



May 27, 2020

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SUBJECT: Review and Response to JCI and Tyco Submittal of Draft Investigation Report of the Southern Area Groundwater Evaluation Efforts  
JCI/Tyco FTC, 2700 Industrial Parkway South, Marinette, WI  
BRRTS #: 02-38-580694

Dear Mr. Danko and Mr. Wahl,

On April 10, 2020, the Wisconsin Department of Natural Resources (DNR) received the draft “Southern Area Groundwater Report” (the “Report”) prepared by Arcadis, U.S., Inc., on behalf of Johnson Controls Inc. and Tyco Fire Products, LP (JCI/Tyco). The Report was submitted with a fee for DNR technical review and response. The DNR understands that JCI/Tyco intends to submit a complete site investigation report at a later date. The Report was reviewed for compliance with Wis. Admin. Code chs. NR 716 and 724. As previously stated to JCI/Tyco, the submittal of a Site Investigation Report is required under Wis. Admin. Code § NR 716.15. The following letter outlines technical comments regarding the Report and requirements for next steps.

### **Background and DNR Review**

The focus of the information provided in the Report is for a geographic area identified by JCI/Tyco as the ‘Southern Area’, which includes a region informally defined by JCI/Tyco as an area of approximately 0.75 square miles. This area is south of Rader Road, north of the Little River, and between Ditch A and the Bay of Green Bay in the Town of Peshtigo. This area also includes the area around Heath Lane (see enclosed map). The Report documents information that is part of a broader Site Investigation to determine the degree and extent of per- and polyfluoroalkyl substances (PFAS) compounds associated with historical activities at the JCI/Tyco Fire Technology Center (FTC) located at 2700 Industrial Parkway South, Marinette, Wisconsin. DNR reviewed the Report and all available file information and determined that additional work is necessary to meet the requirements of Wis. Admin. Code ch. NR 716 and complete the site investigation. The degree and extent of contamination identified at the site has not been adequately characterized or documented.

## Summary

The analysis provided in the Report attempts to demonstrate that PFAS compounds detected in groundwater in the Southern Area are not associated with the documented hazardous substance discharge and environmental pollution from and associated with the FTC. The conclusion of the Report states that multiple lines of physical and chemical evidence show that detections of PFAS in the Southern Area are associated with a yet to be identified local source or sources unrelated to the FTC. Conclusions noted in the Report are premised on data obtained in the yet-to-be completed groundwater and surface water investigations.

The Report further states that other pathways (e.g. historical air transport) are not as likely to have contributed to PFAS in drinking water; however, critically, no evaluation of the air transport pathway has been provided to date. There are significant gaps in data where sampling has been limited to methods for screening PFAS (e.g. Vertical Aquifer Profile (VAP) sampling), rather than relying upon a larger dataset of samples collected from permanently installed well networks within the site investigation area (Wis. Admin. Code § NR 140.03). The Report provides limited information and interpretation regarding the nature of PFAS detections (e.g. PFAS mixture) in groundwater in the Southern Area.

The DNR does not concur, based on the incomplete information provided in the Report, that the ‘Southern Area’ is disconnected from the previously identified detections of PFAS contamination associated with the FTC as described in the Report. The following letter details the requirements and additional information necessary to scientifically validate or invalidate the conclusions of the Report. This letter states site investigation requirements and additional information gathering and analysis necessary to comply with Wis. Admin. Code ch. NR 716.

## Completion of the Site Investigation

Additional Site investigation activities are necessary to adequately define and document the degree and extent of PFAS contamination associated with FTC site. DNR previously directed JCI/Tyco to evaluate additional PFAS transport pathways including air, surface water, and stormwater in DNR correspondence dated February 19, 2020. The comments provided herein are in addition to requirements laid out in the February 19, 2020 letter and address additional site investigation and reporting activities for surface and groundwater investigations.

### A. Scoping the Site Investigation

#### 1. Address Data Gaps and Define Unnamed Sources in the Source Area(s)

The analysis presented in the Report attempts to demonstrate that PFAS in groundwater in the Southern Area are not associated with the known source of PFAS contamination at the FTC. The DNR requires additional investigation be conducted to address data gaps referenced in this letter, to further assess the draft conclusions presented in this Report.

In addition, the report references that contamination in the Southern Area is a result of potential ‘local’ sources (other than the FTC) that have not been identified. The DNR requires JCI/Tyco include a discussion and analysis of other potential sources with specificity and the associated location of these referenced sources.

## 2. Utilize Consistent Sampling Parameters and 36 PFAS Analytes

The analytical parameter list for PFAS for activities conducted to date have been inconsistent between investigation sampling events. The limited PFAS target list, specifically the elimination of fluorotelomer sulfonates from the analytical parameter list post-2016, is problematic in terms of evaluating the PFAS mixtures between the FTC and Southern Area. To support these statements and for all future sampling, the 36 PFAS analytes as defined by the DNR must be analyzed and reported.

## B. Degree and Extent of Contamination in All Affected Media

### 1. Groundwater

Based on the review of data presented in the Report, including data provided in JCI/Tyco’s January 2020 Data Summary Report, the horizontal and vertical extent of groundwater contamination is not defined with respect to the FTC, including the Southern Area. The DNR requires that that the field investigation activities be extended beyond the ‘informal’ boundaries defined by JCI/Tyco (Wis. Admin. Code § NR 716.11(4)).

- The extent of PFAS associated with the FTC remains undefined. Information presented in the Report depicts a line showing the inferred edge of the PFOS, PFOA and/or PFOS+PFOA contamination at concentrations exceeding 20 nanograms per liter (ng/L). The single line does not include all known detections above 20 ng/L (e.g., VAP-09), and the Report does not document an explanation as to why those areas have not been included. Per Wis. Admin. Code § NR 716.15 (4)(c), provide isoconcentration maps depicting for all hydro-stratigraphic units to 2 ng/L (or non-detect) in future Site Investigation Reports. The Report must also include detailed information as to why certain locations with concentrations exceeding 20 ng/L are omitted from the interpretation of the groundwater plume.
- The Report concludes that the PFAS detections in the Southern Area are not connected to the FTC and are more likely from an isolated source. Based on current depictions of groundwater flow as provided in previous reports, and as shown on Figure 5 in the Report, there is a southerly component of groundwater flow in the vicinity of Ditch A from the FTC southward. No geologic or hydrogeologic cross-sections have been provided from the FTC to the Southern Area; per Wis. Admin. Code § NR 716.15 (4)(d), include cross sections to support this interpretation in future Site Investigation Reports.
- Significant data gaps exist where sample collection has been limited to methods for screening of PFAS (e.g. VAP sampling), rather than relying upon samples from permanently installed well networks within the site investigation area (NR 716.11(5)(f)). The DNR requires that the permanent monitoring well networks installed throughout the Southern Area be sampled for 36 PFAS analytes to confirm data precisely obtained from screening methods (e.g. VAPS, temporary wells, and potable wells).

- Limited groundwater data is available for the areas west and northwest of the Heath Lane and Edwards Avenue, including areas north of Rader Road. Additional data is needed to confirm groundwater quality and flow further up-gradient to support the findings provided in the Report. The DNR requires that additional permanent monitoring well networks be installed in the areas west and northwest of the Heath Lane and Edwards Avenue areas, including areas north of Rader Road to confirm conclusions in this Report (NR 716.11(5) (f)). New nested permanent monitoring wells and piezometers should be screened at different intervals vertically within the unconsolidated deposits and sampled for 36 PFAS analytes.
- The Report references private potable well sampling results from the Stanley Lane area as supporting the justification that shallow groundwater impacts in the Heath Lane area are disconnected from the FTC; however, there is no discussion as to the relevance of well construction, screen depth and geology logged at these private wells to the PFAS concentrations in these wells. Based on information provided in the Report, most private potable wells in the Stanley Lane area are reported to be deep. The DNR requires additional assessment relative to the shallow groundwater in the area north and west of the Southern Area including Stanley Lane.
- The Report also references private potable well sampling results within the Southern Area; however, no PFAS analytical results were provided. All private potable wells within the Southern area should be identified on figures and PFAS analytical results should be assessed relative to well construction, screen depth and geology. For any private potable wells in the Southern Area that have not been sampled to date, they must be sampled for 36 PFAS sample analytes.

## 2. Surface Water

Based on the review of data presented in the Report, including data provided in JCI/Tyco's January 2020 Data Summary Report, the extent of surface water contamination is not defined with respect to the FTC, including the Southern Area. Additional site investigation activities are necessary beyond the current sampling locations within and adjacent to Ditch A, as well as at locations within and adjacent to ditches B, C, D, E and the Little River (Wis. Admin. Code § NR 716.11(4)).

- The Ditch A condition is not fully characterized. Additional information must be supplied on ditch history (discharge, water levels, and PFAS concentrations for 36 analytes). The potential for a vertical stagnation distance below the ditch must be assessed to determine if there is sustained flow east or southeastward from the ditch area at some distance below the ditch bottom in the shallow sand aquifer.
- Conclusions provided in the Report regarding affected surface waters are based on only two analytical monitoring locations along the Ditch A in the Southern Area. Additional sampling locations must be established to further characterize conditions along Ditch A, including locations beyond the current southernmost surface water sampling location. New sampling locations must be used to determine discharge, water levels, and PFAS concentrations for 36 analytes.
- Additional sampling locations must also be established immediately downstream of the Ditch A treatment system (prior to where the Ditch A turns south on CTH B) in order to evaluate the potential for discharge of PFAS contamination post-treatment due to 1) surface water in Ditch A bypassing treatment due to volume limitations associated with the Ditch A treatment system, and 2) potential for

discharge of PFAS contamination post-treatment into the groundwater where Ditch A may be characterized as a losing stream and discharging into groundwater. New sampling locations must be used to determine discharge, water levels, and PFAS concentrations for 36 analytes on a quarterly basis.

- Additional sampling of ditches B, C, D, and E must be conducted in order to fully characterize the impact of PFAS in surface water as a potential source of PFAS fate and transport throughout the site investigation area. Samples must be collected from in-stream locations as well as from permanently installed wells on a quarterly basis. Samples must be collected to determine discharge, water levels, and PFAS concentrations for 36 analytes on a quarterly basis. Further response actions to minimize the impacts of this contamination to those water bodies and Lake Michigan will need to be evaluated as well.
- The impact of PFAS discharges from Ditch A to adjacent surface water features has not been established. Sampling of the Little River is necessary fully understand the potential for PFAS discharge from Ditch A into the Little River. Sample locations must be established along the full-reach of the Little River from the location where Ditch A discharges into the Little River to where the Little River discharges into the bay of Green Bay. New sampling locations must be used to determine discharge, water levels, and PFAS concentrations for 36 analytes.

### 3. Other (PFAS Mixture)

- PFAS results from the FTC represent only current conditions, which are a composite of discharges of different AFFF products at the facility over its history. A chronological list explaining which AFFF products were handled at which points in time is required to better understand how PFAS signatures may have changed over time. In general, fingerprinting arguments will remain as unsupported scientific criteria for documenting degree and extent without the accompanying list of AFFF products used as the necessary component to demonstrate the possibility that other sources of PFAS may be present.
- The mixture fingerprinting evaluation also needs to consider in greater detail what transformation processes have been active at the FTC, whether related to natural microbial processes, remedial actions or pilot studies, and how degradation of precursors may have altered the fingerprint. Microbial transformation of precursor PFAS may explain the higher relative concentration of PFOA or other per/polyfluorinated carboxylates (PFCAs) in parts of the FTC.
- The PFAS signature present at the distal end of the affected groundwater area may represent AFFF discharges to the environment from an earlier time in the FTC operational history and could therefore be expected to differ from that present in contemporary samples from the FTC. As an example, the higher relative concentrations of sulfonates in the Southern Area may represent the early use of PFAS-based AFFF at the FTC. In addition, more detailed consideration must be given to transformation of precursors during subsurface transport and their effect on the PFAS fingerprint throughout the affected groundwater area.
- In many cases, the greatest differences in the PFAS fingerprint in the Southern Area compared to the other areas of the FTC occur where PFAS samples concentrations in the Southern Area are the lowest. This could be related to the higher uncertainty in determining PFAS concentrations at these low levels due to limitations in laboratory methods. For future Site Investigation Report documents, utilize a

minimum concentration below which results are excluded from the fingerprinting evaluation, or at least flagged and/or discounted as uncertain.

- The limited PFAS target list identified in the Report is problematic in terms of fingerprinting because many of the target PFAS are commonly present in so many products. Elimination of the fluorotelomer sulfonates in from sampling protocols completed after 2016 is problematic. The full DNR PFAS list of 36 analytes, at a minimum, must be used in future sampling.
- Considering these limitations, if JCI/Tyco posits non-FTC sources in the area where affected groundwater is present specific to PFAS mixtures, it is a Site Investigation Report requirement for JCI/Tyco to identify and propose the specific unnamed PFAS sources present (Wis. Admin. Code § NR 716.15(2)(c)6).

### C. Receptors

Private well receptors are present in the Southern Area that have not been sampled, specifically along Heath Lane and Edwards Avenue. Current depictions of groundwater flow as shown on Figure 5, and provided in previous reports, show that there is a southerly component of groundwater flow that exists in the vicinity of Ditch A from the FTC southward. Based on this current depiction of groundwater flow, as well as the quantified presence of PFAS in the Southern Area, under Wis. Admin. Code §§ 716.07(7), 716.11(5)(b), all private well receptors must be identified and sampled for PFAS. This remains to be an issue of non-compliance and was previously discussed at length by DNR in a letter to JCI/Tyco dated February 19, 2020, where sampling requirements for private wells were required to begin by April 1, 2020. An additional letter detailing non-compliance with this requirement will be sent separately from this correspondence.

### D. Migration pathways

No evaluation of other transport pathways and/or mechanisms were provided in the Report; however, the DNR acknowledges and understands that JCI/Tyco will provide an additional evaluation of the potential for historical air transport of PFAS as part of a Site Investigation Workplan scheduled to be submitted summer 2020.

An evaluation of the air transport pathway is required to further characterize the extent of PFAS contamination, in particular with respect to isolated detections of PFAS that have been detected throughout the Town of Peshtigo. Air transport pathway site investigation requirements include a comprehensive evaluation of groundwater including areas upgradient to the source property, and other areas surrounding the source property as identified in the attached map as the Expanded Site Investigation Area. This should include the analysis of the proposed expansion of the FTC testing facility and its ability to mitigate further air and stormwater pathway discharges to the air, land and waters of the state.

An evaluation of foam on waterways and drainage areas as a potential PFAS transport pathway is required to further characterize the extent of PFAS contamination. Foam observations have been reported to the DNR at Ditches A, B, C, D, and E; the Little River, and the ditch at the southwest corner of Leaf Road and Kraus Road. An additional letter detailing immediate actions required under NR 708 will be sent separately from this correspondence.

## Documentation

### A. Visual Aids

The site investigation report shall include tables and figures to clarify and support results and interpretations (Wis. Admin. Code § NR 716.15(4)). The Report lacks significant visual aids to understand and support the analytical work performed to date in the area. See specific comments below, listed by visual aid types.

#### 1. Maps and Cross Sections

- All private well locations within the Southern Area must be presented on figures including PFAS analytical results (where known), to evaluate potential impacts to receptors (Wis. Admin. Code § NR 716.11 (5) (a)).
- Groundwater flow west of the FTC and Ditch A must be provided (Wis. Admin. Code § NR 716.15 (4) (b)).
- The extent of the PFAS (PFOS, PFOA and/or PFOS+PFOA) groundwater plume should be shown to 2 ng/L or non-detect. The PFAS groundwater plumes should be presented for all hydro-stratigraphic units (Wis. Admin. Code § NR 716.15 (4) (c)).
- A cross-section from the FTC (northwest) to the Southern Area should be provided to depict subsurface conditions in this area (Wis. Admin. Code § NR 716.15 (4)(d)).

#### 2. Data Summary Tables

- Well construction information should be provided for all sampled private wells including depth and screened interval (NR 716.15(4)(e)).

## Summary of Required Action Items and Schedule

In consideration of administrative code requirements, the DNR is requesting implementation of the following schedule:

- 1) The DNR understands JCI/Tyco is preparing a comprehensive site investigation workplan for submittal on August 17, 2020. The DNR requests the comments above be incorporated into this workplan. The work plan must comply with Wis. Admin. Code § NR 716.09(2). A fee is required for DNR review and response (Wis. Admin. Code § NR 716.09(1)).
- 2) Per Wis. Admin. Code § NR 716.11(2g), the additional site investigation activities must begin within 90 days of the submittal of the work plan.
- 3) Per Wis. Admin. Code § NR 716.14, all sampling results are required to be submitted within 10 days of receiving the laboratory data.
- 4) Per Wis. Admin. Code § NR 716.15(1), a supplemental site investigation report shall be submitted within 60 days after completion of the field investigation. A fee is required for DNR review and response.

5) NR 700 semi-annual progress reports will be required until the case is closed.

Once the additional work has been completed and documented, your consultant should evaluate the appropriateness of case closure based on the results of this additional work. If a remedial action is warranted, your consultant should submit a remedial actions option report (RAOR) within 60 days after the completion of the field investigation.

The DNR appreciates your efforts to restore the environment at this site. If you have any questions regarding this letter, please contact me at (920) 362-2072, or at [david.neste@wisconsin.gov](mailto:david.neste@wisconsin.gov).

Sincerely,



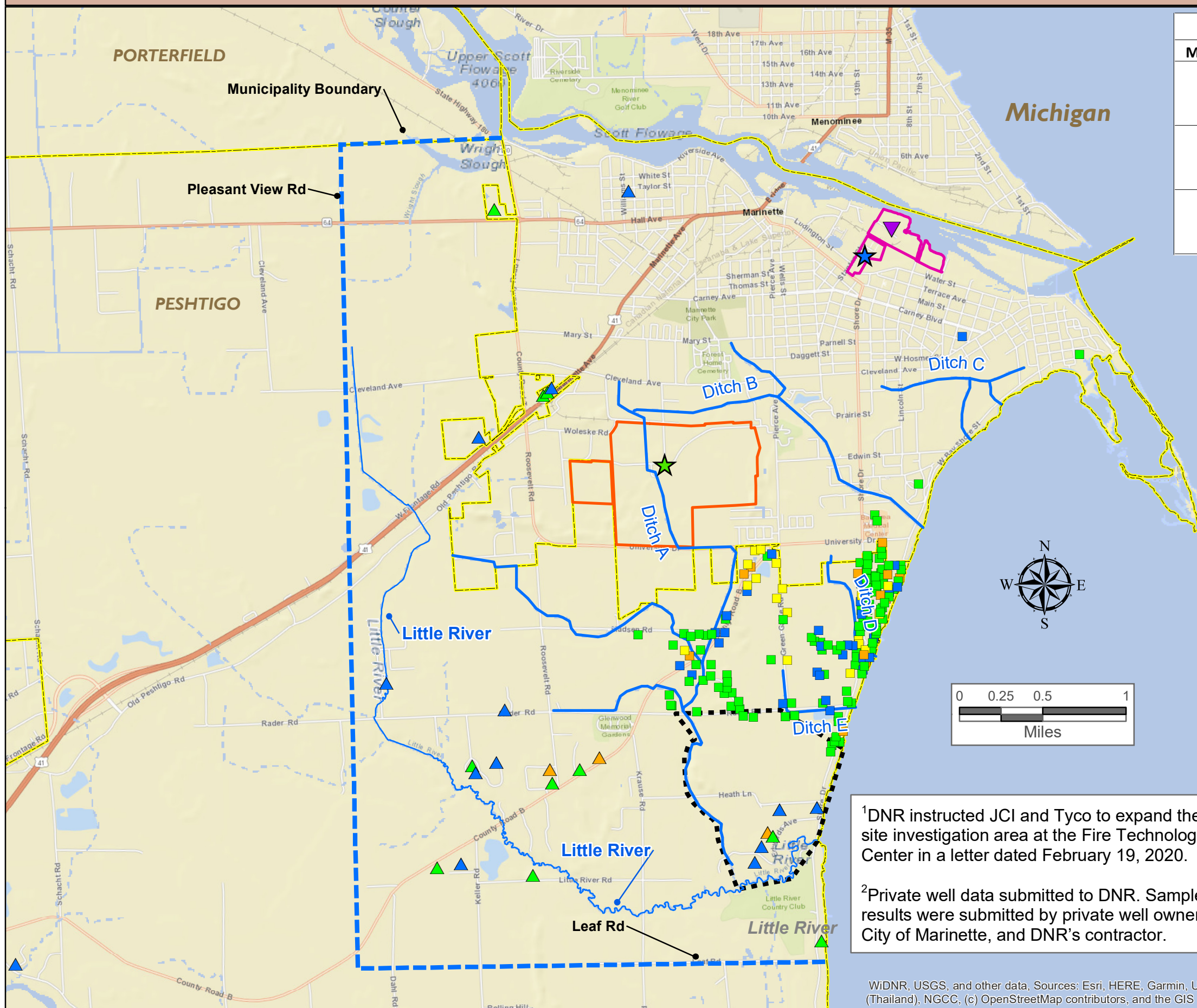
David Neste  
Hydrogeologist, Northeast Region  
Remediation & Redevelopment Program

Enclosure: *Map – Site Investigation Area*

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# JCI/TYCO FIRE TECHNOLOGY CENTER (BRRTS #: 02-38-580694) - SITE INVESTIGATION AREA



LEGEND		
Map Symbol	Facility/Site Name - Address	BRRTS Case
★	JCI/Tyco 1 Stanton St Marinette, WI	JCI/Tyco Stanton (PFAS) Case No. 02-38-581955
★	JCI/Tyco Fire Training Center 2700 Indsutiral Parkway Marinette, WI	JCI/Tyco FTC (PFAS) Case No. 02-38-580694
▼	ChemDesign 2 Stanton St Marinette, WI	ChemDesign (PFAS) Case No. 02-38-583852

--- Expanded Site Investigation Area<sup>1</sup>  
- - - - - Approximate Extent of Southern Area  
— Ditches  
 JCI/Tyco FTC Property Boundary  
 JCI/Tyco Stanton St Property Boundary  
 Municipality Boundary

**JCI/TYCO PRIVATE WELL SAMPLING DATA**

- ND - 2 ppt PFOS/PFOA
- 2 - 20 ppt PFOS/PFOA
- 20 - 70 ppt PFOS/PFOA
- > 70 ppt PFOS/PFOA

**DNR/PRIVATE WELL OWNER SAMPLING DATA<sup>2</sup>**

- ▲ ND PFOS/PFOA
- ▲ 0 - 20 ppt PFOS/PFOA
- ▲ 20 - 70 ppt PFOS/PFOA

<sup>1</sup>DNR instructed JCI and Tyco to expand the site investigation area at the Fire Technology Center in a letter dated February 19, 2020.

<sup>2</sup>Private well data submitted to DNR. Sample results were submitted by private well owners, City of Marinette, and DNR's contractor.



WiDNR, USGS, and other data. Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community