



December 16, 2021

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SUBJECT: Response to Private Drinking Water Well Sampling Program Annual Summary Report  
April 1, 2020 to March 31, 2021  
JCI/Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI  
BRRTS #02-38-580694

Dear Mr. Danko and Mr. Wahl:

On August 6, 2021, the Wisconsin Department of Natural Resources (DNR) received the *Private Drinking Water Well Sampling Program Annual Summary Report* (“2021 PW Summary Report”) for the above-referenced site (the “Site”). The report was submitted by Arcadis U.S., Inc. (Arcadis) on behalf of Johnson Controls, Inc. and Tyco Fire Products LP (JCI/Tyco) and 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. On July 16, 2021, JCI/Tyco submitted a letter responding to DNR’s prior comments to the private drinking water sampling program. This letter was included in the DNR’s review of the 2021 PW Summary Report.

The 2021 PW Summary Report documents the testing results for private drinking water wells and the maintenance of the Point of Entry Treatment (POET) systems for the period between April 1, 2020 and March 31, 2021 (the “reporting period”). This letter provides a summary of the DNR’s review of the 2021 PW Summary Report and provides JCI/Tyco with directions to be addressed in future PW Summary Reports. JCI/Tyco is reminded that it cannot use repeated testing from a fixed set of drinking water wells to test and refine the conceptual site model it has developed for the Site. Additional site investigation that includes NR 141 monitoring wells is required to define the degree and extent of contamination and establish the boundaries of the testing area.

### 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 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 migrated from the FTC property and impacted private drinking water wells and other media in the area. JCI/Tyco’s site investigation to define the degree and extent of contamination is on-going. As part of the field investigation, JCI/Tyco is required to sample known and potentially impacted water supply wells per Wis. Adm. Code § NR 716.13(16).

### **Private Drinking Water Wells Sampling**

As of March 31, 2021, JCI/Tyco had sampled 172<sup>1</sup> private drinking water wells (“wells”) in an area south and east of the Site within the town of Peshtigo and city of Marinette; JCI/Tyco refers to the area as the private drinking water well sampling area (PWSA). The PWSA is shown on **Figure 1**. JCI/Tyco offers bottled water to all residents in the PWSA and maintains POET systems at 45 of the properties.

JCI/Tyco monitors wells and POET systems in the PWSA in accordance with the approved Long-Term Potable Well Sampling Plan (the “Sampling Plan”). JCI/Tyco updates the Sampling Plan semi-annually in April and October; the most recent Sampling Plan (v.4) was received on October 1, 2021.

### **Expanded Site Investigation Area**

The DNR previously directed JCI/Tyco to sample wells beyond the PWSA; an area referred to as the expanded site investigation area (ESIA). The ESIA is shown on **Figure 1**. JCI/Tyco refused to complete the sampling in the ESIA; thus, to evaluate impacts to potential drinking water receptors in a timely manner, the DNR conducted the sampling of wells within the ESIA under the statutory authority provided by Wis. Stat. § 292.11(7)(a).

On October 27, 2021, the DNR provided a letter to JCI/Tyco documenting the results of sampling efforts within the ESIA and outlining next steps JCI/Tyco is required to take within the ESIA. The comments provided herein are specific to the DNR’s review of JCI/Tyco’s PW Summary Report for the PWSA and do not constitute approval of the boundaries of the area where JCI/Tyco must test and supply alternative drinking water.

### **2021 PW Summary Report**

Under the current Sampling Plan, wells are sampled quarterly (or minimum of four events) to evaluate the PFAS concentration and select the frequency of future testing. The 2021 PW Summary Report documents the PFAS testing results for 124<sup>2</sup> wells sampled during the reporting period and evaluates trends since testing began December 2017. The report also documents the testing and routine maintenance for the POET systems during the reporting period.

On June 18, 2021, the DNR issued a letter directing JCI/Tyco to include additional information in their PW Summary Reports; the required additions and JCI/Tyco’s response are summarized below:

- *Compare to Current Recommended Groundwater Standards:* Initially, wells may have only been tested for 6 or 14 PFAS compounds; however, 18 PFAS compounds currently have recommended groundwater standards. Thus, in 2021 JCI/Tyco offered all wells in the PWSA testing for 36 PFAS compounds so that

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<sup>1</sup> Three of the 172 wells are no longer in the sampling program. Wells WS-002 and WS-004 are no longer in use and well WS-005B was determined to not be used for drinking water.

<sup>2</sup> In Section 3.1, JCI/Tyco indicates 117 wells were sampled, but results for 124 wells are included in Table 2.

the results could be compared to the Wisconsin Department of Health Services' (DHS's) current and applicable recommended groundwater enforcement standards ("Recommended ES").<sup>3</sup>

- A total of 37 wells in the PWSA have PFAS  $\geq$  Recommended ES.
- PFAS were detected in an additional 47 wells in the PWSA, but the detected concentrations were less than Recommended ES.
- *Compare to Hazard Index:* The DNR also directed JCI/Tyco to also compare the testing results to the Hazard Index (HI) used by DHS to evaluate cumulative risk, and to identify any wells where the concentrations of PFAS  $<$  Recommended ES, but the HI  $\geq$  1.0.
  - JCI/Tyco did not include the required HI evaluation in the PW Summary Report; however, JCI/Tyco did respond via email on June 22, 2021 with the required analysis (**Attachment A**).
  - JCI/Tyco's analysis found that none of the wells with PFAS  $<$  Recommended ES had a HI  $\geq$  1.0.
- *Distinguish wells with POET systems:* JCI/Tyco summarized the wells with POET systems in Table 1 and identified 45 private drinking water wells with a POET system on the figures.
  - Twenty-three private drinking water wells with PFAS  $>$  Recommended ES have POETs.
  - Private drinking water wells with a POET system are distributed throughout the PWSA.
- *Distinguish shallow and deep wells:* JCI/Tyco summarized the well depths (when known) in Table 2 and prepared maps with the testing results based on relative well depth.
  - Of the 37 wells with PFAS  $\geq$  Recommended ES, all but two are classified as "shallow" wells (less than 65 feet below ground surface).
  - Wells with PFAS  $<$  Recommended ES and with PFAS below the laboratory reporting limit are present throughout the PWSA at all depths.
- *Analyze for Trends:* JCI/Tyco evaluated statistical trends in the concentration of perfluorooctanoic acid (PFOA) + perfluorooctanesulfonic acid (PFOS)<sup>4</sup>.
  - Seven wells in the PWSA have decreasing concentrations, 13 wells have increasing concentrations and 18 wells showed no trend over time.
  - Of the 13 wells with an increasing trend, all but two already have PFAS  $\geq$  Recommended ES. The two wells currently less than the Recommended ES but with an increasing trend (WS-053 and WS-124) are located along County Road B near the southern boundary of PWSA.

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<sup>3</sup> In June 2019, the DHS recommended the Cycle 10 groundwater standards for PFOA and PFOS, and in November 2020 the DHS recommended groundwater standards for 16 additional PFAS (Cycle 11). The Cycle 11 recommended groundwater standards include PFOA and PFOS as part of a combined standards for six PFAS. In prior correspondence with JCI/Tyco, the DNR's reference to "Cycle 11" was intended to mean "Recommended ES" (current and applicable recommended groundwater enforcement standards for PFAS, inclusive of PFOA and PFOS).

<sup>4</sup> The trend analysis was limited to PFOA and PFOS because these are the only two compounds with recommended standards that have been monitored since testing began in the PWSA to provide sufficient historical data to complete a statistical trend analysis. Currently, a total of 48 wells had sufficient PFOS + PFOA results to be able to complete the trend analysis.

- The locations of wells with decreasing, increasing, or stable concentration trends are scattered throughout the PWSA; increasing trends are observed at locations near the western boundary of the PWSA and along the Bay of Green Bay.
- *Analyze for Trends:* JCI/Tyco also evaluated the PFAS results for relative changes in concentration.
  - During this reporting period, 26 wells went from having concentrations below the laboratory reporting limits to having low level detections of PFAS. This shift was attributed to the expanded PFAS-analyte list and not because of changes in groundwater conditions. Most of the new detections (21 of the 26 wells) were perfluorooctanesulfonamide (FOSA), which was analyzed for the first time in these wells.
  - Five shallow wells (WS-048, -060, -069B, -082B, -082C) increased to PFAS  $\geq$  Recommended ES for the first time during this reporting period.
- *Summarize Findings and Conclusions:* JCI/Tyco provided an analysis of the data in the 2021 PW Summary Report. The DNR's responses to these findings and conclusions are provided below.

## DNR Review

The DNR reviewed JCI/Tyco's 2021 PW Summary Report and finds that the report included data to document and evaluate the well testing results in the PWSA and the on-going maintenance of the 45 POET systems.

POET systems have been offered to wells with PFAS  $\geq$  Recommended ES and bottled water has been offered to all residents in the PWSA. JCI/Tyco presents these actions in the PW Summary Report as voluntary actions; JCI/Tyco should refrain from representing its provisions of alternative drinking water to affected persons as optional. The provision of alternative water is required for persons whose water supply has or is likely to be affected by the contamination under Wis. Adm. Code § NR 708.05(4)(f).

The sampling of drinking water wells can support site investigation activities but is not a replacement to a site investigation designed to define the degree and extent of contamination under Wis. Adm. Code ch. NR 716. JCI/Tyco concluded in the PW Summary Report that the results from the testing of private drinking water wells in the PWSA validates the conceptual site model (CSM) for the FTC. Namely that the contamination from the FTC is limited to the boundaries of the PWSA, and that wells with PFAS contamination outside the PWSA are from septic systems or other unidentified sources. The DNR's letter dated October 27, 2021 identifies deficiencies in JCI/Tyco's site investigation that must be addressed to substantiate these claims. The DNR agrees that the repeated testing from a fixed set of private drinking water wells can provide insights into the trends/stability of the groundwater contaminant plume in support of the site investigation. However, JCI/Tyco cannot use repeated testing from a fixed set of drinking water wells to evaluate if the contamination from the FTC is present at other locations or to test and refine the CSM. Additional site investigation that includes NR 141 monitoring wells is required to define the degree and extent of contamination and establish the boundaries of the testing area.

The purpose of the sampling program for the PWSA is to monitor the groundwater quality for potential drinking water receptors, look for trends to determine if changes are needed to the well monitoring or POET maintenance programs and to communicate results consistently to the affected parties and the DNR. JCI/Tyco should use the conclusions from in the PW Summary to make updates, if needed, to the Sampling Plan during its next 6-month revision cycle. At a minimum, the conclusions should address if any wells with PFAS  $<$  Recommended ES, but

with increasing trends (e.g., WS-053 and WS-124) require more frequent testing to check if PFAS concentrations continue to increase to levels greater than Recommended ES or HI  $\geq$  1.0.

The DNR reviewed the Sudebi, et al. 2015 report regarding PFAS in septic system effluent that JCI/Tyco cited in the PW Summary Report. While a useful research paper to cite and use to develop a scope of work for the site investigation, JCI/Tyco should refrain from drawing definitive conclusions about septic or other sources in the drinking water at the Site until site investigation sampling designed to test this hypothesis is completed and the data supports this conclusion.

**Next Steps:**

JCI/Tyco must continue to monitor the wells and POET systems and report out the results in accordance with the approved Sampling Plan. The next annual PW Summary Report is **due July 31, 2022**. In that report, JCI/Tyco must present results and/or incorporate revisions that address the comments highlighted in *italics* above.

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,



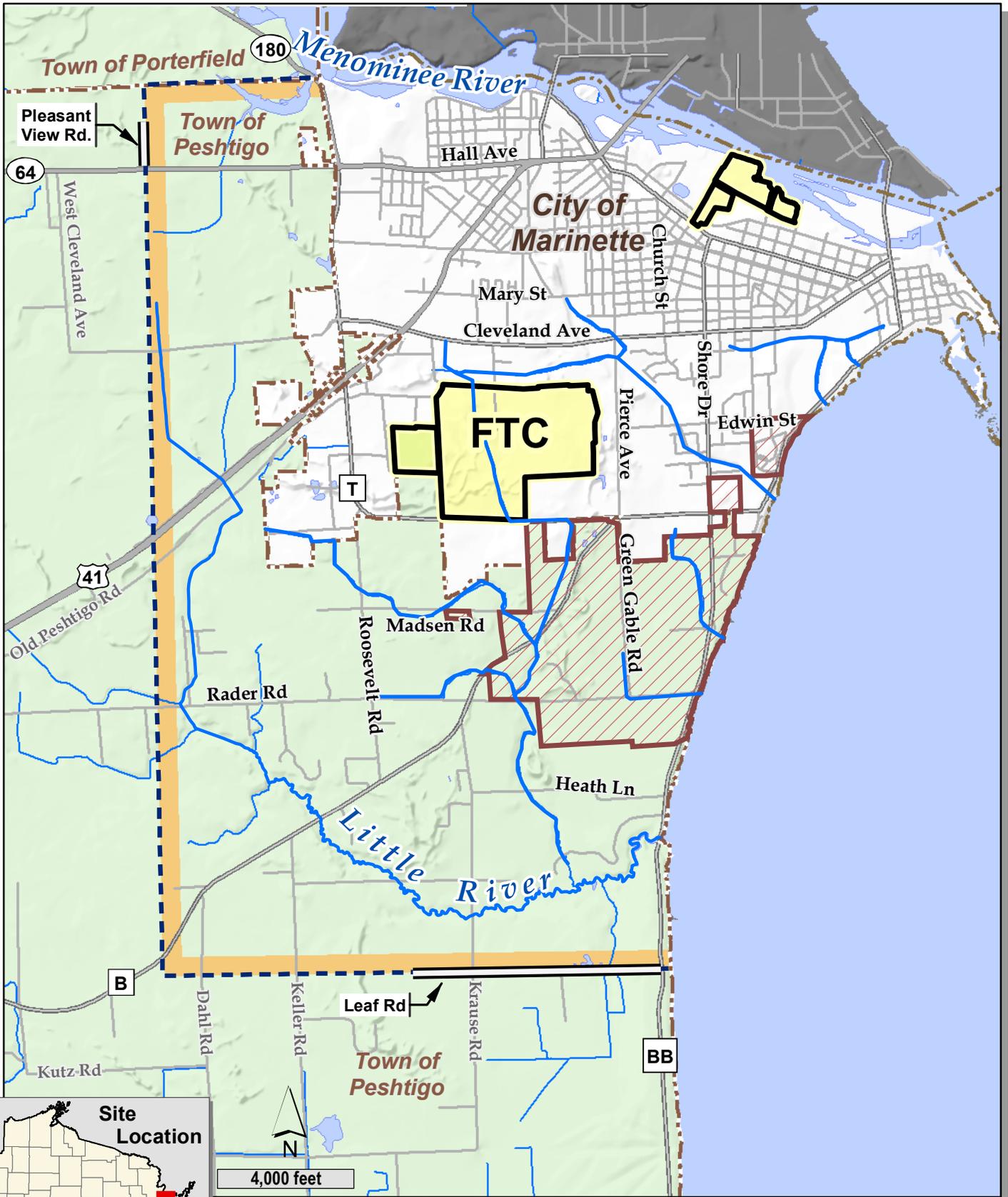
Alyssa Sellwood, PE  
Complex Sites Project Manager  
Remediation & Redevelopment Program

Attachments: Figure 1 – Sampling Areas  
Attachment A: Hazard Index Evaluation

cc: Denice Nelson, JCI (via email: [Denice.karen.nelson@jci.com](mailto:Denice.karen.nelson@jci.com))  
Scott Potter, Arcadis (via email: [Scott.Potter@arcadis.com](mailto:Scott.Potter@arcadis.com))  
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# BRRTS 02-38-580694

## Sampling Areas



- Legend**
- Expanded Site Investigation Area
  - JCI/Tyco Property Boundary
  - JCI/Tyco Potable Well Sampling Area

### Figure 1



**From:** [Jeffrey Howard Danko](#)  
**To:** [Sellwood, Alyssa A - DNR](#)  
**Cc:** [Tim Maciolek](#); [Scott D Wahl](#)  
**Subject:** Potable Well Sampling Area Hazard Index Evaluation  
**Date:** Tuesday, June 22, 2021 10:29:21 AM

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Alyssa:

I am writing in response to your request to evaluate whether any of the 172 wells within the Private Well Sampling Area (PWSA) sampled by Tyco, using the Wisconsin Department of Health Services Hazard Index analysis, had a score that moved above 1 on the Hazard Index analysis. While we did perform the analysis at your request, we have strong concerns about the use of the Hazard Index scoring analysis and our evaluation of the well sampling data (all of which has been previously provided to the WDNR) using the new Hazard Index criteria should not be construed as an acceptance by Tyco that the Hazard Index criteria/scoring method should be used going forward, and should not be construed as Tyco's agreement that the underlying assumptions used in the Hazard Index analysis are applicable or appropriate.

Tyco has received data on 125 samples collected within the PWSA that were analyzed for the 36-analyte list of PFAS compounds. It is important to note that analysis is pending on 10 additional samples; the remaining 37 private wells are either no longer in use or well owners have been non-responsive to requests for additional sampling. An evaluation of the private well results with PFAS detections below the recommended Cycle 11 enforcement standards was completed to assess whether they met or exceeded a hazard Index of 1. The evaluation found that none of the wells resulted in a change of status.

I trust the information meets with your request. Please let me know if you have additional questions.

[Jeffrey Danko](#)  
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**From:** [Sellwood, Alyssa A - DNR](#)  
**To:** [Jeffrey Howard Danko](#)  
**Cc:** [Scott D Wahl](#); [Kelly, Bridget B - DNR](#)  
**Subject:** PFAS Hazard Index (HI) Information and Directions  
**Date:** Thursday, April 15, 2021 4:37:00 PM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)  
[image004.png](#)  
[image007.png](#)

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Jeff – In response to the recent notice “[DNR Adopts DHS Hazard Index for PFAS](#)”, you requested additional information on the Hazard Index (HI) calculation and reporting.

The HI formula and examples of the calculation can be found in the [DHS's PFAS Hazard Index Memo](#).

Please note, the HI is not intended to be used to develop cleanup standards under ch. NR 722, but does apply to assessing the cumulative risk of exposure to PFAS in drinking water. As such, if the HI is equal to or exceeds 1.0 in drinking water, DHS and DNR recommend a safe alternative drinking water source be provided to the affected party as soon as possible.

JCI/Tyco has provided alternative water to parties where its testing found drinking water exceeded the Cycle 10 and Cycle 11 recommended groundwater standards for PFAS based on previous sampling results. With that in mind, here are directions to focus your efforts when evaluating and reporting on the newly adopted HI for PFAS:

Future Private Well Sampling:

- Complete the HI calculation when evaluating PFAS results for all future private well sampling.
- Include the results of the HI calculation in the notification letters sent to property owners and tenants.
  - Where HI calculation is less than 1.0, include a note in the text stating that the HI calculation was completed and was not over 1.0.
  - Where HI calculation is equal to or exceeds 1.0, include the HI calculation results in the summary table and discuss the finding in the text.
- Prepare two template notification letters (one for each HI scenario), and provide drafts to the DNR for review prior to use.

Past Private Well Sampling:

- Complete the HI calculation on past private well sample results where concentrations of PFAS were less than the Cycle 10 or Cycle 11 recommended standards. (Private wells that are already receiving alternative water, but which were below Cycle 10 and Cycle 11 recommended standards must still be included in HI evaluation because the calculation results may change the risk communication provided to those parties.)
- Notify any parties where the HI is equal to or exceeds 1.0 and provide safe alternative drinking water to those affected parties; if requested by the well owner, send them an additional sample results notification letter utilizing the HI template letter described above.
- Summarize the findings and conclusions in a memo to DNR by May 7, 2021; in the summary, distinguish between wells that have been analyzed for 36 PFAS and wells where one or more

PFAS having recommended standards are missing from the analyte list.

Please let me know if you have any questions. Glad to discuss further if needed.

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**Alyssa Sellwood, PE (WI)**

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