

# Attachment B:

## Supplemental Information for the Economic Impact Analysis for Board Order No. WY-23-19

**Maximum Annual Costs: \$4,780,613**

**Maximum 2-Year Costs: \$9,268,046**

The proposed rule package establishes a narrative water quality standard for perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) in s. NR 102.04(8)(d), Wis. Adm. Code. The narrative standard contains numeric criteria to protect public health. The rule also includes requirements in the WPDES permit program to ensure that point source wastewater discharges comply with this narrative water quality standard. The proposed rule requires that larger publicly owned sewage treatment facilities, centralized wastewater treatment facilities, and categories of industrial wastewater facilities that are expected to have PFOA and PFOS in their effluent conduct sampling for PFOA/PFOS. The sampling requirements for each discharger will be included in WPDES permits. The costs for PFOA/PFOS sampling are included in the summary of costs below. Whether WPDES permitted facilities must also take actions to reduce discharges of PFOS and PFOA depends on the concentration of PFOS and PFOA in the discharge and whether the level of PFOS or PFOA in the discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS and PFOA water quality standard. Required actions include the development and implementation of a PFOA/PFOS minimization plan which includes identification of PFOS and PFOA sources and implementation of feasible measures and best management practices to reduce PFOS and PFOA concentrations in a discharge. Ultimately for a few facilities in the state, if source reduction measures don't sufficiently reduce levels of PFOS and PFOA in a discharge, treatment may be necessary.

### 1. Number and Types of Facilities Affected

#### 1.1 Method for determining affected facilities:

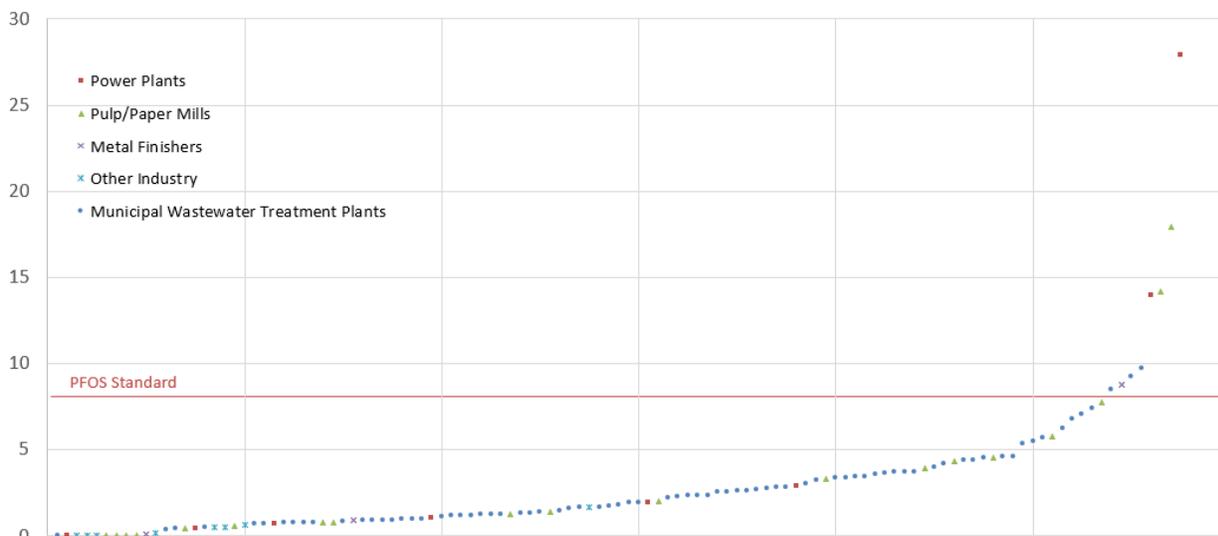
To identify which permitted dischargers may potentially exceed the PFOS and/or PFOA standards and will consequently need to establish and implement a PFOA/PFOS minimization plan, the Wisconsin Department of Natural Resources (the department) will compile all available PFOA/PFOS effluent data and apply the methodology in s. NR 106.98(4), Wis. Adm. Code, of the proposed rule to determine whether a permitted discharge has reasonable potential to cause or contribute to an exceedance of the PFOS and PFOA narrative standard in the proposed s. NR 102.04(8)(d), Wis. Adm. Code. This methodology compares each facility's 99<sup>th</sup> percentile of monthly average effluent data (30-day P99) to the proposed criteria for the surface waters receiving the discharge (defined as: 8 ppt PFOS and 20 ppt PFOA (surface water used for public water supply) or 95 ppt PFOA (non-public water supply)). Per the proposed rule language, 12 effluent samples are necessary in order to calculate a 30-day P99. However, at the time of this proposed rulemaking, for most permitted facilities, the department has only 0-1 sample results for each facility. To estimate the total number of permitted facilities in the state that will have to take actions to reduce PFOS or PFOA discharges, the department used the limited sampling data available and also used effluent data from Michigan for similar categories of dischargers.

**Wisconsin’s effluent data:** In order to most accurately estimate the number of facilities that will be impacted, the department adjusted single effluent data points to estimated 30-day P99 values using probability distributions of effluent data from publicly owned treatment works (POTWs) with many potential PFOA/PFOS contributors. To do this, the department first derived a relationship between the expected values of a discharger’s median effluent concentration and 30-day P99, using available POTWs’ effluent data sets for mercury as a surrogate. This approach was used because mercury, like PFOS and PFOA, is commonly present in wastewater at levels on the order of parts-per-trillion, and both PFOA/PFOS and mercury concentrations are commonly influenced by industrial contributors.

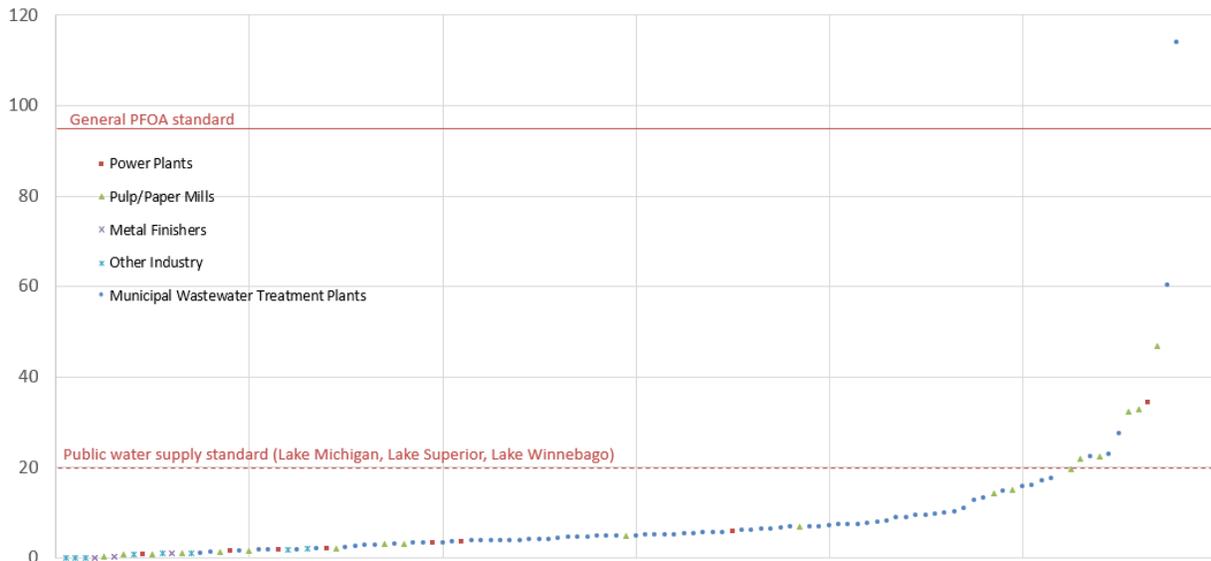
At 3 of the largest POTWs in the state (Jones Island Water Reclamation Facility, Nine Springs Treatment Plant, and Green Bay), data from the last 5 years indicates that the 30-day P99 concentrations of mercury in effluent are approximately 1.3 times greater than the median values. For facilities with one data point, the expected value of that data point is the median, so it may be multiplied by a factor of 1.3 to estimate the 30-day P99. The department applied this transformation to effluent data for each facility for which a single PFOA/PFOS effluent concentration data point exists in order to estimate 30-day P99 concentrations, and then the department compared these estimated 30-day P99 concentrations to the standards to determine what percent of facilities within a given sector would be expected to have reasonable potential to cause or contribute to an exceedance of the proposed PFOA/PFOS standards.

Effluent data (untransformed) collected by the department is shown in the graphs below, along with orange lines indicating the proposed standards (dotted line applies only to public water supplies). Note that effluent limitations for PFOS will be set equal to the standard of 8 ng/L if facilities are unsuccessful in reducing effluent concentrations below the standard following 85 months of PFOA/PFOS minimization plan implementation. For PFOA, though, dilution in the receiving water will be considered, so limits are expected to be substantially higher than the standard in most cases. The reason for this difference is that PFOS is a bioaccumulative chemical of concern while PFOA is not (see the Technical Support Document for this rule for more details on bioaccumulation).

## PFOS Effluent Concentrations



# PFOA Effluent Concentrations



**Michigan’s effluent data:** The department also evaluated PFOA/PFOS data from Michigan to project the types of industrial facilities that will be impacted in Wisconsin by promulgation of this rule. Specifically, this EIA focuses on industrial sectors identified as PFOA/PFOS sources in the Michigan Department of Environment, Great Lakes, and Energy (EGLE)’s [Identified Industrial Sources of PFOS to Municipal Wastewater Treatment Plants](#) report (August 2020), as PFOS is the more stringent of the proposed PFOA/PFOS standards.

## 1.2 POTWs affected:

In order to assess the number of facilities affected by this rule, facilities discharging effluent at estimated 30-day P99 concentrations of PFOA and PFOS that are below the proposed criteria (defined as: 8 ppt PFOS and 20 ppt PFOA (public water supply) or 95 ppt PFOA (non-public water supply)) were assumed to be complying with the proposed rule without incurring any additional compliance costs, other than where initial PFOA/PFOS sampling is required per the proposed rules (see s. NR 106.98(2), Wis. Adm. Code).

Based on representative sampling data collected by the department, all sampled POTWs without significant industrial users or known contamination were discharging at estimated 30-day P99 concentrations below the proposed criteria for PFOA or PFOS. This accounts for most of the POTWs across the state (520 out of 639), and these facilities are not expected to incur costs from the rule. Within Wisconsin, there are approximately 639 POTWs which have an individual permit for discharges to the waters of the State. Of these, 92 have at least one significant industrial user (SIU) discharging to their sanitary sewers or have known PFOA/PFOS contamination, and 27 others implement their own pretreatment programs to regulate multiple SIUs that discharge to their sewer systems.

Of the 92 POTWs without a pretreatment program which have at least one SIU or have known PFOA/PFOS contamination, 18% (6 out of 33) of the sampled POTWs in this category had estimated 30-

day P99s indicating reasonable potential to exceed the proposed criteria. Applying this percentage (18%) from the sampling pool to the 92 POTWs in this category statewide means that about 17 out of 92 of these POTWs will likely have to develop and implement a PFOA/PFOS minimization plan under this proposed rule. It's important to note that only one of the facilities which were sampled in this category of dischargers would need to implement a PFOA/PFOS minimization plan due to PFOA concentrations, and this is based on a comparison with the proposed criteria, not the water quality-based effluent limit which would be calculated based on factors such as background concentration and available dilution.

Of the POTWs authorized to implement their own pretreatment programs which were sampled by the department and have multiple SIUs, 6 out of 26 of the sampled POTWs in this category had estimated 30-day P99s indicating reasonable potential to exceed the proposed criteria. It's important to note that only one of the facilities which were sampled in this category of dischargers would need to implement a PFOA/PFOS minimization plan due to PFOA concentrations alone, and this is based on a comparison with the proposed criteria, not the water quality-based effluent limit which would need to be calculated based on factors such as background concentration and available dilution.

In total, the department expects that approximately 142 POTWs will need to conduct PFOS and PFOA sampling for up to 24 months to determine representative levels of PFOS and PFOA in the effluent (see Table 3 in Section 2 for details on how this estimate was derived), but only 23 out of 639 POTWs in the state are expected to be required to develop and implement a PFOA/PFOS minimization plan. If the actions under the minimization plan are not sufficient to reduce concentrations of PFOS and PFOA in the discharge to a level at which there is no longer the reasonable potential for the discharge to exceed the water quality standard, then the POTWs may be required to install a treatment, or, alternatively, a POTW may apply for a variance under s. 283.15, Wis. Stats. However, the department does not expect that the estimated 23 POTWs with 30-day P99s exceeding the criteria will need to install treatment or apply for a variance because concentrations in their discharges are not far above the expected effluent limitations. The POTW with the 30-day P99 furthest above a forecasted effluent limitation is 4 ng/L greater than the forecasted effluent limitation. The department therefore expects that implementation of the PFOA/PFOS minimization plans should reduce concentrations of PFOS and PFOA below the criteria. See section 4 for further discussion on this.

Table 1: POTWs Expected to be required to implement a PFOA/PFOS Minimization Plan

POTW Type	Total Universe	Facilities with Reasonable Potential that will implement PMP (percent)
Background (no SIUs)	520	0 (0%)
Contributing SIU/known contamination (no pretreatment program)	92	17 (18%)
Pretreatment Program	27	6 (23%)

The above analysis excludes the Marinette Wastewater Utility plant (one of the POTWs with its own pretreatment program) due to the ongoing remedial actions in the Marinette area and expected reduction of PFOA and PFOS levels over time. This is because those costs are being incurred independently of this rule development as a result of actions required of pretreatment industries under state remediation program requirements, ch. NR 159, Wis. Adm. Code, and other applicable existing regulations.

### 1.3 Industrial facilities affected:

In general, industrial facilities that discharge wastewater typically discharge to one or more of the following receiving waters or entities:

- To groundwater through land application or seepage ponds, or to a POTW which discharges to groundwater (not affected by this rule's scope)
- To surface waters directly through an outfall ("direct dischargers")
- To a POTW with an approved pretreatment program where the POTW discharges to surface waters (industrial facilities in this category are commonly referred to as "indirect dischargers")
- To a POTW without an approved pretreatment program where the POTW discharges to surface waters (industrial facilities in this category are also referred to as "indirect dischargers")

This section discusses economic impacts to industrial facilities with discharges that are affected by the proposed rules. Industrial facilities with direct discharges to surface water are regulated directly by the department through the WPDES permit terms and conditions. Industrial facilities that discharge wastewater to POTWs that are authorized to implement their own Pretreatment Programs are primarily regulated by the POTWs. At other POTWs without approved Pretreatment Programs, the POTWs may also regulate discharges from industrial users so that each POTW may maintain compliance with its WPDES permit. The department also has regulatory authority in chapter NR 211, Wis. Adm. Code, over industrial users that discharge to POTWs. Regardless of whether a POTW implements its own Pretreatment Program, the department's permitting requirements imposed on a POTW that may have elevated levels of PFOS or PFOA will likely indirectly impact the industrial facilities that send wastewater to the POTW.

Where industrial sampling data is available, the department has followed a methodology similar to that used for POTWs (see above) to determine whether facilities are expected to be impacted; that is, the department has extrapolated the percentage of facilities with higher levels of PFOS or PFOA from a category of industrial facilities in the department's sampling pool and applied it to the total number of industrial facilities in the same category statewide.

The data outlined in Michigan's report was obtained through EGLE's efforts to implement health criteria for PFOA/PFOS and by requiring that all 95 Michigan POTWs with Industrial Pretreatment Programs (IPPs) sample for PFOA and PFOS. Data from Michigan showed that the following six industrial categories were significant sources of PFOS: landfills, metal finishers, centralized waste treaters (CWTs), paper/packaging manufacturers, commercial industrial laundry facilities, and chemical manufacturers. The department assumed industrial categories of these facilities found to be impacted from Michigan's comprehensive study would be similarly impacted in Wisconsin. The department also included airports, dewatering projects from contaminated areas, and fire suppression activities in its economic analysis because these facilities or activities have been observed to have PFOA/PFOS-impacted discharges in Wisconsin. Industrial sector permit drafters in the department reviewed the data from EGLE's report and made modifications in the applicability of Michigan's data to Wisconsin's industrials when appropriate. Any such modifications are explained throughout this EIA.

Number of Industrial Direct Dischargers and Indirect Industrial Dischargers to POTWs that do not have an approved Pretreatment Programs: To determine the total number of the industrial facilities in sectors that are potential PFOS or PFOA sources that either have a direct discharge to surface waters or that discharge to a POTW without an approved pretreatment program, the department queried the System for Wastewater Applications, Monitoring, and Permits (SWAMP) database for all facilities with identifying Standard Industrial Classification (SIC) codes. This query yielded a total of:

- 24 metal finishers,
- 5 centralized waste treaters (CWTs),
- 44 paper/packaging manufacturers,

- 8 chemical manufacturers.

There were no permitted commercial industrial laundry facilities or landfills authorized to directly discharge to surface waters. It is important to note that the above list excludes those pretreatment industries which discharge to one of the 27 POTWs with approved pretreatment programs, as these facilities are not readily queried in the SWAMP database.

Number of Indirect Industrial Dischargers to POTWs with Pretreatment Program: To project the number of pretreatment industries impacted by this rule which discharge to the 27 POTWs that implement their own Pretreatment Programs, the department first found that 6 of these 27 POTWs had 30-day P99 effluent concentrations indicating the need to implement a PFOA/PFOS minimization plan. The department then examined the significant industrial users discharging to each of these 6 POTWs. The data is summarized below:

- POTW #1: 1 commercial industrial laundry, 1 metal finisher
- POTW #2: 3 metal finishers
- POTW #3: 4 metal finishers, 4 chemical manufacturers, 4 paper/packaging manufacturers, 1 commercial industrial laundry, 1 CWT
- POTW #4: 19 metal finishers, 6 industrial commercial laundries, 5 CWTs, 4 chemical manufacturers, 2 paper/packaging manufacturers
- POTW #5: 2 metal finishers, 1 paper/packaging manufacturer, 2 chemical manufacturers
- POTW #6: 3 metal finishers, 2 paper/packaging manufacturers

### **1.3.1 Metal Finishers**

The department sampled 3 metal finishers that discharge directly to waters of the state. These three facilities were chosen as representative of the metal finishing industry as a whole. One of these facilities was found to have reasonable potential to cause or contribute to an exceedance of the proposed criteria.

Direct Dischargers and IUs (industrial users) outside Pretreatment Programs: Of the 24 metal finishers identified by the SWAMP query that discharge to surface water or that discharge to a POTW without an approved pretreatment program, 7 are discharging strictly non-contact cooling water (not expected to contain PFOA or PFOS), 7 are utilizing industrial processes that are not expected to be significant sources of PFOA or PFOS, 4 are discharging to a POTW that had sample results below the proposed PFOS and PFOA criteria, and 1 facility is not currently discharging. This left a remaining 5 facilities which are discharging to a POTW that had 30-day P99 effluent concentrations above the proposed PFOS and PFOA criteria. These metal finishing facilities include decorative chrome platers, hard chrome platers, or chromate conversion coaters which utilize hexavalent chromium in their processes. These specific types of metal finishers will likely need to develop and implement a PFOA/PFOS minimization plan because they were specifically identified by EGLE as the major sources of PFOS within the metal finisher category of industrial facilities. All 5 of these facilities are expected to be impacted by this rule and are assumed to be required to implement source reduction (for pretreatment facilities) or PFOA/PFOS minimization plans (for direct dischargers).

IUs in Pretreatment Programs: To account for costs incurred to metal finishers which discharge to one of the 6 affected POTWs with their own pretreatment program, the department reviewed pretreatment reports for these POTWs and identified industrial users within the affected categories. This amounts to a total of 32 metal finishers which discharge to a POTW with its own pretreatment program which is expected to implement a PFOA/PFOS minimization program.

Total: In total, 37 metal finishers are projected to be impacted. 36 metal finishers will likely have to engage in source reduction activities and longer-term sampling, and 1 metal finisher is a direct discharger that will need to develop and implement a PFOA/PFOS minimization plan. Costs are discussed in sections 2-4.

### **1.3.2 Paper/Packaging Manufacturers**

The department sampled 17 paper/packaging manufacturers, which were deemed representative of the paper/packaging manufacturing sector. Additionally, 3 other facilities in this sector voluntarily submitted sampling data to the department. Of the 20 facilities for which sampling data is available, 3 were found to have reasonable potential to discharge at levels above the proposed criteria for PFOA and/or PFOS.

Direct Dischargers and SIUs outside Pretreatment Programs: Of the 44 paper/packaging manufacturers that are direct dischargers or discharge to POTWs without approved pretreatment programs, 13 discharge exclusively non-contact cooling water, 17 of the facilities which have sampling data are discharging below the proposed criteria, and two exclusively land apply and do not discharge to surface waters of the State. This left 12 paper/packaging manufacturers that discharge to surface water or to POTWs without pretreatment programs for which PFOA/PFOS data is not yet available. To evaluate these 12 paper/packaging manufacturers, the department examined PFOA/PFOS data from similar dischargers in Michigan.

In Michigan, the facilities with higher PFOS or PFOA levels in their wastewater were paper/packaging manufacturers that used recycled paper in their processes and/or either currently coat or historically coated their products. However, due to the unknown historical usage of PFOA-and/or-PFOS-containing products in Wisconsin and the limited dataset available in both Michigan and Wisconsin, all 11 remaining facilities are assumed to be impacted by this rule, in interest of being conservative. This assumption likely overestimates the number of facilities impacted based on the information available to the department at this time, and this section will be updated if more data is received. Potential costs for these 12 facilities are discussed in sections 2-4.

SIUs in Pretreatment Programs: To estimate costs incurred to paper/packaging manufacturers which discharge to one of the 6 affected POTWs with their own pretreatment program, the department reviewed pretreatment reports for these POTWs and identified industrial users within the affected categories. This amounts to a total of 9 paper/packaging manufacturers which discharge to a POTW with its own pretreatment program which is expected to implement a PFOA/PFOS minimization plan.

Total: In total, 21 paper/packaging manufacturers have potential to be impacted by this rule. 9 indirect dischargers may have to implement source reduction activities and conduct longer term sampling and 12 paper/packaging manufacturers are direct dischargers that may need to develop and implement a PFOA/PFOS minimization plan. The potential costs are discussed in sections 2-4.

### **1.3.3 Centralized Waste Treaters**

There is a total of 12 CWTs in the state, but only 7 are expected to implement source reduction activities. As shown in the table below, the department expects that CWTs discharging to POTWs whose 30-day P99 PFOA and PFOS concentrations are less than the criteria are not expected to take any source reduction actions under this rule. The same is true for those CWTs that process only dairy waste and the 1 CWT that discharges to groundwater, because this rule proposes surface water standards and only affects facilities that directly or indirectly discharge to surface water.

Table 2: Summary of CWTs in Wisconsin

CWT ID	Discharges to:	CWT Expected to be Impacted?
CWT #1	POTW with Pretreatment Program, POTW exceeds PFOA/PFOS Criteria	Yes
CWT #2	POTW with Pretreatment Program, POTW exceeds PFOA/PFOS Criteria	Yes
CWT #3	POTW with Pretreatment Program, POTW exceeds PFOA/PFOS Criteria	Yes
CWT #4	POTW with Pretreatment Program, POTW exceeds PFOA/PFOS Criteria	Yes
CWT #5	POTW with Pretreatment Program, POTW exceeds PFOA/PFOS Criteria	Yes
CWT #6	POTW with Pretreatment Program, POTW exceeds PFOA/PFOS Criteria	Yes
CWT #7	POTW with Pretreatment Program, POTW beneath PFOA/PFOS Criteria	No
CWT #8	POTW without Pretreatment Program, dairy waste only	No
CWT #9	POTW without Pretreatment Program, dairy waste only	No
CWT #10	POTW without Pretreatment Program, dairy waste only	No
CWT #11	POTW without Pretreatment Program	Yes
CWT #12	Groundwater	No

Total: In total, 7 facilities that discharge to POTWs will likely have to implement source reduction activities and conduct longer term sampling. Costs are discussed in sections 2-4.

### 1.3.4 Chemical Manufacturers

Direct Dischargers and SIUs outside Pretreatment Programs: Of the 8 chemical manufacturers identified in the SWAMP query, 7 discharge non-contact cooling water exclusively and are therefore not expected to be a significant source of PFOA or PFOS. The last chemical manufacturer is assumed to not be impacted by this rule because the POTW (without an approved pretreatment program) to which it discharges was sampled by the department, and its estimated 30-day P99 PFOA and PFOS concentrations are below the department's proposed criteria. The POTW may require some additional PFOA and PFOS sampling data from the chemical manufacturer to confirm the available data is representative, but no other actions are expected and/or required under this rule.

IUs in Pretreatment Programs: To account for costs incurred to chemical manufacturers which discharge to one of the 7 affected POTWs with their own pretreatment program, the department reviewed pretreatment reports for these POTWs and identified industrial users within the affected categories. This results in a total of 10 chemical manufacturers.

Total: In total, the department estimates that 10 chemical manufacturers which discharge to a POTW (with an approved pretreatment program) may be impacted (e.g. source reduction activities and long-term sampling). Costs for these facilities are discussed in sections 2-4.

### 1.3.5 Commercial Laundry Facilities

Direct Dischargers and SIUs outside Pretreatment Programs: The SWAMP database was queried for the number of commercial industrial laundry facilities in Wisconsin because this sector was identified as a source of PFOS in Michigan. However, the results of the query showed that there are no industrial commercial laundry facilities in Wisconsin that discharge either directly to surface waters or to a POTW without a pretreatment program. The commercial industrial laundry facilities in Wisconsin discharge to the 27 POTWs with approved pretreatment programs.

IUs in Pretreatment Programs: To account for costs incurred to commercial industrial laundry facilities which discharge to 1 of the 7 affected POTWs with their own pretreatment program, the department

reviewed pretreatment reports for these POTWs and identified industrial users within the affected category. This amounts to a total of 8 commercial industrial laundry facilities impacted by this rule which discharge to a POTW with their own pretreatment program.

Total: In total, 8 commercial industrial laundry facilities are expected to be impacted by this rule through source reduction activities and longer-term sampling. Costs are discussed in sections 2-4.

### **1.3.6 Power Plants**

Power plants are not expected to be sources of PFOA/PFOS because the majority of them utilize non-contact cooling water, which is not expected to be a source of PFOS or PFOA. However, 2 of the 7 power plants sampled by the department in 2021 were found to be discharging PFOS above the proposed criteria. The department's data indicates that the source of PFOS for these 2 facilities is expected to be from domestic wastewater either generated onsite or from a local POTW, which is not a waste stream commonly present in power plant effluent. Consequently, the department does not expect these sampling results to be a clear representation of the power plant industry.

Total: For the purpose of this analysis, the 2 power plants with elevated PFOS and PFOA levels are expected to be the only plants that will need to develop and implement a PFOA/PFOS minimization plan and conduct longer term sampling. It's important to note that only one of the facilities which were sampled in this category of dischargers would need to implement a PFOA/PFOS minimization plan due to PFOA concentrations, and this is based on a comparison with the proposed criteria, not the water quality-based effluent limit which would need to be calculated based on factors such as background concentration and available dilution. However, other power plants that discharge process wastewater may be subject to initial sampling for PFOA/PFOS in their WPDES permits. Costs are discussed in sections 2-4.

### **1.3.7 Airports**

One other category of dischargers known to contain PFOA/PFOS are WPDES-permitted airports where PFOA/PFOS-containing aqueous film-forming foam was used in training exercises. Many of the PFOA/PFOS-related costs that will be incurred by these sites will be the result of ongoing remedial actions required by the department's Remediation and Redevelopment program, which are occurring independently of this rule development. However, 2 airports in Wisconsin also discharge under WPDES individual permits and will likely be required to implement PFOA/PFOS minimization plans. Whether these 2 airports will be able to reduce PFOA/PFOS effluent concentrations to levels below the proposed criteria is unclear at this time because remediation regulatory actions are already underway. If source reduction actions in the WPDES permit and adjacent remedial actions do not reduce PFOS and PFOA levels below the criteria over the first 85 months after the next reissuance of their WPDES permits, the facilities may need to install treatment unless they apply for and are granted an economic variance to water quality standards.

Total: In total, 2 airports are expected to have to develop and implement a PFOA/PFOS minimization plan and conduct longer-term sampling. Costs are discussed in sections 2-4.

Costs associated with dewatering projects for development adjacent to or on airport property are considered in sections 1.4 and 4.

### **1.3.8 Landfills**

Based on the department's expertise, landfills were assumed to be minimally economically impacted by this rule for the following reasons:

- 1) Landfills do not directly discharge leachate to surface waters of the state.
- 2) Landfills discharge a relatively small volume of leachate every day, and if there is enough dilution available at the POTW receiving that waste stream, then the PFOA and PFOS levels in the leachate sent to the POTW should not cause an exceedance above the proposed criteria in a POTW's effluent. This assumption is supported by the Michigan Waste & Recycling Association's and EGLE's 2019 statewide study on landfill leachate PFOA and PFOS levels, which found that, overall, leachate provides a relatively minor contribution to the overall PFOA and PFOS concentration in most POTW influent, and that non-leachate sources of PFOA and PFOS contribute greater mass to influents than leachate.
- 3) Over time, PFOA and PFOS concentrations are expected to be reduced in the landfills' leachates as society moves past everyday use of these compounds.

With the above stated, there were cases in Michigan where a landfill was directed by the receiving POTW to install treatment when the leachate was the cause of exceedances at the POTW. However, this instance was rare in Michigan and is not expected to occur in Wisconsin. Given the flexibility that the proposed rule allows for compliance compared to Michigan's policy (85 months compared to 8 months), the department assumed that landfills that are the primary cause of potential exceedances at a receiving POTW would choose to incur costs to haul leachate to a POTW that does not have reasonable potential to exceed the proposed criteria for PFOA and PFOS, rather than installing treatment. As explained above, 19% of POTWs that receive significant industrial wastewater contributions are expected to have reasonable potential to exceed the criteria for PFOA and PFOS. If landfills haul leachate to POTWs that accept industrial wastewater on an evenly distributed basis, it is reasonable to expect that 19% of landfills haul leachate to POTWs that will be implementing PFOA/PFOS minimization plans. If all of these landfills are found to be PFOA/PFOS sources of concern (which may not be the case, but this analysis will presume that could be the case), then 19% of landfills will need to take action as a result of this rule. With 31 municipal waste landfills and 26 industrial waste landfills, the total universe is 57 facilities. Assuming 19% of these landfills will need to incur hauling costs to transport the leachate to a POTW that will accept it, the estimated number of affected landfills is expected to be about 11 facilities. Hauling costs and sampling costs for these facilities can be found in sections 2 and 3 below.

#### **1.4 Dewatering Projects and Fire Suppression Activities and Class B Fire fighting Foam Facilities**

Dewatering for construction projects and from areas where fire suppression was deployed: The last category of dischargers evaluated in this EIA is those facilities that may need to install treatment associated with construction dewatering projects in areas where groundwater is contaminated with PFOA/PFOS or associated with contamination from fire suppression activities where aqueous film forming foam (AFFF) was deployed. These discharges are typically regulated under a WPDES general permit, and the discharges are typically temporary rather than ongoing. Since 2019, the department has required entities proposing dewatering projects on or near PFOA/PFOS-contaminated sites to both screen the groundwater for PFOA and PFOS levels and then install treatment for PFOA/PFOS if warranted based on concentrations observed. The department determined whether concentrations observed were of public health significance based on the existing narrative water quality standard that protects public health and is included in all WPDES general permits and individual permits.

In the last 24 months, the department reviewed 9 such projects near PFOA/PFOS-contaminated sites or in response to use of AFFF. Of these, 6 were required to install treatment (3 per year, on average), based on the department's interpretation of public health significance in s. NR 102.04(8)(d), Wis. Adm. Code which is a condition in all general permits. However, using this proposed rule's criteria, only 5 (2.5 projects per year) would have been required to treat prior to discharge, amounting to a cost reduction for

0.5 treatment projects per year compared to the department's interpretation of the existing narrative standard.

Total: There may be a reduction in facilities that will be required to treat PFOA/PFOS discharges to obtain coverage under the dewatering general permit. However, this EIA tabulates gross costs rather than net costs, so any savings realized by the proposed rule relative to the status quo are not included in the total cost numbers calculated in this EIA.

Class B Firefighting Foam facilities subject to chapter NR 159: The Tyco One Stanton Street facility's PFOA/PFOS removal costs are not included as impacts of this rule since they are incurred as a result of Michigan's standards applying to the interstate receiving water to which the facility discharges. The Tyco Fire Technology Center's treatment costs are similarly not included as impacts of this rule since PFOA/PFOS removal at that facility was installed as a result of ch. NR 159, Wis. Adm. Code, and 2019 Wisconsin Act 101. This proposed rule does not impose additional costs.

### **1.5 Other Facilities**

One of the facilities that the department sampled is a fish hatchery that is operated by the United States Geological Survey for research purposes. This facility is discharging above the proposed criteria for PFOS due to use of contaminated source water, and therefore would be required to implement source reduction measures under the proposed rule. This facility already has a granular activated carbon treatment system in place, but PFOA/PFOS are not a targeted class of pollutants.

Other fish hatcheries in the state are not expected to be sources of PFOA/PFOS because they are not known to be located near existing PFOA/PFOS contaminated source waters.

## **2. Sampling Costs**

### **Peak Annual Costs: \$1,543,575**

Preliminary sampling cycle: In order to confirm whether a discharge from a WPDES permitted facility has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standard, the proposed rule requires that certain facilities that discharge to surface waters and potentially have PFOS or PFOA in their effluent conduct sampling for PFOS and PFOA at a specified frequency for the first 24 months after their WPDES permit is reissued following promulgation of this rule. The department can waive sampling for an industry or municipality if those facilities are not expected to be discharging PFOA or PFOS at levels above the criteria. The department can also reduce the frequency of sampling after one year of sampling data is collected, provided at least 12 samples are collected.

Permittees expected to be subject to the sampling requirement of s. NR 106.98(2), Wis. Adm. Code, are included in the table below. Industries are required to sample at least monthly, but only if the department expects that the industry's effluent may contain PFOA/PFOS. For this analysis, the department expects that 47 direct dischargers may have PFOA/PFOS in their effluent and will conduct the initial 24 month sampling series: metal finishers (4), pulp and paper mills (29), airports (2), and power plants (11), plus one fish hatchery which uses contaminated groundwater as source water (1). It is assumed that industries not identified by Michigan EGLE's [Identified Industrial Sources of PFOS to Municipal Wastewater Treatment Plants](#) report as PFOA/PFOS sources and those that discharge only noncontact cooling water will not have to complete sampling for PFOS and PFOA, although this may change if the department receives data indicating that other industrial sectors may be sources of PFOA/PFOS. Facilities decommissioning or closing within the next 3 years were also excluded. No chemical manufacturers, centralized waste treaters, or commercial laundry facilities are known to directly discharge process

wastewater to surface waters in Wisconsin. For these indirect industrial dischargers, it is assumed that the initial 24-month sampling cycle for PFOS and PFOA will be conducted by the POTWs receiving the wastewater from these industries so the sampling costs are included in the costs for POTWs in Table 3. The department assumes affected facilities will sample for all 33 PFOA/PFOS compounds on the department's PFOA/PFOS list, at a cost of \$500 per sample, a one-time cost of \$275 per sample for equipment blanks (these costs were provided by the Wisconsin State Laboratory of Hygiene and one other private lab). Shipping costs are estimated to be \$75/sample. The department obtained these sampling costs by surveying multiple laboratories that conduct PFOA/PFOS analysis and using the highest costs of all laboratories that responded to the department's solicitation.

Table 3: Permittees Subject to 24-month Sampling Requirement in s. NR 106.98(2)

Permittees to Complete 24-months of Initial Sampling					
	Number of Facilities	Equipment Blank Sample (per facility)	Sampling Frequency	Influent and/or Effluent	Cost
Major POTWs >5 MGD flow	27	1	Monthly	Both	\$752,625
Major POTWs with flow >1 MGD but <5 MGD	60	1	6/year	Both	\$844,500
Minor POTWs with potential PFOA/PFOS source	55	1	6/year (assumed)	Both	\$774,125
Minor POTW without potential PFOA/PFOS source	405	1	None	Both	\$0
Industry with potential PFOA/PFOS in effluent	47	1	Monthly	Effluent Only	\$661,525
<b>Total Costs (over 6 years)</b>					<b>\$3,032,775</b>

WPDES permits are issued for 5-year terms with issuance dates for permits staggered, so costs for 24 months of sampling will be incurred by dischargers on a rolling basis over the first 6 years of the rule's effectiveness, as shown below:

Table 4: Annual Costs of 24-month Sampling Requirement in s. NR 106.98(2) by Year

Annual Costs of 24-months of Initial Sampling					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
\$303,278	\$606,555	\$606,555	\$606,555	\$606,555	\$303,278

Long-term sampling: If the department determines that levels of PFOS or PFOA in a permitted discharge may cause or contribute to an exceedance of the PFOS or PFOA standard, then the development and implementation of a PFOA/PFOS minimization plan and continued sampling is required.

For sampling costs incurred as a result of source investigation, the department anticipates that these costs will be highest within the first 2 years of implementing a PFOA/PFOS minimization plan. This is because facilities will incur these costs as they identify sources in earlier years of the PFOA/PFOS minimization plan, and the department is assuming that, once the primary sources have been identified, the facility will take steps to eliminate those sources. To account for this additional sampling cost, the department estimates that each facility will take 12 additional samples/year during each of the first 2 years of implementing the PFOA/PFOS minimization plan and performing source investigation. To account for the uncertainty of precisely how many samples will need to be taken and in interest of being conservative, pretreatment industries' sampling costs are double-counted (both in evaluating pretreatment industry

samples and in evaluating samples that POTWs must take). These sampling costs are in addition to the 24 samples a year (both influent and effluent at a frequency of once a month) that POTWs will be collecting and the 12 samples per year (effluent) that affected industries (including direct and indirect dischargers) will be collecting.

Table 5: Estimated Annual Sampling Costs (First two years of PMP implementation)

Sampling Costs (per sample)	Shipping Costs (per sample)	POTWs (36x/yr)*	Industries (24x/yr)
\$500.00	\$75.00	\$20,700.00	\$13,800.00

\*Both influent and effluent

Table 6: Estimated Annual Sampling Costs (After first two years of PMP implementation)

Sampling Costs (per sample)	Shipping Costs (per sample)	POTWs (24x/yr)*	Industries (12x/yr)
\$500.00	\$75.00	\$13,800.00	\$6,900.00

Table 7: Estimated Statewide Long-term Sampling Costs\*

Facility Type	Number of Facilities	Annual Costs (first two years)	Annual Costs (after two years)
POTWs	23	\$476,100	\$317,400
Metal Finishers	37	\$510,600	\$255,300
Paper/Packaging	21	\$289,800	\$144,900
CWTs	7	\$96,600	\$48,300
Chemical Manufacturers	10	\$138,000	\$69,000
Commercial Laundries	8	\$110,400	\$55,200
Power Plants	2	\$27,600	\$13,800
Airports	2	\$27,600	\$13,800
Fish Hatchery	1	\$13,800	\$6,900
Landfills	11	\$75,900**	\$75,900
<b>Total</b>		<b>\$1,766,400</b>	<b>\$1,000,500</b>

\*These estimated costs are for all facilities which the department anticipates either have reasonable potential to exceed the narrative standard or discharge to a POTW with reasonable potential to exceed the standard.

\*\*Landfills are not expected to incur additional sampling costs beyond monthly sampling of the leachate.

These long-term sampling costs will be incurred by facilities after they complete their 24 months of initial sampling and that sampling shows that they (or the POTW to which they discharge) has reasonable potential to exceed the water quality standards. Therefore, the long-term sampling costs will be phased in over multiple years, as shown below:

Table 8: Estimated Long-term Annual Sampling Costs by Year

Annual Costs of Long-Term Sampling								
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Years 9 and Beyond
\$0	\$0	\$353,280	\$706,560	\$906,660	\$1,106,760	\$1,306,860	\$1,153,680	\$1,000,500

### 3. PFOA/PFOS Minimization Plan and Source Reduction Costs

#### **Peak Annual PMP Costs: \$2,617,501**

In estimating costs associated with the development and implementation of a PFOA/PFOS minimization plan, the department relied on existing knowledge of comparable existing pollutant minimization programs for toxic substances for reference, along with knowledge of minimization plan requirements. The costs specified in this section do not include sampling, analytical, or wastewater treatment costs, as those costs are accounted for in sections 2 and 4.

**Landfill Hauling Costs:** This economic impact analysis is only required to estimate **additional** costs incurred to landfills because of this proposed rule, not overall disposal costs. As explained above, landfills may need to change routes of disposal for disposing of leachate, causing additional costs. To forecast these costs, the department relied on hauling cost information obtained from the U.S. Environmental Protection Agency. On average, hauling leachate costs about \$3.00/mile/truck, in 2002 dollars. The statewide median leachate generation is approximately 20,000 gpd. The department compared the proximity of POTWs around the state and assumed that landfills hauling leachate to a new POTW will need to drive two trucks (20,000 gallons total) an additional 30 miles/day to dispose of the leachate that's generated onsite. Over the course of a year, this amounts to an estimated average additional hauling cost of \$65,520/facility/year. For 11 affected landfills, this results in a total compliance cost of \$720,720. Adjusting for inflation (51.75%) to 2021 dollars, this results in a total compliance cost of \$1,093,693.

**Mercury PMPs:** To gain an understanding of costs related to developing and implementing pollutant minimization plans, the department gathered costs reported by 37 facilities currently implementing mercury pollutant minimization plans because of the inherent similarity in the required actions (source identification, product substitution, cleaning of equipment, community information campaigns, etc.), ubiquitous nature of both PFOA/PFOS and mercury at low parts-per-trillion levels, and similar industrial sources of elevated levels of both pollutants. The distribution of the data was heavily skewed and as a result, the median of the cost (capital costs: \$2,000 and annual operating costs: \$4,000) from this data was used in this analysis (entities that reported \$0 cost were excluded). These numbers offer an idea of what to expect from implementing PFOA/PFOS minimization plans, but the department also recognizes that these pollutants are different, and therefore source reduction efforts may differ as a result. To assess the costs associated with PFOA/PFOS minimization plans, the department determined that investigative source identification (see 'Sampling Costs' above) and staff time are the primary contributors to overall PFOA/PFOS minimization plan development and implementation.

Staff time is the long-term cost driver for PFOA/PFOS minimization plan implementation. It will take staff time to review relevant historical documents on potential PFOA/PFOS sources, research potential PFOA/PFOS contamination routes, reach out to various suppliers/pretreatment industries, and take PFOA/PFOS samples of the influent, effluent, and other sources and/or products deemed necessary by the facility. With an assumed pay of \$22/hr (based on the median pay of Wastewater Operators in the state of Wisconsin), the department estimates that 30% of these individuals' time (1 individual per facility) will be devoted to PFOA/PFOS minimization plan development and implementation. On an annual per-facility (average) basis, this amounts to a cost of \$13,728. This percentage was determined based on the range of facilities expected to incur costs as a result of this rule. For example, smaller POTWs with 1 or 2 industrial PFOA/PFOS sources are not expected to spend this estimated amount of time implementing and developing the PFOA/PFOS minimization plan, while larger POTWs with dozens of industrial sources may spend more time.

As explained above, the department assumed that 23 POTWs will need to develop and implement a PFOA/PFOS minimization plan (see discussion in ‘Number of Facilities Affected’ above). Also as outlined above, for industrial facilities, the department evaluated its own sampling data and also considered specific types of facilities in Michigan’s comprehensive study which were determined to be sources of PFOS.

The identified fish hatchery does not add PFOA/PFOS to its products. Rather, the groundwater that it pumps and utilizes in its processes has been identified as being contaminated with PFOA/PFOS. This facility is not anticipated to install treatment in order to comply with the rule. Rather, this facility will need to research ways to reduce PFOA and PFOS in its effluent through the implementation of a PFOA/PFOS minimization plan.

This ultimately results in 37 metal finishers, 21 paper/packaging manufacturers, 7 CWTs, 10 chemical manufacturers, 8 commercial laundries, 2 power plants, 2 airports, and 1 fish hatchery needing to implement a PFOA/PFOS minimization plan. These are 111 facilities in total. Total costs are shown in the table below.

Table 9: Estimated Statewide Costs for PFOA/PFOS Minimization Plan Implementation\*

Facility Type	Number of Direct Dischargers	Number of Indirect Dischargers	Annual Costs
POTWs	23	N/A	\$315,744
Metal Finishers	1	36	\$507,936
Paper/Packaging	12	9	\$288,288
CWTs	0	7	\$96,096
Chemical Manufacturers	0	10	\$137,280
Commercial Laundries	0	8	\$109,824
Power Plants	2	0	\$27,456
Airports	2	0	\$27,456
Fish Hatchery	1	0	\$13,728
Landfills**	0	11	\$1,093,693
<b>Total</b>			<b>\$2,617,501</b>

\*Excludes sampling costs associated with PFOA/PFOS Minimization Plan implementation (see ‘Sampling Costs’ above)

\*\*See derivation of landfill hauling costs above

These costs will be incurred by facilities beginning in the third year of their WPDES permit issued after promulgation of the rule, following 2 initial years of sampling. Because permit issuances are staggered and last for 5 years, costs will be phased in as follows:

Table 10: Estimated PFOA/PFOS Minimization Plan Costs by Year

Annual Costs of PFOA/PFOS Minimization Plans							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Years 8 and Beyond
\$0	\$0	\$523,500	\$1,047,000	\$1,570,501	\$2,094,001	\$2,617,501	\$2,617,501

## 4. Treatment Costs

### **Peak Annual Treatment Cost: \$856,252**

Treatment cost data was gathered through the solicitation of various facilities in Wisconsin that have installed and operated treatment systems for the purposes of removing PFOA/PFOS compounds. Because the costs can potentially vary widely based on the flow rate of the facility installing the treatment system, the department had to make several conservative assumptions in order to estimate the impact on the varied entities under this rule. Based on the agency's experience and consultation with some of the entities that have installed PFOA/PFOS treatment in Wisconsin, the department assumed that the granular activated carbon (GAC) system will be the most common and likely treatment system that affected entities will install if treatment is necessary to achieve the standard. Another assumption is that the GAC carbon changeout will occur every 3 weeks. This is conservative as input from the department's experts and observations from entities with GAC already installed indicated that these systems typically require carbon changeout every 3 to 5 weeks. Additionally, the department assumes that these facilities will rent the equipment, as the only cost data available to the department is rental costs for these systems. For that reason, capital costs are quite low relative to annual operation and maintenance costs. To estimate expected costs associated with carbon replacement and disposal, the department used flow rates of facilities expected to be impacted. See below for an explanation of how these facilities were identified.

In assessing the number of facilities that might need to install treatment as a result of this proposed rule, the department considered the results of Michigan's efforts while also taking into consideration the unique differences between Michigan's PFOA/PFOS surface water quality criteria and Wisconsin's proposed criteria. In Michigan, the first option for industrial source reduction was installing GAC treatment at the industrial contributor, and the timelines associated with PFOA/PFOS source reduction measures were shorter. Therefore, the number of facilities in Michigan that needed to install treatment appears to be higher than what the department estimates that number would be in Wisconsin. This is because Wisconsin's proposed rule allows a facility 85 months to implement the PFOA/PFOS minimization plan prior to requiring compliance with a limit. Because the manufacturing of PFOA- and PFOS-containing products has been significantly reduced just in the past decade, the department believes that the implementation of a PFOA/PFOS minimization plan over 85 months will be sufficient for the vast majority of facilities to comply with the final PFOS and PFOA water quality standard.

The department believes that the PFOA/PFOS Minimization Plans will be highly effective in reducing 30-day P99 concentrations of PFOA and PFOS based on the department's experience reviewing pollutant minimization plans for mercury. An analysis of effluent data from POTWs and industrial direct dischargers who have had mercury variances for at least 10 years revealed that reductions from the first 5 years' 30-day P99 to that of years 6-10 were significant, with a median reduction of 43% (see the figure below). The most significant mercury reductions are expected within years 1-5, but years 6-10 were chosen for this analysis because (a) data for mercury concentrations prior to implementation of PMPs was sparse, and (b) use of data from years 6-10 rather than 1-5 is expected to result in a conservative (i.e. lower) pollutant reduction rate since easier source reduction actions would be implemented in early years. Additionally, the department is using the mercury reductions achieved in 5 years as a surrogate for expected PFOA and PFOS reductions over 85 months, further lending to the conservative nature of this analysis.

If this expected typical reduction of 43% is applied to the expected 30-day P99 values for PFOA and PFOS in the effluent of permittees for which the department sampled, only 1 industry would remain above the calculated water quality based effluent limit for PFOS, and no permittees would remain above



To estimate the amount of carbon needed to treat the 1 metal finisher’s effluent, the department compiled flow data from the 5 identified metal finishers that are likely impacted by this rule, and averaged their maximum flow rates, which came to 10 gpm. At that flow rate, assuming a carbon density of 30 lbs/ft<sup>3</sup> and an empty-bed contact time of 10 minutes per vessel, 1,200 total lbs of carbon would be needed to treat that waste stream (400 lbs/vessel). These costs are summarized in Table 11 and are expected to be incurred at year 7 after completion of the PFOA/PFOS minimization plan’s efforts for product substitution.

Centralized Waste Treater discharging to POTWs without pretreatment programs: The 1 CWT that discharges to a POTW (without an approved pretreatment program) that the department projects may need to install treatment has a maximum flow of about 10,000 gpd (7gpm). Accordingly, the department assumed that the treatment system would need to accommodate a flow rate of 10 gpm, just as with the metal finisher. Therefore, treatment costs are expected to be similar for the affected metal finisher and CWT. These costs are summarized in Table 12 and are expected to be incurred at year 7 after completion of the PFOA/PFOS minimization plan’s efforts for product substitution.

Dewatering and Fire Suppression Dischargers: For the dewatering or fire suppression dischargers which will need to install treatment, this rule is expected to result in a reduction of costs to permitted facilities. Analyzing past discharge data and current practices, it was determined that under the proposed surface water rule, a half-a-facility less per year would ultimately need to install treatment when compared to the status quo (2.5 facilities per year, compared to 3 facilities per year; see discussion in section 1.4).

However, this EIA tabulates gross costs rather than net costs, so any savings realized by the proposed rule relative to the status quo are not included in the total cost numbers calculated in this EIA.

Total: In total, 2 facilities (1 CWT and 1 metal finisher) are expected to install ongoing treatment as a result of this proposed rule, and 0.5 fewer dewatering or fire suppression activities are expected to install temporary treatment systems each year (an expected average of 2.5 projects per year rather than the average of 3 per year over the last 2 years under current rules). The savings associated with the 0.5 dewatering or fire suppression projects per year are not included in the total cost estimate provided in this section or the EIA, since this EIA counts gross (total), not net, costs.

The total compliance cost for treatment include a one-time cost of \$70,000 per entity impacted (consulting fees and system design), and annual costs of \$358,126 for the impacted CWT and metal finisher.

Table 11: Estimated Capital Treatment Costs

<b>One-Time Treatment Costs</b>	
Consulting Fees	\$23,000.00
System Design/Installation	\$47,000.00
<b>Total</b>	<b>\$70,000.00</b>

Table 12: Estimated Annual Treatment Operational Costs for 10 gpm CWT Facility and Metal Finisher

<b>Annual Operational Costs for Installed Treatment (10 gpm facilities)</b>	
Carbon Changeout (one vessel/3 wks = 17 times/yr, \$3.10/lb carbon, 400 lbs carbon/vessel)	\$21,080.00
Carbon Disposal Costs (17 times/yr, \$190/ton, 400 lbs/each time)	\$646.00

Disposal Hauling Fee (\$3,200 ea changeout, 17 times/yr)	\$54,400.00
Rental Costs: 3xGAC Vessels (12 months, \$1,500/month/vessel – excludes carbon cost)	\$54,000.00
Operations/Maintenance Labor (estimated at \$19,000/month)	\$228,000.00
<b>Total</b>	<b>\$358,126.00*</b>

\*These are costs per project and recur on an annual basis beginning in year 7 of rule implementation, after PFOA/PFOS minimization plans have been fully implemented

Table 13: Initial Year Treatment Cost Totals

<b>Year 1 Treatment Cost Totals (Capital Cost + Annual Cost)</b>			
	Projects/yr	Cost per project	Cost
10 gpm CWT/Metal Finisher	2	\$428,126	\$856,252

Table 14: Annual Operational Treatment Cost Totals, after initial year

<b>Annual Operational Treatment Cost Totals</b>			
	Projects/yr	Cost per project	Cost
10 gpm CWT/Metal Finisher	2	\$358,126	\$716,252

Costs by year are expressed below. As mentioned, costs for treatment incurred by the metal finisher and CWT are expected to begin at least 85 months after rule implementation (after the PMP implementation period), as facilities are expected to utilize source reduction as part of the PFOA/PFOS minimization plans prior to installing treatment.

Table 15: PFOA/PFOS Treatment Costs by Year

<b>Annual Costs of PFOA/PFOS Treatment</b>							
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Years 8 and Beyond
\$0	\$0	\$0	\$0	\$0	\$0	\$856,252	\$716,252

## 5. Fiscal Impact and Impact on State Government

The department does not anticipate that this rule will impact the state’s agencies adversely. Unless the department’s Water Quality Program is granted authorization to hire additional positions related to PFOA/PFOS, any additional workload resulting from this rule will need to be absorbed within the current work schedule of the agency’s employees, though this will likely increase workload for existing staff.

## 6. Impacts on Local Governmental Units

All costs to POTWs that are municipally owned are included in the table below. The estimated compliance costs to local governmental units are \$7,753,802 over 10 years, or an average of \$775,380 annual costs. As mentioned in the Treatment section above, treatment is not expected to be necessary for POTWs due to observed success of past source reduction activities and low observed PFOA and PFOS concentrations relative to expected effluent limitations.

Table 16: Estimated Maximum Annual Costs for Local Governmental Units

Cost Type	Number of POTWs	Annual Costs	Cost per POTW per year	Years Incurred	Total Cumulative 10 yr Cost (over first 10 years after next permit reissuance)
Treatment	0	\$0	\$0	N/A	\$0
PFOA/PFOS Minimization Plan	23	\$315,744	\$13,728	8	\$2,525,952
Initial Sampling (2 yrs)	142	\$1,185,625	\$8,350	2	\$2,371,250
Sampling (Years 2- 4)	23	\$476,100	\$20,700	2	\$952,200
Sampling (After Year 4)	23	\$317,400	\$13,800	6	\$1,904,400
<b>Total cumulative 10 years of costs</b>					<b>\$7,753,802</b>

Local governmental units were given the opportunity to provide input prior to finalization of the EIA.

## 7. Impacts on Public Utility Rate Payers

The department expects that 142 municipalities will incur costs associated with initial sampling for a period of 2 years. Of these, 119 communities are expected to have no costs resulting from this rule other than for sampling. The expected increase in annual sewer rates in these 142 communities is expected to be approximately \$0.90/person, effective for 2 years. Because the populations of these communities are unknown, this was derived by dividing the average cost per affected POTW (\$8,350) by the average population of a municipality in Wisconsin (5,900,000 Wisconsinites/639 facilities).

Additionally, the department expects that 23 of these 142 affected municipalities are expected to be impacted beyond the initial 2 years of the rule's implementation in a WPDES permit. The expected increase in annual sewer rates in these 23 municipalities varies based on the populations served, but an estimate after the first 2 years is provided below. Because populations and therefore rate increases for POTWs #13 - #23 are unknown at this time, the average population for POTWs #7 - #12 (11,700) was used to estimate the rate increases. The average estimated rate increase across all 23 POTWs is \$2.22/person. This was derived by dividing the annual estimated cost (\$27,528) by the population of the impacted POTW, then averaging the rate cost across the 23 POTWs. This accounts for the significant outliers in population data.

Table 17: Estimated Cost Increases to Rate Payers, Years 5 - 8

POTW	Cost per POTW per year	Population	Estimated Rate Increase (\$/person)
POTW #1	\$27,528	26,200	\$1.05
POTW #2	\$27,528	38,400	\$0.72
POTW #3	\$27,528	48,400	\$0.57
POTW #4	\$27,528	1,100,000	\$0.03
POTW #5	\$27,528	28,000	\$0.98
POTW #6	\$27,528	38,700	\$0.71
POTW #7	\$27,528	15,000	\$1.84
POTW #8	\$27,528	3,400	\$8.10
POTW #9	\$27,528	7,600	\$3.62
POTW #10	\$27,528	6,900	\$3.99
POTW #11	\$27,528	26,200	\$1.05

POTW #12	\$27,528	11,100	\$2.48
POTW #13	\$27,528	11,700*	\$2.35
POTW #14	\$27,528	11,700*	\$2.35
POTW #15	\$27,528	11,700*	\$2.35
POTW #16	\$27,528	11,700*	\$2.35
POTW #17	\$27,528	11,700*	\$2.35
POTW #18	\$27,528	11,700*	\$2.35
POTW #19	\$27,528	11,700*	\$2.35
POTW #20	\$27,528	11,700*	\$2.35
POTW #21	\$27,528	11,700*	\$2.35
POTW #22	\$27,528	11,700*	\$2.35
POTW #23	\$27,528	11,700*	\$2.35

\*This population is unknown at this time and assumed to be the average of POTWs #7 - #12

There is no expected increase in sewer rates for rate payers in the other 497 POTWs' sanitary sewer service areas.

Actual costs are expected to be less for domestic sewer users, as large portions of this increase will likely be paid by industrial users. The department intends to solicit information for POTWs impacted by this rule to assess what, if any, of the compliance costs will be passed on to consumers.

## 8. Impact on Small Businesses

A breakdown of the statewide economic impact on small businesses is provided in the 2 tables below. The number of affected small businesses was determined based on the number of affected industries discussed above and census data indicating the percent of businesses within given sectors that are small businesses. The facilities projected to be impacted are all expected to either have reasonable potential to exceed the criteria or to be discharging to a facility that has reasonable potential to exceed the criteria. Consequently, these facilities will, at a minimum, incur costs associated with sampling and development and implementation of a PFOA/PFOS minimization plan or just source reduction activities. As stated above, the sampling costs for 'Other Pretreatment Industries' is a conservative assessment of the impact on small businesses. Additionally, the potentially-impacted CWT referenced above does not meet the criteria of a small business, but the metal finisher that may need to install treatment is assumed to be a small business, since 68% of metal finishers are small businesses. Because none of the entities that installed treatment due to dewatering or fire suppression activities were small businesses, the department assumed that these anticipated treatment costs would not be passed on to small businesses.

Identification of entities impacted that are potentially small businesses were based on the 2017 County Business Patterns and 2017 Economic Census from the U.S. Census Bureau based on number of employees (20 employees or less). The department acknowledges that this national data may not accurately reflect Wisconsin.

Table 18: Estimated Number of Affected Small Businesses

Industry Type	Percentages of Small Businesses by Industry Type	Number of Affected Industries	Number of Affected Small Businesses
Metal Finishers	68%	37	25
Paper/Packaging	23%	21	5
CWTs	76%	7	5

Chemical Manufacturers	72%	10	7
Commercial Laundries	70%	8	6
<b>Total</b>			<b>48</b>

Table 19: Estimated Statewide Impact on Small Businesses

Cost Type	Number of Small Businesses	Annual Costs
Treatment	1	\$428,126
PFOA/PFOS Minimization Plan/Source Reduction Measures	48	\$658,944
Sampling	48	\$993,600
<b>Total</b>		<b>\$2,080,670</b>

## 9. Total Cost

The estimated maximum single year cost associated with implementation of Board Order WY-23-19 is **\$4,780,613**. This is the sum of \$2,617,501 in PFOA/PFOS minimization plan and source reduction costs amongst 122 facilities, \$856,252 in treatment costs, and \$1,306,860 in sampling and analytical costs.

Over a 2-year period, the maximum expected cost is **\$9,268,046**. This is the sum of \$5,235,002 in PFOA/PFOS minimization plan costs amongst 122 facilities, \$1,572,504 in treatment costs, and \$2,460,540 in sampling and analytical costs.

These costs by year of rule implementation are laid out in the table below. For detailed explanations of the timing of costs, see sections 2-4.

Table 20: Total Costs of Rule Implementation

Maximum Estimated Total Costs of Rule Implementation									
Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Years 9 and Beyond
24-mos. Initial Sampling	\$303,278	\$606,555	\$606,555	\$606,555	\$606,555	\$303,278	\$0	\$0	\$0
Long-term* Sampling	\$0	\$0	\$353,280	\$706,560	\$906,660	\$1,106,760	\$1,306,860	\$1,153,680	\$1,000,500
PFOA/PFOS Minimization* Plan	\$0	\$0	\$523,500	\$1,047,000	\$1,570,500	\$2,094,001	\$2,617,501	\$2,617,501	\$2,617,501
PFOA/PFOS Treatment**	\$0	\$0	\$0	\$0	\$0	\$0	\$856,252	\$716,252	\$716,252
<b>Total Costs</b>	<b>\$303,278</b>	<b>\$606,555</b>	<b>\$1,483,335</b>	<b>\$2,360,115</b>	<b>\$3,083,716</b>	<b>\$3,504,039</b>	<b>\$4,780,613</b>	<b>\$4,487,433</b>	<b>\$4,334,253</b>

\*Over time, costs of PMP implementation as well as long term sampling costs will likely go down.

\*\*Includes installation of treatment in year 7 and then operational costs of treatment systems thereafter.

## 10. Potential Costs Associated with PFOA/PFOS Contamination, if Left Unregulated

Given that data specific to Wisconsin is not yet available, it is difficult to quantify PFOS/PFOA related health impacts in Wisconsin. For the purpose of this EIA, health impacts and recreational value impact studies presented here and the value transfer methods used to estimate potential Wisconsin specific health impacts are based on a number of assumptions. The purpose of this analysis is to give Wisconsin residents an idea (informational purposes only) of the potential economic value (not actual cost) of PFOS/PFOA-related impacts if the assumptions presented here hold. The economic value of potential impacts derived from this analysis are not deducted from or factored into the final total compliance costs of this rule.

### 10.1 Healthcare Costs

To account for costs incurred to the state of Wisconsin as a result of not promulgating a PFOS/PFOA rule, the department analyzed 2 reports with health data linked to exposure to PFOA/PFOS that were submitted by commenters during the EIA solicitation process.

The first health impacts study estimated that the total cost of PFOA-attributable low birthweight births in the United States for 2003 through 2014 was \$13.7 billion<sup>1</sup>. These costs included the direct hospital costs at the time of birth as well as lost economic productivity due to low birthweight births being associated with a variety of longer-term outcomes including lower lifetime earning potential.

The department does not have data on PFOS/PFOA-attributable health incidents in Wisconsin. Using a value transfer method, we assumed a linear relationship between impacts of PFOA-attributable low birthweight births quantified by Malits et al. (2018) and the total United States population. The department estimates that, based on 1.8% of the U.S. population living in Wisconsin, the total costs due to low birth weight from PFOA exposure for the period (2003 – 2014) studied by Malits et al. (2018) are \$246.6 million (approx. \$276.2 million in 2021 dollars). This cost value is likely not robust, given that this is an extrapolation based on non-specific population data, and recognizing that promulgation of both water quality standards and WPDES permit program regulations will not alone end PFOA/PFOS exposure. However, it shows that it is reasonable to expect significant economic health benefit (avoided cost) as a result of promulgation of these proposed criteria.

The second study examined background exposure to PFOA as it relates to widespread occurrence of hypertension. This study estimated that approximately 10.3 million Europeans would develop hypertension because of this exposure, which would cost Europe an estimated €10.7 – 35 billion<sup>2</sup> annually (\$12.6 – 41.3 billion USD). Again, to use the value transfer method, the department assumed a linear relationship between European population and the estimated cost attributable to PFOA exposure. The department also assumed that the occurrence of PFOA-exposure related hypertension in the European population is the same in the United States as well as Wisconsin. Applying this occurrence to Wisconsin, and taking the lower end of that range, it's estimated that it would cost the state \$99.9 million annually

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<sup>1</sup> Malits J, Blustein J, Trasande L, Attina TM. 2018. Perfluorooctanoic acid and low birth weight: estimate of US attributable burden and economic costs from 2003 through 2014. *International Journal of Hygiene and Environmental Health* 221: 269-275.

<sup>2</sup> Goldenman, Gretta, et al. 2019. The cost of inaction: A socioeconomic analysis of environmental and health impacts linked to exposure to PFOA/PFOS. Nordic Council of Ministers.

(approx. \$103.9 million in 2021 dollars) for PFOA-exposure related hypertension illness if PFOA is not regulated.

It is important to note that the 2 studies cited above were specific to PFOA and low birthweights and hypertension. Total health-related costs associated with total PFOA/PFOS reported by Goldenman, Gretta, et al. (2019) were between €52 billion to €84 billion annually in Europe, which could be several billions of dollars for United States and hundreds of millions for Wisconsin if the quantified values are transferred<sup>3</sup>.

## **10.2 Recreation Costs:**

Contamination of surface water with PFOS will potentially result in a decrease in use and non-use economic value. Sunding (2017), in a study of the impact of PFOS advisory on a water body and its effect on public visitation to parks estimated that a PFOS advisory decreases the total park visitations by approximately 2.9% (upper bound of 5.9%) within the Minneapolis metropolitan area<sup>4</sup>.

This study also found that the economic value of damage to anglers as a result of PFOS contamination in 3 Minneapolis-area counties (Washington, Dakota, Ramsey) was \$28.48 per angling trip (approx. \$31.50 in 2021 dollars) for both popular and unpopular species. If the waterbody is assumed to have a current mercury advisory, the damage related to a PFOS advisory is estimated to be \$18 (approx. \$19.91 in 2021 dollars).

Using the average fishing trip per angler (0.51), the total number of anglers (433,603) and a conservative angler average value loss of \$18 per angling trip, Sunding (2017), estimated that the annual damage of PFOS contamination to the tri-county anglers to be \$3.87 million per year (approx. \$4.28 million in 2021 dollars).

Out of 35 waterbodies (mostly in the Madison Metro area) tested by the department, 12 PFOS fish advisories have been issued since 2006<sup>5</sup>. This represents approximately 34% of water bodies tested. Given that there are hundreds of recreational water bodies in Wisconsin, it is plausible to assume that PFOS advisories will be issues on more water bodies as the department continues its testing efforts to protect public health. The value of economic damage to anglers can be significant if Wisconsin anglers place a similar value on the damage caused by PFOS advisories as the Minneapolis area anglers (\$18 per angling trip). As a reference, the department estimates that 1.3 million anglers fished in Wisconsin on average 17 days in a year<sup>6</sup>.

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<sup>3</sup> Environmental Science and Technology. The True Cost of PFAS and the Benefits of Acting Now. <https://pubs.acs.org/doi/10.1021/acs.est.1c03565>

<sup>4</sup> Sunding DL. 2017. Damage to Minnesota's Natural Resources Resulting from 3M's Disposal of PFASs in Washington County, MN. Prepared for the State of Minnesota in the matter of the State of Minnesota v. 3M Company. September 22, 2017.

<sup>5</sup> <https://dnr.wisconsin.gov/topic/PFAS/Advisories.html>

<sup>6</sup> <https://dnr.wisconsin.gov/topic/Fishing/outreach/AdvertisingFishRegulations.html>