



Recommended PFAS Screening & Evaluation Procedure for Industrial Pretreatment Programs (IPPs)

Consistent with our letter dated February 20, 2018, the Michigan Department of Environmental Quality (DEQ) Water Resources Division (WRD) provides the following information in response to requests by IPP professionals for guidance regarding the process of evaluating potential sources and determining probable sources of PFAS. PFAS are perfluoroalkyl and polyfluoroalkyl substances (also referred to as PFCs), especially the specific chemicals PFOS (perfluorooctane sulfonate) and PFOA (perfluorooctanoic acid).

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1. Identify *Potential* Sources

Determine what *potential* sources of PFOS and PFOA are in your community that may discharge to your publicly owned treatment works (POTW). Do you have any of the following sewer users?

- a. Platers/Metal Finishers
- b. Paper and Packaging Manufacturers
- c. Tanneries and Leather/Fabric/Carpet Treaters
- d. Manufacturers of Parts with PTFE (polytetrafluoroethylene, Teflon type) Coatings (i.e., Bearings)
- e. Landfill Leachate
- f. Centralized Waste Treaters
- g. Contaminated Sites
- h. Any other known or suspected sources of PFAS

If you have these sites in your community, but they do not discharge process wastewater, or infiltrate contaminated groundwater or storm water runoff to your sanitary sewer, they are not required to be covered by your efforts under the IPP PFAS Initiative. However, if you have knowledge of and/or concerns about such sites, please contact your District IPP staff to refer the issue for appropriate DEQ follow-up. An example of such a site would be a site contaminated by plating wastes that may contain PFAS but does not discharge to your sanitary sewer (but may discharge to waters of the state or a storm sewer).

2. Identify *Probable* Sources

Determine which of these *potential* sources is a *probable* source of PFOS and/or PFOA that may discharge to your POTW. Of the potential sources that you have identified in item 1, you will need to evaluate which currently use or have used PFAS-containing chemicals. You will need to interview industry/significant industrial user (SIU) staff and review Safety Data Sheets and Material Safety Data Sheets (SDS/MSDS) to find out about the industrial processes at each potential source and what chemicals have been used and/or generated there. Some industry staff may need to consult with their chemical suppliers to determine the content of the chemicals used at their sites. Please see the attached list of suggested questions organized by potential source that you may use as a guideline.

- a. Platers/Metal Finishers: PFOS-containing chemicals were used by electroplaters as a demister/defoamer/surfactant to control air emissions of hexavalent chromium since mid-1990s. It is also a wetting agent that may have been used for other purposes. Even if used many years ago, historical use of PFOS-containing chemicals is still a potential source of PFOS to POTWs/surface waters due to the persistence of the chemical and typical practices at platers, who may not dump plating tanks or clean tanks and secondary containment pits. Platers in Michigan and Minnesota were found to have PFOS contamination in their wastewater years after they discontinued use of PFOS-containing chemicals.

TIP: Hard chrome and decorative chrome plating using hexavalent chromium are the most likely sources of PFOS-containing chemicals, although other types of plating may have also used these chemicals. Etch tanks where hexavalent chromium is used as part of the process often use demisters/defoamers/surfactants to control air emissions.

PFOS-containing chemicals (greater than 1%) were banned specifically from chrome *electroplating* tanks only since September 2015. Other uses were not banned, but the manufacture of PFOS and PFOA has been largely phased out in the US and Europe. We recommend asking about PFAS in general since some PFAS may be precursors or otherwise create PFOS or PFOA. We have limited information to date on specific products, but examples of demisters/defoamers/surfactants used at sites found to have PFOS include:

- ANKOR WETTING AGENT F, manufactured by Enthone (MSDS listed “fluorinated surfactant(s)” of 1-5%)
- Clepo Chrome Mist Control, manufactured by MacDermid Incorporated (MSDS lists ingredients as “proprietary”)
- Fumetrol™ 140 Mist Suppressant (Atotech USA, Rock Hill, SC). Available MSDS indicate that it contained “organic fluorosulfonate” between 1%-7% by weight.

Mist suppressants presumed to contain PFOS that were studied by the U.S. Environmental Protection Agency, Region V, in their PFOS Chromium Electroplater Study, September 2009, included the following products:

- Benchmark Benchbrite STX
- Benchmark CFS
- MacDermid Proquel B
- MacDermid Macuplex STR
- Plating Process Systems PMS-R
- Femetrol-140
- Brite Guard AF-1 fume control

We recommend looking at the purpose of the product to determine if it may contain PFAS. Products claiming to reduce surface tension, act as a wetting agent, eliminate misting, lower drag-out or act as a surfactant may contain PFAS. Those sold by US companies prior to 2015 may contain PFOS. If the content of the products is unclear or suspected to have PFAS (even “PFOS-free” products), consider this user a probable source. We believe that platers have used demisters/defoamers/surfactants that may contain PFAS for air emissions control since at least the mid-1990s, but we have heard that some platers may have used such chemicals since the 1960s.

- b. Paper and Packaging Manufacturers: Some paper and packaging manufacturers use PFAS coatings or treatments for oil and moisture repellency. Many of these industries discharge directly to receiving streams, but if one discharges to you, contact them to find out if they are or have discharged PFAS-containing chemicals to your POTW.
- c. Tanneries and Leather/Fabric/Carpet Treaters: Factory-applied oil, water and stain repellents have been known to cause contamination. Applications include protective clothing or outerwear, umbrellas, tents, sails, architectural materials, carpets, and upholstery.

TIP: PFAS chemicals used include PTFE (polytetrafluoroethylene)—used in porous, “breathable” fabrics such as Gortex™.

- d. Manufacturers of Parts with PTFE (polytetrafluoroethylene, Teflon type) Coatings (i.e., Bearings): Our understanding is incomplete, but PFOA contamination in New York, New Hampshire, and Vermont appears to have been caused by a company that placed a non-stick coating on parts such as bearings and wires.

TIP: PFAS chemicals used or generated in the process of creating PTFE (polytetrafluoroethylene) coatings may include PFOA.

- e. Landfill Leachate: Most landfills will have some PFAS due to disposal of consumer products, but we are asking you to look for significant sources, which would include landfills receiving industrial wastes from metal finishers, leather/fabric treaters, other sources where there would be concentrated chemicals. Landfills that discharge leachate to your POTW, either by truck or sanitary sewer, should be evaluated.

TIP: PFAS were developed in the 1940s, although uses changed over time. Fabric treatments became prevalent in the 1970s to present. We believe that platers have used demisters/defoamers/surfactants that may contain PFAS for air emissions control since at least the mid-1990s but we have heard that some platers may have used such chemicals since the 1960s.

If sources include those types listed above, the landfill should be considered a probable source of PFAS and should be monitored unless the landfill can show that their specific sources did not discharge PFAS.

The DEQ Waste Management and Radiological Protection Division (WMRPD) is developing a plan and schedule with industry partners to sample and report leachate data from landfills and provide that data to IPPs and the DEQ. Participating landfills will arrange for sampling their leachate and will follow DEQ recommended sampling protocols and SOP's.

If landfills discharge their leachate to your POTW and one or more wish to participate in WMRPD's program, you are encouraged to request an extension to the requirement to submit the landfill data with the Interim Report that is due by June 29, 2018. If you have determined that your landfills are not probable sources, you do not need to request an extension. WRD encourages you to contact your landfill customers and to cooperate with this effort. As stated in the April 18, 2018, letter, you have until May 8, 2018, to request an extension or alternative monitoring plan.

Please be aware that complete PFAS laboratory reports supplied through the WMRPD effort must be evaluated when it is submitted to you and reported to the DEQ WRD. In addition, any landfill leachate data collected should be obtained by POTWs for their review.

- f. Centralized Waste Treaters (CWT) accepting certain wastes such as industrial process wastewater, groundwater cleanup wastewater, or landfill leachate may be sources of PFAS to your POTW.

TIP: Look for platers, paper manufacturers, treated leather/fabrics, tannery wastes, chemical manufacturers, manufacturers using non-stick coatings, groundwater cleanups from these types of industries, and any other known sources of PFAS. Review the past 20 years since PFAS are heavy and may stick to the bottoms and sides of treatment tanks. If sources include those types listed, the CWT should be considered a *probable* source of PFAS and should be monitored unless the CWT can show that their specific sources did not discharge PFAS.

- g. Contaminated Sites: Historical dumping of industrial wastes with PFAS, AFFF (aqueous film-forming foam for fire suppression) – training sites especially, and manufacturing sites where PFAS were used (e.g. platers) may be a concern to POTWs if contaminated groundwater is discharged to POTWs through groundwater cleanup discharges or infiltration to the sanitary sewers. Many of these sites are more likely an issue for direct discharges to lakes and streams (also an issue for storm sewers for those who work on MS4 or storm sewer issues). If you have knowledge of and/or concerns about direct discharges to lakes and streams from contaminated sites, please contact your District IPP staff to refer the issue to the appropriate DEQ staff for follow-up.
- h. Any other known or suspected sources of PFAS: If you know of other potential sources of PFAS, even those that may not be SIUs, you should determine whether they are probable sources, Survey questions are attached.

3. Develop a Monitoring Plan

Develop a monitoring plan to monitor the *probable* sources identified in item 2 above. Include the details of when and where you will sample, as well as how you will conduct sampling, transport your samples and analyze them at your chosen laboratory. The DEQ is developing PFAS sampling guidance and standard operating procedures, which will be posted online when they are available. If you want to sample locations within the collection system to capture multiple probable sources or request an extension for the initial source monitoring, please prepare an alternative plan for submittal to DEQ WRD by May 8, 2018. If you want to propose an alternative monitoring plan, contact your Regional IPP PFAS Specialist. All alternative monitoring plans or requests for extension for the interim report will be submitted through MiEnviro via the IPP Unscheduled Submissions for Approval.

4. Work with Industry to Reduce and/or Eliminate these Pollutants

If you find significant sources of PFOS and/or PFOA through your source monitoring, you are required to work with the industry to reduce and/or eliminate these pollutants from their effluent. This may include:

- **Product substitution:** Stop using the fluorinated chemicals and hex chrome; use PFOS-free demisters (but that doesn't mean they are totally PFAS-free).
- **Operational controls:** Segregating waste streams for off-site disposal; using improved fume hoods.
- **Pretreatment:** Granular activated carbon (GAC) has been the most commonly used in full-scale water treatment applications. Other options are ion exchange resins and membrane filtration.
- **Clean-up:** Cleaning and properly disposing of waste from plating tanks, sump pits, pretreatment tanks, etc. Look at the overall housekeeping to determine where PFAS laden waste may be lurking.

Please note that the DEQ WRD does not expect POTWs that identify sources of PFAS to force any users out of their systems. Instead, we encourage POTWs to take a systematic approach, working with the DEQ and other partners to evaluate options for reducing or treating sources of PFAS and to use the IPP process to ensure that water quality and public health are protected.

5. Monitor Effluent

If there are potential impacts to your POTW (i.e. you have confirmed sources with greater than the applicable water quality standards for PFOS and/or PFOA [see Table 1 below]), you are required to monitor your POTW effluent for PFAS. If your POTW effluent sample results are above the Water Quality Standards (see Table 1 below), you will need to submit the results to the DEQ within 10 days of becoming aware of the results via the NPDES Unscheduled Permit Required Report in MiEnviro. The DEQ will evaluate the results and will follow up with you as needed in writing.

Table 1 – Applicable Rule 57 Values

Chemicals	HNW* (non drinking water)	HNW (drinking water)
PFOS (ng/L)	12	11
PFOA (ng/L)	12,000	420

*HNW – Human Non-cancer Value

6. Reporting

An interim report summarizing your evaluation and the data collected (along with your documentation) is required to be submitted via MiEnviro. Unless you have received an extension approval from the DEQ WRD, you are required to submit an interim report by June 29, 2018. A specific form and Schedule of Compliance will be available in MiEnviro for the submission. In the interim report you will be asked to provide the following:

- A list of potential sources of PFOS and/or PFOA and your determination/justification regarding whether they are a probable source.
- Your monitoring plan outlining the steps taken to sample your probable sources.
- Your sampling results. This includes the contract lab reports and an Excel spreadsheet that the WRD will develop for you as part of the MiEnviro form.
- If applicable, a list of Industrial Users found to be sources of PFOS and/or PFOA through sampling. You will need to provide any steps taken (or will be taken) on behalf of the POTW and IU to reduce and/or eliminate those pollutants in their effluent.
- If applicable, POTW effluent PFAS results, including contract lab reports and an Excel spreadsheet that the WRD will develop for you as part of the MiEnviro form.
- If your POTW effluent results were higher than the WQS, when and how you notified DEQ WRD.

Unless no PFAS sources were found after the interim report submission, you must continue to work with known sources to reduce and/or eliminate PFAS entering the POTW. Depending on the information submitted in the interim report, the DEQ may ask you to do additional effluent monitoring, biosolids monitoring, and/or source monitoring. The DEQ will make these requests in writing.

Unless the DEQ sends a letter saying no further action is needed in response to the Interim Report, you must submit a Summary Report, which is due October 26, 2018. A specific form and Schedule of Compliance will be available in MiEnviro for the submission. In the summary report you will be asked to provide the following:

- Any additional potential source(s) identified since the interim report was submitted and your determination if they are a probable source or not.

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- If you sampled the additional probable sources, your sample results including contract lab reports and an updated Excel spreadsheet.
- An updated list of Industrial Users found to be sources of PFOS and/or PFOA through sampling.
- An update on the steps that have been taken (or will be taken) on behalf of the POTW and IU to reduce and/or eliminate those pollutants at the industries identified in the interim report and at the additional sources you identified.
- Any additional PFAS sampling results, including POTW effluent and/or biosolids, IU effluent for probable or confirmed sources (contract lab reports and an updated Excel spreadsheet).

Additional efforts may be needed at some POTWs. Additional requirements will be addressed in writing by DEQ WRD on a case-by-case basis.

This publication is intended for guidance only and may be impacted by changes in legislation, rules, policies, and procedures adopted after the date of publication. Although this publication makes every effort to teach users how to meet applicable compliance obligations, use of this publication does not constitute the rendering of legal advice.

**IPP PFAS INITIATIVE SCREENING EVALUATION GUIDANCE
ATTACHMENT**

Suggested IU Survey Questions for Per- and Polyfluoroalkyl Substances (PFAS) Identification

Please review the list of potential PFAS sources below. If you currently or have historically discharged wastewater into the sanitary sewers from any of the manufacturing operations or activities listed, please complete the corresponding section identified and return it to (POTW ADDRESS) within 10 days.

- Electroplaters of metals or plastics, metal finishers, circuit board manufacturers – *Complete Section 1*
 - Paper and packaging manufacturers – *Complete Section 2*
 - Leather, textile, fabric and/or carpet treaters, leather tanneries – *Complete Section 3*
 - Manufacturers of parts with polytetrafluoroethylene (PTFE) coatings such as bearings, wires, etc. – *Complete Section 4*
 - Landfills with leachate discharges – *Complete Section 5*
 - Centralized Waste Treaters – *Complete Section 6*
 - Industry sites with soil or groundwater contamination including those where aqueous film forming foam (AFFF) was used (e.g. fires, firefighter training, equipment testing) – *Complete Section 7*
 - Industries using PFAS in other processes or operations – *Complete Section 8*
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IPP PFAS Initiative Screening Evaluation Guidance – Attachment
Suggested Survey Questions for PFAS Identification

Section 1 - Electroplaters/metal finishers/circuit board manufacturers

PFAS-containing chemicals, specifically those containing perfluorooctane sulfonate (PFOS) were used by electroplaters as a demister/defoamer/surfactant to control air emissions of hexavalent chromium beginning in the mid-1990s. While hard chrome and decorative chrome platers using hexavalent chrome are the most likely sources, PFAS have also been found in wetting agents and other plating chemicals involving other metals and plastics. Even if used many years ago, PFAS-containing chemicals may persist in plating tanks, etch tanks, sumps, air emission control systems and secondary containment pits. Some chemicals identified as PFOS-free may still contain PFAS. We are still learning about the behavior of these chemicals, and there are concerns that chemical changes may occur in plating and etch baths. Platers in Michigan and Minnesota were found to have PFOS contamination in their wastewater years after they discontinued use of PFOS-containing chemicals.

- i. What types of plating are currently performed at your facility?

- ii. What types of plating were previously performed at your facility? Please summarize the plating activities over the last 20 years if possible.

- iii. Are or were demisters/defoamers/surfactants used to control air emissions or as wetting agents for any plating or etch tanks? If so, what are the names of the chemicals and amounts and concentrations used? Please provide the SDS/MSDS sheets for these chemicals.

- iv. Are any other chemicals used in the plating processes known to contain PFAS or PFOS? If so, what are the names of the chemicals and amounts and concentrations used? Please provide the SDS/MSDS sheets for these chemicals and a schematic or flow diagram that shows where each chemical is used.

- v. Are there any other fluorinated chemicals used (look for “fluoro” in the SDS/MSDS chemical listing or product name, e.g., “fluorinated surfactant(s)” or “organic fluorosulfonate”)? If so, what are the names of the chemicals and amounts and concentrations used? Please provide the SDS/MSDS sheets for these chemicals and a description of where they are used in your process.

IPP PFAS Initiative Screening Evaluation Guidance – Attachment
Suggested Survey Questions for PFAS Identification

Section 2 – Paper and Packaging Manufacturers

Paper and packaging manufacturers: Some paper and packaging manufacturers use PFAS coatings or treatments for oil and moisture repellency.

- i. Do you currently or have you in the past treated paper or packaging for oil- and/or water-repellency? In answering this question, please review your activities over the last 20 years if possible. Discuss the treatments used, time periods, percentage products treated, types of products treated or number of lines.

- ii. Do any chemicals used to coat or treat the paper/packaging contain PFAS (look for “fluoro” in the SDS/MSDS chemical listing or product name, e.g., “fluorinated surfactant(s)” or “organic fluorosulfonate” ? If so, what are/were the names of the chemicals and amounts and concentrations used? Please provide the SDS/MSDS sheets for these chemicals.

- iii. Are there any other fluorinated chemicals used (look for “fluoro” in the SDS/MSDS chemical listing or product name, e.g., “fluorinated surfactant(s)” or “organic fluorosulfonate”) in your process? If so, what are the names of the chemicals and amounts and concentrations used? Please provide the SDS/MSDS sheets for these chemicals.

- iv. Do you use recycled paper in your process? What is the source of the recycled paper and what percentage of recycled paper is used in the final product?

- i. Do you currently or have you in the past applied treatment to leather, fabrics, textiles or carpet for stain, oil- and/or water-repellency? In answering this question, please review your activities over the last 20 years if possible. Discuss the treatments used, time periods, percentage products treated, type products treated or number of lines.
- ii. Do any of the chemicals used for treating contain PFAS (look for “fluoro” in the SDS/MSDS chemical listing or product name, e.g., “fluorinated surfactant(s)” or “organic fluorosulfonate”)? If so, what are the names of the chemicals and amounts and concentrations used? Please provide the SDS/MSDS sheets for these chemicals.
- iii. Are there any other fluorinated chemicals used in the treatments (look for “fluoro” in the SDS/MSDS chemical listing or product name, e.g., “fluorinated surfactant(s)” or “organic fluorosulfonate”)? If so, what are the names of the chemicals and amounts and concentrations used? Please provide the SDS/MSDS sheets for these chemicals.

Section 4 – Manufacturers of parts with polytetrafluoroethylene (PTFE) coatings

A PFAS containing chemical, perfluorooctanoic acid (PFOA), is used in the process of making PTFE, which is a form of Teflon. Our understanding is incomplete, but PFOA contamination in New York, New Hampshire, and Vermont appears to have been caused by a company that placed a non-stick coating on parts such as bearings and wires.

- i. Do you currently or have you in the past coated parts with PTFE or similar non-stick coatings? Describe all waste streams from the process.

- ii. What are the names of the chemicals used and/or created in the coating process? Please provide the amounts and concentrations used? Please provide the SDS/MSDS sheets for chemicals used. In answering this question, please review your manufacturing operations over the last 20 years if possible.

- iii. What chemical byproducts are generated in the coating process?

- iv. Are there any other PFAS or fluorinated chemicals used (look for “fluoro” in the SDS/MSDS chemical listing or product name, e.g., “fluorinated surfactant(s)” or “organic fluorosulfonate”) or generated? If so, what are the names of the chemicals and amounts and concentrations used or generated? Please provide the SDS/MSDS sheets for these chemicals.

Section 5 – Landfills that Discharge Leachate

Most landfill leachate will have some PFAS due to disposal of consumer products, but we are currently interested in landfills that have received PFAS laden industrial wastes such as sludge from metal finishers, leather tanneries and/or similar sources.

- i. Is your landfill still accepting wastes for disposal? If not, when was it closed?

- ii. Do you currently or have you in the past accepted industrial wastes? Approximately what percentage of your wastes would be considered industrial?

- iii. Were wastes from any of the following manufacturing operations accepted: Sludge from electroplaters/metal finishers, waste from coated/treated paper manufacturers, treated leather/fabric wastes, tannery wastes, wastes from PFAS chemical manufacturers, wastes from manufacturers using non-stick coatings, municipal biosolids known to be impacted by PFAS, any other known sources of PFAS? Please provide types and estimated amounts or percentage wastes received.

- iv. Have you analyzed your leachate for PFAS? If so, please provide the results.

Section 6 – Centralized Waste Treaters (CWTs)

CWTs accepting certain wastes may be sources of PFAS depending on the types of wastewater they receive for treatment.

- i. Do you currently or have you in the past accepted wastewater for treatment from electroplaters, metal finishers, coated/treated paper or packaging manufacturers, treated leather/fabrics manufacturers, leather tanneries, chemical manufacturers involved in PFAS production, manufacturers applying non-stick coatings such as PFTE or Teflon, firefighting foam from training facilities, spills or equipment testing, groundwater remediation of the aforementioned types of industries, storm water from the aforementioned types of industries and/or any other known sources of PFAS?

- ii. Have you analyzed your wastewater for PFAS? If so, please provide the results.

Section 7 – Industry sites with soil or groundwater contamination including those where aqueous film forming foam (AFFF) was used:

If your industry or facility has soil or groundwater contamination due to releases of industrial wastes or the use of AFFF (Class B) firefighting foam due to fires or firefighter training that discharges or infiltrates into the sanitary sewers may be a concern.

- i. Do you currently have contamination of soil or groundwater due to releases from electroplating/metal finishing processes, the coating/treatment of paper or packaging products, textile, leather or fabric treating, leather tanning operations, the manufacturing of PTFE coatings or other PFAS sources? Please describe below.

- ii. Has your facility had a fire in which AFFF (Class B) foam was utilized, or has firefighter training occurred on your site using AFFF foam? Please describe below.

- iii. Have you analyzed your groundwater for PFAS? If so, please provide the results.

- iv. Do you have a groundwater cleanup or investigation? Please describe.

i. What are the names of the chemicals containing PFAS? Please provide the amounts and concentrations used? Please provide the SDS/MSDS sheets for the PFAS containing chemicals. In answering this question, please review your manufacturing operations over the last 20 years if possible.

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