 11, HI < 1	--	Biannually	--	--	--	--	Every 6 mos.		
	≥ Cycle 11, HI ≥ 1		Annually				Every 6 mos.			
No Breakthrough by 12 mos.	< Cycle 11, HI < 1	--	Biannually	--	--	--	--	Every 12 mos.		
	≥ Cycle 11, HI ≥ 1		Annually				Every 12 mos.			

Footnotes:

¹ The influent, mid-point and effluent of the GAC is sampled when the POET system is installed and then quarterly thereafter for 1 year (five total events). The frequency of POET system sampling and maintenance that follows is based on these results.

² Individual maintenance schedules for each POET system can be found in the Sampling Plan.

³ When systems are taken off-line for winterization or other extended vacancy, then GAC is replaced when occupancy and use of the POET system resumes. The POET system is sampled and maintained according to the applicable frequency until the POET system is taken offline again for another extended vacancy at the property.

⁴ The schedule for PFAS Sampling is based on the influent results from the last four sampling events.

⁵ Effluent sampling to occur on or about same day, prior to GAC changeout. If breakthrough is observed, evaluate and report to DNR and well user if the POET system should move to a more frequent maintenance schedule.

Grey Highlights = Items not included in Sampling Plan v.3 that are to be added during the next update to the plan (Sampling Plan v.4).

GAC: Granular activated carbon

HI: Hazard Index

PFAS: Per- and polyfluoroalkyl substances

POET: Point of entry treatment