STATE OF WISCONSIN
DEPARTMENT OF ADMINISTRATION
DOA-2049 (R09/2016)

DIVISION OF EXECUTIVE BUDGET AND FINANCE
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ADMINISTRATIVE RULES
Fiscal Estimate & Economic Impact Analysis

1. Type of Estimate and Analysis	2. Date
☐ Original ☒ Updated ☐ Corrected	January 21, 2022

3. Administrative Rule Chapter, Title and Number (and Clearinghouse Number if applicable)

NR 102 –Water Quality Standards for Wisconsin Surface Waters
NR 105 – Surface Water Quality Criteria and Secondary Values for Toxic Substances
NR 106 - Procedures For Calculating Water Quality Based Effluent Limitations For Point Source Discharges To Surface Waters
NR 219 - Analytical Test Methods And Procedures
(CR 21-083)

4. Subject

Proposed surface water quality standard for two types of poly- and perfluoroalkyl substances (PFAS), perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) to protect public health as well as revisions to the procedures in the Wisconsin Pollutant Discharge Elimination System (WPDES) permitting program to implement the new water quality standard and proposed protocols for analyzing PFAS in sample results. Board Order WY-23-19

5. Fund Sources Affected	6. Chapter 20, Stats. Appropriations Affected
☐ GPR ☐ FED ☐ PRO ☐ PRS ☐ SEG ☐ SEG-S	None

7. Fiscal Effect of Implementing the Rule

☐ No Fiscal Effect ☐ Increase Existing Revenues ☐ Increase Costs ☐ Decrease Costs
☐ Indeterminate ☐ Decrease Existing Revenues ☒ Could Absorb Within Agency's Budget

8. The Rule Will Impact the Following (Check All That Apply)

☐ State's Economy
☒ Local Government Units
☒ Specific Businesses/Sectors
☒ Public Utility Rate Payers
☒ Small Businesses **(if checked, complete Attachment A)**

9. Estimate of Implementation and Compliance to Businesses, Local Governmental Units and Individuals, per s. 227.137(3)(b)(1).

$4,780,613 maximum in any year, $9,268,046 maximum over any two-year period. See Attachment B for a detailed derivation of these figures.

10. Would Implementation and Compliance Costs Businesses, Local Governmental Units and Individuals Be $10 Million or more Over Any 2-year Period, per s. 227.137(3)(b)(2)?

☐ Yes ☒ No

11. Policy Problem Addressed by the Rule

Poly- and perfluoroalkyl substances (PFAS) are human-made, organic compounds that have been manufactured for use in non-stick coatings, waterproof fabrics, firefighting foams, food packaging, and many other applications since the 1940s. PFAS are highly resistant to degradation and have been detected globally in water, sediment, and wildlife. This global distribution is of concern as PFAS have documented toxicity to animals and because epidemiological studies have suggested probable links to several human health effects. In Wisconsin, PFAS have been detected in drinking and surface water near sources of industrial use or manufacture and near spill locations. Perfluorooctane sulfonate (PFOS) has been found in fish tissue resulting in the issuance of special fish consumption advisories for some surface waters in the state.

The proposed rules include a water quality standard for two types of PFAS: PFOS and perfluorooctanoic acid (PFOA). Under the Clean Water Act, surface water quality standards can include criteria that are numeric or narrative. Wisconsin's existing Administrative Codes contain both numeric and narrative criteria for toxic substances:

- Chapter NR 105, Wis. Adm. Code, contains specific numeric criteria for numerous toxic pollutants as well as formulas for calculating numeric criteria and secondary values for toxics that do not yet have promulgated criteria.

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- Section NR 102.04(d), Wis. Adm. Code, contains Wisconsin's narrative criteria for toxics. This existing rule states that substances in concentrations or combinations which are toxic or harmful to humans *shall not be present in amounts found to be of public health significance* [emphasis added], nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

The proposed PFOS and PFOA standard is both narrative and numeric in that it interprets Wisconsin's existing narrative standards under ss. NR 105.04(4m) and 102.04, Wis. Adm. Code, and it includes both narrative provisions and numeric criteria. The proposed rule defines levels of public health significance for the two types of PFAS based on preventing adverse effects from contact with or ingestion of surface waters of the state, or from ingestion of fish taken from waters of the state.

- For PFOS, the proposed level of public health significance is 8 ng/L for all waters except those that cannot naturally support fish and do not have downstream waters that support fish.
- For PFOA, the proposed levels of public health significance are 20 ng/L in waters classified as public water supplies under ch. NR 104, and 95 ng/L for other surface waters.

Related to the proposed PFOS and PFOA standards, the proposed rule also includes assessment protocols that clarify when a surface water that contains levels of PFOS or PFOA above the criteria in the narrative standard should be listed on the state's impaired waters list.

Additionally, this rule includes revisions to ch. NR 106, Wis. Adm. Code, that address WPDES permit implementation procedures for the new PFOS and PFOA standard. With regard to permit implementation of the PFOS and PFOA criteria, DNR is proposing source reduction as a first step toward reducing levels of PFOS and PFOA in the effluent rather than requiring treatment up front because source reduction is the most cost effective approach to reducing or eliminating PFOS and PFOA in wastewater discharges and it avoids the generation of contaminated carbon filters from treatment systems which will contain higher levels of PFOA and PFOS that will have to be disposed of in a safe manner.

The proposed rule establishes WPDES permit requirements for PFOS and PFOA discharges to surface waters of the state, in ch. NR 106 – Subchapter VIII, Wis Adm. Code, including: the determination of the need for a PFOS and PFOA Minimization Plan based on data generation in a reissued permit, a general schedule for PFOS and PFOA Minimization Plan permit implementation procedures, and PFOS and PFOA Minimization Plan requirements. The proposed permit requirements include standard PFOS and PFOA sampling frequencies for categories of permitted dischargers. If the department does not believe that PFOS or PFOA is present in a permittee's discharged effluent, sampling may be waived. Based on the effluent data collected, the proposed rule establishes procedures for determining whether a permitted facility's discharge contains PFOS or PFOA at levels that have the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standard. For permitted facilities that have the reasonable potential to exceed the PFOS or PFOA standard, the proposed rule requires that the permittee develop and implement a PFOS and PFOA Minimization Plan in accordance with the timelines in the rule and WPDES permit schedule. The permittee must also continue sampling for PFOS and PFOA.

The department expects that for nearly all WPDES permitted facilities with discharges to surface waters as well as industrial facilities that discharge wastewater to publicly owned treatment plants, source reduction actions outlined in minimization plans will reduce PFOS and PFOA discharges to levels that are below the public health based standard. The rule allows for up to 85 months of PFOS and PFOA minimization plan implementation. At permit reissuance, for a maximum period of up to 85 months after the initial reasonable potential determination, the department will evaluate the effluent quality of the permitted facility and conduct another determination as to whether levels of PFOS or PFOA in the effluent still have the reasonable potential to cause or contribute to an exceedance of the standard. The proposed rule provides:

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- If levels of PFOS or PFOA in the effluent have been eliminated or reduced to a concentration where there is no longer reasonable potential to exceed the standard, then the department may remove future scheduled actions, the permittee will be required to maintain effluent quality at levels that would not have the reasonable potential to cause or contribute to the exceedance of PFOS or PFOA standards, and continued monitoring may be required in the permit.
- If there is still reasonable potential to exceed the standard the department may request updates be made to the PFOA and PFOS minimization plan and may include revised related terms and conditions, including revisions to the schedule in the reissued permit.

Because past pollutant minimization plans for other similar pollutants such as mercury have been shown to result in a 43 percent (median) reduction in effluent concentrations and based on relatively low initial concentrations of PFOS and PFOA observed in permittees' effluents, the department predicts that only a couple of industrial facilities (indirect dischargers) in the state will eventually have to install treatment to comply with the PFOS and PFOA standard. In these cases, the proposed rule allows a compliance schedule for installation of treatment technology.

In the event treatment becomes necessary for a WPDES permit holder, pursuant to s. 283.15, Wis. Stats., the permitted facility may apply for an economic variance if installation of treatment technology will cause substantial and widespread adverse social and economic impacts in the area where the permittee is located.

Finally, this rule adds specifications for the preservation and holding times of aqueous, biosolids (sludge), and tissue samples that will be analyzed for PFAS in ch. NR 219, Wis. Adm. Code.

12. Summary of the Businesses, Business Sectors, Associations Representing Business, Local Governmental Units, and Individuals that may be Affected by the Proposed Rule that were Contacted for Comments.

Facilities that may be affected and other interested parties were contacted and given the opportunity to comment on the draft EIA during the public solicitation period. Parties which were contacted include: Wisconsin Manufacturing and Commerce, the Wisconsin Paper Council, the League of Wisconsin Municipalities, Wisconsin Rural Water Association, the Municipal Environmental Group, the Wisconsin Cheesemakers Association, the Midwest Food Products Association, and other interested parties.

13. Identify the Local Governmental Units that Participated in the Development of this EIA.

Treatment facility operators and representatives from affected industries were given the opportunity to comment on the draft EIA during the public solicitation period. The department coordinated with local governments in development of the EIA and provided publicly owned treatment facilities that may be affected the opportunity to comment. Interested parties which were contacted include the League of Wisconsin Municipalities, Wisconsin Rural Water Association, and the Municipal Environmental Group. Both the League of Wisconsin Municipalities and the Municipal Environmental Group submitted comments on behalf of Local Governmental Units, and the department has reviewed these comments and updated Attachment B in response to some of the comments.

14. Summary of Rule's Economic and Fiscal Impact on Specific Businesses, Business Sectors, Public Utility Rate Payers, Local Governmental Units and the State's Economy as a Whole (Include Implementation and Compliance Costs Expected to be Incurred)

The maximum total compliance cost per year of this rule is estimated to be $4,780,613 (maximum in any year).

Specific Businesses and Business Sector:

The maximum annual compliance cost to the Business sector is expected to be $4,005,233 per year.

A detailed assessment of compliance cost to specific businesses, business sectors and small businesses is presented in "Attachment B" to this document. Attachment B details assumptions, number of entities impacted and related compliance cost estimations.

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Fiscal Impact and Impact on State Economy

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 PFAS, 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 and may shift workload priorities. The department does not anticipate an adverse impact on the state's economy.

Impacts on Local Governmental Units

All costs to publicly owned treatment works (POTW) that are municipally owned are included in the table below. The estimated average compliance costs to local government are $775,380 annually. See the attached narrative for more detail.

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
PFAS 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
Total cumulative 10 years of costs					**$7,753,802**
Average Annual Cost*					**$775,380**

*If all POTWs pass on costs to utility rate payers, the department anticipates that no additional costs will be incurred by the POTW.

Impacts on Public Utility Rate Payers

This section assumes POTWs will transfer some compliance cost incurred to 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, this rate increase will be in effect for 2 years while initial sampling efforts are underway, and is expected to be lowered back to the original rate once the facility is shown to have no reasonable potential to exceed the thresholds of public health significance. 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 10 POTWs are unknown at this time, the average population from similarly expected POTWs (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. The rate increase is anticipated to be in effect for the duration of the implementation of the PFAS Minimization Plan. This accounts for the significant outliers in population data.

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

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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 solicited information for POTWs impacted by this rule to assess what, if any, of the compliance costs will be passed on to consumers.

Impacts on Small Businesses
See Attachments A and B.

15. Benefits of Implementing the Rule and Alternative(s) to Implementing the Rule
Revisions to the water quality criteria and effluent limits are likely to lead to improved water quality and reduced risk of illness in people recreating in Wisconsin's waters. While these benefits are difficult to quantify, they are expected to result in an overall benefit to the citizens of Wisconsin.

According to U.S. Environmental Protection Agency (U.S. EPA)[1], the adverse health effects of exposure to PFOA and PFOS include:

- Developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations);
- Cancer (e.g., testicular, kidney);
- Liver effects (e.g., tissue damage);
- Immune effects (e.g., antibody production and immunity); and
- Thyroid effects and other effects (e.g., cholesterol changes).

A benefit of establishing numeric definitions of public health significance levels for PFOS and PFOA in a narrative standard is that the rule provides clarity and consistency for interpreting the general narrative standard in s. NR 102.04(d), Wis. Adm. Code, for these pollutants. These defined thresholds for implementation provide regulatory certainty for permittees. The department did consider promulgation of numeric criteria for PFOS and PFOA using the procedures in chapter NR 105, Wis. Adm. Code, but decided against this approach. See section 17 for information regarding why this option was not selected.

While an alternative is to not create the statewide PFOS and PFOA narrative water quality criteria with numeric thresholds, there are several disadvantages to that approach. First, as there are documented negative health effects caused by long-term exposure to PFOS and PFOA, the citizens of Wisconsin would be unprotected from risks of exposure from most discharges of PFOS and PFOA to Wisconsin's surface waters. Two groups that may be particularly at risk are those residents who obtain their drinking water from municipal water systems that use surface water as their source, and those who consume fish from waterbodies that contain PFOS. Secondly, Wisconsin residents who own property near areas of known PFAS contamination may experience diminished property values, depressing their personal net worth as well as the wealth of local communities, as evidenced by Minnesota's experience with PFOS contamination from a 3M facility[5]. Thirdly, if PFOS and PFOA remain largely unregulated, Wisconsin's economy may be adversely affected. Recreational anglers may be unwilling to consume their catch from waters with PFOS contamination and may choose to travel to adjacent states that provide fishing opportunities along with the certainty that efforts are underway to reduce PFOS contamination. This in turn may reduce revenues earned from fishing license sales, fishing charters/guides, lodges/cabins, and dining establishments.

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

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economic value of potential impacts derived from this analysis are not deducted from or factored into the final total compliance costs of this rule.

Health Cost:
To account for costs incurred to the State of Wisconsin as a result of not promulgating a PFOS/PFOA rule, the department analyzed two reports with health data linked to exposure to PFAS.

The first health impact study estimated that the total cost of PFOA-attributable low birthweight births in the United States for 2003 through 2014 was $13.7 billion[2]. 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 US 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) to be $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 PFAS exposure. However, it shows that it is reasonable to expect significant economic health benefit (avoided cost) as a result of promulgation of these proposed thresholds of public health significance.

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[3] 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 (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 two studies cited above were specific to PFOA and low birthweights and hypertension. Total health-related costs associated with total PFAS 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[4].

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[5].

This study also found that the economic value of damage to anglers as a result of PFOS contamination in three Minneapolis-area counties (Washington, Dakota, Ramsey) was $28.48 per 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 per trip (approx. $19.91 in 2021 dollars).

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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, 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 Wisconsin DNR, 12 PFOS fish advisories have been issued since 2006[6]. 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 issued on more water bodies as the WDNR 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 trip). As a reference, the WDNR estimates that 1.3 million anglers fished in Wisconsin on average 17 days in a year[7].

[1] United States Environmental Protection Agency. Drinking Water Health Advisories for PFOA and PFOS. https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos#:~:text=These%20studies%20indicate%20that%20exposure,)%2C%20liver%20effects%20(e.g.%2C
[2] 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.
[3] Goldenman, Gretta, et al. 2019. The cost of inaction: A socioeconomic analysis of environmental and health impacts linked to exposure to PFAS. Nordic Council of Ministers.
[4] 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
[5] 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.
[6] https://dnr.wisconsin.gov/topic/PFAS/Advisories.html
[7] https://dnr.wisconsin.gov/topic/Fishing/outreach/AdvertisingFishRegulations.html

16. Long Range Implications of Implementing the Rule

The creation of surface water quality criteria for PFOS and PFOA will protect public health by keeping PFAS levels in waterways low, as pollutant minimization activities to reduce or eliminate PFOS and PFOA sources will remove other PFAS compounds as well. If PFAS minimization activities are unsuccessful, then a facility may be required to install treatment to achieve compliance with water quality based effluent limitations. Therefore, costs to implement PFAS Minimization Plans and the potential costs for treatment as well as continued monitoring will be recurring annual costs as estimated in this analysis.

17. Compare With Approaches Being Used by Federal Government

Federal statutes and regulations direct states to establish and periodically review water quality standards. State adoption of water quality standards and revisions to standards require U.S. Environmental Protection Agency (EPA) approval pursuant to 40 CFR 131.20 and 131.21. Pursuant to ch. 283, Wis. Stats., WPDES permitting procedures must be consistent with federal National Pollutant Discharge Elimination System (NPDES) permitting procedures.

- 33 USC s. 1313(c) (section 303(c) of the Clean Water Act) requires that states periodically review and modify or adopt, if necessary, water quality standards. This requirement applies to all surface waters in the state.
- 33 USC s. 1314(a) (section 304 of the Clean Water Act) requires that EPA develop and publish criteria for water quality for all waters for uses such as aquatic life, public health protection, and recreation.
- 40 CFR s. 130.3 defines water quality standards as setting water quality goals for a waterbody that will protect its designated uses (such as protection of fish, wildlife, recreation, and public health and welfare). Criteria will be set to protect those uses.
- 40 CFR s. 131.4 specifies that states are responsible for reviewing, establishing and revising their own water quality standards.
- 40 CFR ss. 131.10 and 11 require states to develop water quality standards including uses and criteria to protect the uses. 40 CFR s. 131.11(b) states that the criteria must be based on federal guidance, federal guidance

modified to reflect site-specific criteria, or other scientifically-defensible methods.

- 40 CFR s. 131.11 specifies that criteria must protect the designated uses and that criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. Furthermore, states must review water quality data and information on discharges to identify specific water bodies where toxic pollutants may be adversely affecting water quality or the attainment of the designated use or where the levels of toxic pollutants are at a level to warrant concern, and must adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use.
- 40 CFR 131.20 requires states to periodically review water quality standards.
- 40 CFR 132 and Appendices contain requirements for developing water quality standards in the Great Lakes System as well as implementation procedures for the standards and NPDES permitting requirements for point source discharges to the Great Lakes System.
- 40 CFR 123.25 lists the federal regulations in 40 CFR 122 and 124 that states must follow in the administration of the NPDES permit program. State rules must be at least as stringent as these federal requirements.

EPA has neither promulgated specific water quality standards for PFOS or PFOA nor proposed criteria under section 304(a) of the Clean Water Act. EPA typically relies on states to take the initiative and develop water quality standards because states have varying types of fish and aquatic life species and varying types of waterbodies within, and adjacent to, their borders. Occasionally, EPA will specifically direct states to promulgate water quality standards or promulgate procedures for deriving criteria for pollutants in advance of state efforts, and then require that states adopt water quality standards for the pollutant that are at least as stringent as EPA's procedure or standard. EPA has not expressly directed states to develop water quality standards for PFAS at this time, although states do not need EPA approval to begin developing water quality standards and have the discretion to develop water quality criteria for any pollutant. EPA has stated that it has plans to promulgate both aquatic life criteria and human health criteria for PFAS, but any such recommended criteria won't be established for several years.

The method of calculating numeric criteria in s. NR 105, Wis. Adm. Code, reflects such procedures established by EPA for Great Lakes states. As part of this rulemaking effort, the department also conducted preliminary calculations of numeric criteria using the procedures outlined ch. NR 105, Wis. Adm. Code. At this time, however, the department selected a different methodology to develop public health based PFOS and PFOA criteria. Pursuant to s. NR 105.02 (2), Wis. Adm. Code, the department has authority to promulgate a more or less stringent criterion than a criterion calculated under the standard procedures in ch. NR 105, Wis. Adm. Code. The approach selected for deriving the PFOS standard is based on our data analysis which shows that fish consumption is the dominant exposure route of concern for PFOS. The department selected a method that allowed correlation with fish consumption advisories, which would not be included in calculation under ch. NR 105, Wis. Adm. Code. Also, with regard to the calculation of PFOA criteria, the department's calculated criteria are more protective of children that ingest or consume PFOA contaminated water compared to the procedures under ch. NR 105, Wis. Adm. Code. Finally, codifying a method for developing PFOS and PFOA minimization plans will reduce the administrative burden and permitting timelines that would have been associated with processing a large volume of variance requests expected as a result of the criteria developed using the procedures outlined ch. NR 105, Wis. Adm. Code. The department believes that public health-based criteria combined with PFOS and PFOA minimization plans will result in more timely reductions in levels of PFOS and PFOA. The department expects that the selected approach will be effective at reducing sources of PFOS and PFOA in areas of the state where PFOS or PFOA concentrations in wastewater are elevated.

18. Compare With Approaches Being Used by Neighboring States (Illinois, Iowa, Michigan and Minnesota)

The administrative codes of adjacent states contain narrative criteria for the protection of surface waters, although none of the adjacent states' narrative criteria are specific to PFOS or PFOA. The narrative criteria of Illinois, Iowa, and Michigan specifically prohibit concentrations of toxic substances in surface waters in amounts that will adversely affect human health or public health. Minnesota's narrative criteria prohibits discharge of wastes in such quantities that will

cause pollution as defined by law.
Code citations for these narrative criteria are as follows:

- Illinois: Ill. Admin. Code tit. 35, § 302.210: "Other Toxic Substances. Waters of the State shall be free from any substances or combination of substances in concentrations toxic or harmful to human health, or to animal, plant or aquatic life. Individual chemical substances or parameters for which numeric standards are specified in the Subpart are not subject to this Section."
- Iowa: IAC § 567.61.3(2)(d): "General water quality criteria. The following criteria are applicable to all surface waters including general use and designated use waters, at all places and at all times for the uses described in 61.3(1) 'a.' … 'd.' Such waters shall be free from substances attributable to wastewater discharges or agricultural practices in concentrations or combinations which are acutely toxic to human, animal, or plant life."
- Michigan: R 323.1057, Mich. Admin. Code: "Rule 51. (1) Toxic substances shall not be present in the surface waters of the state at levels that are or may become injurious to the public health, safety, or welfare, plant and animal life, or the designated uses of the waters. As a minimum level of protection, toxic substances shall not exceed the water quality values specified in, or developed pursuant to, the provisions of subrules (2) to (4) of this rule or conditions set forth by the provisions of subrule (6) of this rule. A variance to these values may be granted consistent with the provisions of R 323.1103."
- Minnesota: Minn. Stat. 7050.0210-13: "Pollution prohibited. No sewage, industrial waste, or other wastes shall be discharged from either a point or a nonpoint source into the waters of the state in such quantity or in such manner alone or in combination with other substances as to cause pollution as defined by law. In any case where the waters of the state into which sewage, industrial waste, or other waste effluents discharge are assigned different standards than the waters of the state into which the receiving waters flow, the standards applicable to the waters into which the sewage, industrial waste, or other wastes discharged shall be supplemented by the following: The quality of any waters of the state receiving sewage, industrial waste, or other waste effluents shall be such that no violation of the standards of any waters of the state in any other class shall occur by reason of the discharge of the sewage, industrial waste, or other waste effluents."

Two adjacent states – Michigan and Minnesota – have released numeric water quality values for PFOS, or PFOS and PFOA. Both states developed their values according to the procedures outlined in 40 CFR 132, but each state used different inputs which resulted in different numeric values. Similarly, Wisconsin selected a different methodology and different inputs, as described in Section 9 below, and thus the proposed standards are different. Further, Minnesota released site-specific criteria (SSC) for PFOS rather than implementing the criteria statewide. Michigan has calculated statewide values as Wisconsin is proposing to do. Wisconsin chose not to pursue the development of SSC for this rulemaking effort. Over the past several years, the department has endeavored to collect data on the occurrence of PFAS across the state, and this data indicates the possibility of human exposure to PFOA and PFOS via surface waters or fish taken from surface waters in areas throughout the state. With statewide criteria the department seeks to provide protection for citizens' use of all waters. Additionally, Minnesota's code includes provisions for developing SSCs without rulemaking, but Wisconsin's statutory framework require rulemaking for SSCs. Thus, there would be no administrative time saved or expedited human health protections gained by developing SSCs compared to statewide criteria.

Wisconsin's proposed standard of 8 ng/L for PFOS is slightly more stringent than Michigan's value of 11 ng/L and, compared to Minnesota's PFOS criterion in waters where it applies, less stringent than Minnesota's criterion of 0.05 ng/L. Wisconsin's proposed standards of 20 ng/L and 95 ng/L for PFOA in public drinking water supply waters and non-public drinking supply waters, respectively, are more stringent than Michigan's values of 420 and 12,000 ng/L for PFOA in drinking and non-drinking waters, respectively. The primary reason for the significant difference between Michigan's PFOA criteria and Wisconsin's PFOA criteria is that the reference dose (maximum amount of toxic substance that can be consumed to avoid public health impacts) that Michigan used in its calculations (conducted in 2011) is higher and not

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based on the most recent science. Furthermore, the bioaccumulation factor (BAF) that Michigan used in its PFOA calculation was experimentally derived based on laboratory data while the department used actual field measured fish tissue and water sampling data from surface waters for its PFOA calculations. Federal regulations state that field measured data should be used if available. Finally, Michigan used adult-specific exposure factors (body weight and water ingestion rates) rather than the child-specific factors that the department used. This difference is discussed below in more detail as well as in the technical support document.

Additional information on each adjacent state's approach to developing their values is provided below:

- In 2020, the Minnesota Pollution Control Agency (MPCA) released SSC for PFOS in surface waters and fish tissue for Lake Elmo and two connected waterbodies, Bde Maka Ska and Mississippi River Pool 2. These SSC are not promulgated standards but were developed according to the procedures outlined in 40 CFR 132 pursuant to Minnesota's statutory provisions. Minnesota's administrative code provides the flexibility to implement SSCs without going through rulemaking. The value for fish tissue is 0.37 ng PFOS/g and the value for water that supports the fish tissue criterion is 0.05 ng PFOS/L. MPCA's SSC incorporated the Minnesota Department of Health's toxicity value, which was derived using a model that focuses on the protection of infants and women of childbearing age (WCBA). Accordingly, MPCA's SSC derivation also included WCBA-specific body weights and fish consumption and drinking water intake rates.

  When asked for input from Minnesota on implementation, Minnesota officials responded that they implement their SSC for PFOS in a handful of waterbodies in the Minneapolis-St. Paul metro area – both in the East Metro cleanup area and in other parts. For the most part, PFOS criteria were developed in order to provide appropriate cleanup values for the East Metro and for an area of Minneapolis that has been impacted by a chrome plater. Limitations based on the numeric PFOS SSC described above have not yet been applied in NPDES permits. In 2007, MPCA and STS Consultants, LTD., developed SSC for PFOA and PFOS for Bde Maka Ska and Mississippi River Pool 2. Minnesota has had limited permit implementation of the 2007 criteria; to date, there is only one wastewater plant that has PFAS limits based on these criteria. See: https://www.pca.state.mn.us/waste/water-quality-criteria-development-pfas for more information.

- Michigan Department of Environmental Quality (now called the Department of Environment, Great Lakes, and Energy; EGLE) released statewide water quality values for PFOS in 2014 and PFOA in 2011. The process for calculating surface water quality values, outlined in 40 CFR 132, is promulgated in Michigan's administrative code R. 323.1057. However, values resulting from this process are not promulgated and appear in "Rule 57 Water Quality Values Spreadsheets" available at https://www.michigan.gov/egle/0,9429,7-135-3313_3681_3686_3728-11383--,00.html. Michigan's PFOS and PFOA values apply to surface waters statewide. Concentrations of PFOS may not exceed 11 and 12 ng/L in drinking and non-drinking waters, respectively. Concentrations of PFOA may not exceed 420 and 12,000 ng/L in drinking and non-drinking waters, respectively. Michigan derived their water quality values for PFOA in 2011 (formally published in 2014) with the information that was available at the time. Their values incorporate data from studies where cynomolgus monkeys were exposed to PFOS or PFOA for 182 days (Butenhoff et al. 2002; Seacat et al. 2002). Their selected reference dose (RfD) is based on effects on liver weight and is higher than RfDs that have been subsequently developed based on developmental or immune effects which occur at lower doses. Michigan currently uses a lower RfD, developed by ATSDR, as the basis of their Health-Based Drinking Water Value for PFOA. Additionally, in derivation of their 2011 surface water values, Michigan incorporated a bioaccumulation factor (BAF) of 4 L/kg based on an experimentally derived bioconcentration factor (BCF). Calculating a BAF using at BCF is a method that is less preferred compared to the method of calculating a BAF using field-measured data from fish and water samples according to 40 CFR part 132. During the course of this rulemaking effort, as part of preliminary numeric criteria calculations, the department calculated BAFs for PFOS and PFOA based on field-measured

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data. As noted in Appendix E of the Technical Support Document for WY-23-19, the BAF calculated for PFOA was 40 L/kg, which is higher than the experimentally derived value used by Michigan in 2011.

Michigan implements surface water values for PFOS and PFOA through various water quality programs. Michigan is carrying out an Industrial Pretreatment Program PFAS Initiative, a Municipal NPDES Permitting Strategy, and an Industrial Direct and Industrial Storm Water Discharge Compliance Strategy for monitoring and addressing PFOS and PFOA in regulated discharges. Under the Municipal NPDES Permitting Strategy, municipal permits issued/re-issued after October 1, 2021 will include effluent limits for PFOS/PFOA if applicable. In addition, after July 1, 2021, Michigan will require sampling of biosolids prior to land application as part of a biosolids Interim Strategy. Michigan supports these programs through ambient surface water and fish tissue monitoring.

Iowa and Illinois have not promulgated water quality criteria for any PFAS compounds.

19. Contact Name	20. Contact Phone Number
Jason Knutson	(608) 267-7894

This document can be made available in alternate formats to individuals with disabilities upon request.

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ATTACHMENT A

1. Summary of Rule's Economic and Fiscal Impact on Small Businesses (Separately for each Small Business Sector, Include Implementation and Compliance Costs Expected to be Incurred)

The department has determined that there may be an impact on small businesses in Wisconsin. A breakdown of the statewide economic impact on small businesses is provided in the two tables below. The number of affected small businesses was determined based on the number of affected industries discussed in the narrative attached to the EIA (Attachment B). The facilities are all expected to either have reasonable potential to exceed the criteria or be discharging to a POTW 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 PFOS and PFOA minimization plan or just source reduction activities. See Attachment B to the EIA for further discussion and explanation of the expected treatment costs.

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
Total			**48**

Estimated Statewide Impact on Small Businesses

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

2. Summary of the data sources used to measure the Rule's impact on Small Businesses

To assess the economic impact of this rule, the department sourced cost information for three categories: sampling costs, PFAS Minimization Plan development and implementation costs, and treatment costs. The department reviewed the costs of PFAS wastewater samples at various private and public labs to determine sampling costs. The department used existing cost information obtained by facilities currently implementing mercury pollutant minimization plans and knowledge of staff time and operator pay to assess the costs associated with the implementation and development of PFAS Minimization Plans. Last, the department solicited cost information from several facilities in Wisconsin that have installed PFAS treatment systems in order to estimate treatment costs.

To determine the number of facilities that may incur the costs mentioned above, the department first used effluent data

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obtained through statewide sampling of various publicly-owned treatment works (POTWs) and industries. Based on the number of sampled facilities that were discharging at estimated 30-day P99 concentrations above the proposed thresholds of public health significance for PFOA or PFOS, the department applied those percentages of affected facilities sampled to the total number of facilities throughout the state. The department used data obtained through the "*Identified Industrial Sources of PFOS to Municipal Wastewater Treatment Plants*" document, dated August 2020, and developed by Michigan's Department of Energy, Great Lakes, and the Environment (EGLE). This document provided information on sources of PFOS to POTWs throughout Michigan. Because PFOS, as the more stringent standard, is expected to be the cost driver in Wisconsin (as it was in Michigan), the department focused on those industrial categories outlined in this document.

To obtain an estimate of the total number of facilities in Wisconsin within each impacted industrial sector, the department queried the internal System for Wastewater Monitoring, Applications, and Permits (SWAMP) for Standard Industrial Classification (SIC) codes associated with these industries.

3. Did the agency consider the following methods to reduce the impact of the Rule on Small Businesses?

☒ Less Stringent Compliance or Reporting Requirements
☒ Less Stringent Schedules or Deadlines for Compliance or Reporting
☒ Consolidation or Simplification of Reporting Requirements
☒ Establishment of performance standards in lieu of Design or Operational Standards
☒ Exemption of Small Businesses from some or all requirements
☐ Other, describe:

4. Describe the methods incorporated into the Rule that will reduce its impact on Small Businesses

In order to comply with this rule, affected small businesses will need to develop and implement a PFOS and PFOA minimization plan to reduce PFOA and PFOS concentrations from their effluents. In order to develop this plan, small businesses will need to research known sources of PFOA and PFOS as they apply to their specific processes and make efforts to eliminate or minimize those sources. This will require the affected small businesses to have knowledge of how to use the internet, communication skills to solicit information from other affected entities, and documentation skills to show what actions have been taken.

All affected small businesses will also need to learn how to obtain a representative sample from their discharge, whether it is a direct discharge to surface waters or an indirect discharge to a POTW. Although permitted small businesses are familiar with effluent sample collection, because of the high potential for cross-contamination when sampling for PFAS, these procedures may be different than how facilities currently sample their effluent. For small businesses that have a direct discharge, their sample results are submitted on monthly Discharge Monitoring Reports (DMR). Small businesses with WPDES permits are familiar with DMR reports. For small businesses that discharge to a POTW, the small business can submit the PFOS or PFOA results directly to the POTW consistent with existing standard reporting procedures.

The department estimates that there will potentially be one small business that may need to install treatment. This will require the small business's current treatment system operators to research the requirements to properly operate a granular activated-carbon treatment system. A compliance schedule may be granted to install treatment.

Although not expected, in the event a small business with a WPDES permit (direct discharger) had to install treatment to comply with the PFOS or PFOA standard, the small business could apply for an economic variance pursuant to s. 283.15, Wis. Stats., if treatment costs would result in widespread adverse social and economic impacts. Without specific financial and employment information for a small business variance applicant, it is impossible for the department to determine at this time whether any applicant would qualify for a variance.

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The department has considered the methods outlined in s. 227.114(2)(a) to (e), Wis. Stats., and has concluded that, based on existing state and federal regulations, the department cannot exempt small businesses from sampling and reporting requirements or provide a relaxed schedule simply based on the size of a business. The department also cannot exempt small businesses from compliance with the water quality standard. Wisconsin's WPDES permit program is based on the requirements in ch. 283, Wis. Stats., and the state's permitting program must be consistent with federal NPDES permit requirements established in the Clean Water Act and applicable federal regulations. Federal regulations do not allow less stringent limitations or compliance schedules categorically for small businesses. Although not specific to small businesses, the proposed rule does allow for less-frequent sampling for permittees on a case-by-case basis, and if a small business is not expected to discharge PFOA or PFOS into surface waters, the business doesn't have to sample for these pollutants and would not be subject to the requirements of this proposed rule.

5. Describe the Rule's Enforcement Provisions

This rule is enforceable under the WPDES program, which is based on the requirements in ch. 283, Wis. Stats., and must comply with federal NPDES requirements established in the Clean Water Act. If a facility was found to not be adequately implementing a pollutant minimization plan (PMP) as required by its WPDES permit, the department may take stepped enforcement actions to bring that facility into compliance. If a facility were to receive a water quality-based effluent limit after 85 months of PMP implementation and subsequently exceed that limit, the department may take stepped enforcement to bring that facility into compliance. Pursuant to s. 283.89, Wis. Stats., for any alleged violations of the WPDES permit or rules promulgated under ch. 283, Wis. Stats., the department is required to refer the violations to the Department of Justice and those violations are subject to the penalties, injunctive relief and other costs under ss. 283.87 and 283.91, Wis. Stats.

6. Did the Agency prepare a Cost Benefit Analysis (if Yes, attach to form)

☐ Yes ☒ No A formal CBA was not performed, but an evaluation of costs/benefits was done. Refer to questions 14 and 15 above.

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DEPARTMENT OF ADMINISTRATION
DOA-2049 (R09/2016)

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ATTACHMENT B

See EIA Narrative document

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(1)(d), Wis. Adm. Code. The narrative standard contains numeric thresholds 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 PFAS. The sampling requirements for each discharger will be included in WPDES permits. The costs for PFAS 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 PFAS 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

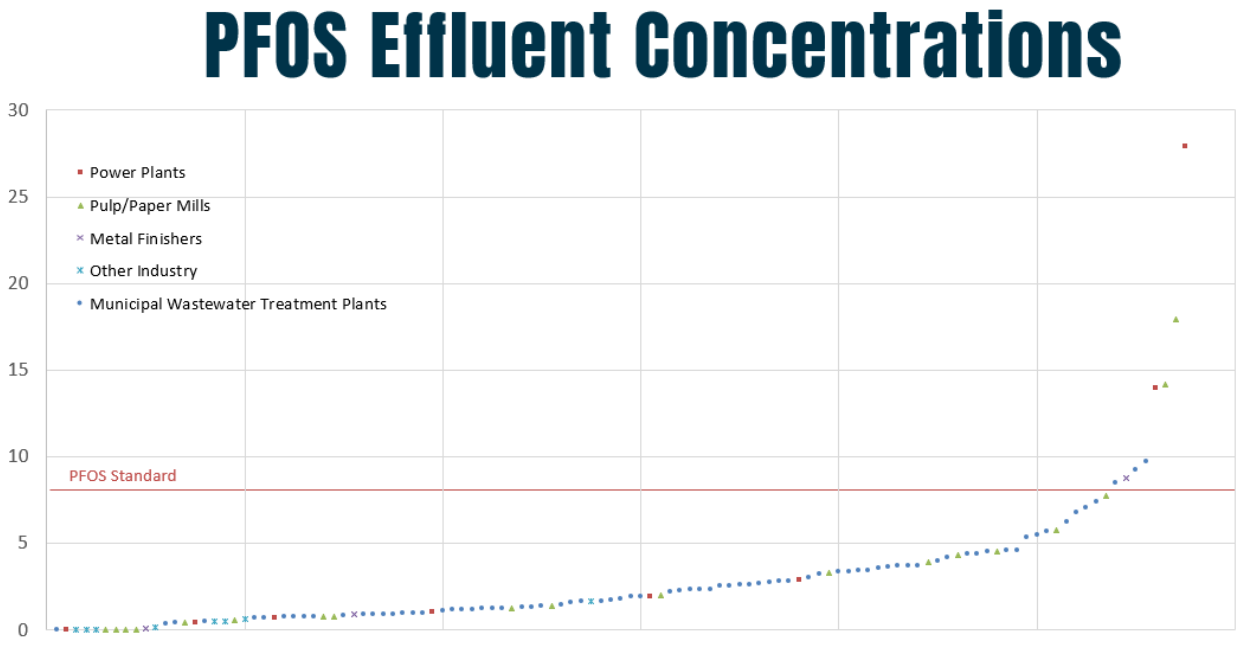
1.1 Method for determining affected facilities:

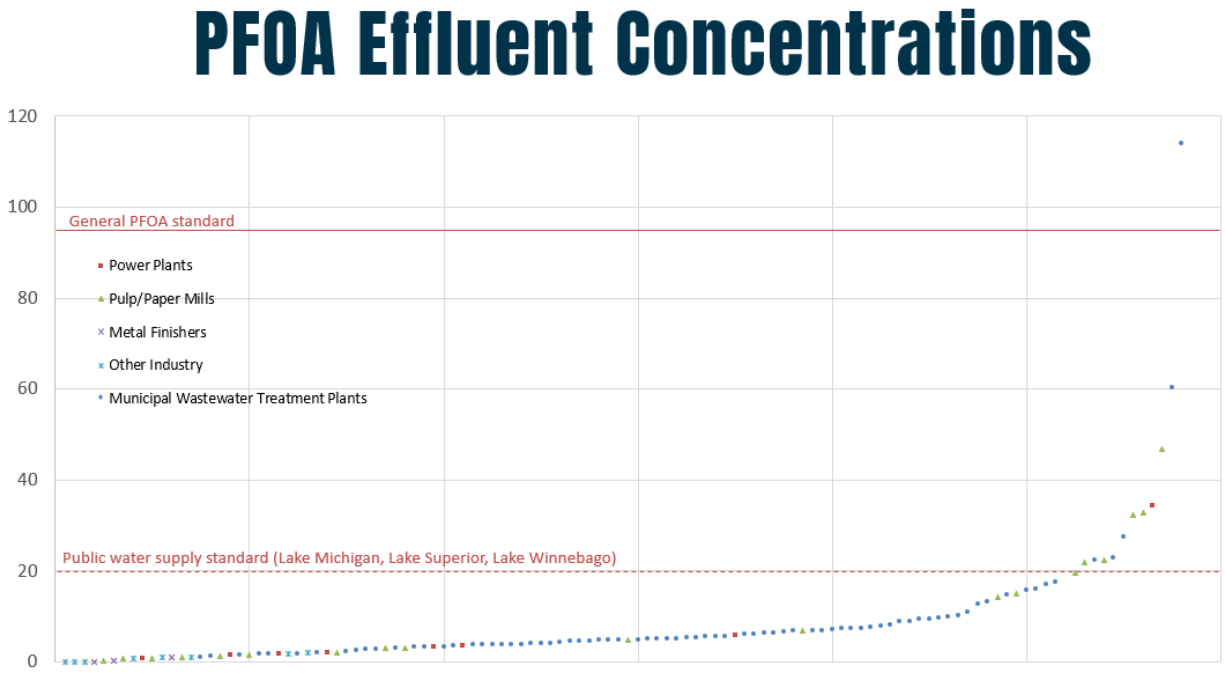
To identify which permitted dischargers may potentially exceed the PFOS and/or PFOA standards and will consequently need to establish and implement a PFAS minimization plan, the Wisconsin Department of Natural Resources (the department) will compile all available PFAS effluent data and apply the methodology 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(1)(d), Wis. Adm. Code. This methodology compares each facility's 99th percentile of monthly average effluent data (30-day P99) to the proposed thresholds of public health significance 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 PFAS 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 PFAS 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 PFAS 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 PFAS 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 7 years of PFAS 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).





Michigan's effluent data: The department also evaluated PFAS 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 PFAS 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 PFAS 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 thresholds of public health significance (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 PFAS 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 thresholds of public health significance 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 PFAS 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 PFAS 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 thresholds of public health significance. 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 PFAS minimization plan under this proposed rule.

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 threshold of public health significance.

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 PFAS 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 thresholds of public health significance 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 PFAS minimization plans should reduce concentrations of PFOS and PFOA below the public health thresholds. See section 4 for further discussion on this.

Table 1: POTWs Expected to be required to implement a PFAS 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 PFAS-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 PFAS 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 thresholds of public health significance.

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 threshold of public health significance, 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 thresholds of public health significance. 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 PFAS 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 PFAS 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 PFAS 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 PFAS 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 thresholds of public health significance 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 threshold of public health significance, 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 PFAS data is not yet available. To evaluate these 12 paper/packaging manufacturers, the department examined PFAS 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 PFAS 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 PFAS 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 threshold of public health significance 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 PFAS ToPHS*	Yes
CWT #2	POTW with Pretreatment Program, POTW exceeds PFAS ToPHS*	Yes
CWT #3	POTW with Pretreatment Program, POTW exceeds PFAS ToPHS*	Yes
CWT #4	POTW with Pretreatment Program, POTW exceeds PFAS ToPHS*	Yes
CWT #5	POTW with Pretreatment Program, POTW exceeds PFAS ToPHS*	Yes
CWT #6	POTW with Pretreatment Program, POTW exceeds PFAS ToPHS*	Yes
CWT #7	POTW with Pretreatment Program, POTW beneath PFAS ToPHS*	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

*ToPHS = Threshold of Public Health Significance for PFOA and PFOS

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 threshold of public health significance. 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 PFAS 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 threshold of public health significance. 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 PFAS minimization plan and conduct longer term sampling. However, other power plants that discharge process wastewater may be subject to initial sampling for PFAS in their WPDES permits. Costs are discussed in sections 2-4.

1.3.7 Airports

One other category of dischargers known to contain PFAS are WPDES-permitted airports where PFAS-containing aqueous film-forming foam was used in training exercises. Many of the PFAS-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 PFAS minimization plans. Whether these 2 airports will be able to reduce PFAS effluent concentrations to levels below the proposed thresholds of public health 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 public health significance threshold levels over the first 7 years 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 PFAS 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 threshold of public health significance 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 (7 years 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 thresholds of public health significance 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 proposed thresholds of public health significance 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 PFAS minimization plans. If all of these landfills are found to be PFAS 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 Firefighting 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 PFAS 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 PFAS-contaminated sites to both screen the groundwater for PFOA and PFOS levels and then install treatment for PFAS 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 PFAS-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(1)(d), Wis. Adm. Code which is a condition in all general permits. However, using this proposed rule's threshold for public health significance, 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 PFAS 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 PFAS 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 PFAS 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 thresholds of public health significance 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 PFAS are not a targeted class of pollutants.

Other fish hatcheries in the state are not expected to be sources of PFAS because they are not known to be located near existing PFAS 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 threshold of public health significance. 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 PFAS. For this analysis, the department expects that 47 direct dischargers may have PFAS 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 PFAS 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 PFAS. 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 PFAS compounds on the WDNR PFAS 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 PFAS 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 PFAS source	55	1	6/year (assumed)	Both	$774,125
Minor POTW without potential PFAS source	405	1	None	Both	$0
Industry with potential PFAS in effluent	47	1	Monthly	Effluent Only	$661,525
Total Costs (over 6 years)					**$3,032,775**

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 PFAS 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 PFAS minimization plan. This is because facilities will incur these costs as they identify sources in earlier years of the PFAS 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 PFAS 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
Total		**$1,766,400**	**$1,000,500**

*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. PFAS Minimization Plan and Source Reduction Costs

Peak Annual PMP Costs: $2,617,501

In estimating costs associated with the development and implementation of a PFAS 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 PFAS 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 PFAS 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 PFAS minimization plans, the department determined that investigative source identification (see 'Sampling Costs' above) and staff time are the primary contributors to overall PFAS minimization plan development and implementation.

Staff time is the long-term cost driver for PFAS minimization plan implementation. It will take staff time to review relevant historical documents on potential PFAS sources, research potential PFAS contamination routes, reach out to various suppliers/pretreatment industries, and take PFAS 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 PFAS 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 PFAS sources are not expected to spend this estimated amount of time implementing and developing the PFAS 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 PFAS 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 PFAS to its products. Rather, the groundwater that it pumps and utilizes in its processes has been identified as being contaminated with PFAS. 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 PFAS 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 PFAS minimization plan. These are 111 facilities in total. Total costs are shown in the table below.

Table 9: Estimated Statewide Costs for PFAS 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
Total			**$2,617,501**

*Excludes sampling costs associated with PFAS 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 PFAS Minimization Plan Costs by Year

Annual Costs of PFAS 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

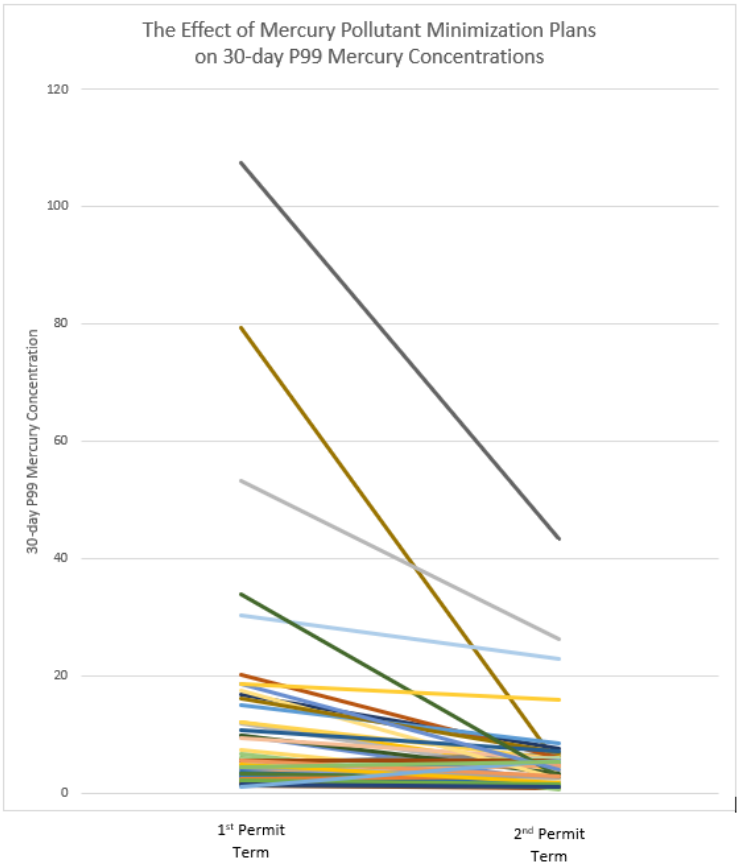
Treatment cost data was gathered through the solicitation of various facilities in Wisconsin that have installed and operated treatment systems for the purposes of removing PFAS compounds. Because the

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 PFAS 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 threshold of public health significance. 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 7 years to implement the PFAS 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 PFAS minimization plan over 7 years 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 PFAS 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 7 years, 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 calculated PFOA limits. That 1 industry reuses POTW effluent for cooling water and is in the process of exploring alternative source waters, so no treatment costs are expected to be incurred by direct dischargers.



Additionally, the department assumed that none of the pretreatment industries which discharge to one of the 27 POTWs with their own pretreatment programs will need to install treatment, as those POTWs are generally not significantly impacted (the greatest estimated 30-day P99 concentrations for PFOA and PFOS in these POTWs' effluents are 36 and 9 ng/L, respectively) and a PFAS minimization plan is expected to be sufficient to comply with this proposed rule. With an expected reduction of 43% using source reduction, no treatment is expected to be necessary for industrial users discharging to POTWs with pretreatment industries.

A summary of compliance cost data associated with the installation of a GAC treatment system is available in Tables 11-15.

Metal Finishers discharging to POTWs without a pretreatment program: Using data from Michigan's comprehensive study, 6% of metal finishers required treatment in Michigan, the vast majority of which fell into one of the categories identified above (decorative chrome plating, hard chrome plating, chromate conversion, and/or facilities which utilize hexavalent chromium). It is worth noting that this was a percentage of the metal finishers which discharged to POTWs which were found to be discharging above Michigan's water quality criteria. The percentages of affected metal finishers in Wisconsin are likely much lower. Using this percentage, applied to the number of identified facilities, the department estimates that 1 metal finisher that discharges to a POTW will need to install treatment in Wisconsin.

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^3 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 PFAS 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 PFAS 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

One-Time Treatment Costs	
Consulting Fees	$23,000.00
System Design/Installation	$47,000.00
Total	**$70,000.00**

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

Annual Operational Costs for Installed Treatment (10 gpm facilities)	
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
Total	**$358,126.00***

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

Table 13: Initial Year Treatment Cost Totals

Year 1 Treatment Cost Totals (Capital Cost + Annual Cost)			
	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

Annual Operational Treatment Cost Totals			
	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 7 years after rule implementation (after the PMP implementation period), as facilities are expected to utilize source reduction as part of the PFAS minimization plans prior to installing treatment.

Table 15: PFAS Treatment Costs by Year

Annual Costs of PFAS Treatment							
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 PFAS, 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
PFAS 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
Total cumulative 10 years of costs					**$7,753,802**

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 threshold of public health significance or to be discharging to a facility that has reasonable potential to exceed the threshold of public health significance. Consequently, these facilities will, at a minimum, incur costs associated with sampling and development and implementation of a PFAS 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
Total			**48**

Table 19: Estimated Statewide Impact on Small Businesses

Cost Type	Number of Small Businesses	Annual Costs
Treatment	1	$428,126
PFAS Minimization Plan/Source Reduction Measures	48	$658,944
Sampling	48	$993,600
Total		**$2,080,670**

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 PFAS 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 PFAS 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
PFAS Minimization* Plan	$0	$0	$523,500	$1,047,000	$1,570,500	$2,094,001	$2,617,501	$2,617,501	$2,617,501
PFAS Treatment**	$0	$0	$0	$0	$0	$0	$856,252	$716,252	$716,252
Total Costs	**$303,278**	**$606,555**	**$1,483,335**	**$2,360,115**	**$3,083,716**	**$3,504,039**	**$4,780,613**	**$4,487,433**	**$4,334,253**

*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 PFAS 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[1]. 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 PFAS exposure. However, it shows that it is reasonable to expect significant economic health benefit (avoided cost) as a result of promulgation of these proposed thresholds of public health significance.

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[2] 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

[1] 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.
[2] Goldenman, Gretta, et al. 2019. The cost of inaction: A socioeconomic analysis of environmental and health impacts linked to exposure to PFAS. 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 PFAS 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[3].

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[4].

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 Wisconsin DNR, 12 PFOS fish advisories have been issued since 2006[5]. 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 WDNR 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 WDNR estimates that 1.3 million anglers fished in Wisconsin on average 17 days in a year[6].

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[3] 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

[4] 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.

[5] https://dnr.wisconsin.gov/topic/PFAS/Advisories.html

[6] https://dnr.wisconsin.gov/topic/Fishing/outreach/AdvertisingFishRegulations.html