

Mr. David Neste  
Remediation and Redevelopment Program  
Wisconsin Department of Natural Resources  
2984 Shawano Avenue  
Green Bay, Wisconsin 54313-6727

Arcadis U.S., Inc.  
10 Friends Lane  
Suite 100  
Newtown  
Pennsylvania 18940  
Tel 267 685 1800  
Fax 267 685 1801  
www.arcadis.com

Subject:  
Response to Comments on the September 2018 Site Investigation Report (SIR)  
Review  
Tyco Fire Technology Center, PFCs,  
2700 Industrial Parkway South, Marinette, Wisconsin  
BRRTS Activity#: 02-38-580694

ENVIRONMENT

Dear Mr. Neste:

Date:  
February 5, 2019

On behalf of Tyco Fire Products, LP (Tyco), Arcadis US, Inc. (Arcadis) submits the following responses to the December 7, 2018 Wisconsin Department of Natural Resources (WDNR) comments on the September 2018 Site Investigation Report (SIR), referenced above. Each WDNR comment is presented below, followed by Tyco's response.

Contact:  
Mike Bedard

Phone:  
267.685.1821

As acknowledged in previously submitted documents, investigation work is an iterative process, and the September 2018 SIR was not intended to represent a completion of the investigation. Tyco will continue to follow a data-driven program to complete characterization.

Email:  
Michael.Bedard  
@arcadis.com

**Comment 1:** The horizontal and vertical extent of groundwater contamination is not yet defined as required under Wis. Admin. Code § NR 716.11 (3)(a). The extent of per- and polyfluoroalkyl substances (PFAS) compounds in groundwater appears to have been generally defined to the west. The Department recommends additional vertical aquifer profile (VAP) sampling to the north and south of the study area to horizontally delineate the extent of the contaminant plume. In addition, a permanent network of monitoring wells should be established to determine if the plume is migrating downward into the lower dolomite aquifer. These wells should be installed on the Fire Technology Center (FTC) property and in down gradient locations.

**Tyco Response:** As acknowledged in the September 2018 Site Investigation Report and April 2018 Site Investigation Work Plan, the data collected and presented to date are part of an ongoing process to identify the nature and extent of PFAS in environmental media due to historical operations at the Site.

Additional PFAS delineation to the south was completed in October and November 2018, after the submission of the 2018 Site Investigation Report. Specifically, five additional VAP borings were completed, including resampling at VAP-36. In addition, five temporary piezometers were installed to assess groundwater elevations and flow directions southeast of the Site. The results of this investigation, provided to the WDNR in an email on January 16, 2019, demonstrate that delineation to the south is complete.

Additional tasks to complete delineation to the north of the study area are proposed as a component of the February 2019 Supplemental Site Investigation Work Plan (SSIWP), submitted concurrently with this letter. The SSIWP proposes the installation of sand unit piezometer clusters to further assess groundwater flow patterns. After groundwater elevations have been collected, the resulting data will be used to guide additional groundwater delineation sampling to the north of the Site.

Additional investigation of the bedrock groundwater is not included in the SSIWP. Investigations completed in 2018 suggest that the deep bedrock aquifer system is hydraulically isolated from the zone of PFAS detected in the overburden. For example, the bedrock boreholes completed during the 2018 Site Investigation showed that the upper shaley dolomite bedrock (to depths of at least 200 feet) is very poorly transmissive, and that this zone limits vertical communication of groundwater from the overburden into deeper portions of the bedrock aquifer system.

Tyco will continue to assess the need to further evaluate risk to bedrock groundwater as additional investigation data become available.

**Comment 2:** The horizontal extent of soil contamination is not yet defined as required under Wis. Admin. Code § NR 716.11 (3)(a). Laboratory data for soil samples collected around the perimeter of the fire training area indicates PFAS compounds are present in the soil up to the horizontal extents of the investigation. Additional soil investigative work is required to delineate to no detection the full extent of PFAS impacts in shallow soil at the source area.

**Tyco Response:** As described in the SSIWP, additional soil sampling is proposed to further delineate on-Site PFAS concentrations. In addition, select soil samples will be collected and analyzed for total organic carbon (TOC), bulk density, porosity, and leach testing to calculate site-specific soil residual contaminant levels (RCLs) for protection of groundwater.

Once site-specific RCLs for protection of groundwater have been calculated and accepted by the Department, existing soil data will be evaluated against the RCLs to determine if additional delineation sampling is required. If additional sampling is needed, it would be proposed in the future, separate from the SSIWP.

**Comment 3:** The Department requests JCI/Tyco develop and implement a plan for PFAS sampling of surface water ponds in the known area of impact, as required under Wis. Admin. Code § NR 716.07 (4). The Department will provide input on the number and location of the ponds that should be sampled.

**Tyco Response:** As described in the SSIWP, surface water samples will be collected from select ponds south of University Drive based on the existing groundwater and surface water data. Tyco will work with the WDNR to select appropriate ponds for sampling.

**Comment 4:** In conjunction with the sampling of surface water ponds, under Wis. Admin. Code§ NR 716.17 (8)(a) the Department requests fish from the same surface water ponds sampled as part of item 3 above be harvested and analyzed for PFAS compounds. The Department will work with JCI/Tyco and other Department programs to select sample locations and develop harvesting and analytical methods.

**Tyco Response:** Tyco is working with the WDNR to research the various and complex components of a fish sampling plan, such as the fish species to collect, fish size, fish collection method, the portion of the fish to sample, the fish processing procedures, and the analytical method. Tyco will identify ponds from which to sample fish based on the results of the surface water sampling proposed above in the response to Comment 3.

A fish sampling plan will be submitted to the Department subsequent to the SSIWP.

**Comment 5:** The Department requests JCI/Tyco develop and implement a protocol for PFAS sampling of surface water in the bay of Green Bay resulting from discharges from Ditch 'B', as required under Wis. Admin. Code§ NR 716.07 (4). The Department is able provide input on the number and location of samples to be collected.

**Tyco Response:** Tyco is in the process of completing an Interim Measure to address surface water in Ditch B. Once the Interim Measure is installed and operational, a surface water sampling program in the bay of Green Bay, adjacent to the mouth of Ditch B, will be implemented. The sampling program will take into consideration other potential inputs of PFAS that could be in the bay, as well as the seasonal hydrodynamics of the bay (including water circulation patterns and water column stratification).

The sampling program will be proposed in a work plan that will be submitted to the WDNR after the evaluation of performance monitoring data associated with the Interim Measure.

**Comment 6:** In accordance with Wis. Admin. Code§§ NR 708.11 (2) (c), the Department requests JCI/Tyco prepare an Interim Action Options Report (IAOR) to address PFAS contamination migrating beyond the boundaries of the FTC property via groundwater flow. The Department can provide assistance in selecting and evaluating interim action options if the IAOR is submitted with Form 4400-237 and the technical assistance review fee.

**Tyco Response:** Tyco will develop a framework for an engineering review and feasibility analysis of potentially appropriate options, identification of additional pre-design data needs, and potential bench and/or pilot testing. This framework of steps will focus on soil and groundwater and will be provided to the Department in mid-2019.

As requested by the WDNR during recent discussions, Tyco will provide a written work plan for the interim action to the Department approximately 60 days prior to the anticipated start date for implementation of the selected measure. Note that Tyco will work closely with the WDNR throughout the evaluation process.

**Comment 7:** The SIR notes the following field activities were outlined in the April 2018 Site Investigation Workplan, however were not undertaken during 2018 investigative activities. The Department requests completion of these activities in accordance with Wis. Admin. Code§ NR 716.11 (2):

- a. Establishment of an area of potential effect (APE) with respect to cultural resources;
- b. Groundwater monitoring at 18 existing monitoring wells currently located on the FTC property, and newly-installed monitoring wells;
- c. Slug testing at newly-installed monitoring wells;
- d. Ditch survey and wetland delineation on the site, and;
- e. Evaluation of storm water runoff on the site.

**Tyco Response:** Tyco will provide, in the form of a Data Summary Report, an update on these activities and associated data that have been collected since the submission of the September 2018 Site Investigation Report. Specifically, the Data Summary Report will provide results associated with the following:

- Groundwater monitoring at existing monitoring wells and newly-installed monitoring wells (August 2018);
- Slug testing at the newly-installed monitoring wells (September 2018);
- Groundwater elevation measurements (August and November 2018);
- Surface water and paired groundwater elevation measurements (August, October, November 2018);
- Surface water sampling and velocity measurements (October 2018);
- VAP sampling at five borings southeast of the Site (October/November 2018); and
- Installation of five temporary piezometers to evaluate groundwater flow patterns southeast of the site (October/November 2018).

The following activities have been completed and summarized under separate cover:

- Establishment of areas of potential effect (APEs) as they pertain to the Ditch A and B Interim Actions (November 2018). Note that Arcadis conducted site-specific records reviews and background research at the two locations in the City of Marinette. The results of each were submitted with the Water Resource Application for Project Permits for each interim measure. Project-specific APEs will be established, and site-specific records reviews and background research will be conducted, as needed, for future work.
- Delineation of wetlands as they pertain to the Ditch A and Ditch B Interim Actions (November 2018). Note that the results of the delineation efforts are summarized in the November 2018 Wetland and Waterbody Delineation Report, Ditch Investigation (Arcadis 2018). In a December 11, 2018 letter, WDNR confirmed concurrence with wetland boundaries delineated by Arcadis.

The following activities, as prescribed in the April 2018 Work Plan, will not be included in the Data Summary Report and are anticipated to be completed by June 30, 2019:

- Seasonal surface water and paired groundwater elevation measurements (snow-melt 2019);
- Seasonal surface water sampling and velocity measurements (snow-melt 2019);

- Ditch survey on the Site; and,
- Evaluation of stormwater runoff on the Site.

**Comment 8:** Documentation not yet submitted needs to be provided in a supplemental site investigation report as discussed under the *Additional Actions Needed* section below. At present, this includes groundwater data collected south of the study area between Radar Road and Heath lane.

**Tyco Response:** Comment noted. The groundwater data collected south of the study area were provided to the Department on a figure on December 20, 2018. Additionally, these data, along with an evaluation of groundwater flow in this area, were provided to the Department in an email on January 16, 2019. These data, along with other data collected since the submission of the September 2018 Site Investigation Report, will be provided in the Data Summary Report referenced in the response to comment number 7 above.

**The following comments are presented for consideration in preparation of future submittals:**

**Comment 1.** Using field data collected during construction of existing and permanent monitoring wells, the Department requests under Wis. Admin. Code § NR 716.15 (4)(a) that cross section drawings of the area of interest be prepared and submitted with future reports.

**Tyco Response:** Cross section drawings will be prepared based on the results of additional investigations and submitted with a Supplemental Site Investigation Report.

**Comment 2.** Using laboratory analytical data, develop isoconcentration maps of PFAS contamination in "...each environmental medium, as appropriate to the scope and complexity of the site and where sufficient data are available to estimate meaningful isoconcentrations;" (Wis. Admin. Code § NR 716.15 (4) (c)).

**Tyco Response:** Isoconcentration maps for PFAS will be prepared, as appropriate, based on the results of additional investigations and submitted with a Supplemental Site Investigation Report.

**Comment 3.** Per Wis. Admin. Code § NR 716.15 (6), provide "...recommendations for further response actions necessary to protect health, safety, and welfare and the environment...".

**Tyco Response:** Tyco will work with the Department in providing recommendations for further response actions following additional investigations, data evaluations, and evaluation of potential response actions.

**Comment 4.** Per Wis. Admin. Code ch. NR 712, on future submittals, please include the proper certification language as outlined in *Guidance Document RR081 -Wis. Admin. Code ch. NR 712 Qualifications and Certifications* ([https://dnr.wis.gov/files/PDF/pubs/rr!RR081 .pdf](https://dnr.wis.gov/files/PDF/pubs/rr!RR081.pdf)).

**Tyco Response:** Comment noted.

**Additional Actions Needed**

**WDNR Comment:** A Supplemental Site Investigation Workplan should be submitted within 60 days of this letter (Wis. Admin. Code § NR 716.09 (1)). This workplan should be submitted prior to initiation of

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February 5, 2019

the above-referenced field activities and other proposed site investigation activities outlined by JCI/Arcadis, as well as include an anticipated schedule of implementation. A review fee of \$700, in accordance with Wis. Admin. Code ch. NR 749, should accompany the submittal if a detailed review and written response is requested.

**Tyco Response:** As noted above, a SSIWP, which is inclusive of a proposed work schedule, is provided along with this letter. Note that a fish sampling program and sampling of the bay of Green Bay adjacent to the mouth of Ditch B will be proposed in separate work plans. Due to the iterative nature of delineation, Tyco acknowledges that additional investigation work not included in the aforementioned work plans may be required.

**WDNR Comment:** A Supplemental Site Investigation Report is required to be submitted after additional investigation is completed that summarizes site investigation activities performed:

- revised and updated soil, groundwater, surface water, and sediment data tables, including all PFAS data collected to date;
- revised figures with soil and groundwater isoconcentration lines;
- additional monitoring and investigation of surface water streams to evaluate how contaminants are transported throughout the areas;
- analytical lab sheets not previously submitted, and;
- soil boring logs, monitoring well construction and development forms and abandonment forms not previously submitted, as applicable.

**Tyco Response:** Following sufficient investigation and data evaluation, a Supplemental Site Investigation Report will be prepared to provide a holistic summary of the investigation results.

If you have any questions regarding these comment responses, please let me know.

Sincerely,

Arcadis U.S., Inc.



Michael Bedard  
Associate Vice President

Copies:

Roxanne Chronert - WDNR  
Jeffrey Danko - Tyco