Economic Analysis for the Final Rule entitled: "TSCA Section 8(a)(7) Reporting and Recordkeeping Requirements for Perfluoroalkyl and Polyfluoroalkyl Substances" (RIN 2070-AK67)

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Notice

This is not an official guidance document and should not be relied upon to determine applicable regulatory requirements. This document was prepared to provide economic information for the rulemaking process, and to meet various administrative and legislative requirements. Due to the nature of the information available to EPA, the document contains various assumptions that may not reflect the regulatory determinations that an individual firm would make were it to apply the rule's requirements to its specific circumstances. Persons seeking information on regulatory requirements as they apply to specific facilities should consult 40 CFR part 704, the preamble for the regulatory action, and EPA guidance documents.

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List of Abbreviations

BLS	Bureau of Labor Statistics
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CDR	Chemical Data Reporting
CDX	Central Data Exchange
CBI	Confidential Business Information
ECEC	Employee Costs for Employee Compensation
EPA	Environmental Protection Agency
FTE	Full time employee
HAP	Hazardous Air Pollutant
IRIS	Integrated Risk Information System
IUR	Inventory Update Rule
LCPFAC	Long-chain perfluoroalkyl carboxylate
LVE	Low volume exemption
MCL	Maximum Contaminant Level
NAICS	North American Industrial Classification System
NODA	Notice of Data Availability
NPDWR	National Primary Drinking Water Regulation
NPDES	National Pollution Discharge Elimination System
NTTAA	National Technology Transfer and Advancement Act
OECD	Organisation for Economic Co-operation and Development
OHT	OECD Harmonised Templates
OMB	Office of Management and Budget
OPPT	Office of Pollution Prevention and Toxics
ORD	Office of Research and Development
OW	Office of Water
PMN	Pre-manufacture Notice
PFAS	Perfluoroalkyl and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid

PMN	Premanufacture Notice
RCRA	Resource Conservation and Recovery Act
R&D	Research and development
SBA	Small Business Administration
SDWA	Safe Drinking Water Act
SNUR	Significant New Use Rule
SUSB	Statistics of U.S. Businesses
TSCA	Toxic Substances Control Act
TRI	Toxics Release Inventory
UCMR3	Unregulated Contaminant Monitoring Rule
UMRA	Unfunded Mandates Reform Act

Executive Summary

This economic analysis estimates and evaluates the costs and benefits of collecting information from manufacturers (including importers) of certain perfluoroalkyl and polyfluoroalkyl substances (PFAS). The final rule will be promulgated by the U.S. Environmental Protection Agency (EPA), under the authority granted by section 8(a) of the Toxic Substances Control Act (TSCA). The final rule requires persons who manufacture (including import) or have manufactured these chemical substances in any year since January 1, 2011, to electronically report information regarding PFAS uses, production volumes, byproducts, disposal, exposures, and existing information on environmental or health effects. In addition, EPA believes that the collected data may help provide more information about PFAS manufacture, and to the extent that new information indicates the presence of negative externalities or data gaps, inform future agency actions and/or legislation governing the manufacture, processing, use, and disposal of PFAS.

EPA estimates that approximately 253 PFAS manufacturers and 13,116 article importers may be subject to reporting requirements under the final rule. In addition, EPA estimates 131,157 importers of articles that *may* contain PFAS will spend time familiarizing themselves with the rule and taking steps to determine if they are subject to the rule's requirements.

Industry is expected to incur one-time burdens and costs associated with rule familiarization, compliance determination, form completion, confidential business information (CBI) claim substantiation, recordkeeping, and electronic reporting activities. Under the final rule, EPA estimates a total industry burden of approximately 11.6 million hours, with a cost of approximately $843 million using a 3 percent discount rate and $800 million using a 7 percent discount rate. The Agency is expected to incur a cost of $1.6 million. The total social cost is therefore estimated to be approximately $845 million under a 3 percent discount rate and $802 million under a 7 percent discount rate.

EPA conducted a small entity impact analysis as required by the Regulatory Flexibility Act of 1980 and the Small Business Regulatory Enforcement Fairness Act of 1996. EPA estimates that 128,051 small firms, as defined by the SBA, will be affected by the final rule. Of those small firms, 64% are expected to have cost impacts of less than 1% of annual revenues, 16% are expected to have impacts between 1-3%, and 20% are expected to have impacts of more than 3% of annual revenues.

The additional data on the production, use, exposure, and environmental and health effects of PFAS chemicals in the United States will allow EPA to more effectively determine whether additional risk assessment and management measures are needed. This information may lead to reduced cost of risk-based decision making and improved decisions concerning PFAS chemicals.

1 Introduction

This economic analysis estimates the costs and qualitatively discusses the benefits expected to result from an information collection rule for perfluoroalkyl and polyfluoroalkyl substance (PFAS) manufacturers promulgated by the U.S. Environmental Protection Agency (EPA) under the authority granted by section 8(a)(7) of the Toxic Substances Control Act (TSCA). The final rule proposes requirements for persons who manufacture (including import) or have manufactured these chemical substances in any year since January 1, 2011, to electronically report information regarding PFAS uses, production volumes, byproducts, disposal, exposures, and existing environmental and health effects. Section 0 provides background information on EPA's statutory authority for the final rule; Section 1.1 reviews the regulatory background; Section 1.2 discusses the need for regulation; Section 1.3 presents a brief summary of the methodology used in the analysis; and Section 1.4 describes the organization of the remainder of this report.

Statutory Authority

Under section 8(a) of TSCA, EPA has statutory authority to impose information reporting and recordkeeping requirements on manufacturers and processors of chemical substances used in commerce. Insofar as the information is known to or reasonably ascertainable, EPA may issue an information collection rule requiring the following items among others:

Table 1-1: TSCA-authorized Reporting Requirements

Reporting Elements
(A) The common or trade name, the chemical identity, and the molecular structure of each chemical substance or mixture for which such a report is required.
(B) The categories or proposed categories of use of each such substance or mixture.
(C) The total amount of each such substance and mixture manufactured or processed, or reasonable estimates of the total amount to be manufactured or processed.
(D) A description of the byproducts resulting from the manufacture, processing, use, or disposal of each such substance or mixture.
(E) All existing data concerning the environmental and health effects of such substance or mixture.
(F) The number of individuals exposed, and reasonable estimates of the number who will be exposed, to such substance or mixture in their places of employment and the duration of such exposure.
(G) In the initial report under paragraph (1) on such substance or mixture, the manner or method of its disposal, and in any subsequent report on such substance or mixture, any change in such manner or method.
Source: TSCA section 8(a), paragraph (2), subparagraphs (A) through (G)

The National Defense Authorization Act for Fiscal Year 2020 (Pub. L. No. 116-92 § 7351) amended TSCA section 8(a) on December 19, 2019, adding section 8(a)(7), titled *PFAS Data Call*. Section 8(a)(7) requires EPA to promulgate a rule "requiring each person who has manufactured a chemical substance that is a [PFAS] in any year since January 1, 2011" to report information described in TSCA section 8(a)(2)(A)-(G), for each year since January 1, 2011.

1.1 Regulatory and Programmatic Background

Several regulatory (Section 1.1.1) and programmatic (Section 1.1.2) activities related to PFAS chemicals precede or coincide with the final rule. These activities are briefly described in the following sections.

1.1.1 Regulatory Background

1.1.1.1 Toxic Substances Control Act

Under TSCA, EPA is directed to prioritize, evaluate, and regulate chemicals manufactured (including imported) or processed in the U.S.

- Under the new chemicals program, since 2006, EPA has reviewed at least 294 new PFAS chemicals before they have commenced commercial production and has regulated at least 191 chemicals through Significant New Use Rules (SNURs) and other Orders under section 5(e) (EPA 2018a).
- In March and December 2002, EPA published a SNUR to require notification to EPA before any future manufacture (including import) of 13 PFAS specifically included in the voluntary phase out PFOS by 3M that took place between 2000 and 2002. The SNUR exempted ongoing uses that were limited to a few specifically limited, highly technical uses of these chemicals for which no alternatives were available, and which were characterized by very low volume, low exposure, and low releases.
- In October 2007, EPA finalized a SNUR on 183 PFAS believed to no longer be manufactured (including imported) or used in the United States.
- In October 2013, EPA issued a rule requiring companies to report all new uses of certain PFOA-related chemicals as part of carpets, a category of potentially harmful chemicals once used on carpets to impart soil, water, and stain resistance. Companies must now report to EPA their intent to manufacture (including import) these chemical substances intended for use as part of carpets or to treat carpets, as well as import carpets already containing these chemical substances.
- In July 2020, EPA finalized a SNUR to require manufacturers (including importers) and processors of certain long-chain perfluoroalkyl carboxylate (LCPFAC) chemical substances to notify EPA before commencing use of LCPFACs that have been phased out. In addition, articles containing LCPFACs as a surface coating and carpets containing perfluoroalkyl sulfonate chemical substances cannot be imported without notice and EPA review. In addition, articles containing LCPFACs as a surface coating and carpets containing perfluoroalkyl sulfonate chemical substances cannot be imported without EPA review (EPA 2020c).
- EPA may collect some information from PFAS manufacturers, including on production volume and use in commerce, under the Chemical Data Reporting (CDR) rule. This information is collected every four years and, in general, applies to chemicals with production volumes of 25,000 lbs. or more at a single site in a single year. The next CDR reporting cycle is in 2024, covering the calendar years 2020 through 2023 (2023 being the principal reporting year). Under 40 CFR 711, the reporting period would be open June 1 through September 30, 2024. The timing of PFAS reports submitted under this TSCA section 8(a)(7) rule may impact the submissions to CDR in 2024. 40 CFR 711.22(a) states: “Any person subject to the requirements of this part who previously has complied with reporting requirements of a rule under TSCA section 8(a) by submitting the information described in § 711.15 for a chemical substance described in § 711.5 to EPA, and has done so within 1 year of the start of a submission period described in § 711.20, is not required to report again on the manufacture of that chemical substance at that site during that submission period.”
- Pursuant to EPA’s TSCA section 4 authority to compel health and environmental effects testing, in October 2021, EPA announced a National PFAS Testing Strategy which will provide the agency with toxicity data and information on categories of PFAS to inform future regulatory

efforts (EPA 2021c). The first test order pursuant to this testing strategy was issued on June 6, 2022, for 6:2 fluorotelomer sulfonamide betaine. The second PFAS test order was issued on January 4, 2023, for trifluoro (trifluoromethyl) oxirane (HFPO).

- In December 2021, EPA granted a petition that requested EPA to compel certain companies to conduct testing of PFAS and submit the toxicity data to EPA. Specifically, EPA indicated it would initiate a rulemaking proceeding or issue an order under TSCA section 4(a)(1)(A)(i) compelling health and environmental effects testing regarding PFAS (EPA 2021d).
- In January 2023, EPA proposed a SNUR that would strengthen the regulation of PFAS by preventing anyone from resuming use of inactive PFAS without EPA review. The SNUR would apply to PFAS that are listed as "Inactive" on the TSCA Inventory and are not already subject to a SNUR. This "Inactive" designation means that a chemical substance has not been manufactured (including imported) or processed in the United States since June 21, 2006.

1.1.1.2 Emergency Planning and Community Right-to-Know Act

Section 7321 of the National Defense Authorization Act for Fiscal Year 2022 (NDAA) (15 U.S.C. 8921) added over 170 PFAS to the Toxics Release Inventory (TRI) toxic chemical list, under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) and provided a statutory framework for additional PFAS to be added to the TRI chemical list. Beginning with Reporting Year 2020, facilities subject to TRI reporting requirements are required to report their releases and other waste management information on listed PFAS; the first set of preliminary TRI data on PFAS was published in July 2021 (EPA 2020b). TRI information provides the public, government agencies, non-governmental organizations, and companies with information about chemical releases and pollution prevention activities reported by industrial and federal facilities to support informed decision making. As of Reporting Year 2023, there are 189 individual PFAS on the TRI chemical list.

In December 2022, EPA published a proposal to add the PFAS subject to TRI reporting to the list of Lower Thresholds for Chemicals of Special Concern (Chemicals of Special Concern). The addition of the PFAS to the Chemicals of Special Concern list will eliminate the use of the de minimis exemption, eliminate the option to use the shorter Form A, and will limit the use of range reporting. In addition, EPA's proposed rule would eliminate the use of the de minimis exemption under the Supplier Notification Requirements for facilities that manufacture or process all chemicals included on the Chemicals of Special Concern list.

1.1.1.3 Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA), EPA sets public health goals and enforceable standards for drinking water quality. In March 2021, EPA published Regulatory Determinations for Contaminants on the Fourth Contaminant Candidate List which included a final determination to regulate perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in drinking water. The Agency is now developing a proposed National Primary Drinking Water Regulation (NPDWR) for these chemicals; NPDWRs include legally enforceable maximum contaminant levels (MCLs) and/or treatment techniques that apply to public water systems and limit the levels of contaminants in drinking water to the extent feasible. EPA has conducted a separate Small Business Advocacy Review Panel for this proposed rulemaking.

Additionally, in November 2022, EPA published the Fifth Contaminant Candidate List (CCL5) (see 87 FR 68060). The CCL is a list of contaminants that are currently not subject to any proposed or promulgated national primary drinking water regulations but are known or anticipated to occur in public water systems. The CCL5 included, among other chemicals, any PFAS other than PFOA and PFOS (which were included in the CCL4). For the purposes of CCL 5, the structural definition of per- and polyfluoroalkyl substances (PFAS) includes chemicals that contain at least one of these three structures:

(1) R-(CF_2)-CF(R′)R″, where both the CF2 and CF moieties are saturated carbons, and none of the R groups can be hydrogen.

(2) R-CF_2OCF_2-R′, where both the CF2 moieties are saturated carbons, and none of the R groups can be hydrogen.

(3) $CF_3C(CF_3)$RR′, where all the carbons are saturated, and none of the R groups can be hydrogen.

In October 2021, EPA's Office of Water also published the final human health toxicity assessment for hexafluoropropylene oxide (HFPO) dimer acid and its ammonium salt, collectively known as "GenX chemicals (EPA 2021a)." The assessment provides hazard identification, dose-response information, and derives toxicity values called oral reference doses (RfDs) for chronic and subchronic exposures to GenX chemicals. The assessment will help inform a national drinking water health advisory for GenX chemicals.

Under SDWA, EPA is authorized to issue health advisories for drinking water contaminants not subject to a national primary drinking water regulation. In June 2022, EPA published interim updated drinking water health advisories for PFOA and PFOS, replacing those that had been issued in 2016, reflecting updated data and considering lifetime exposures. These interim health advisories were based on draft health assessments that had not completed Science Advisory Board review. EPA also issued two new final health advisories, for perfluorobutane sulfonic acid (PFBS) and the GenX chemicals (EPA 2023b). The health advisory for GenX chemicals reflects the final human health toxicity assessment published in October 2021, and the health advisory for PFBS reflects the final human health toxicity assessment published in April 2021 (EPA 2021e).

Additionally, the third Unregulated Contaminant Monitoring Rule (UCMR3) required monitoring for 30 contaminants between 2013 and 2015, including six PFAS. The rule allows EPA to collect data on chemicals that are suspected drinking water contaminants but for which EPA has not set health-based standards under the SDWA. In December 2021, EPA published the fifth UCMR to require samples of 30 chemical constituents, 29 of which are PFAS, between 2023 and 2025 (see 40 CFR § 141).

Finally, SDWA requires EPA to use scientifically robust and validated analytical methods to assess contaminants of emergency concern. Under EPA's PFAS Strategic Roadmap, EPA is working to update and validate analytical methods to monitor additional PFAS in drinking water. This effort includes EPA's review of reports of PFAS of concern and evaluation of certified reference standards, an evaluation of previously published analytical methods for PFAS in drinking water, and finally multi-laboratory validation studies and peer review prior to publishing any updated EPA PFAS analytical methods for drinking water. This is expected in Fall 2024 (EPA 2021b).

1.1.1.4 Comprehensive Environmental Response, Compensation, and Liability Act

Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, EPA is authorized to address certain or threatened environmental releases of hazardous substances. EPA is in the rulemaking process to propose designating PFOA and PFOS as hazardous substances under CERCLA.

In May 2022, EPA added five PFAS to the Regional Screening Levels and Regional Remedial Management Levels. These risk-based values help EPA determine if response or remediation activities are required under CERCLA (EPA 2022c).

1.1.1.5 Clean Water Act

In March 2021, EPA published an advance notice of proposed rulemaking (ANPRM) to solicit data regarding manufacturers of PFAS and the presence and treatment of PFAS in discharges from the Organic Chemicals, Plastics and Synthetic Fibers (OCPSF) point source category (86 FR 14560). EPA also requested information regarding PFAS formulators, which are facilities that produce a variety of PFAS products and materials from PFAS feedstocks. EPA will use any data and information obtained via public comment on the ANPRM to inform its decision about whether a proposed rulemaking may be necessary under the Clean Water Act. EPA's PFAS Strategic Roadmap also includes the initiation of a rulemaking

to revise effluent limitations for Metal Finishing facilities to address PFAS in wastewater discharges from chromium plating operations (EPA 2021b).

In April 2022, EPA issued a memo outlining a new approach under the National Pollutant Discharge Elimination System (NPDES) programs it oversees to restrict PFAS discharges to water bodies. Under this approach, EPA will require monitoring for PFAS, implementing best management practices, and establishing practices to address PFAS-containing firefighting foam in stormwater.

Additionally, in May 2022, EPA published the Draft Recommended Aquatic Life Ambient Water Quality Criteria for both PFOA and PFOS. Both drafts were open for public comment through July 2022 and reflect the latest scientific knowledge regarding the impacts of PFOA and PFOS on freshwater organisms. When the draft CWA criteria are finalized, these can inform tribes' and states' efforts to adopt water quality standards related to PFOA and PFOS. Under EPA's PFAS Strategic Roadmap, EPA is developing aquatic life criteria and human health criteria for certain PFAS. (EPA 2021b).

EPA is also working to collect and share more data on PFAS found in fish tissue in U.S. lakes. This multi-year data collection will help EPA better understand the impact of PFAS on subsistence fishers. EPA also plans to publish a list of PFAS for tribal and state fish advisory programs as guidance for their own monitoring and advisory work. This publication is expected in Spring 2023 (EPA 2021b).

1.1.1.6 Resource Conservation and Recovery Act

In October 2021, EPA announced the initiation of two rulemakings under the Resource Conservation and Recovery Act (RCRA), in response to a petition from the Governor of New Mexico. One future rulemaking will propose listing certain PFAS as RCRA Hazardous Constituents; that rule is slated for proposal in August 2023 (see 88 FR 10966). The other future rulemaking will propose clarification to RCRA Corrective Action Program regulations. According to the Fall 2022 Unified Agenda, EPA plans to publish this proposed rule in June 2023 (see 88 FR 10966).

1.1.2 Programmatic Background

1.1.2.1 PFOA Stewardship Program

In January 2006, EPA launched the 2010/2015 PFOA Stewardship Program (PFOA Stewardship Program) in partnership with eight companies:

- Arkema
- Asahi Glass Company
- BASF Corporation (successor to Ciba Specialty Chemicals Corporation)
- Clariant
- Daikin
- 3M/Dyneon
- DuPont
- Solvay Solexis

These companies represented a large portion of global manufacture of LCPFAC. The program set a goal of reducing facility emissions and product content of LCPFAC chemical substances on a global basis by 95 percent, no later than 2010, and to work toward eliminating emissions and product content of these chemicals by 2015. All companies have met the PFOA Stewardship Program goals (EPA 2020e).

1.1.2.2 EPA PFAS Action Plan

In 2019, EPA released a PFAS Action Plan, which outlined short-term and long-term actions the Agency intended to take to address PFAS (EPA 2019). EPA provided a program update on the action plan in February 2020 (EPA 2020a). EPA outlined both short-term and long-term strategies that incorporate both

regulatory and non-regulatory approaches for drinking water, cleaning, production and use, monitoring, research, enforcement, and risk communications. The goal of EPA's Action Plan is to:

- Demonstrate the Agency's critical national leadership by providing both short-term solutions and long-term strategies.
- Provide a multi-media, multi-program, national research and risk communication plan.
- Respond to the extensive public input the Agency has received during the PFAS National Leadership Summit, multiple community engagements, and through the public docket.

1.1.2.3 EPA PFAS Strategic Roadmap

In 2021, EPA released a PFAS Strategic Roadmap, which outlined the specific actions the Agency plans to take to address PFAS contamination nationwide (EPA 2021b). EPA's integrated approach to PFAS is focused on three central directives: Increase investments in research, leverage authorities to take action now to restrict PFAS chemicals from being released into the environment, and accelerate the cleanup of PFAS contamination. The PFAS Strategic Roadmap lays out:

- Timelines to set enforceable drinking water limits under the Safe Drinking Water Act to ensure water is safe to drink in every community.
- A hazardous substance designation under CERCLA, to strengthen the ability to hold polluters financially accountable.
- Timelines for action on Effluent Guideline Limitations under the Clean Water Act for nine industrial categories.
- A review of past actions on PFAS taken under TSCA to address those that are insufficiently protective.
- Increased monitoring, data collection and research so that the agency can identify what actions are needed and when to take them.
- A final toxicity assessment for GenX, which can be used to develop health advisories that will help communities make informed decisions to better protect human health and ecological wellness.
- Continued efforts to build the technical foundation needed on PFAS air emissions to inform future actions under the Clean Air Act.

1.2 Statement of Need

Executive Order 12866 requires regulatory agencies to identify the specific market failure that a significant rule addresses. The major causes of market failure identified in the Office of Management and Budget (OMB) guidance, Circular A-4, (OMB 2003) of Executive Order 12866 are externality, natural monopoly, market power, and inadequate or asymmetric information. Note, President Biden issued Executive Order 14094 in April 2023, which amends Executive Order 12866. Revisions to Circular A-4 are currently under review, and when finalized, will supersede the previous version. For this final rule, the identified market failure is inadequate or asymmetric information. More information on this as a cause of market failure addressed by this rule is below. The final rule was mandated by Congress. In addition, EPA believes that the information that will be received pursuant to the rule may help provide more information about PFAS manufacture, and to the extent that new information indicates the presence of negative externalities, inform future rulemaking and/or legislation governing the manufacture, processing, and use of PFAS chemicals.

1.2.1 Inadequate Information

Economic theory holds that the more information buyers and sellers have about the costs and benefits of their economic choices, the more efficient allocation of resources will be. While. Improving the

information available to parties to a transaction will lead to more rational decision making. As an example, a producer may not consider substituting a less hazardous chemical for a hazardous chemical if knowledge about either chemical's hazard is unknown or uncertain. More complete information on the hazards associated with the chemical will allow a producer to make more socially efficient decisions.

There are many reasons why information regarding the hazards associated with a chemical substance may not be widely known. Two of these reasons are:

1. Producers may know this information but have no incentive to act on it or reveal it to their customers (because the costs are not borne by, and are therefore external to, the producer).
2. This information may be unknown to both the producers and their customers.

The first of these reasons is known as asymmetric information; that is, a case in which customers and producers do not have the same level of information regarding the aggregate production, uses, and hazards of a chemical substance. Typically, the producers' level of information regarding these items, particularly hazards, exceeds the consumers' level of information.

In the second case, chemical production, use, and hazard information is inadequate and/or unavailable (i.e., unknown to both consumers and producers). Producers may have little incentive to acquire such information due to the potential costs associated with its acquisition. Information is by nature a public good; that is, non-rival (one person's use of information does not diminish the amount remaining for other users) and non-excludable (once made available, information cannot be easily withheld from others). Thus, where information is provided by one person, others are free to use and benefit from that information without having contributed to its development. This situation reduces the incentive to provide the information, resulting in a failure of the market to efficiently provide the information. In addition, individual consumers are unlikely to be willing to pay the cost of collecting and reporting information if they can use information developed and paid for by others.

The final rule addresses the former case of asymmetric information. In cases where EPA has not already collected production, use, or hazard information from manufacturers under the CDR rule or through a PMN submission, the final rule will lead to an increase in EPA's knowledge about PFAS's potential risks. This information is likely to result in a reduction in the cost of risk-based decision making about PFAS and an improvement in the expected outcome of potential risk management decisions.

1.3 Summary of Methodology

This analysis seeks to quantify, to the extent possible, the costs to society of the final rule by identifying the costs to industry associated with performing the required reporting and recordkeeping, and the costs to EPA of administering the rule. Industry costs consist of the collection, compilation, and submission of required information for the PFAS chemicals handled by each reporting firm. Agency costs include reviewing and processing the data received as a result of the rule. Small entity impact is defined as a small business' estimated cost of compliance with the rule as a percent of sales. Data sources for this analysis include burden estimates derived from information collection requests for similar regulations, compensation data acquired from government publications, and EPA's CDR database to estimate the number of affected entities.

This report qualitatively discusses any potential benefits of the final rule based on the value of information it may provide. The benefits analysis was undertaken to address the implicit call for cost-benefit balancing contained in TSCA, as well as the requirements of Executive Order 12866.

Note that all dollar amounts in this analysis are reported in 2022 dollars.

1.4 Organization of This Report

The remainder of this report provides EPA's economic analysis in support of the final rule. The affected chemical substances and companies are characterized in Chapter 2. Chapter 3 estimates industry cost of complying with the final rule, and Chapter 4 estimates government costs associated with the administration of the rule. Chapter 5 presents total social costs. Chapter 6 addresses the qualitative benefits of the final rule using a "value of information" framework. Chapter 7 provides the small entity impact analysis for the final rule, as mandated by the Regulatory Flexibility Act (RFA) and amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA). Chapter 8 presents the regulatory flexibility alternatives EPA considered for the final rule. Chapter 9 presents a sensitivity analysis that provides alternative low- and high-end estimates of total industry cost. Several additional impact analyses are presented in Chapter 10, including: an employment impact analysis; a burden hour analysis, which responds to the requirements of the Paperwork Reduction Act (PRFA); and unfunded mandates statement, which is required by the Unfunded Mandates Reform Act (UMRA); an environmental justice statement, which addresses the requirements of Executive Order 12898; and a children's health statement, which is mandated by Executive Order 13045.

2 Affected Entities

This chapter presents potentially affected manufacturers (including importers) subject to this rule. Section 2.1 describes the chemicals and firms affected by the final rule, as well as general exemptions to the final rule. Section 2.2 describes and estimates the universe of affected manufacturers (including importers) potentially affected by the final rule.

2.1 Chemical Substances and Firms Subject to this Rule

This rule affects firms that currently or have previously manufactured (including imported) PFAS in any year since January 1, 2011. PFAS are a group of synthetic chemicals that have been in use since the 1940s and can be found in a wide array of industrial and consumer products (EPA 2023, ATSDR 2021). PFAS are synthesized for many different uses, ranging from firefighting foams to coatings for clothes and furniture, to food contact substances, to the manufacture of other chemicals and products. PFAS can be released to the environment throughout the lifecycle of manufacturing, processing, distribution, use, and disposal (ATSDR 2021, EPA 2021b). There is evidence that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals, and that continued exposure above specific levels to certain PFAS may lead to adverse health effects (EPA 2023; ATSDR 2021, EPA 2021b). PFAS contain an alkyl carbon chain on which the hydrogen atoms have been partially or completely replaced by fluorine atoms. The strong carbon-fluorine bonds of PFAS make them resistant to degradation and thus highly persistent in the environment (EPA 2019; EPA 2017d). Some PFAS have been detected at high levels in wildlife, including higher trophic organisms, indicating that at least some PFAS have the ability to bioaccumulate (EPA 2017d). Some PFAS can accumulate in humans and remain in the human body for long periods of time (e.g., months to years) (EPA 2019; EPA 2017d; EPA 2009b). Because of the widespread use of PFAS in commerce and their tendency to persist in the environment, most people in the United States have been exposed to PFAS (EPA 2019). As a result, several PFAS have been detected in human blood serum (EPA 2019; EPA 2017d; ATSDR 2021).

For the purpose of this rule, EPA defines PFAS to include at least one of these three structures:

1) R-(CF_2)-CF(R')R'', where both the CF2 and CF moieties are saturated carbons

2) R-CF_2OCF_2-R', where R and R' can either be F, O, or saturated carbons

3) $CF_3C(CF_3)$R'R'', where R' and R" can either be F or saturated carbons.

For this final rule, EPA has identified at least 1,455 known TSCA chemical substances and mixtures that are PFAS and would be subject to reporting under the final rule. The scope of PFAS included in this final rule include the following:

- All PFAS listed on the TSCA active Inventory. This includes PFAS that are identified by CAS number; confidential chemicals whose generic names contain "fluor" and are identified by Accession number, and; confidential chemicals whose generic names do not contain "fluor" and therefore are not listed by CAS or Accession numbers.
- TSCA section 5 (new chemicals) low-volume exemptions
- Withdrawn claims for low-volume exemptions under TSCA section 5
- Any other PFAS that meet the structural definition and are considered a TSCA "chemical substance"

2.2 Estimated Total Regulated Firms

This section characterizes the potentially affected universe of firms affected under the final rule. This final rule does not exempt small manufacturers from reporting and recordkeeping requirements. The final

rule also does not require manufacturers (including importers) to report certain information previously submitted to EPA.

Section 2.2.1 presents the estimated number of manufacturers subject to the rule, and Section 2.2.2 presents the estimated number of article importers.

2.2.1 Manufacturers

EPA expects that this rule will affect manufacturers (including importers) in the North American Industrial Classification System (NAICS) categories listed in Table 2-1, based on the parent companies that reported manufacturing or importing affected PFAS chemicals to the 2016 and 2020 CDR as well as EPA's previous experience with TSCA section 8(a) data collection and the Agency's understanding of disposal and other waste management methods involving PFAS. Note, importing municipal solid waste streams for the purpose of disposal or destruction is not a reportable activity under this rule. The list in Table 2-1 is not exhaustive and may not describe the specific entities and corresponding NAICS codes for manufacturers that may be affected by the final rule.

Table 2-1: NAICS of Affected Parent Companies Reporting to the 2016 and 2020 CDR

NAICS	NAICS Description
221210	Natural Gas Distribution
236220	Commercial and Institutional Building Construction
324	Petroleum and Coal Product Manufacturing
324191	Petroleum Lubricating Oil and Grease Manufacturing
325	Chemical Manufacturing
325120	Industrial Gas Manufacturing
325180	Other Basic Inorganic Chemical Manufacturing
325199	All Other Basic Organic Chemical Manufacturing
325211	Plastics Material and Resin Manufacturing
325212	Synthetic Rubber Manufacturing
325220	Artificial and Synthetic Fibers and Filaments Manufacturing
325320	Pesticide and Other Agricultural Chemical Manufacturing
325411	Medicinal and Botanical Manufacturing
325412	Pharmaceutical Preparation Manufacturing
325612	Polish and Other Sanitation Good Manufacturing
325613	Surface Active Agent Manufacturing
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing
326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing
327910	Abrasive Product Manufacturing
333999	All Other Miscellaneous General Purpose Machinery Manufacturing
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing
336111	Automobile Manufacturing
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers
423420	Office Equipment Merchant Wholesalers
423510	Metal Service Centers and Other Metal Merchant Wholesalers
423740	Refrigeration Equipment and Supplies Merchant Wholesalers
423990	Other Miscellaneous Durable Goods Merchant Wholesalers
424690	Other Chemical and Allied Products Merchant Wholesalers
424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)
424950	Paint, Varnish, and Supplies Merchant Wholesalers
441110	New Car Dealers
447190	Other Gasoline Stations
551112	Offices of Other Holding Companies
562	Waste Management and Remediation Services

Source: EPA 2020d; EPA 2022b

A total of 174 affected chemicals were reported in the 2016 and 2020 CDR data (EPA 2020d, EPA 2022b). The firms manufacturing or importing these 174 chemicals do not represent the complete universe of affected firms because they do not include firms that:

- Manufacture or import a PFAS chemical that is not on the TSCA Inventory
- Manufacture or import a PFAS chemical in volumes below the CDR reporting threshold of 25,000 lbs. (or 2,500 lbs. for chemicals that are the subject of certain TSCA actions)[1]
- Are considered "small manufacturers" and exempt from CDR[2]
- Commenced manufacture or import of the PFAS chemical after the 2020 CDR reporting cycle
- Ceased manufacture or import of the PFAS chemical before the 2016 CDR reporting cycle

The CDR data also does not represent the complete universe of affected substances because the database generally does not include substances that are:

- Certain byproducts, including byproducts:
  - not used for commercial purposes;
  - If its only commercial purpose is for use by public or private organizations that (1) burn it as a fuel, (2) dispose of it as a waste, including in a landfill or for enriching soil, or (3) extract component chemical substances from it for commercial purposes;
  - listed at 40 CFR 711.10(d)(1)(i) and recycled or otherwise used within a site-limited, physically enclosed system that is part of the same overall manufacturing process from which the byproduct substance was generated, and when the site is reporting the byproduct or a different chemical substance that was manufactured from the recycled byproduct or manufactured in the same overall manufacturing process; or
  - byproducts manufactured solely in either pollution control equipment or boilers use for on-site heat or electricity generation)
- Impurities
- Non-isolated intermediates
- Manufactured solely in small quantities for research and development

This analysis uses the subset of manufacturers reporting to the 2016 and 2020 CDRs to estimate the average number of sites per firm and the average number of PFAS per site. EPA estimates an average of 1.4 sites per firm and an average of 4.1 PFAS per site for the non-CBI firms reporting to CDR, resulting in an average of 5.74 PFAS per firm. In addition, using best professional judgement, EPA assumes that manufacturing firms will each manufacture an average of two PFAS for R&D applications, thus resulting in a total average of 7.74 PFAS per manufacturing firm. In the absence of information about the non-represented firms identified above, EPA makes the simplifying assumption that these averages for the manufacturers reporting to CDR are representative of those that do not report to CDR. An estimated 253 firms and 354 sites are expected to be subject to this rule's reporting requirements (Table 2-2).

Given the lack of data on PFAS manufactured as byproducts, impurities, and other chemical substances not on the TSCA Inventory, it is possible that the number of PFAS per firm could be higher than 5.74 and

[1] Generally, manufacturers are not required to report volumes below 25,000 pounds (or 100,000 pounds for small manufacturers) to CDR. Chemicals subject to specific TSCA actions may have different reporting requirements.

[2] A manufacturer (including importer) of a substance is considered a "small manufacturer" under CDR if it meets one of two standards: (1) Its total annual sales during the principal reporting year, when combined with those of its parent company (if any), are less than $12 million, regardless of the quantity of substances produced or imported by that manufacturer (including importer); (2) Total sales during the principal reporting year, combined with those of the parent company, are less than $120 million and the annual production volume of that chemical substance does not exceed 100,000 pounds at any individual plant site (40 CFR 704.3). Firms who meet this standard would be considered "small manufacturers" under the existing section 8(a)(1) definition, and these firms are generally exempt from CDR (except for substances that are the subject of certain TSCA actions, which are not eligible for the CDR small manufacturer exemption).

that more than 253 manufacturing firms could be impacted. However, EPA received public comments that many companies would not have knowledge of byproducts and impurities without testing, which is beyond the known to or reasonably ascertainable standard. EPA is also estimating that all 1,455 known TSCA chemical substances and mixtures that are PFAS will be reported, which may not be the case.

Additionally, EPA believes that PFAS not on the TSCA Inventory are less likely to be in U.S. commerce and therefore less likely to be reported. Section 8(b) of TSCA requires EPA to compile, keep current, and publish a list of each chemical substance that is manufactured or processed, including imports, in the United States for uses under TSCA. For purposes of regulation under TSCA, if a chemical is on the Inventory, the substance is considered an "existing" chemical substance in U.S. commerce. Any chemical that is not on the Inventory is considered a "new chemical substance."

Table 2-2: Estimated Number of Affected PFAS, Firms, and Sites

CDR Reporting Status	Number of Chemical Substances	Number of Affected Firms	Number of Affected Sites
	A	B = A ÷ 5.74	C = B x 1.5
PFAS reporting to CDR	174	30	42
PFAS not reporting to CDR	1,281	223	312
Total	**1,455**	**253**	**354**
Source: EPA 2020d			

Note that certain information that is requested in CDR and TSCA section 5 Premanufacture Notices (PMN) that falls under TSCA section 8(a)(2)(A) through (G) would be required by this final rule, such as information on specific chemical identity, categories of use, production volume, byproducts, and number of persons exposed and duration of exposure. Note that all new chemical substances, whether or not a PFAS, must be submitted as a PMN (or LVE) unless otherwise exempt. Therefore, EPA has been receiving PFAS PMNS since the 1980s if the substance is not already on the TSCA Inventory. In instances where PFAS manufacturers under this final rule have already reported the requested information to EPA for that same year, they will not be required to re-report. However, EPA expects that most firms will need to submit information under the final rule, even if they have previously reported to CDR or submitted a PMN because the final rule requests different information than either CDR or PMN forms. Additionally, this rule requires reporting for each year since 2011 in which a PFAS was manufactured, whereas reporting is not required annually for CDR. In addition, firms that have not previously submitted information to CDR (see Table 2-2) or through a PMN form will need to submit data under the final rule.

2.2.2 Importers of Articles

The final rule also applies to importers of articles that contain PFAS (including articles containing PFAS as part of surface coatings). PFAS are used in a wide variety of products, including textiles, electronics, wires and cables, pipes, cooking and bakeware, sport articles, automotive products, and musical instruments, which may be imported into the United States as finished articles (Glüge et al. 2020). Based on known uses of PFAS in articles, EPA expects that importers in the following NAICS may be affected. However, this list is not exhaustive and may not describe the specific entities and corresponding NAICS codes for article importers that may be affected by the final rule.

- 23 – Construction
- 31-33 – Manufacturing
- 42 – Wholesale Trade
- 44-45 – Retail Trade

- 562920 – Materials Recovery Facilities

Importers have varying levels of knowledge about the chemical content of the articles they import. Therefore, it is reasonable that some importers would not know or have access to all information and would therefore not be subject to report. However, there are some importers in a wide range of sectors that may be affected because they would know the products or articles contain PFAS, including manufacturers, wholesalers, and retailers. As discussed further in Chapter 3, EPA anticipates that importers of articles that *may* contain PFAS will spend time familiarizing themselves with the rule and take steps to determine if they are subject to the rule's requirements. Only a subset of these firms will determine that they are importing PFAS in articles and thus need to report information under the rule. Both the number firms importing articles potentially containing PFAS and the number of reporting firms are presented in Table 2-3.

EPA estimates that 131,157 firms import articles potentially containing PFAS, and 13,116 firms import articles containing PFAS and are subject to the rule's reporting requirements.

Table 2-3: Estimated Number of Importers of Articles Potentially Containing PFAS

Parameter	Value	Calculation
Total value of imports, all imports (billions)[1]	$2,494	A
Estimated value of imports, articles potentially containing PFAS (billions)	$1,456	B
Percentage of total imports	58%	C = B/A
Total importers, all imports[2]	224,699	D
Estimated importers of articles potentially containing PFAS	**131,157**	**E = C x D**
Percentage of firms importing PFAS in articles[3]	10%	F
Estimated number of reporting firms	**13,116**	**G = E x F**
Percentage of firms defined as small under TSCA section 8(a)[4]	91%	H
Estimated number of small importers of articles potentially containing PFAS	119,352	I = E x H
Estimated number of large importers of articles potentially containing PFAS	11,804	J = E x (1-H)
Estimated number of small reporting firms	11,935	K = G x H
Estimated number of large reporting firms	1,180	L = G x (1-H)

[1] U.S. Census Bureau 2021c available at https://usatrade.census.gov/
[2] U.S. Census Bureau 2021b available at https://www.census.gov/foreign-trade/Press-Release/edb/2019/edbrel.pdf
[3] EPA best professional judgement
[4] Estimated in this analysis as the percentage of firms with revenues less than $12 million, as derived from the estimated revenue distribution of article importers. See Section 7.3 for a description of how the estimated revenue distribution is derived.

To estimate the number of importers of articles potentially containing PFAS in Table 2-3, EPA first created a list of likely uses of PFAS in articles based on Glüge et al. (2020). A list of these uses crosswalked to Harmonised Tariff System (HTS) codes is presented in B. Glüge et al. (2020) compiled their inventory of PFAS uses based on risk profiles, reports and books, databases, patents, information from PFAS manufacturers, and studies that measured PFAS in products. EPA used best professional judgment to determine which uses of PFAS described by Glüge et al. (2020) might result in detectable PFAS in finished articles that fall under the scope of TSCA.

To estimate the number of importers affected by the rule, EPA uses the U.S. Census Bureau's 2019 Profile of Importing and Exporting Companies (U.S. Census Bureau 2021b), which includes the total number of importers for all commodities (Table 2-3, row D). EPA assumes that the number of these firms importing articles that *may* contain PFAS is proportional to the total customs value of commodities that

may contain PFAS (Table 2-3, row C). This proportion is estimated using the U.S. Census Bureau's USA Trade Online (U.S. Census Bureau 2021c) report for customs value of imports by HTS code, and the list of HTS codes that may contain PFAS identified in Appendix B (Table 2-3, rows A and B). EPA could not identify any data sources with information on the number of firms importing PFAS in articles. Therefore, EPA assumes 10 percent of firms importing articles that *may* contain PFAS will determine they are importing PFAS in articles and submit reports under the rule (Table 2-3, row F). EPA developed this assumption based on various public comments regarding article importers and their lack of historical records and information on chemical content of their articles, and the various challenges companies expect from contacting suppliers (e.g., foreign suppliers not responding or refusing to give information, suppliers going out of business, etc.). Additionally, EPA considered that, based on EPA's understanding of the PFAS industry, many PFAS are used in such a way that their use is a trade secret or there is no requirement that their use be stated in a specific application. EPA also recognized that article supply chains are complex, and for certain instances testing would be needed to determine the presence of PFAS, which is beyond the known to or reasonably ascertainable standards. All these factors were considered when developing the assumption that 10 percent of firms importing articles that may contain PFAS will determine they are importing PFAS in articles.

The final rule provides an accommodation to small manufacturers (as defined at 40 CFR 704.3) whose reporting obligations are exclusively from article imports in the form of a six-month delay to their reporting deadline. This delayed deadline would only apply to entities whose sole reporting obligation pursuant to this rule arises due to importation of articles containing PFAS. Small businesses are defined under the existing TSCA section 8(a)(1) definition (40 CFR 704.3), where firms meeting either of the following standards would be considered small:

- Total sales during the principal reporting year, combined with those of the parent company, domestic or foreign (if any), are less than $12 million regardless of annual production volume.
- Total sales during the principal reporting year, combined with those of the parent company, domestic or foreign (if any) are less than $120 million and annual production volume of that chemical substance does not exceed 100,000 pounds at any individual plant site. If the annual production volume of the chemical substance at any particular site is more than 100,000 pounds, the submitter is required to report for that particular site.

For the purposes of this analysis, any article importer with less than $12 million in revenues is considered to be small. Based on the estimated revenue distribution of article importers, an estimated 91 percent of article importers are defined as small under TSCA section 8(a)(1). See Section 7.3 for a description of how the estimated revenue distribution for article importers is derived.

Total per-firm costs are dependent on the number of imported chemicals each firm will need to report. Based on CDR data, EPA estimated an average of 5.74 PFAS per firm for manufacturing firms for non-R&D uses. In addition, using best professional judgement, EPA assumes an average of 2 PFAS per firm for manufacturing firms for R&D use. EPA received public comments regarding article importers and their lack of data compared to manufacturers. Given this, EPA believes the average PFAS per firm estimate would be less than 5.74 and therefore assumes an average of 5 PFAS per reporting article importer. As discussed further in Chapter 7, EPA expects that the number of PFAS imported by each firm will be dependent on the size of the firm. Thus, per-firm costs may be higher or lower than the estimated averages presented in this chapter. Furthermore, as previously discussed, EPA acknowledges that importers have varying levels of knowledge about the chemical content of the articles they import. Therefore, the assumption that article importers will submit reports for an average of 5 PFAS reflects the expectation that some importers would not know or have access to all information on a chemical and/or

article and would therefore not be subject to reporting. See Section 7.4 Estimate the Distribution of Costs for Small Parent Entities for more information on the estimated distribution of PFAS per firm.

3 Industry Costs

Since the Notice of Proposed Rulemaking for this action published (86 FR 33926), EPA found additional data and received feedback via public comments to update its economic analysis, including estimating the number of PFAS article importers. Consequently, EPA updated its estimate of costs and published the IRFA and Updated Economic Analysis following the completion of a Small Business Advocacy Review Panel. The IRFA and Updated Economic Analysis detailed the change in costs from approximately $10.8 million to $876 million in industry costs, as well as from $948,078 to $1.6 million in agency costs. Under the final rule, EPA now estimates a total industry burden of approximately 11.6 million hours, with a cost of approximately $843 million and $800 million using a 3 percent and 7 percent discount rate, respectively. The Agency is expected to incur a cost of $1.6 million.

This chapter presents a description of the burden and costs potentially incurred by manufacturers (including importers) under the final rule. Section 3.1 presents the industry wage rates used in this analysis, Section 3.2 presents unit costs for each activity that firms are expected to complete to comply the final rule, and Section 3.3 presents the total estimated industry burden and cost.

3.1 Industry Wage Rates

The final rule involves activities that may require efforts by employees in four labor categories: clerical, professional/technical, managerial, and attorney. Costs for each activity are calculated by estimating the labor hours required in each labor category and multiplying those burdens by the wage rate for each labor category.

Loaded wage rates for each labor category are derived by combining data on wages and fringe benefits with estimates of overhead rates. Wage rates and fringe benefits for clerical, professional/technical, managerial, and attorney labor are calculated using the U.S. Bureau of Labor Statistics' (BLS) Employer Costs for Employee Compensation (ECEC) data for December 2022 (BLS 2023a). The industry wage rate for attorney labor is derived from the National Industry-Specific Occupational Employment and Wage Estimates (BLS 2023b).

Overhead costs are assumed to equal 20% of the sum of wages plus fringe benefits. This loading factor is described in *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and other U.S. EPA Actions* (EPA 2020c) and is reflective of multiplier values used in prior EPA economic analyses and Information Collection Requests (ICRs) that are based on industry- and occupation-specific overhead rates affected by EPA regulations. The loaded wage rates for each labor category are presented in Table 3-1. Detailed information on the estimation of these wage rates is provided in A.

Table 3-1: Loaded Industry Wage Rates (2022$)

Labor Category	Wage[1]	Fringe Benefit[2]	Total Compensation	Overhead % Wage[3]	Overhead	Hourly Loaded Wages[4]
	A	B	C = A + B	D	E = C x D	F = C + E
Clerical	$23.11	$10.33	$33.44	20%	$6.69	$40.13
Professional/ Technical	$46.01	$23.27	$69.28	20%	$13.86	$83.14
Managerial	$54.29	$24.66	$78.95	20%	$15.79	$94.74
Attorney	$78.74	$22.27	$101.01	20%	$20.20	$121.21

[1] Source: Employer Costs for Employee Compensation: December 2022 (BLS 2023a); National Industry-Specific Occupational Employment and Wage Estimates, May 2022 (BLS 2023b).
[2] Source: Employer Costs for Employee Compensation: December 2022 (BLS 2023a)
[3] An overhead rate of 20% is used based on assumptions in *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and other U.S. EPA Actions* (EPA 2020c).
[4] Values may not sum due to rounding. Wage rates are rounded to the nearest cent.

3.2 Unit Industry Costs

This section presents the estimated burdens and costs for the following activities that firms may perform under the final rule:

- Rule Familiarization (Section 3.2.1)
- Compliance Determination (Section **Error! Reference source not found.**)
- Form Completion (Section 3.2.3)
- CBI Claim Substantiation (Section 3.2.4)
- Recordkeeping (Section 3.2.5)
- CDX Registration and Electronic Signature (Section 3.2.6)

Note that certain information that is requested in the CDR that falls under TSCA section 8(a)(2)(A) through (G) would be required by this rule, such as information on specific chemical identity, categories of use, production volume, byproducts, and number of persons exposed and duration of exposure. In instances where PFAS manufacturers under this rule have already reported the requested information to EPA for that same year, they will not be required to re-report. As a conservative estimate that does not overstate costs to industry, EPA does not account for this duplicative reporting. However, EPA expects that most firms will need to submit information under the final rule, even if they have previously reported to CDR because the final rule requests different information from CDR. Additionally, this rule requires reporting for each year since 2011 in which a PFAS was manufactured, whereas reporting is not required annually for CDR. In addition, firms that have not previously submitted information to CDR (see Table 2-2) will need to submit data under the final rule.

Also note that the final rule sets a reporting deadline of 18 months after the rule is promulgated for all manufacturers except for small manufacturers (as defined at 40 CFR 704.3) whose reporting obligations under this rule are exclusively from article imports. who have a reporting deadline of 24 months after the rule is promulgated. This analysis discounts future costs incurred by each type of firm back to current dollars. The unit costs presented in this section are undiscounted. Total discounted costs to the industry are presented in Section 3.3.

3.2.1 Rule Familiarization

The final rule requires reporting businesses and their staff to become familiar with the TSCA section 8(a) rule and its various requirements. Rule familiarization costs for this rule consist of two major components: (1) understanding the rule and its various requirements and (2) understanding the structural definition of PFAS.

For reporting firms, EPA assumes firms will spend 17 hours of technical labor and 7 hours of managerial labor to familiarize themselves with the reporting form (EPA 2020b). EPA recognizes that article importers have varying levels of knowledge about the chemical content of the articles they import and may not immediately know if they are subject to the rule. EPA anticipates that importers of articles that may contain PFAS will spend some time familiarizing themselves with the rule and then take steps to determine if they are subject to the rule's requirements (i.e., that they have manufactured a PFAS). EPA assumes that the importers of articles will spend 6.4 hours of technical labor and 2.85 hours of managerial labor to familiarize themselves with the rule enough to perform compliance determination (see Section 3.2.2 Article Importer Compliance Determination for more information on this activity)[3]. If the article importers

[3] EPA (2020b) estimates that 6.5 hours (4.5 technical hours and 2 managerial hours) of the 24 total hours of rule familiarization burden is attributed to compliance determination. EPA anticipates that compliance determination activities under the final rule are likely more involved than those estimated by EPA (2020b) because firms will need to determine if they have manufactured or imported substances meeting the structural definition of PFAS. However,

determine that they are subject to the rule's reporting requirements, EPA assumes article importers will spend an additional 10.6 hours of technical labor and 4.15 hours of managerial labor to fully complete rule familiarization (thus a total of 17 hours of technical labor and 7 hours of managerial labor).

In addition, firms need to familiarize themselves with the structural definition of PFAS. EPA assumes that manufacturing and importing firms and large article importers will have staff with the technical knowledge to understand a structural definition more easily. Therefore, manufacturing firms and large article importers are assumed to spend 5.5 hours of technical labor on familiarization with the structural definition of PFAS. Small article importers are assumed to spend 10 hours on familiarization with the structural definition of PFAS. EPA also assumes 10 percent of these small article importer firms will rely on consultant attorneys for help understanding the structural definition. The remaining 90 percent of firms are assumed to rely on in-house technical staff. EPA used best professional judgement to determine how many small article importers would rely on outside help for this activity, particularly given that hiring consultants may be outside of many small firms' budget constraints. To simplify the analysis, the burdens and costs of structural definition familiarization presented in Table 3-2 represent a weighted average of labor types. EPA received several comments during the SBAR process that firms may rely on outside help, ranging from chemists, accountants, to attorneys. Using Bureau of Labor Statistics' National Industry-Specific Occupational Employment and Wage Estimates to compare the annual hourly wages of these occupations, EPA uses attorney wages in this analysis as it provides a comparatively conservative estimate.

As shown in Table 3-2, the per-firm cost associated with rule familiarization is estimated to be approximately $802 for non-reporting firms, $457 per manufacturer and large article importer for structural definition familiarization, $869 per small article importer for structural definition familiarization, and $2,076 for reporting firms. It is expected that all firms in the potentially affected universe will undertake structural definition familiarization activity and some rule familiarization activity, including article importers that do not report under this rule.

EPA is not able to identify a burden estimate for comparable compliance determination activities. For example, EPA burden estimates for familiarization with TRI reporting requirements assume the burden of compliance determination is approximately half of overall rule familiarization burden once a firm has determined it is subject to reporting requirements (EPA 2011b). Using a similar assumption for the current analysis would result in a compliance determination estimate of 12 hours for non-reporting firms (i.e., 50 percent of the estimated 24 hours for reporting firms). EPA anticipates that the TRI reporting requirements are more complex than the requirements of the final rule. Thus, this analysis assumes an estimate of 9.25 hours, corresponding to the midpoint of 6.5 hours and 12 hours.

Table 3-2: Average Per-Firm Industry Burden and Cost: Rule Familiarization (2022$)

Reporting Activity	Burden per Firm (hours)				Cost per Firm (2022$)			
	Attorney	Technical	Managerial	Total	Attorney ($121.21/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
Rule Familiarization: Non-Reporting Firms	0	6.4	2.85	**9.25**	$0.00	$532.39	$269.64	**$802**
Rule Familiarization: Reporting Firms	0	17	7	**24**	$0.00	$1,413.31	$663.18	**$2,076**
Structural Definition Familiarization for Manufacturing Firms and Large Article Importers	0	6	0	**5.5**	$0.00	$457.25	$0.00	**$457**
Structural Definition Familiarization for Small Article Importers	1	9	0	**10**	$121.21	$748.22	$0.00	**$869**

Note: Values may not sum due to rounding
[1] Weighted average for 10 percent of firms relying on consultant attorney labor and 90 percent of firms relying on in-house technical labor.
Source: EPA 2009a; BLS 2023a

3.2.2 Compliance Determination

For the purpose of this rule, the reporting standard would be information known to or reasonably ascertainable by the firm, which is the standard used in other TSCA section 8 rules, including CDR since 2011. "Known to or reasonably ascertainable by" is defined to include "all information in a person's possession or control, plus all information that a reasonable person similarly situated might be expected to possess, control, or know" (see 40 CFR § 704.3). This reporting standard requires reporting entities to evaluate their current level of knowledge of their manufactured products (including imports), as well as evaluate whether there is additional information that a reasonable person, similarly situated, would be expected to know, possess, or control.

Under the "known to" portion of the reporting standard (i.e., reporting information insofar as is "known to or reasonably ascertainable" by the submitter), a submitter must ascertain what it knows about a chemical substance it manufactures or imports without confining its inquiry to what is known to managerial and supervisory employees. A submitter would also be expected to review other information it may have in its possession. This standard requires that submitters conduct a reasonable inquiry within the full scope of their organization (not just the information known to managerial or supervisory employees). The inquiry would be as extensive as a reasonable person, similarly situated, might be expected to perform within the organization. Information derived from supplier surveys or other supplier contacts, like any other information, would be "known to" the submitter if it is available after a reasonable inquiry within the organization. The standard does not necessarily require that the manufacturer conduct an exhaustive survey of all employees.

Inquiry under the "reasonably ascertainable" portion of the reporting standard may also entail inquiries outside the organization to fill gaps in the submitter's knowledge. Note, however, that if particular information cannot be derived or reasonably estimated without conducting further supplier surveys (i.e., without sending a comprehensive set of identical questions to multiple suppliers), it would not be "reasonably ascertainable" to the submitter. Thus, there is not a need to conduct new supplier surveys for purposes of this rulemaking. As described above, however, existing customer supplier survey data may nevertheless be "known to" the organization.

While conducting due diligence under the "reasonably ascertainable" portion of the standard may entail inquiries outside the organization to fill gaps in the submitter's knowledge, it does not require each company that manufactures or imports any type of product to exhaustively research every one of their products to prove that they did or did not contain PFAS. Rather, the standard involves a reasonable investigation of the available information that a given company is aware of or should be aware of about the presence of PFAS. If a similarly situated person in the industry would have no reason to anticipate that PFAS may be present in a product, then it is not incumbent on a company to confirm such an understanding by contacting all the entities in their supply chain to investigate every hypothetical possibility.

This standard carries with it an exercise of due diligence, and the information-gathering activities that may be necessary for firms to achieve this reporting standard may vary from case-to-case. EPA understands that manufacturing firms will likely have more knowledge about the chemicals they manufacture (including import) compared to article importers and will therefore undertake different activities to perform due diligence. Thus, EPA estimates compliance determination burden and costs separately for manufacturers and article importers.

3.2.2.1 Manufacturer Compliance Determination

The burden associated with compliance determination for manufacturing firms involves first reviewing files dating back to January 1, 2011, to determine whether reporting is required for PFAS manufactured (including imported) by a particular company. Some firms, such as importers of confidential mixtures, may also contact suppliers to determine the presence of PFAS.[4] EPA received several public comments from industry noting that their records span back five years at the most. Commenters noted that data is unlikely to be available for earlier years due to provisions elsewhere in TSCA that have data retention requirements much less than 12 years (e.g., the 5-year requirement for CDR and PMNs (see 40 CFR § 711.25 and § 720.78), the 3-year requirement for TRI (see 40 CFR § 372.10), etc.) (EPA-HQ-OPPT-2020-0549-0020-A; EPA-HQ-OPPT-2020-0549-0108-A1). Other commentors noted that many companies have maximum record retention policies as short as five years (EPA-HQ-OPPT-2020-0549-0043-A1) and that import record keeping is only required for five years (see 19 CFR § 163.4) (EPA-HQ-OPPT-2020-0549-0047-A1). Consequently, companies may only have records for the more recent years. EPA estimates that it will take 2.5 hours of technical labor to gather information, regardless of the number of chemicals involved. This estimate is derived from EPA (2017a), which assumed 0.5 hours for compliance determination to review files to determine whether reporting is required for a chemical substance, regardless of the number of chemicals involved. EPA assumes firms will have an average of five years of records, and thus multiplies this estimate by five for a total of 2.5 hours.

Once firms review their files to compile the list of PFAS manufactured or imported since January 1, 2011, they will need to determine if the PFAS are subject to reporting under this rule. The Agency has provided a list of non-CBI chemicals that meet the rule's structural definition of PFAS as a resource for reporters to identify the PFAS subject to reporting more easily. Manufacturing firms may review this list of PFAS subject to the rule and search for a particular chemical identity or name. EPA estimates that it will take 0.083 hours of technical labor per chemical to review the list of PFAS subject to the rule (EPA 2017a).

[4] Note, an entity that does not have knowledge of a specific chemical identity must initiate a joint submission with its supplier or other manufacturer. In these cases, the secondary submitter would be responsible for providing the specific chemical identity and for asserting and substantiating any CBI claims concerning the specific chemical identity. For purposes of this analysis, burden and costs associated joint submissions by two or more respondents completing one reporting form is considered roughly equivalent and of the same burden and cost as completion of a singular submission that does not involve joint reporting. If an entity attests that it lacks knowledge of the specific chemical identity and the identity of the manufacturer of the substance, the joint submission provisions would not apply, and the entity would not be able to make or waive a CBI claim for the specific chemical identity.

Assuming an average of 7.74 PFAS per manufacturing firm, EPA estimates that it will take 2.5 hours of technical labor to gather information, regardless of the number of chemicals involved. EPA acknowledges that firms may review the provided list and search for more than 7.74 PFAS, particularly if the PFAS they manufactured fall outside the rule's structural definition. But due to lack of data, EPA is unable to estimate the number of PFAS firms manufactured that do not meet the rule's structural definition.

Not all the PFAS subject to the rule will be listed due to CBI claims. In these cases, firms will need to compare the structure of the PFAS manufactured or imported with the rule's structural definition of PFAS. The burden for this activity depends on if the chemical name indicates the level of fluorination. For example, if the chemical name indicates that it is highly fluorinated, then the substance would be relatively easy to identify as PFAS to someone familiar with the structural definition. Using best professional judgment, EPA estimates that it will take 0.17 hours of technical labor per chemical to determine if a highly fluorinated PFAS is subject to reporting. If the chemical name is ambiguous to the level of fluorination, the substance will be more difficult to distinguish as PFAS. It may require drawing or obtaining the chemical structure. Once the structure is drawn, it will be relatively easy to make a determination. Using best professional judgement, EPA estimates that it will take 1 hour of technical labor per chemical to determine if an ambiguously fluorinated PFAS is subject to reporting. Of the 1,455 identified PFAS, 58.6% cannot be listed due to CBI claims. Due to lack of data, EPA uses the simplifying assumption that 58.6% of the average 7.74 PFAS each firm manufactured will not be listed. Thus, each manufacturing firm will need to review the structural definitions for an average of 4.53 PFAS (58.6% * 7.74 = 4.53) to determine if they meet the rule's structural definition. Assuming an average of 4.53 PFAS per manufacturing firm, EPA estimates firms will require approximately 2.65 hours of technical burden to review the structures of the PFAS they have manufactured.

As shown in Table 3-3, each manufacturing firm is estimated to spend an average of 5.8 hours and $482 on compliance determination activities.

Table 3-3: Per-Firm Industry Burden and Cost: Manufacturer Compliance Determination (2022$)

Reporting Activity	Burden per Firm (hours)			Cost per Firm (2022$)		
	Technical	Managerial	Total	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
Search Company Records	2.50	0	2.50	$207.84	$0.00	$207.84
Review List of PFAS Subject to Reporting[1]	0.64	0	0.64	$53.41	$0.00	$53.41
Review PFAS Structures [2]	2.65	0	2.65	$220.68	$0.00	$220.68
Total	5.80	0	**5.80**	$481.93	$0.00	**$481.93**

[1] Actual costs may vary based on the number of PFAS manufactured (including imported)
[2] Actual costs may vary based on the number of PFAS manufactured (including imported) and if the chemical name indicates the level of fluorination. Average of a range of 0.17 to 1 hour technical labor per CBI chemical (average of 4.53 CBI PFAS per firm = 58.6% CBI chemicals x 7.74 PFAS per firm).

3.2.2.2 Article Importer Compliance Determination

Importers have varying levels of knowledge about the chemical content of the articles they import. The reporting standard would require reporting entities to evaluate their current level of knowledge of their imported articles, as well as evaluate whether there is additional information that a reasonable person, similarly situated, would be expected to know, possess, or control. This standard requires that submitters conduct a reasonable inquiry within the full scope of their organization and may also entail inquiries outside the organization to fill gaps in the submitter's knowledge. Therefore, this analysis estimates unit

costs for article importers to perform the following activities to determine whether any articles they import contain PFAS that are subject to the final rule:

- **Identify the type of imported articles that potentially use PFAS (per-firm cost).** This step involves reviewing the inventory of articles imported by the company and developing a list of the types of articles that are likely to be subject to the rule. This determination may be done based on an understanding of the uses of PFAS (e.g., those described in Section 2.2.2) and the application of any *a priori* knowledge of the material and its manufacture to assess the probability of whether PFAS may be present. Costs will likely vary based on the number of articles imported and the complexity of those articles.

- **Identify suppliers involved (per-firm cost).** The importer may choose to identify the suppliers from whom the articles identified in the previous step are imported. This involves examining the company's existing records, and potentially contacting the suppliers to make them aware of the reporting requirements and the importer's preferred data collection method. Costs will likely vary based on the number of articles imported, number of suppliers, and frequency of supplier changes.

- **Collect data from suppliers (per-article cost).** Importers may choose to obtain verification from identified suppliers that PFAS is or is not found in the article, and if the PFAS in the article meets the rule's structural definition. There is currently no single, widely accepted standard procedure to identify regulated chemicals in supply chains. However, there are several organizations that help provide information on the content of articles, organize declarations from suppliers, or certify suppliers based on materials or processes used.[5] EPA does not expect companies to perform chemical testing on articles to determine if they contain PFAS, as this falls outside of the known to or reasonably ascertainable standard.

  A range of activities may be involved depending on the level of experience of the importer. Companies that are currently subject to regulations such as REACH or State regulations may use a database system such as the Global Data Synchronization Network or BOMcheck. Importers with no previous regulatory experience related to chemical restrictions may reach out to a trade association for support and guidance on supply chain management. Small importer companies who have a simple supply chain may have a closer, more trusting relationship with suppliers and may instead use individual agreements/certifications or questionnaires with them to ensure compliance with the rule. Formats for questionnaires or certifications may be available for free from industry associations, or they may develop their own. Costs will likely vary widely depending on the data collection method, number of articles, number of suppliers, and frequency of supplier changes.

- **Recordkeeping (per-firm cost).** The importer may choose to keep records confirming the activities completed to determine if PFAS is present in articles.

[5] Note, the following are included as examples and do not necessarily reflect EPA's endorsement: The Japan Green Procurement Survey Standardization Initiative (JSPSSI) developed the Joint Industry Guide (JIG) for Material Composition Declaration for Electronic Products, which is a standardized survey used to communicate the composition of chemicals in electronic products between suppliers and customers. The Global Data Synchronization Network (GDSN) is a customizable data management platform that enables companies to share information about their products with their trading partners. The International Material Data System (IMDS) is an online database that suppliers use to provide information on substances in the parts they sell to auto manufacturers. BOM check provides a resource for importers and product manufacturers to gather substance declarations from their suppliers.Green Seal is a global nonprofit organization that develops sustainability standards for products, services, and companies and offers third-party certification for those that meet the criteria in the standard.

EPA recognizes that there is a range of factors that make obtaining data on substances in articles from suppliers easier or more difficult and thus per-firm costs can vary significantly among entities (EPA 2014).

Table 3-4: Factors Affecting the Ease of Obtaining Information on Substances

Factors Making Data-Gathering Easier	Factors Making Data-Gathering Harder
The importation of the product occurred recently	The importation of the product occurred years ago
The organization has well-maintained, electronic records	The organization has paper records
The organization requesting information is a major/important customer of the supplier	The requesting organization is not a key customer
The requesting organization has close or longstanding links with the supplier	The requesting organization switches suppliers frequently
The supplier is a large, multinational company	The supplier is a small company
The supply chain is short and simple	The supply chain is long and/or complex
Products and processes remain unchanged for long periods	Product and process development is rapid, with frequent changes in substances used
There is no secrecy about production composition	The substance content of products is commercially valuable information and/or secret for other reasons
Source: EPA 2014	

Any person required to report under this rule would supply the information to the extent it is known to or reasonably ascertainable by them, or a reasonable estimate when actual data are not available (i.e., known to or reasonably ascertainable). This reporting standard carries with it an exercise of due diligence, and the information-gathering activities that may be necessary for firms to achieve this reporting standard may vary from case-to-case. The scenarios below are intended to serve as a general guide of what EPA assumes article importers may or may not do as part of the compliance determination activities. These scenarios will not necessarily account for all the relevant circumstances of a particular entity.

General Scenarios Involving Company Changes

1. If a supplier is out of business (i.e., has not simply been spun off, merged, or acquired by another company; see discussion below), submitters do not need to contact them as the company no longer exists.
2. If a supplier has split into multiple companies, merged, or been acquired by another company, submitters may need to contact multiple entities to determine who has the relevant information.
    a. One company becomes two companies (e.g., a division of Company X is separated from Company X to become Company Y)
        i. Submitters may need to determine whether Company Y was created as the continuation of the part of Company X that previously supplied the pertinent article(s).
        ii. If Company Y is the continuation of the part of Company X that supplied the pertinent article(s), then importers would contact Company Y for information on all the supplying that Company X did during the calendar years of the reporting period, including the supplying that it did while it was a unit of Company X.
        iii. If Company Y is not the continuation of the part of Company X that supplied the pertinent article(s), then importers would contact Company Y only for information based on the supplying that it did during the calendar years of the reporting period and after it was created and contact Company X separately for information based on its own supplying.

3. Two companies become one company (e.g., (1) one company ceases to have a separate identity, because it has been combined into another company; or (2) two companies cease to have their separate identities, because they have combined to form a new company)

    a. The submitter may need to contact the resulting company about the combination of the supplying conducted by the original companies during the calendar years of the reporting period.

4. One company takes ownership of another company; the two companies maintain their separate identities (e.g., acquiring company buys at least 50% of the voting shares of an acquired company. The acquired company continues to exist as a separate legal entity.)

    a. The submitter may need to contact the acquired company.

5. A part of one company becomes a part of a different company; two companies continue to exist (e.g., Company X combines with a part of Company Y, acquiring all of the assets of that unit of Company Y and assuming all of its liabilities. The remainder of Company Y continues to exist as a separate legal entity.)

    a. The submitter may need to contact Company X about the supplying subject to the rule that it did during the calendar years of the reporting period including the supplying that the newly combined unit did before it combined with Company X.

    b. The submitter may need to contact Company Y about any supplying subject to the rule that it did during the calendar years of the reporting period excluding the supplying that the divested unit did between those same calendar years.

General Scenario Involving Record Retention

6. EPA acknowledges that there may be submitters who do not have records going back to January 1, 2011, and for whom certain information (e.g., imported article inventory records, supplier records, etc.) is not known to or reasonably ascertainable. If that is the case, reporting is not required under this rule. EPA recommends documenting why records do not exist for the full reporting period.

General Scenarios About Conducting Inquiry Within and Outside of an Organization

7. Submitters need not conduct extensive supply chain surveys. That is, they need not conduct a new survey of their suppliers by sending out a comprehensive set of identical questions to multiple suppliers for a given article type to fulfill the rule's reporting standard. However, fulfilling the reporting standard may entail inquiries outside the organization (e.g., contacting first tier/immediate suppliers, major suppliers, examining a supplier's public website) to fill in the gaps in the submitter's knowledge, where the submitter's current knowledge is less than what a "reasonable person similarly situated might be expected to possess, control, or know."

8. Stock Keeping Units (SKUs) are numbers that retailers assign to products to track inventory. If a product is available in different colors or sizes, each variation has a unique SKU number. When there are multiple like items with different SKUs (e.g., textiles made of the same fabric, but of different colors, sizes, and/or shapes), contacting each supplier and collecting requested data on each individual SKU may be beyond the scope of known to or reasonably ascertainable information. Note, if an importer has reason to believe that different items are made from different PFAS (e.g., if their supplier has indicated different PFAS were used in different products through different trade names), they are not considered like items for the purpose of this rule, as the items may be comprised of different reportable substances that each require reporting under section 8(a)(7).

9. Under the "known to" portion of the standard, a submitter must ascertain what it knows without confining its inquiry to what is known to managerial and supervisory employees. This standard requires that submitters conduct a reasonable inquiry within the full scope of their organization (e.g., considering employees in research and development (R&D) or sales, and not limited to the information known to managerial or supervisory employees). The standard does not necessarily require that the submitter conduct an exhaustive survey of all employees. Additionally, it does not require submitters to contact former employees.

10. Submitters may collect information by checking third-party certifications and declarations through databases. Generally, these databases do not include chemical content information below certain de minimis levels. For example, the International Material Data System (IMDS) database has a default de minimis 0.1% reporting threshold, unless otherwise specified. Therefore, submitters may still attempt to contact suppliers to determine whether PFAS are present.

Other General Scenarios

11. This rule does not require submitters to perform chemical analyses on articles or products to determine if they contain PFAS, nor does it require the generation of any other data that are not currently known to or reasonably ascertainable by the submitter.

12. EPA recognizes that some covered substances may not yet have CASRNs, and that other chemical identifiers (e.g., TSCA Accession Numbers, Low Volume Exemption numbers) may be more readily available than a CASRN in some cases. Reporters under this rule need not apply for a CASRN or another identifier if one is not known to or reasonably ascertainable.

Table 3-5contains the cost estimates associated with the above activities. EPA estimates each firm will spend an average of approximately $4,037 on these activities. The activities and cost derivations are discussed in more detail in *Understanding the Costs Associated with Eliminating Exemptions for Articles in SNURs* (EPA 2014).

Table 3-5: Average Per-Firm Industry Burden and Cost: Article Importer Compliance Determination (2022$)

Activity	Burden per Firm (hours)				Cost per Firm (2022$)			
	Clerical	Technical	Managerial	Total	Clerical ($40.13/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
Identify the type of imported articles that potentially use PFAS[1]	0	13	0	13	$0.00	$1,080.77	$0.00	$1,080.77
Identify suppliers involved[2]	17	7	0	24	$682.18	$581.95	$0.00	$1,264.13
Collect data from suppliers[3]	0	20.2	0	20.2	$0.00	$1,679.35	$0.00	$1,679.35
Recordkeeping[4]	0	0.15	0	0.15	$0.00	$12.47	$0.00	$12.47
Total	17	40	0	**57**	$682.18	$3,354.54	$0.00	**$4,036.71**

Source: EPA 2014

[1] Actual costs may vary based on number of articles imported and the complexity of the article itself (number of components). Average of a range of 2 to 24 hours technical labor.

[2] Actual costs may vary depending on the number of articles imported, number of suppliers, and frequency of supplier changes

[3] Actual costs only apply to those companies that choose to collect data from suppliers. They will vary depending on the specific data collection method chosen. Total costs depend on considerations including the number of articles imported, number of suppliers, and frequency of supplier changes. Average of a range of 0.08 to 8 hours per article.

[4] Actual costs may vary depending on recordkeeping system already in place.

If an importer determines that any article contains PFAS, they are expected to incur compliance costs associated with form completion, CBI claim substantiation, recordkeeping, and CDX registration as discussed in Sections 3.2.3 through 3.2.6.

3.2.3 Form Completion

The final rule requires one-time reporting of certain information, including specific chemical identity, categories of use, production volume, byproducts, environmental and health effects, number of persons exposed and duration of exposure, and disposal. All affected firms are required only to submit information that is known to or reasonably ascertainable to them. "Known to or reasonably ascertainable by" would be defined to include "all information in a person's possession or control, plus all information that a reasonable person similarly situated might be expected to possess, control, or know." This reporting standard would require reporting entities to evaluate their current level of knowledge of their manufactured products (including imports), as well as evaluate whether there is additional information that a reasonable person, similarly situated, would be expected to know, possess, or control.

Furthermore, firms are not required to submit the same information for a given year and substance that has already been submitted to EPA under the TSCA section 8(a) CDR rule. Note that firms are still required to submit information for any chemical substances and/or years since 2011 for which they have not previously submitted information. As a conservative approach that does not underestimate industry costs, this analysis does not account for any potential reduction in reporting burdens for firms that have previously submitted duplicate information to EPA. However, EPA expects that most firms will need to submit information under the final rule, even if they have previously reported to CDR because the final rule requests different information than the CDR. Additionally, this rule requires reporting for each year since 2011 in which a PFAS was manufactured, whereas reporting is not required annually for CDR. Furthermore, importers of articles are not required to report to CDR and thus would not have previously submitted any duplicative information.

TSCA section 8(a)(5) requires EPA, to the extent feasible when carrying out TSCA section 8, to avoid requiring unnecessary or duplicative reporting. The Agency seeks to avoid collecting data on PFAS that would duplicate information already reported to the Agency. While developing this rule EPA reviewed the data elements submitted under the Chemical Data Reporting Rule and determined that there may be some overlap with the information requested under the final rule. EPA will allow reporting entities to indicate in the reporting tool that they have previously provided such information to EPA through CDR for certain data elements. The Agency has identified the following data elements which the reporter may be able to indicate has already been submitted to EPA:

- Physical state of the chemical;
- Industrial processing and use type, sector(s), functional category(ies), and percent of production volume for each use;
- Consumer and/or commercial indicator, product category(ies), functional category(ies), percent of production volume for each use, indicator for use in products intended for children, and maximum concentration in the product, and;
- Number of workers reasonably likely to be exposed for each combination of industrial processing or use operation, sector, and function, and the number of commercial workers reasonably likely to be exposed if the PFAS is contained in a commercial product.

If an entity covered under this final rule has previously submitted required information to EPA for some years since 2011, but not for all years, the entity may indicate in the reporting tool the year(s) for which the manufacturer has already submitted that data to EPA as part of CDR.

Conversely, there are some data elements for which CDR reporters may have previously reported information to EPA for some years covered by this rule, but not all, and would still be required to report this information for the missing year(s):

- Domestically manufactured production volume;
- Imported production volume;

- Volume directly exported; and
- Indicator for imported but never physically at site.

EPA estimates form completion burden and costs separately for manufacturers and article importers. Note, the final rule includes a reporting option for article importers to provide data to EPA on a streamlined form. The information requested through this streamlined form will include company information, chemical identity and name, processing and use information, and production volume, as well as the option to provide any additional information to EPA that the entity may have (e.g., SDS, disposal information).

Table 3-6 presents a summary of the estimated per-firm burden and costs associated with form completion. EPA estimates each manufacturing firm will incur an average of approximately 532 burden hours and $44,089 in costs per firm. Table 3-7 presents estimated per-firm burden and costs for article importers. EPA estimates that each article importer will incur an average of approximately 92 burden hours and $7,531 in costs per firm. Note that the final rule requires some reporting elements to be reported for each chemical, site, and/or year subject to the rule. Table 3-6 and Table 3-7 aggregate all burden and cost estimates to the firm level using the average number of reports per firm estimated in Chapter 2. The derivation of the estimated burden for each reporting element is further described in the following sections.

Table 3-6: Average Per-Firm Industry Burden and Cost: Manufacturer Form Completion (2022$)

Reporting Element		Burden per Firm (hours)				Cost per Firm (2022$)			
		Clerical	Technical	Managerial	Total	Clerical ($40.13/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
1	Company and plant site information	0.00	0.022	0.008	0.0308	$0.00	$1.86	$0.80	$2.66
2	Common or trade name, chemical identity, and molecular structure	10.05	25.83	5.74	41.62	$403.09	$2,147.40	$543.81	$3,094.30
3	Byproducts	0.00	2.87	0.00	2.87	$0.00	$238.60	$0.00	$238.60
4	Categories of use	0.00	25.41	9.24	34.66	$0.00	$2,112.81	$875.53	$2,988.34
5	Total production volume	0.00	54.39	15.57	69.96	$0.00	$4,521.48	$1,475.08	$5,996.55
6	Occupational exposure	0.00	77.49	0.00	77.49	$0.00	$6,442.21	$0.00	$6,442.21
7	Environmental release and disposal	0.00	54.53	0.00	54.53	$0.00	$4,533.41	$0.00	$4,533.41
8	Environmental and health effects data	0.00	223.17	0.00	223.17	$0.00	$18,553.56	$0.00	$18,553.56
9	Streamlined reporting form for R&D substances	3.50	19.93	4.68	28.10	$140.45	$1,656.48	$442.91	$2,239.84
	Total	13.5	483.6	35.2	**532.4**	$543.53	$40,207.81	$3,338.12	**$44,089.46**

Note: Estimates may not sum due to rounding.
Sources: EPA 1994; EPA 2018b; EPA 2018c;; BLS 2023a

Table 3-7: Average Per-Firm Industry Burden and Cost: Article Importer Form Completion (2022$)

Reporting Element		Burden per Firm (hours)				Cost per Firm (2022$)			
		Clerical	Technical	Managerial	Total	Clerical ($40.13/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
1	Company and plant site information	0.00	0.016	0.006	0.0220	$0.00	$1.33	$0.57	$1.90
2	Common or trade name, chemical identity, and molecular structure	7.50	15.00	5.00	27.50	$300.96	$1,247.04	$473.70	$2,021.70
3	Byproducts	0.00	0.00	0.00	0.00	$0.00	$0.00	$0.00	$0.00
4	Categories of use	0.00	22.14	8.05	30.19	$0.00	$1,840.42	$762.66	$2,603.08
5	Total production volume	0.00	27.31	6.69	34.00	$0.00	$2,270.65	$633.57	$2,904.23
6	Occupational exposure	0.00	0.00	0.00	0.00	$0.00	$0.00	$0.00	$0.00
7	Environmental release and disposal	0.00	0.00	0.00	0.00	$0.00	$0.00	$0.00	$0.00
8	Environmental and health effects data	0.00	0.00	0.00	0.00	$0.00	$0.00	$0.00	$0.00
	Total	7.5	64.5	19.7	**91.7**	$300.96	$5,359.45	$1,870.50	**$7,530.90**

Note: Estimates may not sum due to rounding.
Sources: EPA 1994; EPA 2018b; EPA 2018c; BLS 2023a

3.2.3.1 Company and plant site information

Each reporting site will need to provide the following information:

- Site information (e.g., site name, site address, technical contact name)
- Parent company information (e.g., company name, company address)

EPA estimates a total of 0.006 hours of managerial burden and 0.016 hours of technical burden per site to report parent company and site identification information (EPA 2018b).

Manufacturers: Assuming an average of 1.4 sites per manufacturing firm, EPA estimates firms will require approximately 0.008 hours of managerial burden and 0.022 hours of technical burden to report company and plant site information.

Article importers: EPA assumes each article importer will require 0.006 hours of managerial burden and 0.016 hours of technical burden to report parent company and site identification information.

3.2.3.2 Common or trade name, chemical identity, and molecular structure

Manufacturers: The final rule requires submitters to report the following information for each chemical they manufacture or import that is subject to the rule's reporting requirements:

- Chemical or generic name
- Chemical identity
- Trade name or common name
- Representative molecular structure, for any PFAS that is not a Class 1 substance[6] on the TSCA Inventory
- Physical form(s) of chemical or mixture

EPA estimates firms will require 1.5 to 2 hours of clerical labor, 3 to 6 hours of technical labor, and one hour of managerial labor to report chemical identity and molecular structure information (EPA 1994). Using the midpoint of these estimates and assuming an average of 5.74 reports per firm results in estimated burdens of 10.05 hours of clerical labor, 25.83 hours of technical labor, and 5.74 hours of managerial labor per firm.

Article importers: The final rule allows a streamlined reporting form for article importers, which would require submitters to provide the following:

- Chemical or generic name
- Chemical identity[7]
- Trade name or common name
- Representative molecular structure, for any PFAS that is not a Class 1 substance on the TSCA inventory

EPA estimates that firms will require 1.5 hours of clerical labor, 3 hours of technical labor, and one hour of managerial labor to report chemical identity and molecular structure information (EPA 1994). These are the lower end of the ranges described above for manufacturers, as article importers are not required to report the physical form of the chemical or mixture, and some article importers may not have information

[6] Class 1 chemical substances are those chemical substances composed of molecules with particular atoms arranged in a definite, known structure.

[7] Note that the final rule allows for joint submissions for situations in which an importer does not know the specific PFAS identity and their supplier refuses to disclose it for proprietary reasons.

on the molecular structure. Assuming an average of 5 reports per firm results in estimated an estimated 7.5 hours of clerical labor, 15 hours of technical labor, and 5 hours of managerial labor per firm.

Note, an entity that does not have knowledge of a specific chemical identity must initiate a joint submission with its supplier or other manufacturer. In these cases, the secondary submitter would be responsible for providing the specific chemical identity and for asserting and substantiating any CBI claims concerning the specific chemical identity. For purposes of this analysis, burden and costs associated joint submissions by two or more respondents completing one reporting form is considered roughly equivalent and of the same burden and cost as completion of a singular submission that does not involve joint reporting. If an entity (such as an article importer) attests that it lacks knowledge of the specific chemical identity and the identity of the manufacturer of the substance, the joint submission provisions would not apply, and the entity would not be able to make or waive a CBI claim for the specific chemical identity.

3.2.3.3 Byproducts

Manufacturers: For each chemical at each reporting site, the rule requires the following information:

- Byproduct chemical or generic name
- Byproduct chemical identity
- Indicate if byproduct is from manufacture, process, use, or disposal
- Indicate if byproduct is released to the environment; if yes, indicate the environmental media they are released to
- Byproduct volume released

EPA estimates that a description of byproducts will require 0.5 hours of technical labor per report per site EPA (1994). Assuming 4.1 reports per site and 1.4 sites per firm, EPA estimates approximately 2.87 hours of technical burden for reporting byproducts.

Article importers: This reporting element will not be required for article importers. EPA thus assumes that article importers will not incur any burden to report byproducts.

3.2.3.4 Categories of use

The rule will require submitters to report the following information on categories of use for each chemical at each reporting site:

- Industrial processing and use – Type of process or use
- Industrial processing and use – Sector(s)
- Industrial processing and use – Functional use category(ies)
- Consumer and commercial use – Product category
- Consumer and commercial use – Functional use category(ies)
- Consumer and commercial use – Consumer or commercial
- Consumer and commercial use – Used in products intended for children
- Consumer and commercial use – Maximum concentration

EPA estimates burden estimates for reporting categories of use data in Table 3-8 and Table 3-9 for manufacturers and article importers, respectively (EPA 2018b). Note that burden estimates differ for industrial uses and consumer and commercial uses (Table 3-8). To estimate a single average burden estimate for reporting categories of use across all types of uses, this analysis therefore weights the industrial use and consumer and commercial use burdens by the percentage of each type of use observed in the 2016 and 2020 CDRs for PFAS manufacturers. The 2016 and 2020 CDRs indicate that approximately 60 percent of firms manufacture PFAS chemicals for use in consumer products (EPA

2020d, EPA 2022b). This analysis therefore further weights burdens by either 40 percent (Industrial use) or 60 percent (Consumer and Commercial use) to derive a weighted average burden per chemical.

EPA is not able to determine the average number of years per chemical for which firms will submit data under the final rule. However, EPA received several public comments from industry noting that their records span back five years at the most. Commenters noted that data is unlikely to be available for earlier years due to provisions elsewhere in TSCA that have data retention requirements much less than 12 years (e.g., the 5-year requirement for CDR and PMNs (see 40 CFR § 711.25 and § 720.78), the 3-year requirement for TRI (see 40 CFR § 372.10), etc.) (EPA-HQ-OPPT-2020-0549-0020-A; EPA-HQ-OPPT-2020-0549-0108-A1). Other commentors noted that many companies have maximum record retention policies as short as five years (EPA-HQ-OPPT-2020-0549-0043-A1) and that import record keeping is only required for five years (see 19 CFR § 163.4) (EPA-HQ-OPPT-2020-0549-0047-A1). Consequently, if companies have information, it will likely be for the most recent reporting years. EPA (2018b)'s estimates for five reporting years is therefore assumed to be a reasonable approximation for the number of years for which a firm will report data under the final rule.

Manufacturers: As shown in Table 3-8 EPA estimates an average of 25.41 hours of technical burden and an average of 9.24 hours of managerial burden per firm for reporting categories of use.

Table 3-8: Average Per-Site Burden: Categories of Use (Manufacturers)

CDR Reporting Element	Technical Burden			Managerial Burden		
	Per Report Burden (Hours)	Reports per Firm	Burden (hours)	Per Report Burden (Hours)	Reports per Firm	Burden (hours)
Industrial Processing and Use Data						
Determination of Applicability (includes "Type of Process or Use")	1.01	5.74	5.81	0.29	5.74	1.65
Sector	0.94	5.74	5.38	0.40	5.74	2.30
Industrial Function Category	4.41	5.74	25.33	2.06	5.74	11.84
Total Industrial Processing and Use (40% of manufacturers)			*36.52*			*15.79*
Consumer and Commercial Use Data						
Determination of Applicability (includes "Consumer or Commercial or both")	0.94	5.74	5.38	0.25	5.74	1.44
Identification of Production Category/Use by Children	0.84	5.74	4.81	0.25	5.74	1.44
Maximum Concentration by Category	1.36	5.74	7.82	0.35	5.74	2.01
Total Consumer and Commercial Use (60% of manufacturers)			*18.01*			*4.88*
Average Per-Firm Burden[1]	-	-	**25.41**	-	-	**9.24**

Source: EPA 2018b; EPA 2020d; EPA 2022b
Note: Clerical burdens are not anticipated for this reporting element and are thus not presented in the table. Estimates may not sum due to rounding.
[1] Average per firm burden across all use types, weighted by 40% for Industrial Processing and Use burdens and 60% for Consumer and Commercial Use burdens.

Article importers: As shown in Table 3-9, EPA estimates an average of 22.14 hours of technical burden and an average of 8.05 hours of managerial burden per firm for reporting categories of use.

Table 3-9: Average Per-Site Burden: Categories of Use (Article Importers)

Reporting Element	Technical Burden			Managerial Burden		
	Per Report Burden (Hours)	Reports per Firm	Per Firm Burden (hours)	Per Report Burden (Hours)	Reports per Firm	Per Firm Burden (hours)
Industrial Processing and Use Data						
Determination of Applicability (includes "Type of Process or Use")	1.01	5.00	5.06	0.29	5.00	1.44
Sector	0.94	5.00	4.69	0.40	5.00	2.00
Industrial Function Category	4.41	5.00	22.06	2.06	5.00	10.31
Total Industrial Processing and Use (40% of importers)			*31.81*			*13.75*
Consumer and Commercial Use Data						
Determination of Applicability (includes "Consumer or Commercial or both")	0.94	5.00	4.69	0.25	5.00	1.25
Identification of Production Category/Use by Children	0.84	5.00	4.19	0.25	5.00	1.25
Maximum Concentration by Category	1.36	5.00	6.81	0.35	5.00	1.75
Total Consumer and Commercial Use (60% of importers)			*15.69*			*4.25*
Average Per-Firm Burden[1]	-	-	**22.14**	-	-	**8.05**

Source: EPA 2018b; EPA 2020d; EPA 2022b
Note: Clerical burdens are not anticipated for this reporting element and are thus not presented in the table. Estimates may not sum due to rounding.
[1] Average per firm burden across all use types, weighted by 40% for Industrial Processing and Use burdens and 60% for Consumer and Commercial Use burdens.

3.2.3.5 Total production volume

Manufacturers: Each affected site is required to report the following elements, to the extent known to or reasonably ascertainable:

- Production volume domestically manufactured at each site
- Production volume imported at each site
- Indication if imported but never physically at site
- Volume directly exported
- Industrial processing and use - % production volume
- Consumer and commercial use - % production volume

EPA estimates burden estimates for reporting categories of use data in Table 3-10 and Table 3-11 for manufacturers and article importers, respectively (EPA 2018b). EPA is not able to determine the average number of years per chemical since 2011 for which firms will submit data under the final rule's one-time reporting requirement. However, EPA received several public comments from industry noting that their records span back five years at the most. Commenters noted that data is unlikely to be available for earlier years due to provisions elsewhere in TSCA that have data retention requirements much less than 12 years (e.g., the 5-year requirement for CDR and PMNs (see 40 CFR § 711.25 and § 720.78), the 3-year requirement for TRI (see 40 CFR § 372.10), etc.) (EPA-HQ-OPPT-2020-0549-0020-A; EPA-HQ-OPPT-2020-0549-0108-A1). Other commentors noted that many companies have maximum record retention policies as short as five years (EPA-HQ-OPPT-2020-0549-0043-A1) and that import record keeping is

only required for five years (see 19 CFR § 163.4) (EPA-HQ-OPPT-2020-0549-0047-A1). Consequently, if companies have information, it will likely be for the most recent reporting years. EPA (2018b)'s estimates for five reporting years is therefore assumed to be a reasonable approximation for the number of years for which a firm will report data under the final rule. As shown in Table 3-10, EPA estimates 54.39 hours of technical burden and 15.57 hours of managerial burden per firm for reporting production volume.

Table 3-10: Average Per-Site Burden: Production Volume (Manufacturers)

CDR Reporting Element	Technical Burden			Managerial Burden		
	Per Report Burden (Hours)	Reports per Firm	Burden (hours)	Per Report Burden (Hours)	Reports per Firm	Burden (hours)
Production volume for all reporting years	5.35	5.74	30.71	1.31	5.74	7.53
Whether imported chemical substance is physically at reporting site	0.11	5.74	0.65	0.03	5.74	0.14
Production volume used on-site	0.20	5.74	1.15	0.05	5.74	0.29
Volume exported	1.03	5.74	5.88	0.25	5.74	1.44
Percent of production volume	2.79	5.74	16.00	1.08	5.74	6.17
Total	-	-	**54.39**	-	-	**15.57**

Source: EPA 2018b; EPA 1994
Note: Estimates may not sum due to rounding.

Article importers: Article importers will be required to report the volume or quantity of imported articles containing PFAS. As shown in Table 3-11, EPA estimates an average 27.31 hours of technical burden and 6.69 hours of managerial burden per firm for reporting production volume.

Table 3-11: Average Per-Site Burden: Production Volume (Article Importers)

CDR Reporting Element	Technical Burden			Managerial Burden		
	Per Report Burden (Hours)	Reports per Firm	Per Firm Burden (hours)	Per Report Burden (Hours)	Reports per Firm	Per Firm Burden (hours)
Volume imported for all reporting years	5.35	5.00	26.75	1.31	5.00	6.56
Whether imported chemical substance is physically at reporting site	0.11	5.00	0.56	0.03	5.00	0.13
Total	-	-	**27.31**	-	-	**6.69**

Source: EPA 2018b; EPA 1994
Note: Estimates may not sum due to rounding.

3.2.3.6 Occupational exposure

Manufacturers: Each affected site is required to report the following elements, to the extent known to or reasonably ascertainable:

- Worker activity descriptions at manufacturing site

- Number of workers reasonably likely to be exposed at the manufacturing site, for each worker activity
- Maximum duration and frequency of exposure for any worker, for each worker activity
- Number of workers reasonably likely to be exposed for each industrial process and use
- Maximum duration and frequency of exposure for any worker for each industrial process and use
- Number of workers reasonably likely to be exposed for each commercial use
- Maximum duration and frequency of exposure for any worker for each commercial use

EPA estimates this activity will require 13 to 14 hours of technical labor per report per site (EPA 1994). Using the midpoint of 13.5 hours per report and assuming 4.1 reports per site and 1.4 sites per firm, EPA estimates approximately 77.49 hours of technical burden per firm to report occupational exposure information.

Article importers: This reporting element will not be required for article importers. EPA thus assumes that article importers will not incur any burden to report occupational exposure information.

3.2.3.7 Environmental release and disposal

Manufacturers: Each affected site is required to report the following elements, to the extent known to or reasonably ascertainable:

- Description of disposal process(es)
- Description of any changes to the disposal process or methods since 2011
- Total volume released (land disposal)
- Total volume released (water)
- Total volume released (air)
- Total volume incinerated (on-site)
- If incineration occurs: the temperature at which the chemical was incinerated
- Total volume recycled (on-site)

EPA estimates this activity will require 9 to 10 hours of technical labor per chemical per site (EPA 1994). Using the midpoint of 9.5 hours per report and assuming 4.1 reports per site and 1.4 sites per firm, EPA estimates approximately 54.53 hours of technical burden per firm to report environmental release and disposal information.

Article importers: This reporting element will not be required for article importers. EPA thus assumes that article importers will not incur any burden to report environmental release and disposal information.

3.2.3.8 Environmental and health effects data

Manufacturers: Each affected site is required to report the following elements for each chemical with a consumer use, to the extent known to or reasonably ascertainable:

- All existing information concerning the environmental and health effects of such substance or mixture.

For this final rule, EPA is requiring firms to report data using the Organisation for Economic Co-operation and Development (OECD)'s Harmonised Templates (OHTs; or "templates"). The OHTs are standardized formats for reporting information on chemicals, including physical properties, production and use, and effects on human health and the environment (OECD 2018). In addition to allowing reporting for a particular endpoint value (e.g., pH, biodegradation, aquatic toxicity), the OHTs are intended to summarize administrative data about the quality of the studies and publications associated with those endpoints (e.g., test materials, study design, study period).

This analysis assumes that firms will submit environmental and health effects data using templates under the Biotic Systems group (19 templates) and the Health Effects group (31 templates). Each template contains a range of fields for the submitter to report, such as endpoint value, study period, test materials, descriptions of materials and methods, descriptions of test organisms, study design, analytical monitoring, test conditions, and results and discussion. In addition to the required template format, those subject to this rulemaking must submit any associated full study reports or underlying data as support documents. The full study reports and support documents are necessary for EPA to understand the full context and evaluate the quality of the data, which is necessary for the Agency to review to determine whether such data may be used for any future Agency actions.

This analysis assumes that 12 hours of technical time will be required to complete each template, which is equivalent to the burden time needed to complete a robust summary for a TSCA 8(d) health and safety study (EPA 2018c). A robust summary for a TSCA section 8(d) health and safety data rule typically includes a description of the test substance, methods, results, conclusions, data quality descriptions, and references associated with a full study, which is similar to the data fields required for the Biotic Systems and Health Effects templates. Based on historic rates of environmental and health studies submitted to EPA under TSCA section 8(d), each firm that submits a report is assumed to submit an average of 18 studies (templates) per chemical (9 in the Biotic Systems group and 9 in the Health Effects group). Thus, the burden per chemical is estimated at 216 hours of technical labor.

EPA expects that only a small subset of firms will have these data available to submit. This analysis therefore assumes that 18 percent of firms will submit data, which is derived from the historic percentage of firms that have submitted health and safety studies to EPA under TSCA 8(d) rules (EPA 2018c). Assuming 18 percent of firms will submit data and 5.74 chemicals per firm, EPA estimates an average of approximately 223.17 hours of technical burden per firm to report environmental and health effects data.

Article importers: This reporting element will not be required for article importers. EPA thus assumes that article importers will not incur any burden to report environmental and health effects data.

3.2.3.9 Streamlined reporting form for R&D substances manufactured in volumes of less than 10 kilograms per year

EPA will allow firms that manufacture R&D substances in volumes of less than 10 kilograms per year to submit a streamlined reporting form. The data elements required on the streamlined form would include, for each year: (1) company and plant site information, (2) specific or generic chemical name, chemical identity, trade name or common name, and molecular structure and (3) production volume of PFAS.

Manufacturers: Due to the lack of data on R&D substances (including reporting exemptions for small quantities of R&D substances under both CDR and PMN reporting), EPA uses best professional judgement to assume that each manufacturing firm will submit reports for an average of two R&D substances. The per-firm unit cost associated with completing the streamlined reporting form for manufacturing firms is presented below in Table 3-12. The burden associated with submitting company and plant site information is not included in the table because it is already accounted for as previously described in this section. The burden for the chemical name/identity and molecular structure is assumed to be the same as for manufacture of non-R&D substances, and production volume is assumed to be the same as the streamlined form for article importers as presented previously in this section. Note, however, that the burdens presented in Table 3-12 reflect reports for two R&D substances rather than the 5.74 assumed for each manufacture and 5 imported substances assumed for each article importer.

Article Importers: It is assumed that article importers will not submit reports for R&D substances.

Table 3-12: Per-Firm Industry Burden and Cost: Streamlined Reporting Form for R&D Substances (2022$)

Reporting Element	Burden per Firm (hours)				Cost per Firm (2022$)			
	Clerical	Technical	Managerial	Total	Clerical ($40.13/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
Common or trade name, chemical identity, and molecular structure[1]	3.50	9.00	2.00	14.50	$140.45	$748.22	$189.48	$1,078.15
Total production volume[2]	0.00	10.70	2.63	13.33	$0.00	$889.56	$248.69	$1,138.25
Whether imported chemical substance is physically at reporting site	0.00	0.23	0.05	0.28	$0.00	$18.71	$4.74	$23.44
Total	**3.50**	**19.93**	**4.63**	**28.10**	**$140.45**	**$1,656.48**	**$442.91**	**$2,239.84**

Note: Values may not sum due to rounding
[1] Estimated as 1.75 clerical hours, 4.5 technical hours, and 1 managerial hour per form.
[2] Estimated as 5.35 technical hours and 1.31 managerial hours per form. See Table 3-11.

3.2.4 CBI Claim Substantiation

TSCA requires that anyone seeking protection of confidential business information (CBI) under TSCA must assert a claim and, for certain information, may be required to substantiate that claim. Any CBI claim for a PFAS' identity must comply with CBI requirements under section 14(c)(1)(C), including by providing a sufficient generic name. For the purposes of this rule, a generic name for a PFAS should note that it is a fluorinated chemical (i.e., should include "fluor" in its generic name). The Act lists information that is generally not subject to substantiation requirements. Furthermore, the Act states that health and safety data submitted for substances in commercial distribution or for which testing or notification is required under TSCA are not protected as CBI. Based on this, the reporting elements of this rule for which a submitter might need to substantiate a claim of CBI, if a claim is made, include but are not limited to:

- Submitter information
- Chemical identity[8] if the chemical is not on the public TSCA Inventory
- Physical properties
- Percent of production volumes for each use
- Byproducts
- Environmental release
- Worker exposure information
- Description of disposal process(es)

[8] Under TSCA, claims regarding chemical identity are subject to specific substantiation requirements, and the claim shall include a structurally descriptive generic name for the chemical substance that the Administrator may disclose to the public, subject to the condition that such generic name shall—(i) be consistent with guidance developed by EPA; and (ii) describe the chemical structure of the chemical substance as specifically as practicable while protecting those features of the chemical structure. A confidentiality claim cannot be asserted for chemical identities listed on the public portion of the TSCA Inventory.

This analysis uses burden estimates from EPA's (2011) Inventory Update Reporting (IUR) Economic Analysis to estimate CBI substantiation for this rule. According to the economic analysis, submitters spent 4.38 hours on each substantiation type reviewing the information, preparing the response, and submitting the response to the Agency (assumed to be 0.36 clerical hours, 2.49 technical hours, and 1.53 managerial hours). EPA assumes that assertion is accomplished via checking a box when completing the form, so the burden is included in the form completion estimate. According to CDR data (EPA 2022b), 10% of the reports claim the company, site, technical contact, or authorized official as CBI, and 6% of reports claim other data as CBI that requires upfront substantiation. Thus, for manufacturers, EPA estimates that 16% of submissions include a CBI claim that requires substantiation. The average per-report burden as described above is adjusted accordingly (e.g., 4.38 hours x 16% = 0.7 hours). For article importers, EPA estimates that 10% of submissions include a CBI claim that requires substantiation. This is due to article importers having a streamlined form with less data elements requiring CBI claim substantiation.

Manufacturers: It is assumed that each firm will submit an average of 7.74 reports, resulting in a total per-firm burden of 5.42 hours. As shown in Table 3-13, the labor cost associated with CBI claim substantiation is approximately $454 per firm.

Article importers: It is assumed that each firm will submit an average of 5 reports, resulting in a total per-firm burden of 2.19 hours. As shown in Table 3-13, the associated labor cost is approximately $183 per firm. EPA is conservatively expecting that 10% of submissions from article importers (or via a joint submission) include a CBI claim that requires substantiation. Given that some article importers may be far removed in the supply chain from an entity who would be able to identify the PFAS, there potentially may not be a secondary reporter who knows the chem ID and can substantiate. In those circumstances, a joint submission would not be required, nor would EPA determine the confidentiality status of that chemical identity on the basis of that submission.

Table 3-13: Average Per-Firm Industry Burden and Cost: CBI Claim Substantiation (2022$)

Reporting Activity	Burden per Firm (hours)				Cost per Firm (2022$)			
	Clerical	Technical	Managerial	Total	Clerical ($40.13/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
Manufacturers								
CBI Claim Substantiation	0.45	3.08	1.89	**5.42**	$17.89	$256.36	$179.51	**$453.76**
Article importers								
CBI Claim Substantiation	0.18	1.25	0.77	**2.19**	$7.22	$103.50	$72.48	**$183.20**

Note: Values may not sum due to rounding.
Source: EPA 2022b; BLS 2023a

3.2.5 Recordkeeping

The final rule requires manufacturers (including importers) subject to the reporting requirements to retain documentation of information contained in their reports for five years from the date of submission. EPA estimates that each report will require 0.5 hours of clerical labor and 0.5 hours of technical labor per report to maintain records (EPA 1994).

EPA acknowledges that there may be submitters who do not have records going back to January 1, 2011, and for whom certain information (e.g., imported article inventory records, supplier records, etc.) is not known to or reasonably ascertainable. If that is the case, reporting is not required under this rule. EPA recommends documenting why records do not exist for the full reporting period.

Manufacturers: Assuming an average of 7.74 reports per firm, the estimated recordkeeping burden for the final rule is 3.87 hours of clerical labor and 3.87 hours of technical labor per firm. These recordkeeping burdens and associated cost estimates are presented in Table 3-14. It is expected that each firm submitting reports will undertake this activity.

Article importers: Assuming an average of 5 reports per firm, the estimated recordkeeping burden is 2.5 hours of clerical labor and 2.5 hours of technical labor per firm, as shown in Table 3-14. It is expected that each firm submitting reports will undertake this activity.

Table 3-14: Average Per-Firm Industry Burden and Cost: Recordkeeping (2022$)

Reporting Activity	Burden per Firm (hours)				Cost per Firm (2022$)			
	Clerical	Technical	Managerial	Total	Clerical ($37.18/hr)	Technical ($81.40/hr)	Managerial ($93.18/hr)	Total
Manufacturers								
Recordkeeping	3.87	3.87	0	**7.74**	$155.30	$321.74	$0.00	**$477.03**
Article importers								
Recordkeeping	2.50	2.50	0	**5.00**	$100.32	$207.84	$0.00	**$308.16**

Note: Values may not sum due to rounding.
Source: EPA 2017b; BLS 2023a

3.2.6 CDX Registration and Electronic Signature

Firms that submit a report to EPA will incur a one-time cost associated with registering with EPA's Central Data Exchange (CDX) to comply with electronic reporting requirements. Respondents will incur electronic reporting costs to register with CDX and provide an electronic signature. These activities occur only once for each submitter.

The one-time burden associated with CDX registration and e-signature is estimated at approximately 2.67 hours per firm (EPA 2009a). These activities are estimated to require the following burden hours:

- ***CDX registration.*** EPA estimates that a firm will spend approximately 11 minutes per employee to register with CDX, and that an average of four technical staff members and one manager would need to register for each firm, totaling approximately 0.92 hours per firm.
- ***CDX electronic signature.*** EPA estimates that a firm would spend 0.25 hours preparing, submitting, and filing an electronic signature agreement (Authentication of Identity) form to EPA per employee. This burden would apply to four technical staff members and one manager per firm, totaling 1.25 hours per company. In addition, EPA estimates that a manager would spend an additional 0.50 hours accessing, preparing, and submitting verification forms (Verification of Authorization) for all authorized submitters to EPA. The total burden incurred by a firm submitting and then verifying electronic signature agreements is 1.75 hours. Note that this burden does not include any additional time required to contact EPA's CDX help desk to notify a change of submitter status, should one occur. Filing the electronic signature agreement requires an additional mailing cost of $3.25 per company (including five $0.58 stamps[9] and five $0.07 business envelopes[10]).

[9] Price for a stamp was taken from the U.S. Postal Service website on April 8, 2022. (USPS 2022).
[10] Price for an envelope was determined based on the per unit price of a regular business envelope. See "Staples® #10, Self-Sealing Envelopes, 500/Box." Available at: http://www.staples.com/ (Accessed 4/8/2022).

As shown in Table 3-15, the estimated cost of CDX registration, electronic signature, and mailing activities is approximately $236 per firm.

As a conservative estimate, it is expected that each firm that submits a report will undertake this activity. Some submitters may already have registered to use the e-TSCA web reporting tool in CDX (and obtained an accompanying electronic signature) to comply with the mandatory electronic reporting requirements of EPA's e-PMN rule and/or IUR/CDR rule. Those submitters will not need to repeat the CDX registration and e-signature process to file their reports. While there may be some overlap in the specific individuals that have already completed CDX activities, EPA is conservatively expecting that all firms that submit a report under this rule will need to register with CDX. Therefore, this economic analysis may overestimate the burden and cost associated with this activity.

Table 3-15: Average Per-Firm Industry Burden and Cost: CDX Registration and Electronic Signature (2022$)

Reporting Activity	Burden per Firm (hours)				Cost per Firm (2022$)			
	Clerical	Technical	Managerial	Total	Clerical ($40.13/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
CDX Registration	0	0.73	0.18	0.92	$0.00	$60.97	$17.37	$78.34
Electronic Signature	0	1.00	0.75	1.75	$0.00	$83.14	$71.06	$154.19
Mailing cost (non-labor)	-	-	-	-	-	-	-	$3.25
Total	0	1.73	0.93	**2.67**	$0.00	$144.10	$88.42	**$235.78**

Note: Values may not sum due to rounding
Source: EPA 2009a; USPS 2022; BLS 2023a

3.3 Total Industry Costs

Table 3-16 presents the total estimated industry burden and costs. As shown in the table, affected firms subject to the final rule are estimated to incur approximately 11.6 million burden hours and $843.2 million in costs for this one-time reporting under a 3 percent discount rate and $800.2 million under a 7 percent discount rate. This analysis makes the simplifying calculation to discount all costs for manufacturers and large article importers by one year (under the final rule, they will have 18 months to report). For small article importers, it is assumed that rule familiarization will occur in the first year after the rule is promulgated, compliance determination activities will be equally split between the first and second year, and all other activities will occur in the second year.

EPA notes that there is a high degree of uncertainty related to article importers. Due to a lack of data on the number of articles that contain PFAS, this analysis made several assumptions to quantify the universe of affected article importers. This includes assumptions regarding the number of firms undertaking compliance determination activities, the type of compliance determination activities, the number of firms importing articles that contain PFAS, the number of articles per firm, and the level of knowledge of each firm about the PFAS content of their imports. Each of these assumptions introduces additional uncertainty into the industry burden and cost estimates of the rule. EPA conducts a sensitivity analysis related to these uncertainties in Chapter 9 to evaluate how sensitive the total industry cost estimates are to these assumptions.

Table 3-16: Total Industry Burden and Costs (2022$)

Activity[1]	Number of Affected Firms[2]	Average Burden per Firm (Hours)	Total Burden (hours)	Average Undiscounted Cost per Firm (2022$)	Average Discounted Cost per Firm (2022$)		Total Cost (2022$)	
					3% Discount	7% Discount	3% Discount	7% Discount
Manufacturers								
Rule Familiarization[3]	253	30	7,464	$2,534	$2,460	$2,368	$622,365	$599,099
Compliance Determination	253	6	1,467	$482	$468	$450	$118,378	$113,952
Form Completion	253	532	134,702	$44,089	$42,805	$41,205	$10,829,742	$10,424,892
CBI Claim Substantiation	253	5	1,372	$454	$441	$424	$111,457	$107,291
Recordkeeping	253	8	1,958	$477	$463	$446	$117,174	$112,793
CDX Registration and Electronic Signature	253	3	675	$236	$229	$220	$57,914	$55,749
Manufacturer Total	*253*	*584*	*147,637*	-	*$46,866*	*$45,114*	*$11,857,030*	*$11,413,776*
Large Article Importers								
Rule Familiarization: Non-Reporting Firms	10,624	9	98,269	$802	$779	$750	$8,272,390	$7,963,142
Structural Definition Familiarization for Large Article Importers	11,804	6	64,922	$457	$444	$427	$5,240,191	$5,044,296
Rule Familiarization: Reporting Firms	1,180	24	28,330	$2,076	$2,016	$1,941	$2,379,718	$2,290,757
Compliance Determination	11,804	57	676,965	$4,037	$3,919	$3,773	$46,261,875	$44,532,459
Form Completion	1,180	92	108,255	$7,531	$7,312	$7,038	$8,630,629	$8,307,989
CBI Claim Substantiation	1,180	2	2,585	$183	$178	$171	$209,956	$202,107
Recordkeeping	1,180	5	5,902	$308	$299	$288	$353,160	$339,958
CDX Registration and Electronic Signature	1,180	3	3,148	$236	$229	$220	$270,206	$260,105
Large Article Importer Total	*11,804*	*84*	*988,376*	-	*$6,067*	*$5,840*	*$71,618,126*	*$68,940,813*
Small Article Importers								
Rule Familiarization: Non-Reporting Firms	107,417	9	993,609	$802	$779	$750	$83,643,055	$80,516,211

Activity[1]	Number of Affected Firms[2]	Average Burden per Firm (Hours)	Total Burden (hours)	Average Undiscounted Cost per Firm (2022$)	Average Discounted Cost per Firm (2022$)		Total Cost (2022$)	
					3% Discount	7% Discount	3% Discount	7% Discount
Structural Definition Familiarization for Small Article Importers	116,308	10	1,163,084	$869	$844	$813	$98,177,375	$94,507,192
Rule Familiarization: Reporting Firms	11,935	24	286,446	$2,076	$2,016	$1,941	$24,061,597	$23,162,098
Compliance Determination	119,352	57	6,844,864	$4,037	$3,862	$3,649	$460,946,938	$435,544,101
Form Completion	11,935	92	1,094,576	$7,531	$7,099	$6,578	$84,723,541	$78,507,472
CBI Claim Substantiation	11,935	2	26,138	$183	$173	$160	$2,061,060	$1,909,842
Recordkeeping	11,935	5	59,676	$308	$290	$269	$3,466,835	$3,212,478
CDX Registration and Electronic Signature	11,935	3	31,827	$236	$222	$206	$2,652,512	$2,457,900
Small Article Importer Total	119,352	*88*	*10,500,220*	-	*$6,365*	*$6,031*	*$759,732,911*	*$719,817,294*
Total Article Importer	*131,157*	*88*	*11,488,596*	-	*$6,339*	*$6,014*	*$831,351,038*	*$788,758,107*
Industry Total	**131,410**	**-**	**11,636,233**	**-**	**-**	**-**	**$843,208,067**	**$800,171,883**

[1] See Section 3.2.1 to Section 3.2.6 for derivations of the average burden per firm and average cost per firm for each reporting activity.
[2] See Section 2.2
[3] Includes rule familiarization and structural definition familiarization for manufacturing firms. See Section 3.2.1 for more detail.

4 Agency Costs

This chapter presents Agency hours and costs associated with collection and administrative activities under the final rule. Section 4.1 presents the Agency wage rates used in this analysis, Section 4.2 presents unit costs for each activity the Agency is expected to take, and Section 4.3 presents the total hours and cost to the Agency for the final rule.

4.1 Agency Wage Rates

EPA assumes that the collection and administrative activities (technical labor) associated with Agency responses to the final rule will be accomplished by a GS-13, Step 5 federal employee in the Washington-Baltimore-Northern Virginia area. EPA's *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and Other EPA Actions* (EPA 2020c) recommends a study by the Congressional Budget Office (Falk 2012) for estimating benefit values for federal government workers. The study reports that total benefits account for 63.9 percent of average wages in the federal government sector. Therefore, 63.9 percent of the wage is used to calculate the fringe in the derivation of Agency wage rates. An additional factor of 20 percent is applied to wages to account for overhead, consistent with the approach described in Section 3.1 for industry wage rates.

The loaded wage rate for a GS-13, Step 5 employee is $114.47 per hour, as shown in Table 4-1. This estimate includes a base wage of $58.20 per hour plus benefits and overhead.

Table 4-1: Agency Wage Rates (2022$)

Labor Category	Data Source for Wage Information	Wage ($/hour)	Fringes as % of Wage[2]	Fringe Benefit	Total Compensation	Overhead as % of Total Compensation[3]	Overhead	Loaded Wage ($/hr)
		A	B	C = A * B	D = A + C	E	F = D * E	G = D + F
Technical	Annual federal staff cost: OPM Washington-Baltimore-Northern Virginia, DC-MD-PA-VA-WV area, GS-13 Step 5 pay rates[1]	$58.20	63.9%	$37.19	$95.39	20.0%	$19.08	$114.47

[1] Source: U.S. Office of Personnel Management 2022
[2] Source: Falk 2012
[3] An overhead rate of 20% is used based on assumptions in *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and Other U.S. EPA Actions* (EPA 2020c)

4.2 Agency Unit Cost

EPA will incur costs in administering the final rule associated with processing submitted reports, analyzing data from the reports, maintaining the information technology systems that support these activities, reviewing CBI claim substantiations, and information technology (IT) infrastructure.

Under TSCA, as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act, EPA must review a number of CBI claims received, including some associated with submissions under the rule, within 90 days after receipt. Under the Act, EPA must review 100 percent of claims related to chemical identity, and at least 25 percent (a representative sample) of all other claims where substantiation is required. EPA expects that two FTE of technical Agency staff time will be needed for data processing, including time to gather report format requirements, programmatic time to quality check

the data, and time to review CBI chemical identity and other CBI claims. EPA assumes these activities will occur in the second year after the rule is promulgated.

In addition, EPA estimates $10,000 of contractor support will be required to create reports from the data. EPA further estimates that one FTE of technical staff time will be needed for analysis and data use for different programs throughout the Agency. EPA assumes these activities will occur in the second year after the rule is promulgated.

As discussed in Section 3.2.3, EPA is requiring firms to report environmental and health effects data by attaching the relevant OECD template to their submission in CDX. EPA estimates a cost of approximately $930,000 to the Agency for completing IT infrastructure startup tasks to allow for this submission method in CDX and to develop guidance for using the reporting tool. EPA assumes these activities will occur immediately following rule promulgation and thus does not discount these costs.

4.3 Total Agency Costs

Table 4-2 summarizes the total Agency hours and costs associated with administering the final rule. As shown in the table, Agency hours and cost are estimated to total approximately 6,240 hours and approximately $1.6 million for this one-time reporting.

Table 4-2: Total Agency Costs (2022$)

EPA Activity	Hours	Cost (2022$)	
		3% Discount Rate	7% Discount Rate
Data Processing	4,160	$448,851	$415,919
Data Analysis	2,080	$224,425	$207,960
Contractor Data Processing Support	-	$9,426	$8,734
IT Infrastructure and Guidance Development	-	$930,000	$930,000
Total Agency Hours and Cost	**6,240**	**$1,612,702**	**$1,562,613**

5 Total Social Burden and Cost

This chapter presents the total burden and cost to society associated with the final rule. The total burden and cost to society includes the burden and cost to industry (presented in Chapter 3) and the cost to the Agency (presented in Chapter 4). As shown in Table 5-1, the estimated total cost to society associated with this final rule is $844.8 million and $801.7 million under a 3 percent and 7 percent rate, respectively, with an associated burden of 11.6 million hours.

Table 5-1: Total Social Burden and Cost

Type	Burden (Hours)	Cost (2022$)	
		3% Discount Rate	7% Discount Rate
Industry	11,636,233	$843,208,067	$800,171,883
Agency	N/A	$1,612,702	$1,562,613
Total Social Burden and Cost	**11,636,233**	**$844,820,770**	**$801,734,496**

6 Benefits

This chapter qualitatively discusses the benefits that may result from the final rule. The final rule is an information-collecting rule and does not attempt to reduce risks related to PFAS chemicals at a quantifiable level. Accordingly, this benefits analysis does not seek to quantitatively measure the associated benefits and does not formally identify or define the universe of recipients of those benefits.

The final rule will supply information on PFAS chemicals to which the Agency (or the public) does not currently have access. EPA aims to better understand the scope of existing information on manufactured PFAS and would not otherwise have knowledge of PFAS that have been manufactured as byproducts, impurities, or below de minimis levels due to multiple reporting exemptions in other rules such as CDR and TRI. Further, this rule will assist EPA in determining where manufacturers might lack information on PFAS in their supply chains, products, or on-site processes, should certain industries or entities be unable to respond to this data call due to a lack of information as it relates to this rule's reporting standard.

The formation of PFAS byproducts is not well understood but is expected to occur during manufacturing, including when manufacturers are not directly using PFAS in the manufacturing process. Understanding the types of manufacturing processes and reactions that can form PFAS, or transform certain PFAS into different chemicals, may provide useful insights for characterizing exposure and risk for PFAS. While byproducts may, or may not, in themselves have commercial value, they are nonetheless produced for the purpose of obtaining a commercial advantage since they are part of the manufacture of a chemical product for a commercial purpose. (40 CFR 704.3 and 40 CFR 720.3). EPA understands that certain waste management activities (e.g., incineration) may manufacture PFAS coincidentally, and the Agency would not otherwise have information related to their manufacture without this data gathering rule. Additionally, there may be byproducts of particular concern to the environment and human health. Some PFAS that have been linked to adverse health effects have been coincidentally manufactured as byproducts. For example, some long-chain PFAS are byproducts of the manufacturing process for fluorinated polyolefins (EPA 2022a) and GenX chemicals hexafluoropropylene oxide dimer acid and its ammonium salt can be produced as a byproduct of some manufacturing processes (EPA 2021a).

As has been widely noted, some PFAS may exhibit properties that are of concern to human health and the environment, even in small quantities or concentrations. EPA has both the authority and the interest in receiving any existing or reasonably ascertainable data on PFAS, even in de minimis levels. Due to the strong carbon-fluorine bonds of PFAS, they are stable in the environment and resistant to biodegradation, photooxidation, direct photolysis, and hydrolysis. Some PFAS have been detected at high levels in wildlife, including higher trophic organisms, indicating that at least some PFAS have the ability to bioaccumulate (ATSDR 2021). Historical PFAS information, even below the de minimis level, is still important and relevant given that PFAS are resistant to environmental and metabolic degradation and this high persistence may mean that their continual release will result in accumulating environmental concentrations.

Given the highly persistent nature of PFAS, EPA believes that it is important to understand the uses and universe of PFAS in a current and historical context to fully characterize exposure and risk associated with PFAS. By enhancing the data supplied to Agency risk-screening programs, EPA expects to more effectively and expeditiously evaluate any potential risks posed by PFAS. The more EPA can base its decisions on actual data rather than on assumptions, the better EPA is able to tailor its risk management decisions to the level of actual risk, whether higher or lower than it would be if based on assumptions alone. Ultimately, EPA believes that enhancing the risk screening process will have positive consequences for human and environmental health and may enable a more efficient allocation of EPA's and society's resources.

6.1 Market Failure

Improving the information available to parties to a transaction will lead to more rational decision making. If the value of information deficit exceeds the cost of providing that information to both parties, a market failure exists. Information regarding the hazards associated with a chemical substance may not be widely known for several reasons. In one case, known as asymmetric information, consumers and producers do not have the same level of information regarding the aggregate production, uses, and hazards of a chemical substance. Because information is a public good, producers are reluctant to provide information (that is, businesses may perceive the high costs of collecting and disclosing information to be greater than the benefits from increased access to chemical information). Individual consumers are simultaneously unlikely to be willing to pay the cost of collecting and reporting information if they can use information developed and paid for by others.

In addition to concerns about these direct costs, industry may have a disincentive to disclose data due to the possibility of liability or regulation (Applegate 1991). For example, some firms releasing Toxics Release Inventory (TRI) data saw a negative response in financial markets, indicating further reasons why businesses may be reluctant to disclose information (Konar and Cohen 1997). As a result, data on the chemicals subject to the final rule may be produced below what is optimal for society.

6.2 Benefits of Information-Based Policies

Increased and improved data on the production and use of PFAS in the U.S. would allow EPA and other federal agencies to use the data more effectively as part of screening and prioritization programs. Screening chemicals for potential risks is an essential first step in developing and prioritizing risk management activities. Effective risk-screening by EPA depends on the ability to characterize chemical uses accurately and to predict potential exposures. Current screening activities are greatly hampered by the incomplete and inconsistent nature of available data. The White House Office of Science and Technology Policy recently released a PFAS report underscoring the significant data gaps regarding PFAS (OSTP 2023). In addition, EPA's current screening activities are further hampered by the fact that EPA must rely on relatively limited public sources of information. This rule may benefit EPA by filling in these information gaps and contributing to better assessments of potential risks and risk management decisions. It may also help identify information gaps that may be filled using other EPA authorities.

The final rule may increase EPA's knowledge by providing the agency with significant exposure-related data on PFAS, as well as certain existing health and environmental effects information, and consequently is likely to result in (a) a reduction in the cost of risk-based decision making about a PFAS, and (b) an improvement in the expected outcome of the decisions.

- **Reduced cost of risk-based decision making**. By making new information about PFAS available to EPA and other government agencies, this rule may be able to replace other information-gathering, management, and dissemination activities related to PFAS.

- **Improved outcome of decisions.** Information-based policies contribute to better decisions by redirecting resources toward their most highly valued uses. With incomplete information regarding toxic chemicals, federal decision makers are not able to assess adequately the benefits and costs of actions that involve these substances. In this final rule, EPA decisions regarding whether, when, and how to target PFAS for further risk assessment could be misdirected if basic risk-screening information is unavailable or inadequate. With more information to fill gaps in the current understanding of the benefits and risks of PFAS, EPA can better direct its limited resources toward high-priority risks. Improved information can therefore help lead to more socially optimal reductions in risks to humans and the environment.

The final rule may generate both types of benefits. First, it may provide data that are otherwise unavailable or reduce EPA's reliance on databases and information sources that are inadequate for accurately characterizing the risks associated with the PFAS chemicals in commerce that need to be evaluated and potentially regulated. As discussed in Chapter 4, EPA will bear the cost of collecting and managing the data; however, by providing more reliable and complete data on PFAS uses and exposures, the final rule may also allow EPA to save time and resources in screening chemicals and in developing risk management priorities.

Secondly, the final rule may allow EPA to better identify candidates for its prioritization, risk evaluation, and risk management activities—to move more quickly in addressing PFAS that pose relatively high risks (and/or relatively low risk-management costs). For example, potential problems from incomplete information may include the initiation of prioritization for a relatively lower risk or higher risk-management cost PFAS, resulting in unnecessary effort and resource expenditures for both regulated parties and EPA in cases where adequate data would have led the Agency to act differently. Similarly, if a business cannot provide adequate data for its product, that product may be subject to regulations which are unsuitable for its true hazard level (Applegate 1991). In these cases, it is in the best interest of the business to disclose information about its chemical production. Reporting through TSCA ensures the public that the chemical information provided by firms is credible, and thus is more likely to be utilized efficiently (Cohen and Santhakumar 2007). As described by Konar and Cohen (1997), information provision can also serve as informal regulation, providing financial incentives for reducing behaviors which may lead to negative externalities.

6.3 Potential Users of Information Generated by the Rule

As EPA learns more about the family of PFAS, the Agency can do more to protect public health and the environment. A growing body of scientific evidence shows that exposure at certain levels to specific PFAS can adversely impact human health and other living things (ATSDR 2021). But while the universe of PFAS has rapidly expanded over the years, significant gaps remain related to the impacts of other PFAS on human health and in the environment as well as the understanding of the universe of PFAS chemicals. Each of these chemicals has different properties and may be used for different purposes or may simply be present as unintended byproducts of certain manufacturing or other processes. The toxicity of PFAS varies, and people may be exposed to each chemical in different ways and in varying amounts. Robust information about PFAS is needed to better understand the risks they pose, and the data gathered from the final rule may help EPA fill these gaps and inform future Agency regulations and actions. EPA is expected to be the primary user of the information generated by the rule and will evaluate the data quality and robustness of information received as part of its consideration of potential uses. Depending on the type of information submitted and for which PFAS under this rule, data submitted may be applied and disseminated by EPA and other federal agencies in several ways; however, it will primarily serve to reduce the costs of screening and managing chemical risks and to improve risk management decisions. If information received under this rule can be used to improve risk management decisions, then the rule could help to better target risk management activities to the areas where the net benefits (i.e., risk reductions net of control costs) are expected to be the largest.

EPA anticipates the following potential uses for the data collected from the final rule. EPA's notes that future use of data collected under this rule is contingent on ensuring that data quality is adequate and fit for the intended purpose.

Office of Pollution Prevention and Toxics Programs

EPA's Office of Pollution Prevention and Toxics (OPPT) would be able to use information collected on production volumes, categories of use, disposal, byproducts, and worker-related information in future screening-level assessments of potential exposure to these PFAS chemicals. OPPT's New Chemicals program ensures the safety of new chemicals, including new PFAS, prior to their entry in US commerce.

Where unreasonable risks are identified during the review process, EPA must mitigate those risks before any manufacturing activity can begin. Given the complexity of PFAS chemistry, potential health effects, and their longevity and persistence in the environment, EPA is looking at PFAS that it has previously reviewed through the TSCA New Chemicals program as well as revisiting past PFAS regulatory decisions and addressing those that are insufficiently protective. The data gathered from this rule may help the Agency review previous actions and ensure existing PFAS are being used in ways that do not present concerns.

Additionally, OPPT screens existing chemicals on the TSCA Inventory to identify potential risks and determine whether more detailed assessments should be undertaken. With the data currently available, EPA does not have the information needed to effectively and systematically screen most PFAS, some of which may not even be included in the Inventory. The final rule would supply exposure-related information that the Agency does not currently have, recognizing that industry has a greater knowledge than EPA about its own operations and the uses of chemicals it manufactures and/or sells. Without this information, EPA would likely: (1) not screen these chemicals, (2) screen them using outdated or anecdotal exposure information, or (3) screen them but rely on exposure estimates using modeling data. Therefore, data collected as a result of the final rule will improve the Agency's ability to screen PFAS chemicals in commerce, allowing the Agency to better focus its chemical screening programs and to identify potentially risky situations earlier than otherwise possible.

OPPT may also be able to use information collected from this rule to improve the Agency's modeling data for other chemicals undergoing review. In the absence of sufficient measured data for a chemical undergoing review, chemical analogs may be used to predict environmental and human health effects. Depending on the type of information submitted and for which PFAS under this rule, data submitted through this rule may serve as analogs for other chemicals undergoing prioritization and improve the Agency's modeling data.

PFAS continue to be released into the environment throughout the lifecycle of manufacturing, processing, distribution in commerce, use, and disposal. Each action in this cycle creates environmental contamination and the potential for human and ecological exposure. PFAS-containing articles play a role in the contribution of PFAS to the environment through their use, degradation, and disposal. However, the extent of those exposures as well as the prevalence of PFAS is poorly understood because there is no comprehensive source of information on many of the PFAS that are used in different types of articles. By including article importers in this rule, EPA would have a more complete dataset of PFAS chemicals that the Agency would not have otherwise. Data gathered from this rule would help the Agency better understand the sources and quantities of PFAS, the universe of PFAS and the firms involved, and better account for the full lifecycle of PFAS. Additionally, to the extent the requested information is not known to or reasonably ascertainable by a manufacturer or importer of PFAS (including articles), EPA may have a greater understanding of existing data gaps concerning the presence of PFAS in commerce, which would help inform the Agency's work going forward under the PFAS Strategic Roadmap (EPA 2021b).

Additionally, the gathered data may also be able to inform development of future existing chemical Significant New Use Rules (SNURS) and complement EPA's testing authority under TSCA § 4 to improve EPA's knowledge of environmental and health effects information and inform EPA's Testing Strategy. The data gathered under this rule may also complement PFAS data submitted under other reporting rules (TSCA Chemical Data Reporting; the Toxics Release Inventory) and improve EPA's ability to conduct data quality checks on those datasets.

Other EPA Programs

Additionally, other EPA offices' regulatory and non-regulatory programs would benefit from information collected, such as data on the manufacturing, processing, use, disposal, releases, and other waste management methods of PFAS as well as the environment and health effects data. Many offices across EPA are fulfilling directives under the Agency's PFAS Strategic Roadmap (EPA 2021b) and this first

nationwide dataset on PFAS, production, use, disposal, and exposure-related information would complement these activities and provide necessary screening-level data.

The collected data would help the Office of Land and Emergency Management understand the level of contamination and current risks posed by PFAS to surrounding communities and inform future regulatory and non-regulatory actions. Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), EPA can designate a substance as "hazardous", which gives the Agency the ability to designate sites containing such substances as Superfund sites and force parties responsible for the pollution to pay for the cleanup of the site. Data gathered from this rule may inform the Agency in designating certain PFAS as CERCLA hazardous substances, which would designate certain PFAS contaminated sites as Superfund sites, strengthening EPA's ability to hold polluters financially accountable. The data collected may also inform EPA's decision making of whether to designate certain PFAS as hazardous waste under RCRA. Designated PFAS would become subject to the RCRA regulations – a "cradle-to-grave" management system from the point of generation through transportation to treatment and disposal at a RCRA facility. RCRA treatment, storage, and disposal facilities are subject to permits and corrective action.

The Office of Air and Radiation (OAR) could use the collected data to potentially identify sources of PFAS air emissions and increase understanding of the hazards associated with certain PFAS. More specifically, the collected data would increase OAR's ability to 1) characterize the magnitude of various PFAS species being released from various sources in the U.S., 2) estimate the transport, deposition, and fate of PFAS air emissions, resulting exposure pathways, and health impacts, 3) site monitors to collect ambient and deposition data, 4) evaluate technologies that are effective at mitigating PFAS air emissions, and 5) identify and prioritize office needs for hazard and dose-response assessments to characterize risk for both inhalation and ingestion exposures. The Clean Air Act requires EPA to regulate emissions of hazardous air pollutants (HAPs), which are pollutants that are known or suspected to cause cancer or other serious health effects. The Office of Air and Radiation uses data from other ongoing EPA activities, such as field tests and TRI submissions to better understand the sources and releases of chemicals and inform decisions on designating certain chemicals as HAPs. Unfortunately, data collected under the TRI program is limited and does not provide all the necessary emissions data. The TRI program does not provide the level of detail needed for the EPA to fully characterize inhalation risks for these pollutants and only a small subset of the PFAS subject to this rule are also subject to TRI reporting. The collected data could help build the technical foundation of PFAS air emissions to inform future decisions on designating certain PFAS as HAPs.

PFAS air emissions from various chemical plants, industrial sources, and other sectors are not well characterized. How and the extent to which PFAS-containing waste material in the United States is disposed is not fully documented or understood as PFAS are not listed as hazardous wastes under RCRA or HAPs under Clean Air Act regulations, so they are not subject to the tracking systems associated with these regulations. Products known to contain PFAS are regularly disposed of in landfills and by incineration, which can lead to the release of PFAS. The information collected from this rule could help EPA better understand the destruction and disposal of certain PFAS-containing materials.

The Office of Water (OW) could use the collected data to inform decision making on various actions. Information related to chemical use and disposal; sources and quantities; and data on environmental and health effects can inform the listing of contaminants under the Contaminant Candidate List (CCL) under the Safe Drinking Water Act (SDWA). Contaminants under the CCL are currently not subject to any proposed or promulgated National Primary Drinking Water Regulation (NPDWR) but are known or anticipated to occur in public water systems. These data may help OW identify contaminants that may present the greatest public health concern related to exposure from drinking water. Additionally, these data can support OW in identifying priority contaminants for regulatory decision making (through the regulatory determinations process) and information collection (through the Unregulated Contaminant

Monitoring Rule or UCMR). Data generated by the Rule can specifically inform the regulatory determinations process under SDWA by supporting the Agency's evaluation on whether a contaminant meets certain criteria for regulation: whether a contaminant may have adverse effects on the health of persons; whether the contaminant is known to occur or there is a substantial likelihood the contaminant will occur in public water systems with a frequency and at levels of public health concern; and finally, in the sole judgment of the Administrator, whether regulation of the contaminant presents a meaningful opportunity for health risk reductions for persons served by public water systems. If EPA decides to regulate a particular contaminant, the data generated by the rule may also support the Agency's rulemaking process to establish a NPDWR. The collected health effects data would also inform EPA toxicity assessments for drinking water health advisories, which are developed to help Tribes, states, and local governments inform the public and determine whether local actions are needed to address public health impacts in these communities. The data collected by the rule may also inform a variety of Clean Water Act actions to include: implementation of infrastructure funding to address emerging contaminant challenges; assessment of National Pollution Discharge Elimination System (NPDES) discharges on downstream drinking water sources or effluent toxicity; NPDES pretreatment standards for industrial users; informing the understanding of optimal options for ensuring influent quality and treatment technology selection for potable reuse treatment; States' implementation of surface water contaminant screening levels or standards; equity and environmental justice studies and assistance to disadvantaged communities negatively impacted by PFAS pollution; and development of additional standard methods for PFAS compounds.

EPA's Office of Research and Development (ORD) is the scientific research arm of the EPA. ORD conducts research for EPA that informs Agency decisions and supports the emerging needs of EPA stakeholders. The collected data could be used as inputs to ORD's assessment, research, and data compilation activities, such as Integrated Risk Information System (IRIS) assessments and other research and assessment activities, if data quality is adequate. To accelerate EPA's ability to address PFAS, EPA is working to break the large, diverse class of PFAS into smaller categories based on similarities across defined parameters, such as chemical structure, physical and chemical properties, and toxicological properties. Data collected from the rule could provide data to help EPA develop these smaller categories for further hazard assessment and to inform hazard- or risk-based decisions. Additionally, EPA will continue to develop human health toxicity assessments for individual PFAS under EPA's IRIS Program, and, if needed, other fit-for-purpose toxicity values. When combined with exposure information and other important considerations, EPA can use IRIS toxicity assessments to assess potential human health risks to determine if, and when, it is appropriate to address these chemicals. Most PFAS, however, have limited or no toxicity data to inform human health or ecological toxicity assessments. Data from the rule could help ORD better understand human health and ecological toxicity across a wider variety of PFAS by potentially providing additional existing, relevant scientific information on PFAS environmental and health effects.

Data from the rule may also potentially inform priorities for targeted development of analytical methods for detection and measurement of PFAS in the environment and might potentially increase scientific understanding of exposure pathways by providing information on PFAS releases to the environment or other potential routes of human and environmental exposure. Such release information may also inform Agency research on PFAS management and release control practices. Data submitted on disposal practices may also be used to help prioritize efforts to evaluate the effectiveness of different treatment, destruction, and disposal technologies.

The collected data may also benefit cross-program efforts, such as helping EPA establish a voluntary stewardship program challenging industry to reduce overall releases of PFAS into the environment. From the data gathered from this rule, EPA could identify potential participants for a voluntary stewardship program and streamline industry outreach for this type of endeavor. EPA is initiating actions under multiple environmental authorities—RCRA, TSCA, CWA, SDWA and CERCLA—to identify past and

ongoing releases of PFAS into the environment at facilities where PFAS has been used, manufactured, discharged, disposed of, released, and/or spilled. The collected data from this rule could also help EPA identify these facilities for compliance and enforcement follow-up under these environmental authorities. This may also help the Agency quality check its various public databases, such as CDR, TRI, and NEI, that collect information on certain PFAS.

This information may also improve EPA's ability to conduct assessments of contamination, including analyses of potential environmental justice impacts. Many known and potential sources of PFAS contamination are near low-income communities and communities of color. EPA may be able to use information collected from this rule to better understand PFAS exposure pathways in disadvantaged communities and help the Agency determine to what extent PFAS pollution contributes to the cumulative burden of exposures from multiple sources in these communities.

Stakeholders

Addressing PFAS contamination is an important part of EPA's mission to protect human health and the environment, as evidenced by the PFAS Strategic Roadmap (EPA 2021b). EPA cannot achieve its goals of preventing and mitigating potential health and environmental concerns of PFAS exposure without better understanding the lifecycle of PFAS in the United States and communicating with communities, individuals, businesses, the media, and tribal, state, and local partners about the known and potential health risks associated with exposure to these chemicals. The Agency plans to publish non-CBI information collected from this rule. EPA may update its online analytical tools with exposure and hazard information and could also provide the CompTox Chemicals Dashboard[11] with toxicity information. As noted in the White House Office of Science and Technology's recent PFAS report, a national, accessible database containing PFAS information would allow for more effective data sharing and reduce potential duplication of efforts (OSTP 2023). The historical and more recent data collected from this rule may enhance the public's understanding of the potential risks associated with PFAS exposure, the amount of PFAS manufactured and imported to the US, and the variety of uses of PFAS.

Comments received during this rule's public comment period and in other stakeholder outreach activities, which are available in the rulemaking docket, indicate that there is significant interest among external stakeholders to use data that will be submitted through this rule. State and local governments plan to use information on the volumes, types, uses, and disposal of manufactured PFAS to inform their own actions addressing PFAS exposures and potential contamination. States across the country are working to increase their understanding of PFAS and address the public health and environmental challenge of PFAS contamination and exposure. The publicly available information collected under the rule would assist states' evaluations of PFAS manufactured, imported, used, and released into the environment. The New Jersey Department of Environmental Protection commented that without this rule, states would need to expend substantial resources to obtain the information that will be collected through this rule (EPA-HQ-OPPT-2020-0549-0062-A1). The Attorneys General of several states also commented that states have begun to regulate PFAS-containing products, and the collected information about PFAS in articles could help states understand the extent of potential exposures and improve their knowledge of various products that may contain PFAS, their categories of use, and production volumes (EPA-HQ-OPPT-2020-0549-0086). The Tribal PFAS Working Group (TPFWG), an ad hoc committee of the National Tribal Water Council tasked with understanding the impacts of PFAS on indigenous communities and disseminating information with other Tribal environmental professionals, commented that it is only through the availability of data on the use of PFAS in their current and historical context that Indian Country can

[11] See www.comptox.epa.gov/dashboard

understand and characterize exposure and evaluate potential risks posed by PFAS to Tribal resources (EPA-HQ-OPPT-2020-0549-0136).

Despite the prevalence of PFAS in commerce, there are currently no federal standards for tracking and managing the disposal of articles containing PFAS. Additionally, there are no readily available estimates of the quantities of PFAS discarded in waste or the method of their disposal. The collected disposal data from this rule could help states better understand the disposal of PFAS and aid in their efforts protect public health. According to a study by the Tishman Environment and Design Center at the New School in New York City, the vast majority of municipal solid waste incinerators in the United States are located in communities with environmental justice concerns (Baptista and Perovich 2019). Collected disposal data could also help states better understand the cumulative burden of pollution in communities with environmental justice concerns within their respective states.

Additionally, EPA is required under TSCA section 9(e) to provide information related to certain exposures or releases of a chemical substance or mixture to other EPA offices and other federal agencies upon request if such information may help prevent or reduce exposures to or releases of a chemical substance or mixture under another federal law. Information related to exposures or releases, as well as any health and safety information, could be useful for other federal agencies currently working to address various health and environmental concerns from PFAS (such as the Department of Defense, the Centers for Disease Control and Prevention, and the National Institute for Occupational Safety and Health).

Many private-sector organizations have a strong interest in reducing risks and providing leadership in preventing pollution while still maintaining productive economic enterprises. Comments received during this rule's public comment period indicate that there is interest among industry to reduce the use of certain PFAS substances that have the largest environmental and health impacts (EPA-HQ-OPPT-2020-0549-0113). These organizations may be able to better meet these objectives by developing a better understanding of PFAS exposure, hazard, and toxicity information in general. The publicly available collected data may allow them to manage risks and participate in community, regional, and national priority setting for chemicals more effectively.

The publicly available information collected under the rule could also support activities typically undertaken by non-governmental organizations (NGOs), such as organizing grassroots involvement in risk-based decision-making and conducting outreach and educational programs. If data quality is sufficient, these organizations may be able to use the new data to identify and establish priorities for risks; to evaluate chemicals and chemical use patterns to determine areas of concern; to identify and promote pollution prevention opportunities; and to focus pollution prevention, public outreach, and education initiatives and activities.

EPA is hopeful that the information collected under the reporting rule may allow for improved understanding of releases and potential contributors to water systems. The effect of the reporting rule on understanding impacts to water systems will depend on the nature of information that companies have collected in the past. The utilities sector may also use this collected data to better understand upstream industrial sources of PFAS entering the treatment works. The American Water Works Association, the Association of Metropolitan Water Agencies, and the National Association of Clean Water Agencies commented that this one-time reporting rule has the potential to alleviate costly state-wide sampling programs to determine industrial sources of PFAS as well as burdensome industrial pretreatment investigations to identify these same industries potentially sending PFAS to publicly owned wastewater treatment works (POTWs) (EPA-HQ-OPPT-2020-0549-0046-A1).

7 Small Entity Impact Analysis

The Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996, requires regulators to assess the effects of regulations on small entities, including businesses, nonprofit organizations, and governments. In some instances, agencies are also required to examine regulatory alternatives that may reduce adverse economic effects on significantly impacted small entities. The RFA requires agencies to prepare an initial and final regulatory flexibility analysis for each rule unless the Agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. The RFA, however, does not specifically define "a significant economic impact on a substantial number" of small entities. Sections 603 and 604 of the RFA require that the regulatory flexibility analyses identify the types, and estimate the numbers, of small entities to which the rule will apply; and describe the rule requirements to which small entities will be subject and any regulatory alternatives, including exemptions and deferral, that would lessen the rule's burden of small entities.

To fulfill the requirements of the RFA, this analysis addresses two basic questions regarding the final rule: (1) the number small entities potentially affected, and (2) the extent of the final rule's potential economic impact on those entities as measured by the cost-to-revenue ratio. This ratio is a good measure of entities' ability to afford the costs attributable to a regulatory requirement because comparing compliance costs to revenues or expenses provides a reasonable indication of the magnitude of the regulatory burden relative to a commonly available measure of economic activity. Where regulatory costs represent a small fraction of a typical entity's revenues or expenses, the financial impacts of the regulation on such entities may be considered as not significant.

The general methodology used to estimate impacts on small entities consists of the following steps and are presented in further detail in the sections below:

- Select a relevant small business definition (Section 7.1)
- Estimate the percentage of firms that are small (Section 7.2)
- Estimate the distribution of annual revenues for small parent entities (Section 7.3)
- Estimate the distribution of costs for affected small parent entities and calculate the cost-to-revenue ratio (Section 7.4)

7.1 Select a Relevant Small Business Definition

The RFA relies on the definition of "small business" found in the Small Business Act, which authorizes the Small Business Administration (SBA) to develop definitions for "small businesses" for industries in each North American Industry Classification System (NAICS) code. These definitions can be based either on a company's number of employees or its sales, depending on SBA's criteria for that industry.

For manufacturing firms, this analysis applies the SBA small business definitions to the 28 6-digit NAICS listed in Table 7-1 for PFAS manufacturers. These NAICS were determined by identifying the NAICS listed for the global parent company in the Dun & Bradstreet database for each site in the 2016 and 2020 CDRs that manufactures a PFAS chemical subject to the final rule (Dun & Bradstreet Hoovers 2022). The ultimate parent NAICS codes and corresponding small business size standards are shown in Table 7-1.

Table 7-1: Ultimate Parent NAICS Codes and Small Business Thresholds for Manufacturing Firms

Ultimate Parent NAICS Code	NAICS Description	Small Business Threshold
221210	Natural Gas Distribution	1,150 employees
236220	Commercial and Institutional Building Construction	$45.0 million
324191	Petroleum Lubricating Oil and Grease Manufacturing	900 employees
325130	Synthetic Dye and Pigment Manufacturing	1,050 employees
325180	Other Basic Inorganic Chemical Manufacturing	1,000 employees
325199	All Other Basic Organic Chemical Manufacturing	1,250 employees
325211	Plastics Material and Resin Manufacturing	1,250 employees
325212	Synthetic Rubber Manufacturing	1,000 employees
325320	Pesticide and Other Agricultural Chemical Manufacturing	1,150 employees
325412	Pharmaceutical Preparation Manufacturing	1,300 employees
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	650 employees
327910	Abrasive Product Manufacturing	900 employees
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	1,250 employees
334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing	1,000 employees
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	1,350 employees
336111	Automobile Manufacturing	N/A*
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers	200 employees
423690	Other Electronic Parts and Equipment Merchant Wholesalers	250 employees
424690	Other Chemical and Allied Products Merchant Wholesalers	175 employees
424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)	200 employees
424950	Paint, Varnish, and Supplies Merchant Wholesalers	150 employees
447190	Other Gasoline Stations	N/A*
515210	Cable and Other Subscription Programming	N/A*
531190	Lessors of Other Real Estate Property	$34.0 million
541330	Engineering Services	$25.5 million
551112	Offices of Other Holding Companies	$45.5 million
561499	All Other Business Support Services	$21.5 million
812320	Drycleaning and Laundry Services (except Coin-Operated)	$8.0 million

*Small business size standards are not established for these Sectors
Source: U.S. Small Business Administration 2023
Note: Given the lack of data, EPA is unable to estimate the number of affected firms within each affected NAICS.

In addition, article importers across several industries are expected to be affected by the rule, including the following NAICS:

- 23 – Construction
- 31-33 – Manufacturing
- 42 – Wholesale Trade
- 44-45 – Retail Trade
- 562920 – Materials Recovery Facilities

For article importers, EPA applies the SBA small business definitions to the 6-digit NAICS under each of these industry categories. For a detailed listing of SBA definitions of small business for affected industries or sectors, by NAICS code, please, see C. Note that a "small business" for the purposes of this small entity analysis is defined according to the SBA small business definition. However, EPA uses the small manufacturer definition under TSCA section 8(a)(1) to determine the applicable reporting deadline for small and large article importers. As demonstrated by the revenue distribution in Table 7-2, there is a high degree of overlap between the article importers defined as small under the SBA and TSCA 8(a) definitions. However, there is a small percentage of article importers defined as small under the SBA definition that are included in this small entity analysis that would not be granted a delayed reporting deadline because they are not defined as small under the TSCA 8(a) definition.

7.2 Estimate the Percentage of Firms That are Small

For both manufacturers and article importers, EPA uses employment and revenue distribution data from the Census' Statistics of U.S. Businesses (SUSB) to estimate the percentage of firms that are small. The percentage of businesses that are small for NAICS with employment-based small business definitions are calculated using the 2019 SUSB by detailed employment size (U.S. Census Bureau 2022). It is assumed that firms are uniformly distributed within an employment bracket. Thus, small firms include those in brackets below the small business threshold as well as a proportional portion of those in brackets that span a threshold. For example, if a small business threshold is the midpoint of an employment bracket, then it is assumed that half of firms in that bracket are small. The percentage of businesses that are small for NAICS with revenue-based small business definitions are calculated using the 2017 SUSB by revenue, with revenues inflated to 2022$ (U.S. Census Bureau 2021a). Similar to the approach for employment-based definitions, small firms include those in brackets below the small business threshold as well as a proportional portion of those in brackets that span a threshold.

EPA estimates that 95% of manufacturers and 97% of article importers are small businesses as defined by SBA.

7.3 Estimate the Distribution of Annual Revenues for Small Parent Entities

This analysis estimates a distribution of revenues for the NAICS listed previously in this section using data on annual receipts per firm from the 2017 SUSB (U.S. Census Bureau 2021a). The SUSB data divides firms into 17 revenue brackets according to the firm's annual receipts, which are defined as "all revenue in whatever form received or accrued from whatever source, including from the sales of products or services" from all affiliates in a given year (13 CFR § 121.104).

Note that the lowest revenue bracket in the SUSB data has a minimum revenue of zero. However, no affected firms are expected to have zero revenue, as a firm would have to manufacture or import a PFAS chemical to be affected by the rule, and presumably they receive some sales revenue for their products. Therefore, EPA estimates a minimum revenue to use as the revenue floor for the first revenue bracket. The minimum revenue is estimated as the cost of employing one part-time technical worker (0.5 FTE). The loaded wage rate for technical workers is approximately $83.14 per hour (see Table 3-1), which equates to an annual salary of $86,461 for an employee working 20 hours a week for 52 weeks a year.

Using the revenue brackets and firm counts from the SUSB data, a full annual revenue distribution is estimated by assuming that revenues are uniformly distributed within the revenue brackets. For NAICS with employment-based small business definitions, it is assumed that the large firms are those in the top revenue brackets and EPA therefore excludes the large firms from the top of the revenue distribution. For NAICS with revenue-based small business definitions, all firms in brackets above the small business threshold are excluded from the revenue distribution. Estimated revenue distributions at the 1st, 5th, 25th, 50th, 75th, 95th, and 99th percentile for entities across all potentially affected NAICS are presented in Table 7-2.

Table 7-2: Estimated Revenue Distribution for Small Entities

Firm Type	1st Percentile	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	99th Percentile
Manufacturers	$88,857	$98,438	$293,151	$767,892	$2,866,347	$17,763,264	$62,948,265
Article Importers	$88,285	$95,577	$240,593	$645,659	$2,436,277	$14,644,764	$61,954,135
See Appendix D for an expanded version of this table broken out by NAICS industry.							

7.4 Estimate the Distribution of Costs for Small Parent Entities

Average per-firm costs of the final rule are presented in Chapter 3. However, as discussed in Chapter 3, the actual costs incurred by a given firm will be dependent on the number of PFAS for which it will submit reports. EPA could not identify any information that would allow for an estimation of the distribution of expected report submissions per firm. In the absence of these data, EPA assumes that the number of PFAS manufactured or imported per firm is proportional to firm revenue. Thus, manufacturers with lower sales are expected to manufacture proportionally fewer chemicals and incur lower costs, and similarly for article importers. Moreover, EPA received public comments that larger entities may manufacture (including import) a greater number of products than smaller enterprises, and thus incur higher costs to submit a larger number of reports. Note that because firm revenues are positively skewed (see Table 7-2), this assumption results in the expectation that most manufacturing firms will only submit reports for 2 or 3 PFAS and most article importers will only submit reports for 1 or 2 PFAS, with the highest earners accounting for the majority of submissions, as shown in Table 7-3.[12] Additionally, Table 7-4 shows the estimated distribution of total PFAS reported, by revenue percentile.

Table 7-3: Estimated Distribution of PFAS per Firm

Firm Type	1st Percentile	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	99th Percentile	Average
Manufacturers[1]	2.02	2.02	2.05	2.15	2.70	12.57	152.33	7.74
Article Importers	1.02	1.02	1.05	1.13	1.50	5.79	107.62	5.00

[1] Includes PFAS for both R&D (average 2 PFAS/firm) and non-R&D applications (average 5.74 PFAS/firm). For more information on the average number of PFAS per firm, see Section 2.2.1.

Table 7-4: Estimated Distribution of Total PFAS, by Revenue Percentile

Firm Type	1st Percentile	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	99th Percentile
Manufacturers	0.5%	1.5%	6.7%	13.4%	21.0%	33.1%	73.8%
Article Importers	0.4%	1.2%	5.3%	10.7%	17.0%	27.0%	55.8%

While average per-firm costs of the final rule are presented in Chapter 3, not all firms will incur costs for all reporting elements. Table 7-5 and Table 7-6 present the percentage of manufacturing and article importer firms expected to incur that cost, respectively.

[12] Comments submitted by industry representatives for the Small Business Advocacy Review (SBAR) panel indicate that many firms expect to only identify one or two reportable chemicals (ACA 2022). Thus, EPA concludes its assumption that the number of chemicals per firm is proportional to revenue to be reasonable.

Table 7-5: Percentage of Firms Incurring Costs, by Reporting Element (Manufacturers)

Element	Reporting Element	Percentage of Firms Incurring Cost	Average Cost per Firm (7% Discount Rate)
RF	Rule Familiarization	100%	$2,368
CD	Manufacturer Compliance Determination	100%	$450
CBI	CBI Substantiation	16%	$424
RC	Recordkeeping	100%	$446
CDX	CDX Registration and Electronic Signature	100%	$220
FC/EH	Form Completion - Environmental and health effects data	18%	$17,340
FC/OT	Form Completion - All other form elements	100%	$23,865

Table 7-6: Percentage of Firms Incurring Costs, by Reporting Element (Article Importers)

Element	Reporting Element	Percentage of Firms Incurring Cost	Average Cost per Firm (7% Discount Rate)
RF/NR	Rule Familiarization – Non-Reporting Firms	90%	$750
RF/R	Rule Familiarization – Reporting Firms	10%	$1,941
RF/IH	Rule Familiarization – In house structural definition familiarization	90%	$427 - $777
RF/CT	Rule Familiarization – Consultant structural definition familiarization	10%	$1,133
CD	Article Importer Compliance Determination	100%	$3,649 - $3,773
CBI	CBI Substantiation	1%	$160 - $171
RC	Recordkeeping	10%	$269 - $288
CDX	CDX Registration and Electronic Signature	10%	$206 - $220
FC	Form Completion	10%	$6,578 - $7,038

Table 7-7 presents each combination of reporting elements for manufacturers from Table 7-5 and for each estimates the distribution of total cost per firm and the distribution of cost-revenue ratios using the revenue distribution from Table 7-2.

Table 7-8 similarly presents the distribution of revenues, total cost, and cost-revenue ratios for article importers.

The affected firms may experience a wide range in per-firm costs. There will be affected article importers that incur costs for rule familiarization and compliance determination, but find they are not required to report. The reporting firms will have varying amounts of information to report, as some firms may report on all data elements, others may not. Additionally, some reporting firms may have CBI claims, while others do not. All these factors result in a range of per-firm costs among firms that also have a wide range in revenues. Table 7-7 and

Table 7-8 show the range of costs and cost-revenue ratios firms may experience depending on company revenue, the number of PFAS they report on, and the amount of information they have.

Table 7-7: Distribution of Per-Firm Revenue, Cost, and Cost-Revenue Ratio (Small Manufacturers)

Reporting Elements Incurred	Parameter	1st Percentile	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	99th Percentile
All	Per-Firm Revenue	$88,857	$98,438	$293,151	$767,892	$2,866,347	$17,763,264	$62,948,265
RF, CD, CBI, RC, CDX, FC/PV, FC/OT	Per-Firm Cost (7%)	$25,443	$25,474	$26,038	$27,463	$33,509	$72,833	$211,188
	Cost-Revenue Ratio	28.63%	25.88%	8.88%	3.58%	1.17%	0.41%	0.34%
RF, CD, RC, CDX, FC/EH, FC/OT	Per-Firm Cost (7%)	$24,976	$25,006	$25,558	$26,951	$32,867	$71,339	$206,697
	Cost-Revenue Ratio	28.11%	25.40%	8.72%	3.51%	1.15%	0.40%	0.33%
RF, CD, CBI, RC, CDX, FC/OT	Per-Firm Cost (7%)	$8,455	$8,462	$8,582	$8,885	$10,171	$18,533	$47,954
	Cost-Revenue Ratio	9.52%	8.60%	2.93%	1.16%	0.35%	0.10%	0.08%
RF, CD, RC, CDX, FC/OT	Per-Firm Cost (7%)	$7,988	$7,994	$8,102	$8,374	$9,528	$17,039	$43,463
	Cost-Revenue Ratio	8.99%	8.12%	2.76%	1.09%	0.33%	0.10%	0.07%

Table 7-8: Distribution of Per-Firm Revenue, Cost, and Cost-Revenue Ratio (Small Article Importers)

Reporting Elements Incurred	Parameter	1st Percentile	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	99th Percentile
All	Per-Firm Revenue	$88,285	$95,577	$240,593	$645,659	$2,436,277	$14,644,764	$61,954,135
RF/CT, CD, CBI, RC, CDX, FC	Per-Firm Cost (7%)	$7,262	$7,264	$7,313	$7,444	$8,066	$12,273	$26,926
	Cost-Revenue Ratio	8.23%	7.60%	3.04%	1.15%	0.33%	0.08%	0.04%
RF/IH, CD, CBI, RC, CDX, FC	Per-Firm Cost (7%)	$6,906	$6,909	$6,957	$7,088	$7,710	$11,917	$26,570
	Cost-Revenue Ratio	7.82%	7.23%	2.89%	1.10%	0.32%	0.08%	0.04%
RF/CT, CD, RC, CDX, FC	Per-Firm Cost (7%)	$7,059	$7,061	$7,104	$7,220	$7,774	$11,478	$24,558
	Cost-Revenue Ratio	8.00%	7.39%	2.95%	1.12%	0.32%	0.08%	0.04%
RF/IH, CD, RC, CDX, FC	Per-Firm Cost (7%)	$6,703	$6,705	$6,748	$6,865	$7,418	$11,122	$24,202
	Cost-Revenue Ratio	7.59%	7.02%	2.80%	1.06%	0.30%	0.08%	0.04%
RF/CT, CD	Per-Firm Cost (7%)	$4,322	$4,322	$4,331	$4,352	$4,456	$5,175	$7,559
	Cost-Revenue Ratio	4.90%	4.52%	1.80%	0.67%	0.18%	0.04%	0.01%
RF/IH, CD	Per-Firm Cost (7%)	$3,966	$3,967	$3,975	$3,997	$4,100	$4,819	$7,203
	Cost-Revenue Ratio	4.49%	4.15%	1.65%	0.62%	0.17%	0.03%	0.01%

7.5 Summary of Impacts for Small Entities

Table 7-9 presents a summary of the small business impacts of the final rule. For firms subject to the final rule, 64% of small firms are expected to have cost impacts of less than 1% of annual revenues, 16% are expected to have impacts between 1-3%, and 20% are expected to have impacts of more than 3% of annual revenues. The distribution of per-firm costs for small manufacturers are summarized in Table 7-7 and are estimated to range from $7,988 to $11,188 (7 percent discount rate). Per-firm costs for small article importers are summarized in

Table 7-8 and are estimated to range from $3,966 to $26,926 (7 percent discount rate). The affected small businesses subject to the final rule are expected to incur approximately $791 million in costs for this one-time reporting under a 7 percent discount rate.

Note that many of these small entities would have been outside the scope of previous TSCA section 8(a) and CDR reporting because they are considered small manufacturers by the 8(a) definition (either revenues less than $120 million and less than 100,000 lbs. in production volume, or revenues less than $12 million regardless of production volume). EPA estimates approximately 97% of all affected firms (127,970 firms) would be defined as small under SBA's small business definition.

Table 7-9: Summary of Small Business Impacts

Firm Type	Affected Firms			Number and Percent of Small Firms by Cost-Impact Ratio		
	All Firms	Percent Small	Small Firms	<1%	1-3%	>3%
Manufacturer	253	95%	240	108 (45%)	59 (25%)	73 (30%)
Article Importer	131,157	97%	127,811	81,825 (64%)	20,923 (16%)	25,064 (20%)
Total Industry	**131,410**	**97%**	**128,051**	**81,933 (64%)**	**20,982 (16%)**	**25,137 (20%)**

8 Alternatives Analysis

This chapter presents the regulatory flexibility alternatives EPA considered for this final rule. Note, these alternatives were developed following the SBAR panel for this rule and were detailed in the IRFA and Notice of Data Availability (NODA). EPA considered including small business exemptions, removing the structural definition of PFAS, including reporting threshold exemptions, providing longer reporting time, and providing simplified reporting forms for certain entities. When analyzing the regulatory flexibility alternatives, EPA considered the factors under section 8(a)(5), which requires EPA, to the extent feasible, to:

(A) not require reporting which is unnecessary or duplicative;
(B) minimize the cost of compliance on small manufacturers; and
(C) apply any reporting obligations on those persons likely to have information relevant to the effective implementation of TSCA.

Section 8.1 presents the estimated costs associated with several small business exemptions considered for this final rule. Section 8.2 presents the estimated costs of limiting the PFAS subject to the rule to a finite list rather than providing a structural definition for PFAS. Section 8.3 presents the estimated costs associated with providing a reporting threshold exemption. Section 8.4 presents a discussion on providing a longer reporting timeline for the final rule. Section 8.5 presents the estimated costs associated with providing streamlined reporting forms for certain entities and substances. Section 8.6 presents a discussion of other, unquantified alternatives EPA considered for the final rule. Section 8.7 presents a summary of the total industry costs associated with the various alternatives presented in this chapter.

8.1 Small Business Exemptions

EPA considered several broad small business exemptions, as detailed below, including exemptions for all small businesses as well as exemptions for only small article importers. Each small business exemption alternative EPA considered would limit reporting from small manufacturers and thus reduce costs on small manufacturers. However, based on public comments and input from the SBAR Panel, EPA believes that small manufacturers are likely to have information regarding commercially manufactured PFAS, which is relevant to the effective implementation of TSCA. EPA has not made a determination that a complete exemption of small entities is not legally viable in this rulemaking. EPA believes such an exemption would result in diminished collection of reasonably known or ascertainable information about PFAS manufacturing and import since 2011 and therefore is exercising its discretion to not implement this alternative.

8.1.1 Exemption for Businesses with Less Than $12 Million in Sales

EPA considered exempting small businesses whose total sales, combined with those of the parent company, domestic or foreign (if any), are less than $12 million. This threshold was chosen because firms who meet this standard would be considered "small manufacturers" under the existing section 8(a)(1) definition[13], and these firms are generally exempt from CDR and other section 8(a)(1) reporting rules (except for substances subject to certain TSCA actions).

[13] Firms meeting either of the following standards (40 CFR 704.3) would be considered "small manufacturers" under the 8(a) small business definition:

- Total sales during the principal reporting year, combined with those of the parent company, domestic or foreign (if any), are less than $12 million regardless of annual production volume.
- Total sales during the principal reporting year, combined with those of the parent company, domestic or foreign (if any), are less than $120 million and your annual production volume of that chemical substance does not exceed 100,000 pounds at any individual plant site. If the annual production volume of the chemical substance at any particular site is more than 100,000 pounds, the submitter is required to report for that particular site.

Note, this $12 million threshold is only part of the TSCA section 8(a) definition for small entities. EPA considered exempting small entities using the full section 8(a) definition, which also includes firms whose total sales during the principal reporting year, combined with those of the parent company, domestic or foreign (if any), are less than $120 million and whose annual production volume of a PFAS does not exceed 100,000 pounds at any individual plant site. If the annual production volume of the chemical substance at any particular site is more than 100,000 pounds, the submitter is required to report for that particular site. But the lack of production volume data for the affected PFAS made it difficult to estimate the number of entities that would be exempt under this definition.

Under this regulatory flexibility alternative, 87 percent of the affected manufacturers and 91 percent of the affected article importers would be exempt from the rule. Table 8-1 details the decrease in affected and reporting firms under this alternative.

Table 8-1: Reporting Universe with <$12M Sales Exemption

Firm Type	All Firms[1]	Percentage Exempted Firms[2]	Number of Exempted Firms[3]	Number of Affected Firms[4]	Number of Reporting Firms[5]
Manufacturers	253	87%	220.11	33	33
Article Importers	131,157	91%	119,352	11,804	1,180
Total Industry	**131,410**	**91%**	**119,573**	**11,837**	**1,213**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS
[2] Manufacturers: Based on 2016 and 2020 CDR data. Article Importers: Based on 2017 SUSB data.
[3] Number of firms with parent revenues less than $12 million
[4] Number of firms with parent revenues greater than $12 million manufacturing PFAS or potentially importing articles containing PFAS. Article importers assumed to incur costs for rule familiarization and for determining if imported products contain PFAS.
[5] Number of firms with parent revenues greater than $12 million assumed to submit reports under the rule

As shown in Table 8-2, under this alternative, EPA estimates that total number of PFAS reports submitted would decrease from 67,536 PFAS to 51,647 PFAS reported; a 24 percent decrease in reports.

Table 8-2: Number of Reports with <$12M Sales Exemption

Firm Type	Expected PFAS for All Firms[1]	Estimated PFAS Reported by Non-Exempt Firms[2]	Estimated Percentage PFAS Reported
Manufacturers	1,958	1,451	74%
Article Importers	65,578	50,196	77%
Total Industry	**67,536**	**51,647**	**76%**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS
[2] PFAS reported by firms with parent revenues greater than or equal to $12 million

Table 8-3 presents a summary of the small business impacts of this regulatory alternative. EPA estimates that 7,883 small firms would be affected by the rule under this alternative. Of those small firms, 100 percent are expected to have cost impacts of less than 1% of annual revenue for this one-time reporting. The total industry cost would be $63.8 million and $60.7 million under a 3 and 7 percent discount rate, respectively. The affected small businesses under this alternative would be expected to incur $48.8 million in costs for this one-time reporting under a 7 percent discount rate.

Table 8-3: Small Entity Impacts with <$12M Sales Exemption

Reporting Elements Incurred	Affected Firms				Number and Percent of Small Firms by Cost-Impact Ratio		
	All Firms	Percent Small	Percentage Firms Incurring Costs	Small Firms	<1%	1-3%	>3%
Manufacturers							
RF, CBI, RC, CDX, FC/EH, FC/OT	33	53%	2.9%	0	0 (100%)	0 (0%)	0 (0%)
RF, RC, CDX, FC/EH, FC/OT			15.1%	3	3 (100%)	0 (0%)	0 (0%)
RF, CBI, RC, CDX, FC/OT			13.1%	2	2 (100%)	0 (0%)	0 (0%)
RF, RC, CDX, FC/OT			68.9%	12	12 (100%)	0 (0%)	0 (0%)
Total Manufacturing	*33*	*53%*	*100.0%*	*17*	*17 (100%)*	*0 (0%)*	*0 (0%)*
Article Importers							
RF/IH, CD, CBI, RC, CDX, FC	11,804	67%	0.9%	71	71 (100%)	0 (0%)	0 (0%)
RF/IH, CD, RC, CDX, FC			8.1%	637	637 (100%)	0 (0%)	0 (0%)
RF/IH, CD			81.0%	6,371	6,371 (100%)	0 (0%)	0 (0%)
RF/CT, CD, CBI, RC, CDX, FC			0.1%	8	8 (100%)	0 (0%)	0 (0%)
RF/CT, CD, RC, CDX, FC			0.9%	71	71 (100%)	0 (0%)	0 (0%)
RF/CT, CD			9.0%	708	708 (100%)	0 (0%)	0 (0%)
Total Article Importers	*11,804*	*67%*	*100.0%*	*7,866*	*7,866 (100%)*	*0 (0%)*	*0 (0%)*
Total Industry	**11,837**	**67%**	**-**	**7,883**	**7,883 (100%)**	**0 (0%)**	**0 (0%)**

8.1.2 Exemption for businesses with less than $6 million in sales.

In estimating the impact of a potential small entity exemption, EPA developed a sensitivity analysis based on the existing definition for "small manufacturer" at 40 CFR 704.3. As part of this, EPA also considered implementing a small entity threshold 50 percent below part of the existing section 8(a)(1) definition. Therefore, EPA considered exempting small businesses whose total sales, combined with those of the parent company, domestic or foreign (if any), are less than $6 million.

Under this regulatory flexibility alternative, 80 percent of the affected manufacturers and 86 percent of the affected article importers would be exempt from the rule. Table 8-4 details the decrease in affected and reporting firms under this alternative.

Table 8-4: Reporting Universe with <$6M Sales Exemption

Firm Type	All Firms[1]	Percentage Exempted Firms[2]	Number of Exempted Firms[3]	Number of Affected Firms[4]	Number of Reporting Firms[5]
Manufacturers	253	80%	202	51	51
Article Importers	131,157	86%	112,795	18,362	1,836
Total Industry	**131,410**	**86%**	**112,997**	**18,413**	**1,887**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS
[2] Manufacturers: Based on 2016 and 2020 CDR data. Article Importers: Based on 2017 SUSB data.
3 Number of firms with parent revenues less than $ 6 million
[4] Number of firms with parent revenues greater than $6 million manufacturing PFAS or potentially importing articles containing PFAS. Article importers assumed to incur costs for rule familiarization and for determining if imported products contain PFAS.
[5] Number of firms with parent revenues greater than $6 million assumed to submit reports under the rule

As shown in Table 8-5, under this alternative, EPA estimates that total number of PFAS reports submitted would decrease from 67,536 PFAS to 53,399 PFAS reported; a 21 percent decrease in reports.

Table 8-5: Number of Reports with <$6M Sales Exemption

Firm Type	Expected PFAS for All Firms[1]	Estimated PFAS Reported by Non-Exempt Firms[2]	Estimated Percentage PFAS Reported
Manufacturers	1,958	1,512	77%
Article Importers	65,578	51,887	79%
Total Industry	**67,536**	**53,399**	**79%**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS
[2] PFAS reported by firms with parent revenues greater than or equal to $6 million

Table 8-6 presents a summary of the small business impacts of this regulatory alternative. EPA estimates that 14,537 small firms would be affected by the rule under this alternative. Of those small firms, 100 percent are expected to have cost impacts of less than 1% of annual revenue for this one-time reporting. The total industry cost would be $100.2 million and $95.3 million under a 3 and 7 percent discount rate, respectively. The affected small businesses under this alternative would be expected to incur $90 million in costs for this one-time reporting under a 7 percent discount rate.

Table 8-6: Small Entity Impacts with <$6M Sales Exemption

Reporting Elements Incurred	Affected Firms				Number and Percent of Small Firms by Cost-Impact Ratio		
	All Firms	Percent Small	Percentage Firms Incurring Costs	Small Firms	<1%	1-3%	>3%
Manufacturers							
RF, CBI, RC, CDX, FC/EH, FC/OT	48	66%	2.9%	1	1 (100%)	0 (0%)	0 (0%)
RF, RC, CDX, FC/EH, FC/OT			15.1%	5	5 (100%)	0 (0%)	0 (0%)
RF, CBI, RC, CDX, FC/OT			13.1%	4	4 (100%)	0 (0%)	0 (0%)
RF, RC, CDX, FC/OT			68.9%	23	23 (100%)	0 (0%)	0 (0%)
Total Manufacturing	*48*	*66%*	100.0%	*34*	*34 (100%)*	*0 (0%)*	*0 (0%)*
Article Importers							
RF/IH, CD, CBI, RC, CDX, FC	18,362	79%	0.9%	131	131 (100%)	0 (0%)	0 (0%)
RF/IH, CD, RC, CDX, FC			8.1%	1,175	1,175 (100%)	0 (0%)	0 (0%)
RF/IH, CD			81.0%	11,748	11,748 (100%)	0 (0%)	0 (0%)
RF/CT, CD, CBI, RC, CDX, FC			0.1%	15	15 (100%)	0 (0%)	0 (0%)
RF/CT, CD, RC, CDX, FC			0.9%	131	131 (100%)	0 (0%)	0 (0%)
RF/CT, CD			9.0%	1,305	1,305 (100%)	0 (0%)	0 (0%)
Total Article Importers	*18,362*	*79%*	100.0%	*14,503*	*14,503 (100%)*	*0 (0%)*	*0 (0%)*
Total Industry	**18,410**	**79%**	**-**	**14,537**	**14,537 (100%)**	**0 (0%)**	**0 (0%)**

8.1.3 Exemption for article importers with less than $6 million in sales.

EPA also considered exempting small article importers, rather than all small firms, from this one-time reporting rule as part of the sensitivity analysis based on the existing section 8(a)(1) definition for "small manufacturer." Therefore, EPA considered implementing a small entity threshold for article importers 50 percent below part of the existing definition at 40 CFR 704.3, as multiple SERs recommended including reporting exemptions for imported articles. This alternative would exempt small article importers whose total sales, combined with those of the parent company, domestic or foreign (if any), are less than $6 million.

Under this regulatory flexibility alternative, 86 percent of the affected article importers would be exempt from the rule. Table 8-7 details the decrease in affected and reporting firms under this alternative.

Table 8-7: Reporting Universe with <$6M Sales Exemption for Article Importers

Firm Type	All Firms[1]	Percentage Exempted Firms[2]	Number of Exempted Firms[3]	Number of Affected Firms[4]	Number of Reporting Firms[5]
Manufacturers	253	0%	0	253	253
Article Importers	131,157	86%	112,795	18,362	1,836
Total Industry	**131,410**	**86%**	**112,795**	**18,615**	**2,089**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS
[2] Based on 2017 SUSB data.
3 Number of firms manufacturing or importing PFAS, or firms with parent revenues less than $6M (for article importers)
[4] Number of firms manufacturing or importing PFAS, or firms with parent revenues greater than $6M potentially importing articles containing PFAS. Article importers assumed to incur costs for rule familiarization and for determining if imported products contain PFAS.
[5] Number of firms manufacturing or importing PFAS, or article importers with parent revenues greater than $6M assumed to submit reports under the rule

As shown in Table 8-8, under this alternative, EPA estimates that total number of PFAS reports submitted would decrease from 67,536 PFAS to 53,845 PFAS reported; a 20 percent decrease in reports.

Table 8-8: Number of Reports with <$6M Sales Exemption for Article Importers

Firm Type	Expected PFAS for All Firms[1]	Estimated PFAS Reported by Non-Exempt Firms[2]	Estimated Percentage PFAS Reported
Manufacturers	1,958	1,958	100%
Article Importers	65,578	51,887	79%
Total Industry	**67,536**	**53,845**	**80%**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS
[2] PFAS reported by manufacturers or article importers with parent revenues greater than or equal to $6 million

Table 8-9 presents a summary of the small business impacts of this regulatory alternative. EPA estimates that 14,743 small firms would be affected by the rule under this alternative. Of those small firms, 99 percent are expected to have cost impacts of less than 1% of annual revenue for this one-time reporting. The total industry cost would be $109.7 million and $104.4 million under a 3 and 7 percent discount rate, respectively. The affected small businesses under this alternative would be expected to incur $99.3 million in costs for this one-time reporting under a 7 percent discount rate.

Table 8-9: Small Entity Impacts with <$6M Sales Exemption for Article Importers

Reporting Elements Incurred	Affected Firms				Number and Percent of Small Firms by Cost-Impact Ratio		
	All Firms	Percent Small	Percentage Firms Incurring Costs	Small Firms	<1%	1-3%	>3%
Manufacturers							
RF, CBI, RC, CDX, FC/EH, FC/OT	253	95%	2.9%	7	2 (22%)	2 (22%)	4 (57%)
RF, RC, CDX, FC/EH, FC/OT			15.1%	36	8 (22%)	8 (21%)	21 (57%)
RF, CBI, RC, CDX, FC/OT			13.1%	31	15 (47%)	8 (26%)	8 (27%)
RF, RC, CDX, FC/OT			68.9%	165	79 (48%)	43 (26%)	43 (26%)
Total Manufacturing	*253*	*95%*	*100.0%*	*240*	*104 (43%)*	*60 (25%)*	*76 (32%)*
Article Importers							
RF/IH, CD, CBI, RC, CDX, FC	18,362	79%	0.900%	131	131 (100%)	0 (0%)	0 (0%)
RF/IH, CD, RC, CDX, FC			8.100%	1,175	1,175 (100%)	0 (0%)	0 (0%)
RF/IH, CD			81.000%	11,748	11,748 (100%)	0 (0%)	0 (0%)
RF/CT, CD, CBI, RC, CDX, FC			0.100%	15	15 (100%)	0 (0%)	0 (0%)
RF/CT, CD, RC, CDX, FC			0.900%	131	131 (100%)	0 (0%)	0 (0%)
RF/CT, CD			9.000%	1,305	1,305 (100%)	0 (0%)	0 (0%)
Total Article Importers	*18,362*	*79%*	*100.0%*	*14,503*	*14,503 (100%)*	*0 (0%)*	*0 (0%)*
Total Industry	**18,615**	**79%**	**-**	**14,743**	**14,607 (99%)**	**60 (0%)**	**76 (1%)**

8.1.4 Exemption for article importers with less than $2 million in revenue.

As part of the sensitivity analysis based on the existing section 8(a)(1) definition for "small manufacturer," EPA also considered implementing a small entity threshold for article importers approximately 84 percent below part of the existing definition at 40 CFR 704.3. Therefore, EPA considered exempting small article importers whose total sales, combined with those of the parent company, domestic or foreign (if any), are less than $2 million, as multiple SERs recommended including reporting exemptions for imported articles.

Under this regulatory flexibility alternative, 69 percent of the affected article importers would be exempt from the rule. Table 8-10 details the decrease in affected and reporting firms under this alternative.

Table 8-10: Reporting Universe with <$2M Sales Exemption for Article Importers

Firm Type	All Firms[1]	Percentage Exempted Firms[2]	Number of Exempted Firms[3]	Number of Affected Firms[4]	Number of Reporting Firms[5]
Manufacturers	253	0%	0	253	253
Article Importers	131,157	69%	90,498	40,659	4,066
Total Industry	**131,410**	**69%**	**90,498**	**40,912**	**4,319**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS
[2] Based on 2017 SUSB data.
3 Number of firms manufacturing or importing PFAS, or firms with parent revenues less than $2M (for article importers)
[4] Number of firms manufacturing or importing PFAS, or firms with parent revenues greater than $2M potentially importing articles containing PFAS. Article importers assumed to incur costs for rule familiarization and for determining if imported products contain PFAS.
[5] Number of firms manufacturing or importing PFAS, or article importers with parent revenues greater than $2M assumed to submit reports under the rule

As shown in Table 8-11, under this alternative, EPA estimates that total number of PFAS reports submitted would decrease from 67,536 PFAS to 57,514 PFAS reported; a 15 percent decrease in reports.

Table 8-11: Number of Reports with <$2M Sales Exemption for Article Importers

Firm Type	Expected PFAS for All Firms[1]	Estimated PFAS Reported by Non-Exempt Firms[2]	Estimated Percentage PFAS Reported
Manufacturers	1,958	1,958	100%
Article Importers	65,578	55,556	85%
Total Industry	**67,536**	**57,514**	**85%**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS
[2] PFAS reported by manufacturers or article importers with parent revenues greater than or equal to $2 million

Table 8-12 presents a summary of the small business impacts of this regulatory alternative. EPA estimates that 35,985 small firms would be affected by the rule under this alternative. Of those small firms, approximately 100 percent are expected to have cost impacts of less than 1% of annual revenue for this one-time reporting. The total industry cost would be $269.9 million and $259.2 million under a 3 percent and 7 percent discount rate, respectively. The affected small businesses under this alternative would be expected to incur $229.5 million in costs for this one-time reporting under a 7 percent discount rate.

Table 8-12: Small Entity Impacts with <$2M Sales Exemption for Article Importers

Reporting Elements Incurred	Affected Firms				Number and Percent of Small Firms by Cost-Impact Ratio		
	All Firms	Percent Small	Percentage Firms Incurring Costs	Small Firms	<1%	1-3%	>3%
Manufacturers							
RF, CBI, RC, CDX, FC/EH, FC/OT	253	95%	2.9%	7	2 (23%)	2 (24%)	4 (54%)
RF, RC, CDX, FC/EH, FC/OT			15.1%	36	8 (23%)	8 (23%)	20 (54%)
RF, CBI, RC, CDX, FC/OT			13.1%	31	15 (48%)	8 (26%)	8 (26%)
RF, RC, CDX, FC/OT			68.9%	165	83 (50%)	41 (25%)	41 (25%)
Total Manufacturing	*253*	*95%*	*100.0%*	*240*	*108 (45%)*	*59 (25%)*	*73 (30%)*
Article Importers							
RF/IH, CD, CBI, RC, CDX, FC	40,659	81%	0.900%	323	323 (100%)	0 (0%)	0 (0%)
RF/IH, CD, RC, CDX, FC			8.100%	2,904	2,904 (100%)	0 (0%)	0 (0%)
RF/IH, CD			81.000%	29,042	29,042 (100%)	0 (0%)	0 (0%)
RF/CT, CD, CBI, RC, CDX, FC			0.100%	36	36 (100%)	0 (0%)	0 (0%)
RF/CT, CD, RC, CDX, FC			0.900%	323	323 (100%)	0 (0%)	0 (0%)
RF/CT, CD			9.000%	3,227	3,227 (100%)	0 (0%)	0 (0%)
Total Article Importers	*40,659*	*81%*	*100.0%*	*35,855*	*35,855 (100%)*	*0 (0%)*	*0 (0%)*
Total Industry	**40,912**	**81%**	**-**	**36,095**	**35,962 (100%)**	**59 (0%)**	**73 (0%)**

8.2 Removing the Structural Definition

EPA considered limiting the PFAS subject to the rule to a finite list rather than providing a structural definition for PFAS. This alternative simplifies rule familiarization for affected entities and removes the cost and burden of understanding the structural definition of PFAS. Additionally, it reduces compliance determination costs for affected firms. However, this also significantly limits the number of PFAS subject to the rule and excludes many PFAS that cannot be listed due to CBI claims but are active in U.S. commerce.

Specifically, there are PFAS on the TSCA Inventory or submitted as LVEs whose generic names did not clearly state the substance is fluorinated (i.e., no "fluor" included in the generic name). The inclusion of those chemicals on a discrete list for reporting under this rule would not be permitted as that would divulge CBI. For example, under the final structural definition, over 200 PFAS have the term "fluorine" masked in their generic names. EPA is unable to include the generic names of these substances on a list of

PFAS (which, by definition, contain fluorine) as it would reveal masked structural information on these substances. If EPA limited the scope to a discrete list of PFAS on the TSCA Inventory and LVEs that could be specifically named under the final definition, 602 PFAS would be subject to the rule.[14]

With 853 fewer identified PFAS within the scope of the rule, the estimated number of reporting firms decreases to 6,663. Under this regulatory flexibility alternative, the number of affected manufacturers would decrease from 253 to 105 and the number of article importers that are estimated to report under this rule would decrease from 13,116 to 6,558. As shown in Table 8-13, if EPA were to limit the scope of the rule to a finite list of PFAS, EPA estimates that total number of PFAS reports submitted would decrease from 67,285 PFAS to 33,602 PFAS reported; a 50 percent decrease in reports.

Table 8-13: Number of Reports with Finite List of PFAS

Firm Type	Estimated PFAS Reported with Structural Definition	Estimated PFAS Reported with Finite List	Estimated Percentage PFAS Reported
Manufacturers	1,958	813	42%
Article Importers	65,578	32,789	50%
Total Industry	**67,536**	**33,602**	**50%**

EPA estimates that 127,911 small firms would be affected by the rule under this alternative. Of those small firms, 70 percent are expected to have cost impacts of less than 1% of annual revenue, 17 percent are expected to have impacts between 1-3%, and 13 percent are expected to have impacts of more than 3% of annual revenues for this one-time reporting. The total industry cost would be $673.5 million and $638.5 million at a 3 percent and 7 percent discount rate, respectively, due to the decrease in the number of reportable substances and the subsequent decrease in reporting firms. Under this alternative, firms would no longer need to spend time familiarizing themselves with the structural definition, and compliance determination costs may also decrease. The affected small businesses under this alternative would be expected to incur $626.4 million in costs for this one-time reporting under a 7 percent discount rate.

Table 8-14: Small Entity Impacts – Finite list of PFAS

Firm Type	Affected Firms			Number and Percent of Small Firms by Cost-Impact Ratio		
	All Firms	Percent Small	Small Firms	<1%	1-3%	>3%
Manufacturer	105	95%	100	46 (46%)	25 (25%)	29 (29%)
Article Importer	131,157	97%	127,811	89,526 (70%)	22,239 (17%)	16,047 (13%)
Total Industry	**131,262**	**97%**	**127,911**	**89,571 (70%)**	**22,265 (17%)**	**16,075 (13%)**

As stated previously, this alternative would prevent EPA from listing certain PFAS due to CBI claims over some chemical identities. Specifically, there are PFAS on the TSCA Inventory or submitted as LVEs whose generic names did not clearly state the substance is fluorinated (i.e., no "fluor" included in the

[14] Under the final rule, EPA identified 1,455 PFAS that would fall under the structural definition. But if the scope was limited to a finite list of PFAS, EPA would only be able to list 602 PFAS due to CBI claims.

generic name). The inclusion of those chemicals on a discrete list for reporting under this rule would not be permitted as that would divulge CBI. Additionally, reporting exemptions for both existing chemicals (e.g., certain byproduct exemptions in the CDR rule) and new chemicals (e.g., byproducts and impurities not listed on the TSCA Inventory) mean that EPA may be unaware of some substances which meet this definition of PFAS, and which would also meet the TSCA section 3(2) definition of "chemical substance." Therefore, EPA has chosen to define the scope of covered substances for the purpose of this rule using a structural definition and not inadvertently limit the scope of reporting to a discrete list.

Note, EPA has modified the proposed structural definition, and has thus adjusted the cost and burden estimates for structural definition familiarization since publishing the IRFA to account for this change. In the IRFA and Updated Economic Analysis, EPA estimated that it would take manufacturing firms and larger article importers 4 hours to understand the proposed structural definition, while it would take small article importers 7 hours. For the updated structural definition, EPA adjusted the estimates to account for the expansion. Now, EPA estimates that it will take manufacturing firms and large article importers 5.5 hours to understand the updated structural definition, while it will take article importers 10 hours. Additionally, EPA is providing a list of substances that meet this definition, gathered from the Inventory, LVEs, and the CompTox Chemicals Dashboard. This list is available in the CompTox Chemicals Dashboard at https://comptox.epa.gov/dashboard. EPA believes an extensive list of examples allows reporters to more easily identify potential PFAS, and will help firms with compliance determination, but still allow for the inclusion of those substances for which CBI claims prevent the Agency from listing their identities for this rule.

8.3 Reporting Threshold of Either 2,500 pounds per year or 25,000 pounds per year

EPA considered providing a reporting threshold exemption, as this alternative was recommended by multiple SERs. For this alternative, EPA considered providing an annual reporting threshold exemption of 2,500 lbs. per year and an annual reporting threshold exemption of 25,000 pounds per year. These thresholds were chosen because manufacturers are required to report to CDR if they meet certain annual production volume thresholds, generally 25,000 pounds or more of a chemical substance at a single site. However, a reduced reporting threshold of 2,500 pounds applies to chemical substances subject to certain TSCA actions. Reporting would be triggered if the annual reporting threshold at a manufacturing (including importing) site is met during any of the calendar years since January 1, 2011. The majority of costs for this rule come from rule familiarization and article compliance determination activities, which would likely not be affected by implementing a reporting threshold. Based on public comments EPA received on the proposed rule, not all article importers will readily know or reasonably ascertain if the imported articles contain PFAS or the total import volumes of the PFAS; and consequently, these firms may still need to conduct compliance determination activities even with a reporting threshold in place. Therefore, this alternative is not expected to lower per-firm costs. A reporting threshold would likely decrease the number of reporting entities but given the lack of data it is difficult to accurately estimate the effect, particularly since article importers may not know enough about the concentration or volumes of the PFAS in their imported articles to know if they are below the reporting threshold.

While this alternative is not expected to reduce per-firm costs, it is expected to reduce total industry costs as some firms will be exempt from reporting if they are under the reporting threshold. To give an idea of the effect a reporting threshold could potentially have, EPA provides low- and high-end estimates for this alternative. Given the lack of data on low production volumes and article importers' lack of knowledge regarding the concentration or volumes of the PFAS in their imported articles, EPA was unable to provide estimates for the specific 25,000 lbs. and 2,500 lbs. reporting threshold exemptions. Instead, EPA alters the number of article importers reporting under this alternative, regardless of the specific reporting threshold chosen, to show the potential decrease in reporting firms.

In the primary analysis, EPA estimates that 131,157 firms import articles potentially containing PFAS, but only 10 percent of those firms import articles containing PFAS and are subject to the rule's reporting requirements. For the low-end estimate, EPA assumes that 5 percent of the affected article importer firms import articles containing PFAS above a given threshold and are subject to the rule's reporting requirements. Thus, the low-end estimate assumes that the number of article importers reporting under the rule would decrease from 13,116 to 6,558 firms. Under this alternative for the low-end estimate, EPA estimates that total number of PFAS reports submitted would decrease by 49 percent.

Table 8-15: Number of Reports with Reporting Threshold (Low)

Firm Type	Expected PFAS for All Firms[1]	Estimated PFAS Reported by Non-Exempt Firms[2]	Estimated Percentage PFAS Reported
Manufacturers	1,707	1,707	100%
Article Importers	65,578	32,790	50%
Total Industry	**67,285**	**34,497**	**51%**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS regardless of volume
[2] PFAS reported by manufacturers or article importers with volumes greater than the reporting threshold

Of the 128,051 affected small firms, 65 percent are expected to have cost impacts of less than 1% of annual revenue, 16 percent are expected to have impacts between 1-3%, and 19 percent are expected to have impacts of more than 3% of annual revenues for this one-time reporting. And the total industry cost would be $783.9 million and $744.8 million under a 3 percent and 7 percent discount rate, respectively. The affected small businesses under this alternative would be expected to incur $736.6 million in costs for this one-time reporting under a 7 percent discount rate.

Table 8-16: Small Entity Impacts – Reporting Threshold (Low Estimate)

Firm Type	Affected Firms			Number and Percent of Small Firms by Cost-Impact Ratio		
	All Firms	Percent Small	Small Firms	<1%	1-3%	>3%
Manufacturer	253	95%	240	108 (45%)	59 (25%)	73 (30%)
Article Importer	131,157	97%	127,811	82,835 (65%)	20,303 (16%)	24,674 (19%)
Total Industry	**131,410**	**97%**	**128,051**	**82,942 (65%)**	**20,362 (16%)**	**24,747 (19%)**

EPA assumes that 0.5 percent of all affected article importers will know enough information to report on the production volume. Therefore, even if EPA were to include a reporting threshold exemption, many article importers may not know enough to determine if they are below the threshold. Given this, for the high-end estimate, EPA assumes that 9.5 percent of the affected article importer firms import articles containing PFAS above a given threshold and are subject to the rule's reporting requirements. EPA assumes that the number of article importers reporting under the rule would decrease from 13,116 to 12,460 firms.

As shown in Table 8-17, under this alternative for the high-end estimate, EPA estimates that total number of PFAS reports submitted would decrease by 5 percent.

Table 8-17: Number of Reports with Reporting Threshold (High)

Firm Type	Expected PFAS for All Firms[1]	Estimated PFAS Reported by Non-Exempt Firms[2]	Estimated Percentage PFAS Reported
Manufacturers	1,707	1,707	100%
Article Importers	65,578	62,300	95%
Total Industry	**67,285**	**64,007**	**95%**

[1] All firms manufacturing PFAS or potentially importing articles containing PFAS regardless of volume
[2] PFAS reported by manufacturers or article importers with volumes greater than the reporting threshold

Of the 128,051 affected small firms, 60 percent are expected to have cost impacts of less than 1% of annual revenue, 20 percent are expected to have impacts between 1-3%, and 20 percent are expected to have impacts of more than 3% of annual revenues for this one-time reporting. And the total industry cost would be $837.3 million and $794.6 million under a 3 percent and 7 percent discount rate, respectively. The affected small businesses under this alternative would be expected to incur $785.2 million in costs for this one-time reporting under a 7 percent discount rate.

Table 8-18: Small Entity Impacts – Reporting Threshold (High Estimate)

Firm Type	Affected Firms			Number and Percent of Small Firms by Cost-Impact Ratio		
	All Firms	Percent Small	Small Firms	<1%	1-3%	>3%
Manufacturer	253	95%	240	104 (43%)	60 (25%)	76 (32%)
Article Importer	131,157	97%	127,811	77,288 (60%)	25,250 (20%)	25,274 (20%)
Total Industry	**131,410**	**97%**	**128,051**	**77,391 (60%)**	**25,310 (20%)**	**25,350 (20%)**

EPA believes that establishing a minimum threshold based on production volume would likely result in reduced information collected under this rule. Additionally, EPA understands that some PFAS which were manufactured in lower quantities may persist in the environment, and the Agency is interested in better scoping the extent of environmental exposure. Because this rule aims to provide an understanding of which PFAS have been commercially manufactured in the United States since 2011, and for which uses, EPA does not believe that incorporating a minimum threshold would enable the Agency to meet its information needs. Therefore, EPA has decided not to include a reporting threshold in the final rule.

8.4 Longer Reporting Timeline for Small Businesses

The compliance schedule proposed by EPA includes a six-month deferral of the data submission period following the effective date of the final rule, and then another six-month information submission period. Thus, the reporting deadline would be one year from the effective date of the final rule. EPA considered providing a longer reporting timeline for small businesses whose total sales, combined with those of the parent company, domestic or foreign (if any), are less than $12 million. A longer timeframe could potentially decrease opportunity costs if firms are diverting resources from other business activities to report information under the rule.

Under this regulatory alternative, six more months would be added to the information collection period ahead of the reporting tool opening (for a total of one year from the effective date of this rule). This one-year information collection period would then be followed by a six-month reporting submission period. Thus, information would be due 18 months following the effective date of this rule. The submission

period under this alternative would end June 1, 2024 (if the rule was finalized January 1, 2023). This alternative may reduce the opportunity costs on affected firms, particularly small entities.

As discussed previously, the next CDR submission period is June 1 to September 30, 2024. Manufacturers will determine their need to report to CDR based on production volumes from the years 2020 to 2023. Some of the data elements under this rule may overlap with the data required under the 2024 CDR reporting cycle, though the scope of such overlap is not significant. There are several differences between the CDR rule and this rule that limit the scope of any potential overlaps between the datasets. First, CDR includes several reporting exemptions and a reporting threshold based on production volume that are not included in this rule: imported articles, certain byproducts, non-isolated intermediates, small quantities of R&D chemicals, and a minimum production volume reporting threshold of 25,000 pounds/year (or 2,500 pounds/year for substances subject to certain TSCA actions). Therefore, PFAS reporters with activities that are exempt in CDR or who manufacture PFAS below the CDR reporting threshold will not have reported such information to CDR before and reporting from these entities would not be considered "duplicative" here. Further, CDR reporters may have excluded quantities that would be reportable under this rule based on certain CDR exemptions, and therefore, the information they previously submitted to CDR would not be considered duplicative and would not be responsive to this rule. Additionally, the scope of PFAS that have been reportable under CDR are a subset of the scope of PFAS for this rule. The scope of CDR chemical substances is limited to those on the TSCA Inventory and excludes polymers. The scope of this reporting rule includes any chemical substance meeting the rule's structural definition, which is not limited to those on the Inventory (e.g., LVEs), and includes any fluoropolymers that meet the structural definition. Finally, the years for which certain required data elements may have been reported to CDR differ.

Many public commenters and SERs suggested that the proposed timeline should extended by at least six months, with some suggesting up to two years, to allow more time for small entities to familiarize themselves with the rule and its requirements, including the CDX reporting platform. SERs provided that the additional time would be important for entities who do not have experience with TSCA regulations, the section 8(a) reporting standard, or using CDX. After considering input from the commenters and other stakeholders, EPA has decided to finalize a one-year information collection period following the effective date of this rule, which will then be followed by a six-month reporting period. Further, EPA is granting an additional six months for reporting to small manufacturers (as defined at 40 CFR 704.3) who are exclusively article importers. "Small manufacturers" as defined at 40 CFR 704.3 include manufacturers who meet one of two standards: (1) a manufacturer (including importer) whose total annual sales, when combined with those of its parent company, are less than $120 million, and the annual production volume of a chemical substance is less than 100,000 lbs; or (2) a manufacturer (including importer) whose total annual sales, when combined with those of its parent company, are less than $12 million. Thus, reporting forms will be due 18 months following the effective date of this rule, except for small article importers (as defined at 40 CFR 704.3), whose reporting forms are due 24 months following the effective date of this rule. EPA believes this timeframe will be sufficient to allow manufacturers to familiarize themselves with the rule, identify PFAS they have manufactured, identify any suppliers or other contacts, collect information, and submit the information to EPA. This longer timeframe may also reduce the opportunity costs on affected firms, particularly small entities. EPA also appreciates that the additional time will enable reporters to thoroughly review their known or reasonably ascertainable information and provide EPA with the extent of the requested information under this reporting standard.

8.5 Streamlined Reporting Forms

EPA considered two alternatives regarding streamlined reporting forms, as detailed below, including a streamlined reporting form for R&D substances manufactured in volumes of less than 10 kilograms per year and a streamlined reporting form for article importers. From public input, EPA believes that those entities are generally less likely to know certain information outlined in TSCA section 8(a)(2)(A) – (G),

and EPA is finalizing these streamlined reporting form options to reduce the burden of repeatedly indicating NKRA in the reporting tool. Without these streamlined reporting forms, EPA estimates that the final rule would result in a total industry cost of $923.2 million and $874.6 million under a 3 percent and 7 percent discount rate, respectively, with small businesses expected to incur $869.4 million in costs for this one-time reporting under a 7 percent discount rate.

8.5.1 Streamlined reporting form for R&D substances manufactured in volumes of less than 10 kilograms per year

EPA considered providing a streamlined reporting form for R&D substances manufactured in volumes of less than 10 kilograms per year. The data elements required on the simplified form would include, for each year: (1) company and plant site information, (2) specific or generic chemical name, chemical identity, trade or common name, and molecular structure, and (3) production volume of PFAS. With this alternative, firms would not be required to report existing environmental and health effects data, environmental release and disposal data, or occupational exposure data for these R&D substances.

Based on EPA's knowledge of manufacturers of R&D substances in low quantities and input from public comments and SERs, such manufacturers may have less information to report under this rule than other manufacturers. EPA understands from stakeholder input that low volumes of R&D substances are used for laboratory analytical purposes only, and therefore such manufacturers would not likely know or reasonably ascertain any of the reportable information other than chemical identity and production volume. Therefore, this option could still enable EPA to collect all the known or reasonably ascertainable historical PFAS data and reduce industry burden.

This alternative would reduce the reporting burden on chemical manufacturers. Due to the lack of data on R&D substances (including reporting exemptions for small quantities of R&D substances under both CDR and pre-manufacture notice (PMN) reporting), EPA uses best professional judgement to assume that each manufacturing firm will submit reports for an average of two R&D substances. The per-firm unit cost associated with completing the streamlined reporting form for manufacturing firms is presented below in Table 8-19. Note, the burden associated with submitting company and plant site information is not included in the table because it is assumed this information is submitted on the general reporting form. EPA estimates that each manufacturer would incur $2,240 in costs to complete the streamlined R&D form and $41,850 in costs to complete the general reporting form; thus, incurring a total of $44,089 in costs per firm for form completion. Without a streamlined reporting form, EPA estimates that each manufacturer would incur an average of approximately 637 burden hours and $52,739 in costs for form completion.

Table 8-19: Per-Firm Industry Burden and Cost: Streamlined Reporting Form for R&D Substances

Reporting Element	Burden per Firm (hours)				Cost per Firm (2022$)			
	Clerical	Technical	Managerial	Total	Clerical ($40.13/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
Common or trade name, chemical identity, and molecular structure[1]	3.50	9.00	2.00	14.50	$140.45	$748.22	$189.48	$1,078.15
Total production volume[2]	0.00	10.70	2.63	13.33	$0.00	$889.56	$248.69	$1,138.25
Whether imported chemical substance is physically at reporting site	0.00	0.23	0.05	0.28	$0.00	$18.71	$4.74	$23.44
Total	**3.50**	**19.93**	**4.63**	**28.10**	**$140.45**	**$1,656.48**	**$442.91**	**$2,239.84**

Note: Values may not sum due to rounding
[1] Estimated as 1.75 clerical hours, 4.5 technical hours, and 1 managerial hour per form.
[2] Estimated as 4.28 technical hours and 1.05 managerial hours per form.

In response to concerns related to the burden of reporting of R&D substances manufactured in low quantities, EPA has decided to provide a reporting option to manufacturers of R&D chemicals produced in volumes below 10 kilograms per year to submit this streamlined reporting form, if they do not know or cannot reasonably ascertain the information requested of the longer form. EPA does not want to lose information on chemical identities and production volumes, even for chemicals manufactured in lower volumes, but recognizes those substances are likely to be used for laboratory analytical purposes only, and therefore those manufacturers are not likely to have other information requested from PFAS manufacturers. This reporting option will reduce the burden on firms that manufacture R&D substances, while still allowing EPA to collect relevant historical PFAS data.

8.5.2 Streamlined reporting form for article importers

EPA also considered providing a simplified reporting for article importers. The data elements required on the simplified form would include, for each year: (1) company information, (2) specific or generic chemical name, chemical identity, trade or common name, and molecular structure, (3) volume/quantity of imported articles, and (4) processing and use information. Additionally, article importers would have the option to provide more information and documentation if such information were known or reasonably ascertainable. With this alternative, article importers would not be required to report existing environmental and health effects data, environmental release and disposal data, or occupational exposure data.

Based on EPA's knowledge of article importers and input from public comments and SERs, article importers may have less information to report under this rule than other manufacturers. Therefore, this option could still enable EPA to collect all the known or reasonably ascertainable historical PFAS data and reduce industry burden. This alternative would reduce the reporting burden on article importers. Table 8-20 presents estimated per-firm burden and costs for article importers reporting with a streamlined form. EPA estimates that each article importer will incur an average of approximately 91.7 burden hours and $7,531 in costs per firm. Without a streamlined reporting form, EPA estimates that each article importer would incur an average of approximately 168 burden hours and $13,818 in costs for form completion.

Table 8-20: Per-Firm Industry Burden and Cost: Streamlined Reporting Form for Article Importers

Reporting Element	Burden per Firm (hours)				Cost per Firm (2022$)			
	Clerical	Technical	Managerial	Total	Clerical ($40.13/hr)	Technical ($83.14/hr)	Managerial ($94.74/hr)	Total
Company and plant site information	0	0.016	0.006	0.022	$0.00	$1.33	$0.57	$1.90
Common or trade name, chemical identity, and molecular structure	7.5	15	5	27.5	$300.96	$1,247.04	$473.70	$2,021.70
Conditions of use	0.00	22.14	8.05	30.19	$0.00	$1,840.42	$762.66	$2,603.08
Total production volume	0.00	26.75	6.56	33.31	$0.00	$2,223.89	$633.57	$2,904.23
Whether imported chemical substance is physically at reporting site	0.00	0.56	0.13	0.69	$0.00	$46.56	$12.32	$58.87
Total	**7.5**	**64.5**	**19.7**	**91.7**	**$300.96**	**$5,359.24**	**$1,870.50**	**$7,530.90**

In response to concerns related to including article importers within the scope of the rule, EPA has decided to provide a reporting option to importers of articles to submit this streamlined reporting form, if they do not know or cannot reasonably ascertain the information requested of the longer form. EPA does not want to lose information, even for chemicals within articles, but recognizes those firms are not likely to have other information requested from PFAS manufacturers. This reporting option will reduce the burden on article importers, while still allowing EPA to collect relevant historical PFAS data.

8.6 Other Exemptions Considered

EPA also considered providing reporting exemptions for research and development substances, byproducts, impurities, recyclers, and intermediates. Given the lack of data on all these types of substances, EPA was unable to estimate the total industry cost of exempting them from the rule. Though if exempted, EPA may not be able to collect all known or reasonably ascertainable historical PFAS data from manufacturers and importers, particularly since EPA would typically not otherwise receive this type of information on R&D substances, byproducts, impurities, recyclers, and intermediates.

Broad reporting exemptions for all byproducts, impurities, R&D substances, recyclers, and intermediates would exclude such data, which is inconsistent with the language and intent of the NDAA and to provide a more comprehensive understanding of the scope of commercially manufactured PFAS and their uses. Therefore, EPA has decided not to provide reporting exemptions for research and development substances, byproducts, impurities, recyclers, and intermediates.

8.7 Total Industry Costs and Summary of Alternatives Considered

EPA considered including broad small business exemptions; only reporting for a finite list of chemicals; reporting exemptions for imported articles, R&D substances, byproducts, impurities, recyclers, and impurities; a longer reporting timeline for small businesses; simplified reporting forms for certain entities; and implementing a reporting threshold. The table below summarizes the costs of these alternatives and the cost of the final rule.

After careful consideration, EPA is finalizing the following alternatives for all reporting entities: extending the reporting timeline by six months (and an additional 6 months for small manufacturers who report exclusively as article importers); and creating streamlined reporting forms for article importers and manufacturers of small quantities (under 10 kg/year) of R&D substances. These modifications to the proposed rule reduce compliance costs without a complete exemption of small entities. EPA has not made

a determination that a complete exemption of small entities is not legally viable in this rulemaking. EPA believes such an exemption would result in diminished collection of reasonably known or ascertainable information about PFAS manufacturing and import since 2011 and therefore is exercising its discretion to not implement this alternative.

Table 8-21: Summary of Alternatives Considered

Alternative	Total Small Business Cost (millions)	Total Industry Cost (millions)	Reduction in Total Cost	Percent of PFAS Info
Final Rule without streamlined reporting and without longer reporting timelines[1]	$925	$954.2	N/A	100%
Final Rule with streamlined reporting[2]	**$790.6**	**$800.2**	**16%**	**100%**
Exemption for businesses with less than $12 million in revenue	$48.8	$60.7	*94%*	76%
Exemption for businesses with less than $6 million in revenue	$90.0	$95.3	*90%*	79%
Exemption for article importers with less than $6 million in revenue	$99.3	$104.4	*89%*	80%
Exemption for article importers with less than $2 million in revenue	$229.6	$259.2	*73%*	85%
Limit the scope to a finite list of PFAS subject to the rule	$626.5	$638.5	*33%*	50%
Reporting Threshold of either 2,500 lbs. per year or 25,000 lbs. per year	$736.6 - $785.2	$744.8 - $794.6	22% - 17%	51% - 95%
Exemptions for research and development substances, byproducts, impurities, recyclers, and intermediates	Not quantified	Not quantified	Not quantified	Not quantified

[1] Does not include any exemptions, nor does it include longer reporting timelines or streamlined forms for article importers and low volume R&D substances. But does include updates to the structural definition of PFAS, compliance determination costs, form completion costs, and the number of PFAS per manufacturing firm.

[2] The Final Rule includes a longer reporting timeline for all entities, with an additional six months for reporting to small manufacturers (as defined at 40 CFR 704.3) who are exclusively article importers, and streamlined forms for article importers and low volume R&D substances.

9 Sensitivity Analysis

This chapter presents primary and alternative industry costs under varying assumptions for the number of PFAS that would be reported, and the number of article importers affected by the rule. Section 9.1 evaluates alternative assumptions for the number of PFAS firms may report. Section 9.2 evaluates alternative assumptions for the percentage of firms importing PFAS in articles and thus required to report under the rule. Section 9.3 evaluates alternative assumptions for the number of firms importing articles that potentially contain PFAS.

9.1 Number of PFAS Reported

EPA has identified at least 1,455 chemical substances and mixtures that are PFAS and would be subject to reporting under the rule. In the primary analysis, EPA estimates that all 1,455 identified PFAS will be reported on. This sensitivity analysis evaluates the alternative assumptions of 1,000 PFAS and 2,000 PFAS being reported on as low and high estimates. As shown in Table 9-1, this results in an estimated 174 manufacturing firms reporting as the low-estimate and 348 manufacturing firms reporting as the high estimate. EPA did not identify any data sources with information on the percentage of imported articles that contain PFAS, and thus based the primary estimate of 10 percent of affected firms importing PFAS in articles on professional judgement. For this sensitivity analysis, the low-end estimate uses the same assumption as in the primary analysis (10 percent of affected firms importing PFAS in articles). For the high-end estimate EPA assumes 15 percent of affected firms import PFAS in articles. Based on various public comments regarding article importers' lack of historical records and information on chemical content of their articles, and the various challenges companies expect from contacting suppliers, EPA believes that 15 percent is a reasonable high-end estimate. Additionally, EPA considered that, based on EPA's understanding of the PFAS industry, many PFAS are used in such a way that their use is a trade secret or there is no requirement that their use be stated in a specific application. EPA also recognized that article supply chains are complex, and for certain instances testing would be needed to determine the presence of PFAS, which is beyond the reasonably known to or ascertainable standards. All these factors were considered when determining a reasonable high-end estimate for this sensitivity analysis.

Table 9-1 Estimated Number of PFAS, Primary and Alternative Estimates

Parameter	Primary Analysis	Low Estimate	High Estimate
Number of Chemicals	1,455	1,000	2,000
Number of affected manufacturing firms	253	174	348
Number of affected manufacturing sites	354	244	487
Number of reporting article importers	13,116	13,116	19,673

Table 9-2 and Table 9-3 present the total industry burden and costs under the low-end and high-end estimates, respectively. The low-end estimate results in a total burden of approximately 11.6 million hours and a total cost of approximately $839.5 million and $ 796.6 million under a 3 and 7 percent discount rate, respectively. The high-end estimate results in a total burden of approximately 12.5 million hours and a total cost of approximately $912.7 million and $865.6 million under a 3 and 7 percent discount rate, respectively. This represents an approximately 0.4 percent decrease and a 8.2 percent increase in total costs under the low-end and high-end assumptions, respectively.

Table 9-2: Total Industry Burden and Costs (2022$), Low-End Estimates for the Number of PFAS

Activity	Number of Affected Firms	Average Burden per Firm (hours)	Total Burden (hours)	Average Cost per Firm (2022$)	Total Cost (2022$)	Average Cost per Firm (2022$)	Total Cost (2022$)
				3% Discount Rate		7% Discount Rate	
Manufacturers							
Rule Familiarization	174	30	5,133	$2,460	$428,030	$2,368	$412,029
Compliance Determination	174	6	1,009	$468	$81,414	$450	$78,370
Form Completion	174	532	92,641	$42,805	$7,448,123	$41,205	$7,169,688
CBI Claim Substantiation	174	5	944	$441	$76,654	$424	$73,789
Recordkeeping	174	8	1,347	$463	$80,586	$446	$77,573
CDX Registration and Electronic Signature	174	3	464	$229	$39,830	$220	$38,341
Manufacturer Total	*174*	*584*	*101,537*	*$46,866*	*$8,154,637*	*$77*	*$7,849,791*
Article Importers							
Rule Familiarization: Non-Reporting Firms	118,041	9	1,091,878	$779	$91,915,445	$750	$88,479,353
Structural Definition Familiarization for Large Article Importers	11,804	6	64,922	$444	$5,240,191	$427	$5,044,296
Structural Definition Familiarization for Small Article Importers	116,308	10	1,163,084	$844	$98,177,375	$813	$94,507,192
Rule Familiarization: Reporting Firms	13,116	24	314,776	$2,016	$26,441,315	$1,941	$25,452,855
Compliance Determination	131,157	57	7,521,829	$3,867	$507,208,813	$3,660	$480,076,560
Form Completion	13,116	92	1,202,830	$7,118	$93,354,170	$6,619	$86,815,460
CBI Claim Substantiation	13,116	2	28,723	$173	$2,271,016	$161	$2,111,950
Recordkeeping	13,116	5	65,578	$291	$3,819,995	$271	$3,552,435
CDX Registration and Electronic Signature	13,116	3	34,975	$223	$2,922,718	$207	$2,718,005
Article Importer Total	131,157	*0*	*11,488,596*	*$6,339*	*$831,351,038*	*$6,014*	*$788,758,107*
Industry Total	**131,331**	**-**	**11,590,133**	**-**	**$839,505,675**	**-**	**$796,607,898**

Table 9-3: Total Industry Burden and Costs (2022$), High-End Estimates for the Number of PFAS

Activity	Number of Affected Firms	Average Burden per Firm (hours)	Total Burden (hours)	Average Cost per Firm (2022$)	Total Cost (2022$)	Average Cost per Firm (2022$)	Total Cost (2022$)
				3% Discount Rate		7% Discount Rate	
Manufacturers							
Rule Familiarization	348	30	10,266	$2,460	$856,060	$2,368	$824,057
Compliance Determination	348	0	0	$0	$0	$450	$156,741
Form Completion	348	532	185,282	$42,805	$14,896,246	$41,205	$14,339,377
CBI Claim Substantiation	348	5	1,888	$441	$153,309	$424	$147,577
Recordkeeping	348	8	2,694	$463	$161,172	$446	$155,147
CDX Registration and Electronic Signature	348	3	928	$229	$79,660	$220	$76,682
Manufacturer Total	*348*	*578*	*201,057*	*$46,398*	*$16,146,446*	*$45,114*	*$15,699,582*
Article Importers							
Rule Familiarization: Non-Reporting Firms	111,484	9	1,031,223	$779	$86,809,408	$750	$83,564,196
Structural Definition Familiarization for Large Article Importers	3,345	6	18,398	$444	$1,485,012	$427	$1,429,497
Structural Definition Familiarization for Small Article Importers	127,811	10	1,278,114	$844	$107,887,225	$813	$103,854,057
Rule Familiarization: Reporting Firms	19,673	24	472,152	$2,016	$39,660,997	$1,941	$38,178,343
Compliance Determination	131,157	57	7,521,829	$3,867	$507,208,813	$3,660	$480,076,560
Form Completion	19,673	92	1,804,201	$7,118	$140,027,812	$6,619	$130,219,989
CBI Claim Substantiation	19,673	2	43,084	$173	$3,406,441	$161	$3,167,847
Recordkeeping	19,673	5	98,365	$291	$5,729,852	$271	$5,328,522
CDX Registration and Electronic Signature	19,673	3	52,461	$223	$4,383,969	$207	$4,076,907
Article Importer Total	131,157	*94*	*12,319,827*	*$6,836*	*$896,599,528*	*$6,480*	*$849,895,919*
Industry Total	**131,505**	**-**	**12,520,884**	**-**	**$912,745,974**	**-**	**$865,595,501**

9.2 Number of Reporting Importers of Articles

EPA did not identify any data sources with information on the percentage of imported articles that contain PFAS, and thus based the primary estimate of 10 percent of firms importing PFAS in articles on professional judgement, as discussed in Section 2.2.2. This sensitivity analysis evaluates alternative assumptions of 1 percent and 20 percent of firms importing PFAS in articles as low and high estimates, respectively. As shown in Table 9-4, this results in an estimated 1,312 article importers reporting under the rule under the low-end estimate and 26,231 reporting article importers under the high-end estimate, as compared to 13,116 article importers assumed for the primary analysis.

Table 9-4: Estimated Number of Importers of Articles Containing PFAS, Primary and Alternative Estimates

Parameter	Primary Analysis	Low Estimate	High Estimate
Estimated importers of articles potentially containing PFAS	131,157	131,157	131,157
Percentage of firms importing PFAS in articles	10%	1%	20%
Estimated number of reporting firms	**13,116**	**1,312**	**26,231**

Table 9-5 presents the total industry burden and costs under the primary and alternative estimates. The low-end estimate results in a total burden of approximately 10.3 million hours and a total cost of approximately $737 million and $701 million under a 3 and 7 percent discount rate, respectively. The high-end estimate results in a total burden of approximately 13.2 million hours and a total cost of approximately $967 million and $923 million under a 3 and 7 percent discount rate, respectively. This represents an approximately 13 percent decrease and a 14 percent increase in total costs under the low-end and high-end assumptions, respectively. Thus, industry costs appear to be sensitive to the assumed percentage of firms importing PFAS in articles. As previously discussed, the lack of data available to estimate this percentage is a limitation to accurately estimating total costs to industry of the final rule.

Table 9-5: Total Industry Burden and Costs (2022$), Primary and Alternative Estimates for Article Importers

Activity	Number of Affected Firms	Average Burden per Firm (Hours)	Total Burden (hours)	Average Cost per Firm (2022$)	Total Cost (2022$)	Average Cost per Firm (2022$)	Total Cost (2022$)
				3% Discount Rate		7% Discount Rate	
Primary Estimate							
Rule Familiarization	131,410	20	2,642,124	$1,692	$222,396,690	$1,629	$214,082,795
Compliance Determination	131,410	57	7,523,295	$3,861	$507,327,191	$3,654	$480,190,513
Form Completion	13,369	100	1,337,532	$7,793	$104,183,912	$7,274	$97,240,352
CBI Claim Substantiation	13,369	2	30,096	$178	$2,382,473	$166	$2,219,240
Recordkeeping	13,369	5	67,536	$295	$3,937,169	$274	$3,665,229
CDX Registration and Electronic Signature	13,369	3	35,650	$223	$2,980,632	$207	$2,773,754
Total, Primary Estimate	**131,410**	**89**	**11,636,233**	**$6,417**	**$843,208,067**	**$6,089**	**$800,171,883**
Low Estimate							
Rule Familiarization	131,410	19	2,468,014	$1,581	$207,791,051	$1,522	$200,023,161
Compliance Determination	131,410	57	7,523,295	$3,861	$507,327,191	$3,654	$480,190,513
Form Completion	1,565	163	254,985	$13,051	$20,419,329	$12,563	$19,655,990
CBI Claim Substantiation	1,565	3	4,245	$220	$344,742	$212	$331,854
Recordkeeping	1,565	5	8,516	$326	$509,574	$314	$490,524
CDX Registration and Electronic Signature	1,565	3	4,172	$229	$358,143	$220	$344,755
Total, Low Estimate	**131,410**	**78**	**10,263,227**	**$5,607**	**$736,750,031**	**$5,335**	**$701,036,798**
High Estimate							
Rule Familiarization	131,410	22	2,835,580	$1,816	$238,625,178	$1,748	$229,704,611
Compliance Determination	131,410	57	7,523,295	$3,861	$507,327,191	$3,654	$480,190,513
Form Completion	26,231	97	2,540,362	$7,724	$202,621,494	$7,436	$195,046,859
CBI Claim Substantiation	26,231	2	58,819	$182	$4,777,153	$175	$4,598,568
Recordkeeping	26,231	5	133,115	$304	$7,965,175	$292	$7,667,411
CDX Registration and Electronic Signature	26,231	3	70,625	$231	$6,062,501	$222	$5,835,865
Total, High Estimate	**131,410**	**100**	**13,161,796**	**$7,362**	**$967,378,691**	**$7,024**	**$923,043,826**

9.3 Number of Importers of Articles Potentially Containing PFAS

The approach for estimating the number of importers of articles potentially containing PFAS is described in Section 2.2.2. As previously described, the analysis assumes that the number of firms importing articles that may contain PFAS is proportional to the total customs value of commodities that may contain PFAS (58 percent; see Table 2-3). However, this assumption is subject to uncertainty regarding the market for imported articles that may contain PFAS. The analysis may underestimate the number of firms if more firms import smaller volumes of articles. It may also overestimate the number of firms if fewer firms import larger volumes of articles.

This sensitivity analysis evaluates alternative assumptions of 50 percent and 70 percent of firms importing articles potentially containing PFAS. Table 9-6 presents the estimated number of importers potentially containing PFAS and the estimated number of reporting firms under the primary and alternative assumptions.

Table 9-6: Estimated Number of Importers of Articles Containing PFAS, Primary and Alternative Estimates for Importers of Articles Potentially Containing PFAS

Parameter	Primary Analysis (58 percent of total article importers)	Low Estimate (50 percent of total article importers)	High Estimate (70 percent of total article importers)
Estimated importers of articles potentially containing PFAS	131,157	112,350	157,289
Percentage of firms importing PFAS in articles	10%	10%	10%
Estimated number of reporting firms	**13,116**	**11,235**	**15,729**

Table 9-7 presents the total industry burden and costs under the primary and alternative estimates. The low-end estimate results in a total burden of approximately 10 million hours and a total cost of approximately $734 million and $707 million under a 3 percent and 7 percent discount rate, respectively. The high-end estimate results in a total burden of approximately 14 million hours and a total cost of approximately $1.02 billion and $985 million under a 3 percent and 7 percent discount rate, respectively. This represents an approximately 13 percent decrease and a 21 percent increase in total costs under the low-end and high-end assumptions, respectively.

Table 9-7: Total Industry Burden and Costs (2022$), Primary and Alternative Estimates for Importers of Articles Potentially Containing PFAS

Activity	Number of Affected Firms	Average Burden per Firm (Hours)	Total Burden (hours)	Average Cost per Firm (2022$)	Total Cost (2022$)	Average Cost per Firm (2022$)	Total Cost (2022$)
				3% Discount Rate		7% Discount Rate	
Primary Estimate							
Rule Familiarization	131,410	20	2,642,124	$1,692	$222,396,690	$1,629	$214,082,795
Compliance Determination	131,410	0	7,523,295	$0	$507,327,191	$3,654	$480,190,513
Form Completion	13,369	100	1,337,532	$7,793	$104,183,912	$7,274	$97,240,352
CBI Claim Substantiation	13,369	2	30,096	$178	$2,382,473	$166	$2,219,240
Recordkeeping	13,369	5	67,536	$295	$3,937,169	$274	$3,665,229
CDX Registration and Electronic Signature	13,369	3	35,650	$223	$2,980,632	$207	$2,773,754
Total, Primary Estimate	**131,410**	**89**	**11,636,233**	**$6,417**	**$843,208,067**	**$6,089**	**$800,171,883**
Low Estimate							
Rule Familiarization	112,603	20	2,290,416	$1,712	$192,797,539	$1,648	$185,590,154
Compliance Determination	112,603	57	6,444,739	$3,911	$440,433,691	$3,765	$423,968,880
Form Completion	11,488	101	1,165,058	$8,093	$92,975,094	$7,791	$89,499,390
CBI Claim Substantiation	11,488	2	25,977	$184	$2,109,798	$177	$2,030,927
Recordkeeping	11,488	5	58,133	$303	$3,478,511	$291	$3,348,473
CDX Registration and Electronic Signature	11,488	3	30,635	$229	$2,629,708	$220	$2,531,401
Total, Low Estimate	**112,603**	**89**	**10,014,958**	**$6,522**	**$734,424,341**	**$6,278**	**$706,969,226**
High Estimate							
Rule Familiarization	157,542	20	3,203,576	$1,712	$269,665,898	$1,648	$259,584,930
Compliance Determination	157,542	57	9,021,991	$3,914	$616,555,898	$3,767	$593,507,079
Form Completion	15,982	99	1,577,191	$7,873	$125,832,504	$7,579	$121,128,485
CBI Claim Substantiation	15,982	2	35,819	$182	$2,909,116	$175	$2,800,364
Recordkeeping	15,982	5	80,603	$302	$4,823,016	$290	$4,642,717
CDX Registration and Electronic Signature	15,982	3	42,618	$229	$3,658,403	$220	$3,521,640
Total, High Estimate	**157,542**	**89**	**13,961,798**	**$6,496**	**$1,023,444,835**	**$6,253**	**$985,185,215**

10 Other Impact Analyses

Several statutes and executive orders (EOs) pertain to the rule. This chapter presents statements discussing paperwork reduction, unfunded mandates, regulatory planning and review, tribal governments, children's health, and environmental justice, among others.

10.1 Employment Impact Analysis

While a standalone analysis of employment impacts is not included in a standard cost-benefit analysis,[15] EPA typically examines employment impacts for regulations promulgated under TSCA. Executive Order 13563 states, "Our regulatory system must protect public health, welfare, safety, and our *environment* while promoting economic growth, innovation, competitiveness, and *job creation*" (emphasis added). For this rule, EPA presents a qualitative assessment of the potential for employment impacts in the short and long term for firms that might be directly or indirectly affected by the rule.

Regulatory employment impacts are difficult to disentangle from other economic changes affecting employment decisions that occur over the timeframe of analysis and across affected regions and industries. Labor market responses to regulation are complex. They depend on labor demand and supply elasticities and possible labor market imperfections (e.g., wage stickiness, structural unemployment, etc.). The observability of an employment response may depend on the unit of measurement. Possible measured units include the number of jobs, job years, types of job, hours worked, and earnings. Net employment impacts are composed of a mix of potential declines and gains in different areas of the economy including the directly regulated sector, the environmental protection sector, upstream and downstream sectors, and ultimately all affected sectors. In light of these complexities, economic theory provides a constructive framework for analysis. The theory is explained below, followed by a quick summary of empirical findings in the rapidly expanding literature relevant to employment effects of environmental regulation. The final subsections present qualitative assessments of the employment impacts of the current rulemaking.

10.1.1 Theory

Microeconomic theory describes how firms adjust their use of inputs in response to changes in economic conditions (Layard 1978). Labor is one of many inputs to production, along with capital, energy, and materials. In competitive markets, firms choose inputs and outputs to maximize profit as a function of market prices and technological constraints (Hamermesh 1993).[16] Berman and Bui (2001) adapt this model to analyze how environmental regulations affect the quantity of labor demanded by regulated firms. They model environmental regulation as effectively requiring certain factors of production, such as pollution abatement capital, at levels that firms would not otherwise choose. Berman and Bui (2001) model two components that drive changes in firm-level labor demand: output effects and substitution effects.[17] Regulation affects the profit-maximizing quantity of output by changing the marginal cost of production. If a regulation causes marginal cost to increase, it will place upward pressure on output prices, leading to a decrease in demand for output, and resulting in a decrease in production. The output effect describes how, holding labor intensity constant, a decrease in production causes a decrease in labor demand. As noted by Berman and Bui, although many assume that regulations must increase marginal cost, it need not be the case. A regulation could induce a firm to upgrade to less polluting and more efficient equipment or production processes that lower the marginal cost of production.

[15] Except to the extent that labor costs are part of total costs in a cost-benefit analysis.

[16] In this framework, labor demand is a function of quantity of output and prices (of both outputs and inputs).

[17] The authors also discuss a third component, the impact of regulation on factor prices, but conclude that this effect is unlikely to be important for large competitive factor markets, such as labor and capital.

The substitution effect describes how, holding output constant, regulation affects the labor-intensity of production. Although increased environmental regulation may increase the use of pollution control equipment and energy to operate that equipment, or otherwise change production processes, the impact on labor demand is ambiguous. For example, pollution abatement technologies or materials that alter the production process, requirements for inspection and certification, and required paperwork and recordkeeping may affect the amount of labor necessary to produce a unit of output. Berman and Bui model the substitution effect as the effect of regulation on pollution control equipment and expenditures and the corresponding change in the labor-intensity of production. In summary, as output and substitution effects may be positive or negative, economic theory alone cannot predict the direction of the net effect of environmental regulation on labor demand at the level of the regulated firm. This final rule will require manufacturers and processors of certain PFAS chemicals to electronically report to EPA certain information. This requirement may impact labor demand at regulated firms through increased labor needs.

In addition to changes to labor demand in the regulated industry, net employment impacts encompass changes in other related sectors throughout the U.S. economy. For example, this final rule will increase the amount of data on PFAS chemicals available for Federal agency risk management programs, state and local government programs, private sector, and non-governmental organization researchers. As a result, this increased amount of data may increase labor demand at organizations that analyze the data. Therefore, it is important to consider the net effect of compliance actions on employment across multiple sectors or industries. If the U.S. economy is at full employment, even a large-scale environmental regulation is unlikely to have a noticeable impact on aggregate net employment.[18] Since early 2022, the unemployment rate has consistently been below 4%, indicating that the U.S. economy is likely at or close to full employment (BLS 2023c). Instead, labor in affected sectors would primarily be reallocated from one productive use to another, and net national employment effects from environmental regulation would be small and transitory (e.g., as workers move from one job to another) (Arrow 1996). Some workers may retrain or relocate in anticipation of new requirements or require time to search for new jobs, while shortages in some sectors or regions could bid up wages to attract workers. These adjustment costs can lead to local labor disruptions. Although the net change in the national workforce is expected to be very small, localized reductions in employment may adversely impact individuals and communities just as localized increases may have positive impacts. If, on the other hand, the economy is operating at less than full employment, economic theory does not clearly indicate the direction or magnitude of the net impact of environmental regulation on employment (Schmalensee and Stavins 2011). For example, the Congressional Budget Office considered EPA's Mercury Air Toxics Standards and regulations for industrial boilers and process heaters as potentially leading to short-run net *increases* in economic growth and employment, driven by capital investments for compliance with the regulations (Congressional Budget Office 2011).

Adding to the unknowns and complex movements of labor within the regulated sector and across the larger U.S. economy, effects on employment are also likely to change over time. Employment in some sectors will be affected at the time of promulgation or when a regulation becomes effective, while others may be affected farther into the future. In addition, environmental regulation may affect labor *supply* and productivity. In particular, pollution and other environmental risks may impact labor productivity or employees' ability to work.[19] The empirical findings regarding labor supply are reviewed below.

[18] "Full employment describes the level of employment consistent with an economy that is making full use of its productive resources. It does not mean zero unemployment", from the Federal Reserve Bank of Chicago: "The Federal Reserve's Dual Mandate: Frequently Asked Questions", < https://chicagofed.org/publications/speeches/our-dual-mandate-faqs>.
[19] E.g. Graff Zivin and Neidell (2012)

10.1.2 Empirical Findings

The labor economics literature contains an extensive body of peer-reviewed empirical work analyzing various aspects of labor demand, relying on the theoretical framework discussed in the preceding section.[20] This work focuses primarily on effects of employment policies such as labor taxes and minimum wages.[21] In contrast, the peer-reviewed empirical literature specifically estimating employment effects of environmental regulations is growing, but is more limited. This section presents an overview of the latter.

Empirical studies, such as Berman and Bui (2001) and Ferris et al. (2014), suggest that regulation-induced net employment impacts may be zero or slightly positive, but small in the regulated sector. Gray et al. (2014) find that pulp mills that had to comply with both the air and water regulations in EPA's 1998 "Cluster Rule" experienced relatively small, and not always statistically significant, decreases in employment. Other research on regulated sectors suggests that employment growth may be lower in more regulated areas (Greenstone 2002; Walker 2011; Walker 2013; Kahn and Mansur 2013). However since these latter studies compare more regulated to less regulated counties this methodological approach likely overstates employment impacts to the extent that regulation causes plants to locate in one area of the country rather than another, which would lead to "double counting" of the employment impacts. List et al. (2003) find some evidence that this type of geographic relocation may be occurring.

The empirical literature on environmental regulatory employment impacts focuses primarily on labor demand. However, there is a nascent literature focusing on regulation-induced effects on labor productivity and supply.[22] Although this literature faces empirical challenges, researchers have found that air quality improvements lead to reductions in lost work days (e.g., Ostro 1987). Limited evidence suggests worker productivity may also improve when pollution is reduced. Graff Zivin and Neidell (2012) used detailed worker-level productivity data from 2009 and 2010, paired with local ozone air quality monitoring data for one large California farm growing multiple crops, with a piece-rate payment structure. Their quasi-experimental structure identifies an effect of daily variation in monitored ozone levels on productivity. They find "ozone levels well below federal air quality standards have a significant impact on productivity: a 10 parts per billion (ppb) decreases in ozone concentrations increases worker productivity by 5.5 percent." (Graff Zivin and Neidell 2012, p. 3654). As noted above, it is very difficult to estimate the net national employment impacts of environmental regulation. Given the difficulty with estimating national impacts of regulations, EPA has not generally estimated economy-wide employment impacts of its regulations in its benefit-cost analyses. However, in its continuing effort to advance the evaluation of costs, benefits, and economic impacts associated with environmental regulation, in 2015 EPA formed a panel of experts as part of EPA's Science Advisory Board (SAB) to advise EPA on the technical merits and challenges of using economy-wide economic models to evaluate the impacts of its air pollution regulations, including the impact on net national employment.[23] An SAB report issued in September 2017 (EPA 2017c) noted that the case for using economy-wide models is strongest when costs are expected to be large in magnitude and the sector has strong linkages to the rest of the economy. The report also noted that the extent to which economy-wide models add value to the analysis depends on data availability, in that data limitations are a significant obstacle to achieving the granularity needed to adequately represent a regulation in the model to estimate its effects. In the case of this final rule, secondary effects are likely to be limited in scope.

[20] Again, see Hamermesh (1993) for a detailed treatment.
[21] See Ehrenberg and Smith (2000), Chapter 4: "Employment Effects: Empirical Estimates" for a concise overview.
[22] For a recent review see Graff Zivin and Neidell (2012).
[23] For further information see:
http://yosemite.epa.gov/sab/sabproduct.nsf/0/07E67CF77B54734285257BB0004F87ED?OpenDocument

Conclusions Regarding the Literature. This section has outlined the challenges associated with estimating regulatory effects on both labor demand and supply for specific sectors. These challenges make it difficult to estimate net national employment estimates that would appropriately capture the way in which costs, compliance spending, and environmental benefits propagate through the macro-economy. Overall, the peer-reviewed literature does not contain evidence that environmental regulation has a large impact on net employment (either negative or positive) in the long run across the whole economy.

Section 10.1.3 presents a qualitative assessment of immediate and short-term employment impacts of the current rulemaking. Section 10.1.4 describes longer term impacts.

10.1.3 Qualitative Assessment: Immediate and Short-term Employment Impacts

Firms impacted by this final rule are manufacturers (including importers) and processors of certain PFAS chemicals. The one-time activities that firms may need to perform to comply with this final rule are rule familiarization, compliance determination, form completion, CBI substantiation, electronic reporting, and recordkeeping. An estimated 131,410 firms are expected to be affected under the final rule, incurring an average one-time cost of $6,089 per firm under a 3 percent discount rate and $6,417 per firm under a 7 percent discount rate. See Chapter 3 for a discussion of how per-firm costs were estimated. The net effect on short-term labor demand in the regulated sector is ambiguous but expected to be small.

10.1.4 Qualitative Assessment: Longer-term Employment Impacts

EPA is not anticipating any significant longer-term cost impacts on regulated entities and therefore the final rule is not expected to have any significant longer-term employment effects.

10.1.5 Summary of Qualitatively Assessed Employment Impacts

The direction of change in employment in the regulated and environmental sectors from this final rulemaking is ambiguous. This is true for both the short-term employment impacts and the long-term employment impacts. As this is a one-time reporting requirement, EPA does not anticipate any significant longer-term employment effects. EPA notes that all affected firms, including importers, are required only to submit information that is known or reasonably ascertainable to them, thus EPA expects employment impacts to be small as well.

10.2 Paperwork Reduction Act (PRA)

According to the Paperwork Reduction Act (PRA), 44 USC 3501 et seq., an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information that requires Office of Management and Budget (OMB) approval under the PRA, unless it has been approved by OMB and displays a currently valid OMB control number. The final rule will impose a burden requiring additional OMB approval.

This section estimates the burden and costs for both the respondents and the Agency associated with the recordkeeping and reporting requirements of the final rule. In this context, the term “burden” is interpreted as the total time, effort, or financial resources expended by people to generate, maintain, retain, disclose, or provide information to or for a federal agency. This includes the time needed by regulated entities to review instructions and to develop, acquire, install, and use technology and systems to collect, validate, verify, and disclose information. Time taken to adjust existing ways to comply with any previously applicable instructions and requirements and to train personnel to respond to the information collection task is also included. In this section, burden hours for both the industry respondents and the government are estimated.

Table 10-1 presents a summary of the total burden to industry associated with the final rule. The data used to populate this table are explained in greater detail in Chapter 3.

Table 10-1: Industry Burden Estimates

Firms	Number of Reports	Average Rule Familiarization and Compliance Determination Burden per Firm (Hours)	Form Completion, CBI Substantiation, and Recordkeeping Burden per Firm (Hours)[1]	Average Electronic Reporting Burden per Firm (Hours)[1]	Total Burden (Hours)
A		B	C	D	E = A x (B+C+D)
131,410	67,536	78	11	0.27	11,636,233
[1] Averaged across all firms. Note that not all firms will incur these costs.					

10.3 Unfunded Mandates Reform Act (UMRA)

This action contains a Federal mandate that may result in expenditures of $100 million or more as described in UMRA (2 U.S.C. 1531-1538) to the private sector. It does not significantly or uniquely affect small governments.

10.4 Executive Order 13132 – Federalism

Under Executive Order 13132, "Federalism" (64 FR 43255, August 10, 1999), EPA has determined that the rule does not have "federalism implications" because it will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in the executive order. The final rule establishes reporting and recordkeeping requirements that apply to manufacturers and processors of certain chemicals. Because EPA has no information to indicate that any state or local government manufactures or processes the chemical substances covered by this action, the final rule does not apply directly to states and localities and will not affect state and local governments. Thus, EO 13132 does not apply to the final rule.

10.5 Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments

As required by Executive Order 13175, entitled *Consultation and Coordination with Indian Tribal Governments* (65 FR 67249, November 9, 2000), EPA has determined that this final rule does not have tribal implications because it will not have any effect on tribal governments, on the relationship between the Federal government and the Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in the Order. Thus, EO 13175 does not apply to the final rule.

10.6 Executive Order 13045 – Children's Health

EPA interprets Executive Order 13045 (62 FR 19885, April 23, 1997) as applying only to those regulatory actions that concern environmental health or safety risks that EPA has reason to believe may disproportionately affect children, per the definition of "covered regulatory action" in section 2-202 of the Executive Order. This action is not subject to Executive Order 13045, because it does not concern an environmental health or safety risk. Since this action does not concern human health, EPA's Policy on Children's Health also does not apply.

Although this action does not concern an environmental health or safety risk, this one-time data collection will provide information that could be used to support future risk management efforts. This regulatory action establishes one-time reporting requirements for PFAS that will result in information on the quantity of PFAS to which children may be exposed. EPA believes that the information obtained as a result of this one-time data collection could also be used by the public, government agencies and others to identify potential problems, set priorities, and take appropriate steps to reduce any potential human health or environmental risks.

10.7 Executive Order 12898 – Environmental Justice and Executive Order 14096 Revitalizing Our National's Commitment to Environmental Justice for All

Executive Order 12898 (59 FR 7629, February 16, 1994) directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations (people of color and/or Indigenous peoples) and low-income populations.

However, this regulatory action makes changes to the reporting requirements for PFAS that will result in more information being collected and provided to better evaluate exposures and the risks posed by such exposures as explained in Unit II.A, certain PFAS exposure may be a hazard to human health. This action establishes one-time reporting requirements for companies to submit to EPA certain known or reasonably ascertainable information on manufactured PFAS by those entities as discussed in detailed in Unit III.D. The determination of potential risk to human health and/or the environment depends upon many factors, including the toxicity of the chemical, the fate of the chemical in the environment, and the amount and duration of human or other exposure to the chemical. This action does not directly address human health or environmental risks. However, the action will increase the level of information available to assess environmental protection for all affected populations without having any disproportionate and adverse human health or environmental effects on any population, including any community with environmental justice concerns. The information obtained as a result of this action may be used to collect all existing and reasonably ascertainable information related to PFAS-containing articles will be of use in identifying current data gaps surrounding the knowledge of commercially manufactured PFAS, and reporting of PFAS within imported articles will enable EPA to meet its obligations under the FY 2020 NDAA. Understanding the extent of existing data gaps related to manufactured PFAS will also help inform and tailor future EPA actions to address PFAS as needed. EPA also believes that the information obtained as a result of this action potentially could be used by the public (including communities with environmental justice concerns) with access to data which they may use to seek lower exposures and consequently reductions in chemical risks for themselves and their children. Technical assistance may be provided to communities with environmental justice concerns and efforts will be made to ensure meaningful access for individuals with limited English proficiency and individuals with disabilities. This information can also be used by government agencies and others to identify potential problems, set priorities, and take appropriate steps to reduce any potential risks to human health and the environment. Therefore, informational benefits, of the action, including behavioral changes such as consumers avoiding specific products, may have positive impact on the human health and environmental impacts on all communities, including communities with environmental justice concerns.

10.8 Executive Order 13211 – Energy Supply, Distribution, or Use.

This final rule is not subject to Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355, May 22, 2001), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy and has not otherwise been designated by the Administrator of OMB's Office of Information and Regulatory Affairs as a "significant energy action."

10.9 National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law No. 104-113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

The final rule does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards.

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APPENDICES

A. Wage Rate Calculations

This appendix describes the derivation of the fully loaded wage rates and inflation factors used in calculating costs of labor, materials, and other inputs. All cost estimates are presented in 2022 dollars.

The fully loaded unit labor cost for managerial, professional/technical, and clerical labor in the regulated industry and for EPA staff is estimated by adding fringe benefits and overhead costs to the hourly wage or annual salary for each category following the method described in EPA's *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and Other EPA Actions* (EPA 2020c). This appendix describes the method employed to estimate the fully loaded unit labor costs for each labor category and presents the results of the analysis.

Labor categories used in the analysis correspond to the U.S. Bureau of Labor Statistics (BLS) Standard Occupational Classification (SOC) system. Table **Error! No text of specified style in document.**-1 lists the SOC titles that correspond to the managerial, professional/technical, and clerical labor categories used in this analysis (Weinstein and Loewenstein 2004).

Table Error! No text of specified style in document.**-1: Detail of Labor Categories Used in the Analysis**

Labor Category Used in the Analysis	BLS Title (SOC)
Managerial	Management, business, and financial
Professional/Technical	Professional and related
Clerical	Office and administrative support
Sources: BLS 2023a; Weinstein and Loewenstein 2004	

Derivation of Industry Unit Wage Rates

Wages and fringe benefit data for managerial, professional/technical, and clerical labor are from the BLS Employer Costs for Employee Compensation (ECEC) data for December 2022 (BLS 2023a). For attorney, the wage rate was taken from the BLS Occupational Employment Statistics (OES) May 2022 National Industry-Specific Occupational Employment and Wage Estimates for Sectors 31, 32, and 33 – Manufacturing and SOC Code 23-1011 – Lawyers (BLS 2023b).

The costs of fringe benefits such as paid leave and insurance, specific to each labor category, are taken from the same BLS report (BLS 2023a). Overhead costs are assumed to equal 20% of the sum of wages plus fringe benefits. This loading factor is described in *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and Other U.S. EPA Actions* (EPA 2020c) and is reflective of multiplier values used in prior EPA economic analyses and ICRs that are based on industry- and occupation-specific overhead rates affected by EPA regulations. This overhead loading factor is multiplied by the total compensation (wages plus fringe benefits). For example, the fully loaded wage rate for professional/technical labor is ($46.01 + $23.27)*1.2 = $83.14. Fully loaded costs for managerial, clerical, and attorney labor are calculated in a similar manner. The calculated overhead costs (20% of the total compensation) are shown in Table A-2 as well as the total hourly loaded wages.

Table Error! No text of specified style in document.**-2: Derivation of Loaded Industry Wage Rates (2022$)**

Labor Category	Data Source for Wage Information	Wage[1]	Fringe Benefit[2]	Total Compensation	Overhead % of Total Compensation[3]	Overhead	Hourly Loaded Wages[4]
		A	B	C = A + B	D	E = C x D	F = C + E
Clerical	BLS ECEC, Private Manufacturing industries, "Office and administrative support occupations"	$23.11	$10.33	$33.44	20%	$6.69	**$40.13**
Professional/Technical	BLS ECEC, Private Manufacturing industries, "Professional and related occupations"	$46.01	$23.27	$69.28	20%	$13.86	**$83.14**
Managerial	BLS ECEC, Private Manufacturing industries, "Management, business, and financial occupations"	$54.29	$24.66	$78.95	20%	$15.79	**$94.74**
Attorney	BLS OES, Occupational Employment and Wages, 23-1011 Lawyers	$78.74	$22.27	$101.01	20%	$20.20	**$121.21**

[1] Source: Employer Costs for Employee Compensation Tables: December 2022 (BLS 2023a); National Industry-Specific Occupational Employment and Wage Estimates, May 2022 (BLS 2023b).
[2] Source: Employer Costs for Employee Compensation Tables: December 2022 (BLS 2023a)
[3] An overhead rate of 20% is used based on assumptions in *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and other U.S. EPA Actions* (EPA 2020c).
[4] Values may not sum due to rounding. Wage rates are rounded to the nearest cent.

Derivation of Agency Unit Wage Rates

Unit wage rates for EPA staff are calculated based on annual federal salaries for the Washington-Baltimore area published by the Office of Personnel Management (OPM) and effective January 2022 (OPM 2022). The average salary for one full-time equivalent (FTE) technical/professional staff member is estimated as the salary for a GS-13 Step 5 employee, and the average salary for on FTE attorney staff member is estimated as the salary for a GS-14, Step 5 employee. EPA's *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and Other EPA Actions* (EPA 2020c) recommends a study by the Congressional Budget Office (Falk 2012) for estimating benefit values for federal government workers. The study reports that total benefits account for 63.9 percent of average wages in the federal government sector. Therefore, 63.9 percent of the wage is used to calculate the fringe in the derivation of Agency wage rates. An additional factor of 20 percent is applied to wages to account for overhead, consistent with the approach described in Section A.1 for industry wage rates.

The loaded hourly salary of EPA staff was calculated to be $114.47. Fully loaded costs for Agency labor are shown in Table **Error! No text of specified style in document.**-3.

Table Error! No text of specified style in document.**-3: Derivation of Loaded Agency Wage Rates (2022$)**

Labor Category	Data Source for Wage Information	Wage ($/hour)	Fringes as % of Wage[2]	Fringe Benefit	Total Compensation	Overhead as % of Total Compensation[3]	Overhead	Loaded Wage ($/hr)
		A	B	C = A * B	D = A + C	E	F = D * E	G = D + F
Technical	Annual federal staff cost: OPM Washington-Baltimore-Northern Virginia, DC-MD-PA-VA-WV area, GS-13 Step 5 pay rates[1]	$58.20	63.9%	$37.19	$95.39	20.0%	$19.08	$114.47

[1] Source: U.S. Office of Personnel Management 2022
[2] Source: Falk 2012
[3] An overhead rate of 20% is used based on assumptions in *Handbook on Valuing Changes in Time Use Induced by Regulatory Requirements and Other U.S. EPA Actions* (EPA 2020c)

B. Crosswalk of Harmonised Tariff System Codes and PFAS Uses in Articles

Table Error! No text of specified style in document.**-4: Crosswalk of Harmonised Tariff System Codes and PFAS Uses in Articles**

HTS Code	Industry	Use
3701 Photo Plates & Film, Flat, Sensitized, Unexposed	Photographic industry	Photographic materials, such as films and papers
3703 Photo Paper, Paperboard & Textiles, Sens, Unexpos	Photographic industry	Paper and plates
3704 Photo Plates, Flm, Paper, Etc, Exposed, Nt Develop	Photographic industry	Paper and plates
3705 Photo Plates & Still Film, Exposed & Developed	Photographic industry	Paper and plates
39 Plastics And Articles Thereof	Automotive	Interior
	Coatings, paints and varnishes	Coatings
		Paints
	Household applications	Threads and joints
	Laboratory supplies, equipment and instrumentation	Consumable materials (vials, caps, tape)
	Oil and gas industry	Oil and gas transport
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Plastic and rubber	Plastic
		Polycarbonate resins
		Resin
	Production of plastic and rubber	Fluoroelastomer formulation
	Sealants and adhesives	Adhesives
40 Rubber And Articles Thereof	Coatings, paints and varnishes	Paints
	Laboratory supplies, equipment and instrumentation	Personal protective equipment (gloves)
	Pharmaceutical industry	Reaction vessels, stirrers, and other components
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Plastic and rubber	Bonding of rubber to steel
		Rubber and plastic
		Thermoplastic
	Production of plastic and rubber	Fluoroelastomer formulation
	Sealants and adhesives	Silicone rubber seals
4104 Bovine Or Equine Leather, No Hair Nesoi	Leather	Repellent treatment (genuine leather)
4105 Sheep Or Lamb Skin Leather, No Wool Nesoi		
4106 Other Animal N Leather, No Hair Nesoi		
4107 Leather Furt Prep Aft Tan/crust, No Hair On,nes		
4108 Chamois (including Combination Chamois) Leather		

B: Crosswalk of Harmonised Tariff System Codes and PFAS Uses in Articles

HTS Code	Industry	Use
4109 Patent & Patent Laminated Leather; Metallzd Leathr		
411000 Leather Waste; Leather Dust, Powder And Flour		
4111 Composition Lea, Lea Fiber In Slabs, Sheets, Strip		
4112 Sheep/lamb Ltr,ft Prp Tan/crus, W/o Wool,nt Hd4114		
4113 Lthr Fthr Perp After Tanning,of Oth Aml, W/o Wl/hr		
4114 Chamois/patent/patent Laminated/metallized Leather		
4115 Comps. Lthr,fbr Slb/sht/srp;lthr Wst/dust/pwd/flou		
42 Leather Art; Saddlery Etc; Handbags Etc; Gut Art		
4410 Particle Board & Similar Board Of Wood Etc.	Sealants and adhesives	Adhesives
	Wood industry	Coating for wood substrate
		Wood particleboard
4411 Fiberboard Of Wood Or Other Ligneous Materials	Sealants and adhesives	Adhesives
	Wood industry	Coating for wood substrate
		Wood particleboard
4412 Plywood, Veneered Panels & Similar Laminated Wood	Wood industry	Coating for wood substrate
		Wood particleboard
4414 Wooden Frames Paintings, Photographs, Mirrors, Etc	Wood industry	Coating for wood substrate
		Wood particleboard
4415 Packings Etc, Wood; Pallets, Collars Etc, Of Wood	Wood industry	Coating for wood substrate
		Wood particleboard
4416 Casks, Barrels, Vats, Etc. And Parts, Of Wood	Sealants and adhesives	Adhesives
	Wood industry	Coating for wood substrate
		Wood particleboard
4417 Tools/tool & Broom Bodies Etc Shoe Last/trees Wood	Sealants and adhesives	Adhesives
	Wood industry	Coating for wood substrate
		Wood particleboard
4418 Builders' Joinery And Carpentry Of Wood	Sealants and adhesives	Adhesives
	Wood industry	Coating for wood substrate
		Wood particleboard
4419 Tableware And Kitchenware, Of Wood	Sealants and adhesives	Adhesives
	Wood industry	Coating for wood substrate
		Wood particleboard
4420 Wood Marquetry Etc; Jewel Case Etc & Wd Furn Nesoi	Sealants and adhesives	Adhesives
	Wood industry	Coating for wood substrate
		Wood particleboard
4421 Articles Of Wood, Nesoi	Sealants and adhesives	Adhesives
	Wood industry	Coating for wood substrate

B: Crosswalk of Harmonised Tariff System Codes and PFAS Uses in Articles

HTS Code	Industry	Use
		Wood particleboard
4805 Paper & Paperboard, Uncoat, Nesoi, Rolls Or Sheets	Paper and packaging	Paper and cardboard
4807 Composite Paper & Paperboard, No Surf Coat, Rl Etc	Paper and packaging	Paper and cardboard
	Pharmaceutical industry	Packaging
4808 Paper And Paperboard, Corrugated Etc, Rolls Etc	Paper and packaging	Paper and cardboard
	Pharmaceutical industry	Packaging
4810 Paper & Paperboard, Coated With Kaolin Etc, Rl Etc	Paper and packaging	Paper and cardboard
	Pharmaceutical industry	Packaging
4811 Paper, Paperboard, Wad Etc, Coat Etc Nesoi, Rl Etc	Paper and packaging	Paper and cardboard
	Pharmaceutical industry	Packaging
4814 Wallpaper Etc.; Window Transparencies Of Paper	Paper and packaging	Paper and cardboard
4819 Cartons Etc Paper; Office Box Files Etc, Paper Etc	Pharmaceutical industry	Packaging
	Paper and packaging	Paper and cardboard
4823 Paper, Paperboard, Cellul Wad To Size & Arts Nesoi	Pharmaceutical industry	Packaging
	Paper and packaging	Paper and cardboard
51 Wool & Animal Hair, Including Yarn & Woven Fabric	Textile and upholstery	Weaving yarn
52 Cotton, Including Yarn And Woven Fabric Thereof		
53 Veg Text Fib Nesoi; Veg Fib & Paper Yns & Wov Fab		
54 Manmade Filaments, Including Yarns & Woven Fabrics		
57 Carpets And Other Textile Floor Coverings	Automotive	Interior
	Floor covering including carpets and floor polish	Soil release finishes for carpets
58 Spec Wov Fabrics; Tufted Fab; Lace; Tapestries Etc	Textile and upholstery	Surface treatment
59 Impregnated Etc Text Fabrics; Tex Art For Industry	Floor covering including carpets and floor polish	Resilient linoleum
	Textile and upholstery	Surface treatment
6201 Men's Or Boys' Overcoats, Cloaks Etc, Not Knit Etc	Apparel	Long-lasting durable water repellant finish
6202 Women's Or Girls' Overcoats Etc, Not Knit Or Croch		
6210 Garments, Of Felt Etc, Or Fabric Impregnated Etc		
6211 Track Suits, Ski-suits & Swimwear, Not Knit Etc		
6216 Gloves, Mittens And Mitts, Not Knit Or Crocheted		
63 Textile Art Nesoi; Needlecraft Sets; Worn Text Art	Textile and upholstery	Surface treatment
6401 Waterproof Footwear, Rubber Or Plastics, Bond Sole	Apparel	Long-lasting durable water repellant finish
6402 Footwear, Outer Sole & Upper Rubber Or Plast Nesoi		

B: Crosswalk of Harmonised Tariff System Codes and PFAS Uses in Articles

HTS Code	Industry	Use
6403 Footwear, Outer Sole Rub, Plast Or Lea & Upper Lea		
6406 Parts Of Footwear; Insoles Etc; Gaitors Etc, Parts		
6601 Umbrellas & Sun Umbrellas & Other Umbrellas	Textile and upholstery	Surface treatment
68 Art Of Stone, Plaster, Cement, Asbestos, Mica Etc.	Automotive	Brake pad additives
	Coatings, paints and varnishes	Coatings
		Paints
	Stone, concrete and tile	Stone, concrete and tile
	Building and construction	Architectural membranges (e.g. in roofs)
69 Ceramic Products	Building and construction	Architectural membranges (e.g. in roofs)
	Coatings, paints and varnishes	Coatings
		Paints
		Paints and coatings
70 Glass And Glassware	Coatings, paints and varnishes	Coatings
		Paints
	Glass	Surface treatment
	Laboratory supplies, equipment and instrumentation	Consumable materials (vials, caps, tape)
	Pharmaceutical industry	Reaction vessels, stirrers, and other components
73 Articles Of Iron Or Steel	Aerospace	Thermal control and radiator surfaces
	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Oil and gas industry	Drilling - insulating material for cable and wire
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable
74 Copper And Articles Thereof	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable
75 Nickel And Articles Thereof	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable

HTS Code	Industry	Use
	Oil and gas industry	Drilling - insulating material for cable and wire
76 Aluminum And Articles Thereof	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable
	Oil and gas industry	Drilling - insulating material for cable and wire
78 Lead And Articles Thereof	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable
	Oil and gas industry	Drilling - insulating material for cable and wire
79 Zinc And Articles Thereof	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable
	Oil and gas industry	Drilling - insulating material for cable and wire
80 Tin And Articles Thereof	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable
	Oil and gas industry	Drilling - insulating material for cable and wire
81 Base Metals Nesoi; Cermets; Articles Thereof	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable

B: Crosswalk of Harmonised Tariff System Codes and PFAS Uses in Articles

HTS Code	Industry	Use
	Oil and gas industry	Drilling - insulating material for cable and wire
82 Tools, Cutlery Etc. Of Base Metal & Parts Thereof	Building and construction	Cable and wire insulation, gaskets & hoses
	Electronic devices	Razors
	Manufacture of metal products	Treatment of coating of metal surfaces
	Oil and gas industry	Drilling - insulating material for cable and wire
	Pipes, pumps, fittings and liners	Pipes, pipe plugs, seal glands, pump parts, fasteners, fittings and liners
	Wire and cable	Wire and cable
83 Miscellaneous Articles Of Base Metal	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
	Oil and gas industry	Drilling - insulating material for cable and wire
	Wire and cable	Wire and cable
84 Nuclear Reactors, Boilers, Machinery Etc.; Parts	Automotive	Cylinder head coatings and horses
		Electronics
		Engine and steering system
	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Energy	Wind mill blades
	Machinery and equipment	Machinery and equipment
	Oil and gas industry	Drilling - insulating material for cable and wire
	Printing (inks)	Ink-jet recording heads
		Lithographic printing plates
	Semiconductor industry	Antireflective coating
		Multilayer circuit board
		Photoresist
		Technical equipment in contact with process chemical or reactive plasma
		Wafer thinning
	Wire and cable	Wire and cable
85 Electric Machinery Etc; Sound Equip; Tv Equip; Pts	Aerospace	Wire and cable
	Building and construction	Cable and wire insulation, gaskets & hoses
	Coatings, paints and varnishes	Coatings
		Paints
	Electronic devices	Acoustical equipment
		Capacitors
		Electroluminescent lamps
		Light management films in flat panel display
		Liquid crystal displays (LCDs)

B: Crosswalk of Harmonised Tariff System Codes and PFAS Uses in Articles

HTS Code	Industry	Use
		Printed circuit boards
	Energy	Alkaline manganese batteries
		Ion exchange membrane in vanadium redox batteries
		Lithium batteries
		Photovoltaic cells
		Polymer electrolyte fuel cells
		Solar collectors and photovoltaic cells
		Zinc batteries
	Flame retardants	Polycarbonate resin
	Laboratory supplies, equipment and instrumentation	Liquid chromatography columns
		Liquid chromatography instruments
	Oil and gas industry	Drilling - insulating material for cable and wire
	Semiconductor industry	Antireflective coating
		Multilayer circuit board
		Photoresist
		Technical equipment in contact with process chemical or reactive plasma
		Wafer thinning
	Wire and cable	Wire and cable
86 Railway Or Tramway Stock Etc; Traffic Signal Equip	Coatings, paints and varnishes	Coatings
		Paints
	Manufacture of metal products	Treatment of coating of metal surfaces
87 Vehicles, Except Railway Or Tramway, And Parts Etc	Aerospace	Wire and cable
		Automotive waxes
		Brake pad additives
		Car body
		Cylinder head coatings and horses
		Electronics
		Engine and steering system
		Fuel lines, steel hydraulic brake tubes
		Interior
	Coatings, paints and varnishes	Coatings
		Paints
88 Aircraft, Spacecraft, And Parts Thereof	Aerospace	Wire and cable
	Coatings, paints and varnishes	Coatings
		Paints
89 Ships, Boats And Floating Structures	Coatings, paints and varnishes	Coatings
		Paints
	Sport article	Sailing boat equipment
9101 Watches, Wrist, Pocket Etc, Prec Metal Or Cld Case	Watchmaking industry	Lubricants

B: Crosswalk of Harmonised Tariff System Codes and PFAS Uses in Articles

HTS Code	Industry	Use
9102 Watches, Wrist, Pocket Etc, Case Not Prec Nor Clad		
9104 Inst Panel Clk & Clk Simlr,for Vehicle,aircrft,etc	Automotive	Automotive
9108 Watch Movements, Complete & Assembled	Watchmaking industry	Lubricants
9110 Comp Watch Or Clock Mvt; Incom Watch Or Clock Mvt		
9201 Pianos, Harpsichords & Other Keyboard String Instr	Music instruments	Piano
9202902000 Guitars Not Over $100, Excld The Value Of The Case (no)	Music instruments	Guitar strings
9202904000 Guitars, Nesoi (no)		
930610 Cartridges For Riveting Or Similar Tools & Parts	Ammunition	Ammunition
930629 Air Gun Pellets And Parts Of Shotgun Cartridges	Ammunition	Ammunition
930690 Bomb Mines Ot Ammntion Projctions Etc And Parts	Ammunition	Ammunition
9401 Seats (except Barber, Dental, Etc), And Parts	Automotive	Interior
9403 Furniture Nesoi And Parts Thereof	Textile and upholstery	Surface treatment
9404 Mattress Supports; Articles Of Bedding Etc.		
9406 Prefabricated Buildings	Building and construction	Greenhouse
		Architectural membranes (e.g. in roofs)
95 Toys, Games & Sport Equipment; Parts & Accessories	Sport article	Bicycle
		Climbing ropes
		Fishing lines
		Golf gloves
		Ski wax
		Tennis rackets

Note: This table presents a crosswalk of HTS codes and identified PFAS uses from Glüge et al. 2020. However, not all industries and uses listed are within the scope of the rule (e.g., pharmaceutical uses).

C. Industry Sectors Potentially Affected by EPA's Action

Table Error! No text of specified style in document.**-5: Industry Sectors Potentially Affected by EPA's Action**

Name of Industry/Sector	NAICS Code	SBA Size Standard for Small Business
Natural Gas Distribution	221210	1150 employees
New Single-family Housing Construction (Except For-Sale Builders)	236115	$45.0 million
New Multifamily Housing Construction (except For-Sale Builders)	236116	$45.0 million
New Housing For-Sale Builders	236117	$45.0 million
Residential Remodelers	236118	$45.0 million
Industrial Building Construction	236210	$45.0 million
Commercial and Institutional Building Construction	236220	$45.0 million
Water and Sewer Line and Related Structures Construction	237110	$45.0 million
Oil and Gas Pipeline and Related Structures Construction	237120	$45.0 million
Power and Communication Line and Related Structures Construction	237130	$45.0 million
Land Subdivision	237210	$34.0 million
Highway, Street, and Bridge Construction	237310	$45.0 million
Other Heavy and Civil Engineering Construction	237990	$45.0 million
Poured Concrete Foundation and Structure Contractors	238110	$19.0 million
Structural Steel and Precast Concrete Contractors	238120	$19.0 million
Framing Contractors	238130	$19.0 million
Masonry Contractors	238140	$19.0 million
Glass and Glazing Contractors	238150	$19.0 million
Roofing Contractors	238160	$19.0 million
Siding Contractors	238170	$19.0 million
Other Foundation, Structure, and Building Exterior Contractors	238190	$19.0 million
Electrical Contractors and Other Wiring Installation Contractors	238210	$19.0 million
Plumbing, Heating, and Air Conditioning Contractors	238220	$19.0 million
Other Building Equipment Contractors	238290	$22.0 million
Drywall and Insulation Contractors	238310	$19.0 million
Painting and Wall Covering Contractors	238320	$19.0 million
Flooring Contractors	238330	$19.0 million
Tile and Terrazzo Contractors	238340	$19.0 million
Finish Carpentry Contractors	238350	$19.0 million
Other Building Finishing Contractors	238390	$19.0 million
Site Preparation Contractors	238910	$19.0 million
All Other Specialty Trade Contractors	238990	$19.0 million

Fiber, Yarn, and Thread Mills	313110	1250 employees
Broadwoven Fabric Mills	313210	1000 employees
Narrow Fabric Mills and Schiffli Machine Embroidery	313220	550 employees
Nonwoven Fabric Mills	313230	850 employees
Knit Fabric Mills	313240	500 employees
Textile and Fabric Finishing Mills	313310	1000 employees
Fabric Coating Mills	313320	1000 employees
Carpet and Rug Mills	314110	1500 employees
Curtain and Linen Mills	314120	750 employees
Textile Bag and Canvas Mills	314910	500 employees
Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills	314994	1000 employees
All Other Miscellaneous Textile Product Mills	314999	550 employees
Hosiery and Sock Mills	315110	N/A*
Other Apparel Knitting Mills	315190	N/A*
Cut and Sew Apparel Contractors	315210	750 employees
Men's and Boys' Cut and Sew Apparel Manufacturing	315220	N/A*
Women's, Girls', and Infants' Cut and Sew Apparel Manufacturing	315240	N/A*
Other Cut and Sew Apparel Manufacturing	315280	N/A*
Apparel Accessories and Other Apparel Manufacturing	315990	600 employees
Leather and Hide Tanning and Finishing	316110	800 employees
Footwear Manufacturing	316210	1000 employees
Women's Handbag and Purse Manufacturing	316992	N/A*
All Other Leather Good and Allied Product Manufacturing	316998	N/A*
Sawmills	321113	550 employees
Wood Preservation	321114	550 employees
Hardwood Veneer and Plywood Manufacturing	321211	600 employees
Softwood Veneer and Plywood Manufacturing	321212	1250 employees
Engineered Wood Member (except Truss) Manufacturing	321213	N/A*
Truss Manufacturing	321214	N/A*
Reconstituted Wood Product Manufacturing	321219	750 employees
Wood Window and Door Manufacturing	321911	1000 employees
Cut Stock, Resawing Lumber, and Planing	321912	500 employees
Other Millwork (including Flooring)	321918	500 employees
Wood Container and Pallet Manufacturing	321920	500 employees
Manufactured Home (Mobile Home) Manufacturing	321991	1250 employees
Prefabricated Wood Building Manufacturing	321992	500 employees
All Other Miscellaneous Wood Product Manufacturing	321999	500 employees
Pulp Mills	322110	1050 employees
Paper (except Newsprint) Mills	322121	N/A*
Newsprint Mills	322122	N/A*
Paperboard Mills	322130	1250 employees

Corrugated and Solid Fiber Box Manufacturing	322211	1250 employees
Folding Paperboard Box Manufacturing	322212	750 employees
Other Paperboard Container Manufacturing	322219	1000 employees
Paper Bag and Coated and Treated Paper Manufacturing	322220	750 employees
Stationery Product Manufacturing	322230	750 employees
Sanitary Paper Product Manufacturing	322291	1500 employees
All Other Converted Paper Product Manufacturing	322299	500 employees
Commercial Printing (except Screen and Books)	323111	650 employees
Commercial Screen Printing	323113	500 employees
Books Printing	323117	1250 employees
Support Activities for Printing	323120	550 employees
Petroleum Refineries	324110	1500 employees
Asphalt Paving Mixture and Block Manufacturing	324121	500 employees
Asphalt Shingle and Coating Materials Manufacturing	324122	1100 employees
Petroleum Lubricating Oil and Grease Manufacturing	324191	900 employees
All Other Petroleum and Coal Products Manufacturing	324199	950 employees
Petrochemical Manufacturing	325110	1300 employees
Industrial Gas Manufacturing	325120	1200 employees
Synthetic Dye and Pigment Manufacturing	325130	1050 employees
Other Basic Inorganic Chemical Manufacturing	325180	1000 employees
Ethyl Alcohol Manufacturing	325193	1000 employees
Cyclic Crude, Intermediate, and Gum and Wood Chemical Manufacturing	325194	1250 employees
All Other Basic Organic Chemical Manufacturing	325199	1250 employees
Plastics Material and Resin Manufacturing	325211	1250 employees
Synthetic Rubber Manufacturing	325212	1000 employees
Artificial and Synthetic Fibers and Filaments Manufacturing	325220	1050 employees
Pesticide and Other Agricultural Chemical Manufacturing	325320	1150 employees
Pharmaceutical Preparation Manufacturing	325412	1300 employees
Paint and Coating Manufacturing	325510	1000 employees
Adhesive Manufacturing	325520	550 employees
Soap and Other Detergent Manufacturing	325611	1100 employees
Polish and Other Sanitation Good Manufacturing	325612	900 employees
Surface Active Agent Manufacturing	325613	1100 employees
Printing Ink Manufacturing	325910	750 employees
Explosives Manufacturing	325920	750 employees
Custom Compounding of Purchased Resins	325991	600 employees
Photographic Film, Paper, Plate and Chemical Manufacturing	325992	1500 employees
All Other Miscellaneous Chemical Product and Preparation Manufacturing	325998	650 employees
Plastic Bag and Pouch Manufacturing	326111	750 employees

Plastics Packaging Film and Sheet (including Laminated) Manufacturing	326112	1000 employees
Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing	326113	750 employees
Unlaminated Plastics Profile Shape Manufacturing	326121	600 employees
Plastics Pipe and Pipe Fitting Manufacturing	326122	750 employees
Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing	326130	650 employees
Polystyrene Foam Product Manufacturing	326140	1000 employees
Urethane and Other Foam Product (except Polystyrene) Manufacturing	326150	750 employees
Plastics Bottle Manufacturing	326160	1250 employees
Plastics Plumbing Fixture Manufacturing	326191	750 employees
All Other Plastics Product Manufacturing	326199	750 employees
Tire Manufacturing (except Retreading)5	326211	1500 employees
Tire Retreading	326212	500 employees
Rubber and Plastics Hoses and Belting Manufacturing	326220	800 employees
Rubber Product Manufacturing for Mechanical Use	326291	750 employees
All Other Rubber Product Manufacturing	326299	650 employees
Pottery, Ceramics, and Plumbing Fixture Manufacturing	327110	1000 employees
Clay Building Material and Refractories Manufacturing	327120	750 employees
Flat Glass Manufacturing	327211	1100 employees
Other Pressed and Blown Glass and Glassware Manufacturing	327212	1250 employees
Glass Container Manufacturing	327213	1250 employees
Glass Product Manufacturing Made of Purchased Glass	327215	1000 employees
Cement Manufacturing	327310	1000 employees
Ready-Mix Concrete Manufacturing	327320	500 employees
Concrete Block and Brick Manufacturing	327331	500 employees
Concrete Pipe Manufacturing	327332	750 employees
Other Concrete Product Manufacturing	327390	500 employees
Lime Manufacturing	327410	1050 employees
Gypsum Product Manufacturing	327420	1500 employees
Abrasive Product Manufacturing	327910	900 employees
Cut Stone and Stone Product Manufacturing	327991	500 employees
Ground or Treated Mineral and Earth Manufacturing	327992	600 employees
Mineral Wool Manufacturing	327993	1500 employees
All Other Miscellaneous Nonmetallic Mineral Product Manufacturing	327999	750 employees
Iron and Steel Mills and Ferroalloy Manufacturing	331110	1500 employees
Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	331210	1000 employees
Rolled Steel Shape Manufacturing	331221	1000 employees

Steel Wire Drawing	331222	1000 employees
Alumina Refining and Primary Aluminum Production	331313	1300 employees
Secondary Smelting and Alloying of Aluminum	331314	750 employees
Aluminum Sheet, Plate and Foil Manufacturing	331315	1400 employees
Other Aluminum Rolling, Drawing, and Extruding	331318	750 employees
Nonferrous Metal (except Aluminum) Smelting and Refining	331410	1000 employees
Copper Rolling, Drawing, Extruding, and Alloying	331420	1050 employees
Nonferrous Metal (except Copper and Aluminum) Rolling, Drawing and Extruding	331491	900 employees
Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	331492	850 employees
Iron Foundries	331511	1000 employees
Steel Investment Foundries	331512	1050 employees
Steel Foundries (except Investment)	331513	700 employees
Nonferrous Metal Die-Casting Foundries	331523	700 employees
Aluminum Foundries (except Die-Casting)	331524	550 employees
Other Nonferrous Metal Foundries (except Die-Casting)	331529	500 employees
Iron and Steel Forging	332111	750 employees
Nonferrous Forging	332112	950 employees
Custom Roll Forming	332114	600 employees
Powder Metallurgy Part Manufacturing	332117	550 employees
Metal Crown, Closure, and Other Metal Stamping (except Automotive)	332119	500 employees
Metal Kitchen Cookware, Utensil, Cutlery, and Flatware (except Precious) Manufacturing	332215	1000 employees
Saw Blade and Handtool Manufacturing	332216	750 employees
Prefabricated Metal Building and Component Manufacturing	332311	750 employees
Fabricated Structural Metal Manufacturing	332312	500 employees
Plate Work Manufacturing	332313	750 employees
Metal Window and Door Manufacturing	332321	750 employees
Sheet Metal Work Manufacturing	332322	500 employees
Ornamental and Architectural Metal Work Manufacturing	332323	500 employees
Power Boiler and Heat Exchanger Manufacturing	332410	750 employees
Metal Tank (Heavy Gauge) Manufacturing	332420	750 employees
Metal Can Manufacturing	332431	1500 employees
Other Metal Container Manufacturing	332439	600 employees
Hardware Manufacturing	332510	750 employees
Spring Manufacturing	332613	600 employees
Other Fabricated Wire Product Manufacturing	332618	500 employees
Machine Shops	332710	500 employees
Precision Turned Product Manufacturing	332721	500 employees

Bolt, Nut, Screw, Rivet and Washer Manufacturing	332722	600 employees
Metal Heat Treating	332811	750 employees
Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	332812	600 employees
Electroplating, Plating, Polishing, Anodizing and Coloring	332813	500 employees
Industrial Valve Manufacturing	332911	750 employees
Fluid Power Valve and Hose Fitting Manufacturing	332912	1000 employees
Plumbing Fixture Fitting and Trim Manufacturing	332913	1000 employees
Other Metal Valve and Pipe Fitting Manufacturing	332919	750 employees
Ball and Roller Bearing Manufacturing	332991	1250 employees
Fabricated Pipe and Pipe Fitting Manufacturing	332996	550 employees
All Other Miscellaneous Fabricated Metal Product Manufacturing	332999	750 employees
Farm Machinery and Equipment Manufacturing	333111	1250 employees
Lawn and Garden Tractor and Home Lawn and Garden Equipment Manufacturing	333112	1500 employees
Construction Machinery Manufacturing	333120	1250 employees
Mining Machinery and Equipment Manufacturing	333131	900 employees
Oil and Gas Field Machinery and Equipment Manufacturing	333132	1250 employees
Food Product Machinery Manufacturing	333241	500 employees
Semiconductor Machinery Manufacturing	333242	1500 employees
Sawmill, Woodworking, and Paper Machinery Manufacturing	333243	550 employees
Printing Machinery and Equipment Manufacturing	333244	N/A*
Other Industrial Machinery Manufacturing	333249	N/A*
Optical Instrument and Lens Manufacturing	333314	N/A*
Photographic and Photocopying Equipment Manufacturing	333316	N/A*
Other Commercial and Service Industry Machinery Manufacturing	333318	N/A*
Industrial and Commercial Fan and Blower and Air Purification Equipment Manufacturing	333413	500 employees
Heating Equipment (except Warm Air Furnaces) Manufacturing	333414	500 employees
Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	333415	1250 employees
Industrial Mold Manufacturing	333511	500 employees
Special Die and Tool, Die Set, Jig and Fixture Manufacturing	333514	500 employees
Cutting Tool and Machine Tool Accessory Manufacturing	333515	500 employees
Machine Tool Manufacturing	333517	500 employees

Rolling Mill and Other Metalworking Machinery Manufacturing	333519	500 employees
Turbine and Turbine Generator Set Unit Manufacturing	333611	1500 employees
Speed Changer, Industrial High-Speed Drive and Gear Manufacturing	333612	750 employees
Mechanical Power Transmission Equipment Manufacturing	333613	750 employees
Other Engine Equipment Manufacturing	333618	1500 employees
Air and Gas Compressor Manufacturing	333912	1000 employees
Measuring, Dispensing, and Other Pumping Equipment Manufacturing	333914	750 employees
Elevator and Moving Stairway Manufacturing	333921	1000 employees
Conveyor and Conveying Equipment Manufacturing	333922	500 employees
Overhead Traveling Crane, Hoist and Monorail System Manufacturing	333923	1250 employees
Industrial Truck, Tractor, Trailer and Stacker Machinery Manufacturing	333924	900 employees
Power-Driven Hand Tool Manufacturing	333991	950 employees
Welding and Soldering Equipment Manufacturing	333992	1250 employees
Packaging Machinery Manufacturing	333993	600 employees
Industrial Process Furnace and Oven Manufacturing	333994	500 employees
Fluid Power Cylinder and Actuator Manufacturing	333995	800 employees
Fluid Power Pump and Motor Manufacturing	333996	1250 employees
Scale and Balance Manufacturing	333997	N/A*
All Other Miscellaneous General Purpose Machinery Manufacturing	333999	N/A*
Electronic Computer Manufacturing	334111	1250 employees
Computer Storage Device Manufacturing	334112	1250 employees
Computer Terminal and Other Computer Peripheral Equipment Manufacturing	334118	1000 employees
Telephone Apparatus Manufacturing	334210	1250 employees
Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	334220	1250 employees
Other Communications Equipment Manufacturing	334290	800 employees
Audio and Video Equipment Manufacturing	334310	750 employees
Bare Printed Circuit Board Manufacturing	334412	750 employees
Semiconductor and Related Device Manufacturing	334413	1250 employees
Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing	334416	550 employees
Electronic Connector Manufacturing	334417	1000 employees
Printed Circuit Assembly (Electronic Assembly) Manufacturing	334418	750 employees
Other Electronic Component Manufacturing	334419	750 employees
Electromedical and Electrotherapeutic Apparatus Manufacturing	334510	1250 employees

Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	334511	1350 employees
Automatic Environmental Control Manufacturing for Residential, Commercial and Appliance Use	334512	650 employees
Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	334513	750 employees
Totalizing Fluid Meter and Counting Device Manufacturing	334514	850 employees
Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	334515	750 employees
Analytical Laboratory Instrument Manufacturing	334516	1000 employees
Irradiation Apparatus Manufacturing	334517	1200 employees
Other Measuring and Controlling Device Manufacturing	334519	600 employees
Blank Magnetic and Optical Recording Media Manufacturing	334613	N/A*
Software and Other Prerecorded Compact Disc, Tape, and Record Reproducing	334614	N/A*
Electric Lamp Bulb and Part Manufacturing	335110	N/A*
Residential Electric Lighting Fixture Manufacturing	335121	N/A*
Commercial, Industrial and Institutional Electric Lighting Fixture Manufacturing	335122	N/A*
Other Lighting Equipment Manufacturing	335129	N/A*
Small Electrical Appliance Manufacturing	335210	1500 employees
Major Household Appliance Manufacturing	335220	1500 employees
Power, Distribution and Specialty Transformer Manufacturing	335311	800 employees
Motor and Generator Manufacturing	335312	1250 employees
Switchgear and Switchboard Apparatus Manufacturing	335313	1250 employees
Relay and Industrial Control Manufacturing	335314	750 employees
Storage Battery Manufacturing	335911	N/A*
Primary Battery Manufacturing	335912	N/A*
Fiber Optic Cable Manufacturing	335921	1000 employees
Other Communication and Energy Wire Manufacturing	335929	1000 employees
Current Carrying Wiring Device Manufacturing	335931	600 employees
Noncurrent Carrying Wiring Device Manufacturing	335932	1000 employees
Carbon and Graphite Product Manufacturing	335991	900 employees
All Other Miscellaneous Electrical Equipment and Component Manufacturing	335999	600 employees
Automobile Manufacturing	336111	N/A*
Light Truck and Utility Vehicle Manufacturing	336112	N/A*
Heavy Duty Truck Manufacturing	336120	1500 employees
Motor Vehicle Body Manufacturing	336211	1000 employees
Truck Trailer Manufacturing	336212	1000 employees
Motor Home Manufacturing	336213	1250 employees

Travel Trailer and Camper Manufacturing	336214	1000 employees
Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	336310	1050 employees
Motor Vehicle Electrical and Electronic Equipment Manufacturing	336320	1000 employees
Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	336330	1000 employees
Motor Vehicle Brake System Manufacturing	336340	1250 employees
Motor Vehicle Transmission and Power Train Parts Manufacturing	336350	1500 employees
Motor Vehicle Seating and Interior Trim Manufacturing	336360	1500 employees
Motor Vehicle Metal Stamping	336370	1000 employees
Other Motor Vehicle Parts Manufacturing	336390	1000 employees
Aircraft Manufacturing	336411	1500 employees
Aircraft Engine and Engine Parts Manufacturing	336412	1500 employees
Other Aircraft Part and Auxiliary Equipment Manufacturing	336413	1250 employees
Guided Missile and Space Vehicle Manufacturing	336414	1300 employees
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing	336415	1250 employees
Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing	336419	1050 employees
Railroad Rolling Stock Manufacturing	336510	1500 employees
Ship Building and Repairing	336611	1300 employees
Boat Building	336612	1000 employees
Motorcycle, Bicycle and Parts Manufacturing	336991	1050 employees
Military Armored Vehicle, Tank and Tank Component Manufacturing	336992	1500 employees
All Other Transportation Equipment Manufacturing	336999	1000 employees
Wood Kitchen Cabinet and Counter Top Manufacturing	337110	750 employees
Upholstered Household Furniture Manufacturing	337121	1000 employees
Non-upholstered Wood Household Furniture Manufacturing	337122	750 employees
Metal Household Furniture Manufacturing	337124	N/A*
Household Furniture (except Wood and Metal) Manufacturing	337125	N/A*
Institutional Furniture Manufacturing	337127	500 employees
Wood Office Furniture Manufacturing	337211	1000 employees
Custom Architectural Woodwork and Millwork Manufacturing	337212	500 employees
Office Furniture (Except Wood) Manufacturing	337214	1100 employees
Showcase, Partition, Shelving, and Locker Manufacturing	337215	500 employees
Mattress Manufacturing	337910	1000 employees
Blind and Shade Manufacturing	337920	1000 employees

Jewelry and Silverware Manufacturing	339910	700 employees
Sporting and Athletic Goods Manufacturing	339920	750 employees
Doll, Toy, and Game Manufacturing	339930	700 employees
Office Supplies (except Paper) Manufacturing	339940	750 employees
Sign Manufacturing	339950	500 employees
Gasket, Packing, and Sealing Device Manufacturing	339991	600 employees
Musical Instrument Manufacturing	339992	1000 employees
Fastener, Button, Needle and Pin Manufacturing	339993	750 employees
Broom, Brush and Mop Manufacturing	339994	750 employees
Burial Casket Manufacturing	339995	1000 employees
All Other Miscellaneous Manufacturing	339999	550 employees
Automobile and Other Motor Vehicle Merchant Wholesalers	423110	250 employees
Motor Vehicle Supplies and New Parts Merchant Wholesalers	423120	200 employees
Tire and Tube Merchant Wholesalers	423130	200 employees
Motor Vehicle Parts (Used) Merchant Wholesalers	423140	125 employees
Furniture Merchant Wholesalers	423210	100 employees
Home Furnishing Merchant Wholesalers	423220	100 employees
Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers	423310	150 employees
Brick, Stone, and Related Construction Material Merchant Wholesalers	423320	150 employees
Roofing, Siding, and Insulation Material Merchant Wholesalers	423330	225 employees
Other Construction Material Merchant Wholesalers	423390	100 employees
Photographic Equipment and Supplies Merchant Wholesalers	423410	200 employees
Office Equipment Merchant Wholesalers	423420	200 employees
Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	423430	250 employees
Other Commercial Equipment Merchant Wholesalers	423440	100 employees
Ophthalmic Goods Merchant Wholesalers	423460	175 employees
Other Professional Equipment and Supplies Merchant Wholesalers	423490	150 employees
Metal Service Centers and Other Metal Merchant Wholesalers	423510	200 employees
Coal and Other Mineral and Ore Merchant Wholesalers	423520	200 employees
Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers	423610	200 employees
Household Appliances, Electric Housewares, and Consumer Electronics Merchant Wholesalers	423620	225 employees
Other Electronic Parts and Equipment Merchant Wholesalers	423690	250 employees

Hardware Merchant Wholesalers	423710	150 employees
Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers	423720	200 employees
Warm Air Heating and Air Conditioning Equipment and Supplies Merchant Wholesalers	423730	175 employees
Refrigeration Equipment and Supplies Merchant Wholesalers	423740	125 employees
Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers	423810	250 employees
Farm and Garden Machinery and Equipment Merchant Wholesalers	423820	125 employees
Industrial Machinery and Equipment Merchant Wholesalers	423830	100 employees
Industrial Supplies Merchant Wholesalers	423840	125 employees
Service Establishment Equipment and Supplies Merchant Wholesalers	423850	125 employees
Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers	423860	175 employees
Sporting and Recreational Goods and Supplies Merchant Wholesalers	423910	100 employees
Toy and Hobby Goods and Supplies Merchant Wholesalers	423920	175 employees
Recyclable Material Merchant Wholesalers	423930	125 employees
Jewelry, Watch, Precious Stone, and Precious Metal Merchant Wholesalers	423940	125 employees
Other Miscellaneous Durable Goods Merchant Wholesalers	423990	100 employees
Printing and Writing Paper Merchant Wholesalers	424110	225 employees
Stationery and Office Supplies Merchant Wholesalers	424120	150 employees
Industrial and Personal Service Paper Merchant Wholesalers	424130	150 employees
Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers	424310	100 employees
Men's and Boys' Clothing and Furnishings Merchant Wholesalers	424320	N/A*
Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers	424330	N/A*
Footwear Merchant Wholesalers	424340	200 employees
General Line Grocery Merchant Wholesalers	424410	250 employees
Plastics Materials and Basic Forms and Shapes Merchant Wholesalers	424610	150 employees
Other Chemical and Allied Products Merchant Wholesalers	424690	175 employees
Petroleum Bulk Stations and Terminals	424710	225 employees

Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)	424720	200 employees
Farm Supplies Merchant Wholesalers	424910	200 employees
Book, Periodical, and Newspaper Merchant Wholesalers	424920	200 employees
Flower, Nursery Stock, and Florists' Supplies Merchant Wholesalers	424930	100 employees
Paint, Varnish, and Supplies Merchant Wholesalers	424950	150 employees
Other Miscellaneous Nondurable Goods Merchant Wholesalers	424990	100 employees
Business to Business Electronic Markets	425110	N/A*
Wholesale Trade Agents and Brokers	425120	125 employees
New Car Dealers	441110	200 employees
Used Car Dealers	441120	$30.5 million
Recreational Vehicle Dealers	441210	$40.0 million
Boat Dealers	441222	$40.0 million
Motorcycle, ATV, and All Other Motor Vehicle Dealers	441228	N/A*
Automotive Parts and Accessories Stores	441310	N/A*
Tire Dealers	441320	N/A*
Furniture Stores	442110	N/A*
Floor Covering Stores	442210	N/A*
Window Treatment Stores	442291	N/A*
All Other Home Furnishings Stores	442299	N/A*
Household Appliance Stores	443141	N/A*
Electronics Stores	443142	N/A*
Home Centers	444110	$47.0 million
Paint and Wallpaper Stores	444120	$34.0 million
Hardware Stores	444130	N/A*
Other Building Material Dealers	444190	N/A*
Outdoor Power Equipment Stores	444210	N/A*
Nursery and Garden Centers	444220	N/A*
Gasoline Stations with Convenience Stores	447110	N/A*
Other Gasoline Stations	447190	N/A*
Men's Clothing Stores	448110	N/A*
Women's Clothing Stores	448120	N/A*
Children's and Infants' Clothing Stores	448130	N/A*
Family Clothing Stores	448140	N/A*
Clothing Accessories Stores	448150	N/A*
Other Clothing Stores	448190	N/A*
Shoe Stores	448210	N/A*
Jewelry Stores	448310	N/A*
Luggage and Leather Goods Stores	448320	N/A*
Sporting Goods Stores	451110	N/A*
Hobby, Toy and Game Stores	451120	N/A*
Sewing, Needlework and Piece Goods Stores	451130	N/A*

Musical Instrument and Supplies Stores	451140	N/A*
Book Stores	451211	N/A*
News Dealers and Newsstands	451212	N/A*
Department Stores	452210	N/A*
Warehouse Clubs and Supercenters	452311	N/A*
All Other General Merchandise Stores	452319	N/A*
Florists	453110	N/A*
Office Supplies and Stationery Stores	453210	N/A*
Gift, Novelty and Souvenir Stores	453220	N/A*
Used Merchandise Stores	453310	N/A*
Pet and Pet Supplies Stores	453910	N/A*
Art Dealers	453920	N/A*
Manufactured (Mobile) Home Dealers	453930	N/A*
All Other Miscellaneous Store Retailers (except Tobacco Stores)	453998	N/A*
Electronic Shopping and Mail-Order Houses	454110	N/A*
Vending Machine Operators	454210	N/A*
Fuel Dealers	454310	N/A*
Other Direct Selling Establishments	454390	N/A*
Offices of Other Holding Companies	551112	$45.5 million
All Other Business Support Services	561499	$21.5 million
Materials Recovery Facilities	562920	$25.0 million
Drycleaning and Laundry Services (except Coin-Operated)	812320	$8 million
*Small business size standards are not established for these Sectors Source: U.S. Small Business Administration Table of Small Business Size Standards		

Appendix D: Estimated Small Business Revenue Distributions

D. Estimated Small Business Revenue Distributions, by NAICS

NAICS	1st Percentile	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	99th Percentile
Manufacturer							
221210	$93,404	$134,637	$779,755	$3,857,182	$28,846,680	$800,475,069	$1,104,690,323
236220	$89,856	$103,433	$405,932	$1,322,911	$5,028,528	$21,012,373	$34,612,428
324191	$99,973	$213,868	$1,881,344	$7,215,134	$21,892,128	$644,578,958	$1,073,511,101
325130	$93,613	$151,053	$1,457,297	$4,796,035	$17,119,727	$625,794,393	$1,069,754,188
325180	$109,210	$623,297	$2,864,107	$11,191,536	$64,145,992	$886,542,056	$1,121,903,721
325199	$112,582	$438,921	$2,480,540	$10,535,829	$41,571,984	$810,963,794	$1,106,788,068
325211	$103,134	$338,684	$2,927,143	$7,454,333	$24,624,528	$689,739,512	$1,082,543,212
325212	$149,113	$273,266	$1,130,464	$5,903,721	$22,433,194	$722,978,718	$1,089,191,053
325998	$91,191	$110,107	$575,965	$2,315,633	$8,150,261	$199,278,421	$984,450,994
327910	$91,678	$112,546	$1,002,806	$2,586,281	$8,077,906	$51,165,186	$87,078,758
333415	$91,990	$114,104	$1,159,477	$4,013,070	$13,053,533	$98,319,265	$891,166,637
334118	$89,361	$100,960	$446,735	$1,556,438	$5,331,890	$43,908,406	$644,095,927
334511	$90,428	$106,295	$751,925	$2,951,860	$9,265,398	$79,207,446	$846,003,174
336111	$135,059	$202,999	$542,700	$2,038,057	$5,332,522	$27,697,473	$452,815,376
423120	$91,377	$111,037	$490,489	$1,528,371	$5,068,585	$30,907,860	$76,921,602
423690	$90,226	$105,284	$463,905	$1,618,171	$5,408,196	$38,680,686	$111,672,400
424690	$90,996	$109,137	$510,363	$1,856,219	$6,499,691	$48,410,392	$115,346,385
424720	$94,786	$162,461	$1,118,006	$6,759,418	$39,357,351	$680,108,623	$1,080,617,034
424950	$91,079	$109,551	$586,530	$1,934,281	$5,387,656	$21,901,965	$71,955,420
447190	$93,582	$137,546	$722,974	$2,125,838	$4,778,379	$13,753,761	$23,476,212
515210	$88,265	$95,480	$219,575	$531,738	$1,415,531	$9,357,197	$17,403,049
531190	$88,192	$95,112	$198,972	$471,888	$1,022,710	$3,526,792	$10,144,044
541330	$88,228	$95,293	$216,963	$535,071	$1,854,891	$8,420,363	$17,576,036
551112	$88,077	$94,541	$240,233	$1,023,849	$6,336,148	$28,246,800	$38,198,759
561499	$87,689	$92,601	$120,535	$407,109	$979,703	$5,556,538	$13,743,929
812320	$88,134	$94,826	$169,417	$357,952	$546,487	$1,598,758	$3,208,088
Article Importer							
221210	$93,404	$134,637	$779,755	$3,857,182	$28,846,680	$800,475,069	$1,104,690,323
236115	$87,679	$92,548	$118,097	$399,592	$1,080,020	$5,870,380	$16,193,684
236116	$88,191	$95,111	$223,443	$579,014	$3,541,458	$20,553,929	$35,493,562
236117	$87,942	$93,864	$178,259	$516,736	$2,754,096	$14,632,818	$31,092,846
236118	$87,406	$91,182	$110,064	$317,402	$636,402	$3,561,718	$9,706,249
236210	$89,470	$101,503	$360,081	$1,004,815	$3,660,293	$16,941,354	$32,602,681
236220	$89,856	$103,433	$405,932	$1,322,911	$5,028,528	$21,012,373	$34,612,428
237110	$89,055	$99,430	$332,389	$932,577	$2,862,139	$14,093,574	$29,604,459
237120	$90,136	$104,833	$521,783	$2,227,748	$7,247,919	$24,574,045	$37,316,056
237130	$89,651	$102,410	$387,336	$1,155,996	$4,106,474	$17,195,570	$33,102,505
237210	$87,388	$91,096	$109,635	$377,365	$1,135,031	$6,016,354	$17,917,751
237310	$90,286	$105,582	$502,848	$2,119,990	$6,867,001	$24,939,943	$36,408,109

237990	$88,451	$96,409	$272,253	$805,633	$2,668,788	$13,276,863	$30,163,161
238110	$88,180	$95,055	$218,316	$561,915	$1,835,780	$7,192,606	$14,031,651
238120	$88,857	$98,438	$363,940	$1,092,071	$3,414,900	$11,114,463	$16,289,063
238130	$87,650	$92,404	$116,173	$381,707	$883,519	$5,119,074	$11,840,061
238140	$87,579	$92,049	$114,401	$388,022	$971,424	$5,270,679	$12,201,046
238150	$88,416	$96,235	$263,595	$721,713	$2,223,742	$8,247,562	$14,866,407
238160	$87,782	$93,062	$147,254	$521,929	$2,061,797	$7,796,692	$14,531,965
238170	$87,431	$91,308	$110,692	$329,105	$701,893	$3,947,596	$9,320,701
238190	$87,769	$93,000	$139,655	$451,487	$1,226,155	$5,775,697	$12,672,532
238210	$87,894	$93,626	$166,675	$489,610	$1,337,641	$5,933,332	$13,359,248
238220	$87,880	$93,555	$166,975	$511,508	$1,487,519	$5,820,018	$12,861,291
238290	$88,257	$95,438	$259,247	$828,839	$2,632,260	$9,176,184	$15,490,552
238310	$87,581	$92,059	$114,449	$467,570	$1,773,610	$7,610,477	$14,698,987
238320	$87,289	$90,599	$107,150	$276,272	$575,298	$2,921,786	$8,422,044
238330	$87,253	$90,419	$106,251	$271,018	$652,436	$4,692,353	$10,871,122
238340	$87,318	$90,742	$107,867	$317,137	$883,385	$4,628,232	$10,365,755
238350	$87,316	$90,734	$107,822	$308,273	$786,222	$4,069,775	$9,471,720
238390	$87,762	$92,964	$141,189	$502,802	$1,510,496	$5,891,315	$13,048,397
238910	$88,118	$94,746	$209,811	$555,560	$2,021,028	$7,930,060	$14,797,575
238990	$87,846	$93,385	$157,016	$479,189	$1,434,714	$5,666,236	$11,970,629
313110	$89,748	$102,895	$399,092	$1,508,510	$7,747,895	$224,341,386	$989,463,587
313210	$90,773	$108,018	$425,983	$1,571,776	$10,248,958	$277,474,872	$1,000,090,284
313220	$88,494	$96,626	$320,413	$1,049,941	$4,523,418	$21,621,595	$45,910,351
313230	$99,243	$240,011	$2,419,699	$7,443,206	$20,662,432	$585,649,092	$1,061,725,128
313240	$92,200	$115,155	$786,769	$2,655,690	$9,123,825	$27,628,610	$900,199,330
313310	$88,955	$98,931	$350,042	$1,089,176	$3,772,816	$28,210,432	$621,956,974
313320	$93,410	$141,630	$1,507,797	$5,358,994	$16,431,098	$518,990,718	$1,048,393,453
314110	$88,615	$97,230	$342,416	$1,574,063	$5,903,721	$203,087,992	$985,212,908
314120	$87,670	$92,502	$116,665	$493,819	$1,641,106	$10,493,208	$56,249,749
314910	$88,108	$94,694	$216,641	$602,348	$1,916,350	$10,013,155	$44,182,874
314994	$89,154	$99,922	$392,893	$1,222,885	$4,574,734	$16,972,164	$569,709,046
314999	$87,472	$91,514	$111,725	$376,497	$977,660	$6,924,496	$37,101,269
315110	$89,978	$104,045	$438,434	$1,602,157	$4,796,035	$15,854,897	$21,567,488
315190	$87,770	$93,004	$147,519	$569,561	$1,829,720	$5,791,889	$12,633,797
315210	$87,356	$90,934	$108,825	$292,541	$565,486	$3,598,902	$16,030,440
315220	$88,137	$94,840	$211,652	$553,696	$2,453,856	$15,112,864	$42,447,527
315240	$87,659	$92,451	$116,411	$496,896	$2,293,099	$18,626,056	$87,890,488
315280	$87,431	$91,309	$110,701	$439,864	$1,551,650	$6,379,108	$43,077,132
315990	$87,746	$92,882	$133,460	$428,969	$1,168,233	$7,299,619	$34,580,031
316110	$88,881	$98,558	$297,008	$737,670	$2,355,028	$22,211,849	$758,332,922
316210	$89,860	$103,453	$332,068	$795,696	$2,876,932	$21,547,813	$81,101,480
316992	$87,364	$90,972	$109,014	$316,827	$678,751	$2,316,453	$4,678,008
316998	$87,762	$92,966	$138,183	$451,303	$1,401,986	$7,658,599	$22,551,245

321113	$91,067	$109,490	$512,689	$1,702,909	$5,324,620	$34,607,550	$125,725,636
321114	$94,567	$159,017	$1,032,266	$4,158,957	$12,496,071	$98,517,940	$921,275,613
321211	$95,794	$161,148	$695,585	$2,414,336	$8,173,474	$75,566,964	$691,916,064
321212	$144,771	$251,558	$1,081,365	$4,796,035	$86,094,844	$954,926,821	$1,135,580,674
321213	$92,167	$114,992	$552,385	$2,581,943	$9,003,115	$737,965,086	$1,092,188,327
321214	$98,391	$207,339	$1,042,354	$2,937,169	$9,082,556	$63,330,650	$555,894,340
321219	$90,113	$104,721	$1,589,191	$5,041,925	$15,742,468	$463,442,074	$1,037,283,724
321911	$91,274	$110,524	$518,524	$1,347,183	$3,928,590	$41,842,517	$685,008,711
321912	$89,479	$101,547	$505,063	$2,032,105	$5,886,504	$30,371,193	$107,225,580
321918	$88,737	$97,841	$311,256	$899,434	$2,781,731	$17,109,890	$58,681,838
321920	$90,269	$105,498	$419,765	$1,254,967	$4,220,094	$19,035,802	$58,504,744
321991	$93,968	$140,818	$674,542	$4,194,252	$14,266,833	$66,908,520	$656,493,740
321992	$89,459	$101,448	$382,651	$1,105,914	$4,300,016	$26,507,127	$67,794,042
321999	$87,890	$93,606	$167,022	$497,415	$1,803,335	$13,332,264	$59,509,486
322110	$1,251,542	$1,534,731	$118,074,414	$472,297,655	$826,520,896	$1,109,899,489	$1,166,575,207
322121	$206,409	$559,747	$6,641,391	$99,624,844	$611,456,785	$1,066,886,666	$1,157,972,643
322122	$128,701,111	$171,207,900	$383,741,844	$649,409,275	$915,076,706	$1,127,610,651	$1,170,117,440
322130	$191,883	$487,116	$11,658,727	$67,892,434	$446,251,828	$1,033,845,675	$1,151,364,444
322211	$103,669	$333,289	$2,888,358	$9,056,764	$28,814,739	$393,862,509	$1,023,367,811
322212	$106,775	$456,916	$3,475,994	$9,720,435	$30,010,482	$80,948,217	$775,411,542
322219	$95,591	$202,202	$1,164,058	$4,650,736	$9,794,434	$42,309,801	$55,494,148
322220	$112,329	$309,466	$1,781,648	$5,325,233	$21,043,241	$100,631,120	$895,501,211
322230	$97,950	$192,406	$969,138	$2,492,579	$9,470,306	$66,047,595	$538,891,624
322291	$92,015	$114,231	$3,478,767	$15,250,590	$39,480,320	$828,131,001	$1,110,221,510
322299	$96,200	$176,964	$922,736	$2,708,223	$8,378,484	$39,849,229	$79,699,403
323111	$88,067	$94,490	$198,912	$533,074	$1,876,126	$12,129,013	$52,004,742
323113	$87,860	$93,455	$158,199	$467,430	$1,112,213	$5,768,689	$24,303,512
323117	$88,662	$97,462	$271,733	$664,021	$2,677,815	$23,539,920	$54,293,845
323120	$87,758	$92,945	$139,067	$481,772	$1,706,032	$11,649,506	$46,107,102
324110	$160,475	$330,077	$284,116,558	$582,992,418	$881,868,277	$1,120,968,965	$1,168,789,102
324121	$112,146	$497,324	$3,414,280	$10,576,811	$44,933,153	$682,470,111	$1,081,089,332
324122	$94,298	$195,472	$1,401,986	$8,608,510	$23,983,791	$87,669,107	$961,834,174
324191	$99,973	$213,868	$1,881,344	$7,215,134	$21,892,128	$644,578,958	$1,073,511,101
324199	$89,322	$100,765	$572,366	$2,840,059	$61,496,992	$903,269,265	$1,125,249,162
325110	$128,701,111	$171,207,900	$383,741,844	$649,409,275	$915,076,706	$1,127,610,651	$1,170,117,440
325120	$0	$0	$0	$0	$0	$0	$0
325130	$93,613	$151,053	$1,457,297	$4,796,035	$17,119,727	$625,794,393	$1,069,754,188
325180	$109,210	$623,297	$2,864,107	$11,191,536	$64,145,992	$886,542,056	$1,121,903,721
325193	$227,609	$1,468,359	$116,370,305	$464,597,149	$822,670,643	$1,109,129,438	$1,166,421,197
325194	$147,519	$265,298	$1,977,215	$18,694,919	$231,931,884	$990,981,686	$1,142,791,647
325199	$112,582	$438,921	$2,480,540	$10,535,829	$41,571,984	$810,963,794	$1,106,788,068
325211	$103,134	$338,684	$2,927,143	$7,454,333	$24,624,528	$689,739,512	$1,082,543,212
325212	$149,113	$273,266	$1,130,464	$5,903,721	$22,433,194	$722,978,718	$1,089,191,053

325220	$156,706	$311,232	$2,139,459	$8,485,565	$37,635,777	$745,049,550	$1,093,605,220
325510	$93,788	$141,205	$823,036	$2,592,927	$8,016,707	$83,905,635	$839,627,156
325520	$96,117	$181,381	$1,758,828	$5,117,278	$20,760,808	$374,501,238	$1,019,495,557
325611	$88,445	$96,377	$352,609	$1,778,097	$5,891,849	$63,022,059	$810,059,933
325612	$90,265	$105,482	$550,993	$1,975,409	$7,379,060	$78,715,489	$755,676,248
325613	$92,852	$125,322	$1,061,725	$3,993,277	$11,807,441	$808,809,734	$1,106,357,256
325910	$93,461	$137,100	$918,960	$3,752,759	$10,699,756	$58,888,448	$610,444,719
325991	$94,595	$166,495	$1,272,928	$4,604,241	$21,318,270	$104,421,425	$896,721,502
325992	$88,972	$99,015	$284,928	$664,021	$2,737,632	$13,529,016	$742,392,876
325998	$91,191	$110,107	$575,965	$2,315,633	$8,150,261	$199,278,421	$984,450,994
326111	$95,591	$190,554	$2,307,067	$7,045,919	$22,251,577	$118,074,414	$968,210,192
326112	$96,466	$228,359	$2,935,930	$9,636,643	$39,295,866	$621,779,862	$1,068,951,282
326113	$97,085	$196,914	$1,404,787	$4,236,834	$19,924,615	$209,160,390	$986,427,387
326121	$92,345	$115,879	$1,015,899	$4,189,242	$15,966,049	$109,218,006	$943,687,045
326122	$109,691	$246,492	$1,925,412	$6,061,793	$20,826,391	$244,777,342	$993,550,778
326130	$92,548	$118,074	$786,769	$2,636,024	$14,020,894	$445,049,713	$1,033,605,252
326140	$95,074	$165,761	$1,397,279	$4,886,195	$15,723,550	$345,367,660	$1,013,668,841
326150	$95,849	$205,479	$1,623,228	$4,468,759	$14,498,305	$101,838,650	$876,365,166
326160	$97,174	$280,824	$2,951,860	$7,379,060	$19,073,287	$401,453,007	$1,024,885,911
326191	$94,120	$154,586	$985,972	$2,497,905	$8,405,384	$77,116,628	$645,867,043
326199	$92,336	$115,833	$972,713	$2,774,436	$10,047,202	$71,724,283	$757,144,978
326211	$92,649	$119,886	$562,012	$2,286,954	$21,154,310	$886,094,805	$1,121,814,270
326212	$91,026	$109,286	$578,722	$2,562,157	$10,035,853	$108,234,092	$948,888,925
326220	$90,899	$108,652	$912,586	$3,268,005	$23,825,688	$335,438,675	$1,011,683,045
326291	$98,444	$194,140	$962,708	$3,924,243	$13,599,284	$80,039,988	$808,809,734
326299	$91,192	$110,116	$834,992	$3,007,186	$10,366,048	$78,131,290	$761,398,315
327110	$87,690	$92,604	$120,865	$425,082	$1,150,550	$9,869,877	$27,805,686
327120	$90,476	$106,535	$684,479	$2,904,102	$13,924,657	$78,223,532	$775,748,898
327211	$90,950	$108,905	$507,652	$4,980,453	$15,391,126	$135,785,576	$971,752,425
327212	$88,216	$95,234	$216,660	$538,590	$2,032,190	$18,522,761	$690,587,727
327213	$605,691	$666,967	$973,346	$2,065,712	$490,008,817	$1,042,597,073	$1,153,114,724
327215	$88,407	$96,187	$273,070	$867,639	$3,349,067	$33,113,787	$107,299,374
327310	$138,028	$217,840	$688,571	$2,951,860	$23,614,883	$832,961,318	$1,111,187,573
327320	$96,124	$192,503	$1,526,402	$4,286,500	$11,187,570	$57,284,129	$409,549,538
327331	$93,658	$147,880	$1,155,014	$3,607,567	$10,994,824	$81,515,859	$852,133,961
327332	$160,475	$330,077	$1,205,327	$3,622,469	$12,439,856	$463,442,074	$1,037,283,724
327390	$91,980	$114,052	$642,702	$1,973,920	$5,492,305	$32,838,782	$83,956,723
327410	$143,986	$247,632	$884,968	$5,903,721	$450,158,702	$1,034,627,050	$1,151,520,719
327420	$134,721	$201,305	$534,228	$1,341,647	$3,823,652	$8,306,417	$17,591,931
327910	$91,678	$112,546	$1,002,806	$2,586,281	$8,077,906	$51,165,186	$87,078,758
327991	$90,043	$104,369	$389,688	$1,019,438	$2,794,696	$13,753,874	$39,781,771
327992	$93,826	$145,556	$1,204,033	$5,072,661	$18,817,888	$721,519,006	$1,088,899,111
327993	$92,358	$115,943	$874,446	$2,820,537	$8,003,243	$110,693,877	$945,438,698

327999	$90,811	$108,212	$748,191	$2,422,157	$7,322,317	$35,244,067	$664,286,651
331110	$96,565	$179,042	$906,524	$4,392,890	$36,602,832	$860,011,093	$1,116,597,528
331210	$157,334	$314,373	$2,301,703	$22,302,026	$83,020,113	$915,076,706	$1,127,610,651
331221	$145,399	$254,698	$1,004,647	$4,600,770	$25,090,518	$752,724,387	$1,095,140,187
331222	$92,717	$121,019	$556,802	$2,737,067	$20,873,237	$663,391,772	$1,077,273,664
331313	$87,435	$91,331	$110,807	$471,412	$573,504,295	$1,059,296,168	$1,156,454,543
331314	$166,364	$359,522	$1,269,241	$16,726,225	$342,869,932	$1,013,169,296	$1,147,229,169
331315	$90,925	$108,778	$688,571	$2,697,832	$109,639,684	$920,980,427	$1,128,791,395
331318	$104,721	$201,213	$927,053	$4,970,746	$38,373,594	$445,049,713	$1,033,605,252
331410	$93,278	$136,919	$884,968	$3,756,591	$23,614,883	$585,649,092	$1,061,725,128
331420	$100,257	$267,261	$2,467,970	$8,855,581	$93,475,381	$931,566,409	$1,130,908,591
331491	$98,634	$187,356	$786,769	$2,419,699	$8,643,637	$88,555,810	$826,520,896
331492	$92,586	$120,037	$1,522,663	$6,471,159	$27,857,333	$677,538,768	$1,080,103,063
331511	$93,182	$132,797	$972,007	$3,397,893	$13,559,758	$70,633,337	$242,052,548
331512	$214,653	$610,012	$3,837,064	$8,173,474	$18,817,888	$309,354,964	$1,006,466,302
331513	$93,591	$137,569	$858,186	$3,170,429	$9,593,251	$32,824,026	$64,350,343
331523	$90,695	$107,632	$917,701	$3,063,207	$10,898,359	$78,715,489	$802,906,013
331524	$90,276	$105,536	$469,940	$1,651,775	$5,496,069	$29,156,712	$62,653,091
331529	$91,570	$112,003	$566,638	$1,877,421	$5,831,153	$30,010,482	$348,319,520
332111	$88,808	$98,194	$369,694	$1,979,374	$8,787,339	$96,525,514	$897,687,565
332112	$144,457	$249,987	$758,712	$1,888,718	$43,293,558	$883,196,614	$1,121,234,632
332114	$95,010	$187,957	$1,354,577	$3,044,069	$12,276,962	$81,980,294	$852,379,192
332117	$212,298	$590,372	$2,318,560	$5,903,721	$29,518,603	$73,795,918	$649,409,275
332119	$91,975	$114,029	$969,912	$2,869,614	$9,219,363	$41,029,737	$86,931,171
332215	$88,059	$94,450	$191,686	$500,857	$2,206,502	$48,853,126	$83,300,528
332216	$89,247	$100,387	$370,687	$1,072,438	$4,562,691	$37,024,442	$435,104,214
332311	$89,961	$103,960	$649,650	$2,196,587	$8,218,478	$62,423,029	$580,818,775
332312	$89,939	$103,849	$724,228	$2,562,123	$7,769,381	$38,581,276	$150,687,381
332313	$91,923	$113,771	$693,808	$2,103,186	$5,566,637	$28,402,498	$104,200,044
332321	$91,087	$109,590	$777,189	$2,298,128	$8,003,243	$46,865,352	$440,417,563
332322	$90,226	$105,284	$533,982	$1,840,256	$5,208,093	$28,618,627	$92,479,891
332323	$88,717	$97,741	$309,783	$888,118	$2,622,982	$16,517,427	$77,559,390
332410	$104,645	$280,917	$2,104,755	$7,010,226	$23,211,256	$122,502,204	$969,095,750
332420	$93,704	$162,831	$1,301,069	$4,134,916	$12,563,254	$72,412,289	$694,368,379
332431	$89,657	$102,438	$458,326	$3,541,996	$10,330,921	$808,809,734	$1,106,357,256
332439	$90,209	$105,201	$550,845	$2,083,064	$5,486,418	$18,807,348	$34,919,427
332510	$90,290	$105,605	$462,999	$1,909,958	$6,532,106	$63,043,143	$842,565,125
332613	$96,504	$172,114	$830,257	$2,637,537	$9,731,564	$47,820,079	$112,346,853
332618	$90,570	$107,003	$620,129	$2,085,674	$6,302,461	$51,480,019	$492,134,156
332710	$88,264	$95,473	$235,649	$613,975	$2,220,843	$10,509,170	$38,803,636
332721	$92,150	$114,904	$736,544	$1,941,835	$5,001,102	$24,659,792	$74,310,365
332722	$90,736	$107,833	$792,106	$2,431,676	$9,150,649	$73,101,391	$675,567,299
332811	$93,379	$137,298	$820,421	$2,444,019	$6,170,537	$65,611,542	$732,145,704

332812	$89,135	$99,827	$340,188	$892,469	$2,819,192	$18,510,464	$86,709,791
332813	$89,975	$104,029	$410,979	$1,146,831	$3,640,352	$19,245,822	$58,563,776
332911	$91,604	$112,177	$1,257,034	$4,536,485	$14,892,860	$89,293,746	$904,450,009
332912	$97,765	$196,594	$1,296,175	$4,394,415	$15,742,468	$118,074,414	$968,210,192
332913	$89,099	$99,649	$409,058	$2,360,701	$13,283,076	$662,692,647	$1,077,133,839
332919	$94,461	$159,533	$949,010	$3,689,530	$11,216,125	$75,566,964	$203,087,992
332991	$91,452	$111,416	$1,248,819	$5,097,809	$12,545,259	$696,639,041	$1,083,923,118
332996	$90,831	$108,307	$583,838	$2,210,663	$8,395,849	$49,413,924	$379,756,833
332999	$89,320	$100,755	$338,841	$924,913	$3,155,853	$22,339,617	$97,273,289
333111	$89,906	$103,684	$556,292	$2,069,716	$6,715,158	$66,028,175	$827,663,551
333112	$89,551	$101,912	$442,983	$1,997,637	$5,389,378	$17,001,677	$946,956,798
333120	$93,167	$134,858	$1,085,828	$4,686,381	$15,184,375	$187,308,956	$982,057,101
333131	$93,292	$140,606	$994,077	$3,388,998	$11,135,652	$92,983,424	$751,425,569
333132	$93,200	$131,492	$752,649	$2,693,422	$11,612,137	$106,081,780	$933,673,426
333241	$90,035	$104,330	$676,527	$2,437,180	$8,175,744	$44,218,289	$307,229,624
333242	$93,643	$146,341	$990,180	$4,796,035	$10,773,523	$397,025,216	$1,024,000,353
333243	$90,722	$107,764	$655,039	$2,397,575	$7,969,196	$42,388,502	$116,774,466
333244	$92,004	$114,177	$720,674	$2,155,329	$5,267,324	$48,213,621	$638,782,578
333249	$89,894	$103,624	$483,810	$1,769,880	$5,813,449	$43,998,584	$470,799,018
333314	$90,352	$105,916	$526,155	$2,065,712	$5,874,703	$38,521,158	$800,308,376
333316	$89,018	$99,243	$383,833	$1,599,939	$4,372,558	$14,876,762	$585,649,092
333318	$90,160	$104,956	$496,787	$2,073,374	$7,908,936	$79,311,016	$842,125,866
333413	$92,107	$114,687	$1,048,190	$3,459,764	$10,207,976	$51,509,535	$687,931,053
333414	$89,657	$102,438	$540,455	$2,242,705	$8,608,510	$54,785,772	$94,852,860
333415	$91,990	$114,104	$1,159,477	$4,013,070	$13,053,533	$98,319,265	$891,166,637
333511	$89,968	$103,992	$500,531	$1,538,565	$5,038,926	$23,850,984	$65,799,380
333514	$89,182	$100,065	$379,338	$1,028,057	$2,942,900	$15,683,071	$55,343,886
333515	$89,247	$100,389	$330,197	$838,186	$2,800,916	$16,411,423	$71,803,492
333517	$88,424	$96,275	$442,248	$2,643,191	$7,874,682	$54,534,889	$795,652,870
333519	$90,710	$107,705	$573,370	$2,571,408	$8,387,209	$34,093,072	$75,616,159
333611	$174,608	$400,745	$4,427,200	$16,726,225	$118,074,414	$968,210,192	$1,138,237,348
333612	$162,307	$339,238	$1,479,720	$4,163,747	$11,166,947	$183,015,341	$981,198,378
333613	$94,982	$169,469	$1,140,284	$3,279,714	$8,559,332	$32,076,371	$288,101,569
333618	$91,705	$112,680	$549,096	$2,580,228	$7,986,553	$116,105,405	$964,345,939
333912	$91,168	$109,996	$907,629	$5,800,792	$15,224,701	$300,246,366	$1,004,644,583
333914	$92,388	$116,097	$1,504,352	$4,796,035	$14,109,432	$84,987,941	$870,292,768
333921	$91,736	$112,836	$1,040,930	$3,220,104	$11,478,407	$57,147,024	$628,155,881
333922	$93,157	$138,359	$1,285,331	$4,732,901	$13,968,193	$70,696,589	$663,072,172
333923	$99,142	$213,770	$1,145,572	$4,091,896	$12,894,751	$73,795,918	$801,219,236
333924	$90,994	$109,125	$954,740	$2,936,852	$13,947,112	$109,007,167	$930,131,194
333991	$91,686	$112,582	$583,302	$2,347,293	$5,399,583	$16,013,001	$29,458,397
333992	$90,125	$104,777	$376,237	$1,352,454	$4,992,747	$24,500,264	$86,709,791
333993	$94,374	$152,896	$960,505	$2,914,558	$9,921,104	$56,871,545	$789,327,455

333994	$94,733	$167,046	$969,664	$2,710,474	$8,057,717	$28,956,681	$70,903,211
333995	$93,698	$148,878	$1,044,540	$3,669,593	$10,986,627	$306,085,211	$1,005,812,352
333996	$94,602	$157,825	$1,087,502	$2,685,189	$7,624,950	$85,971,855	$953,332,816
333997	$90,113	$104,721	$480,472	$1,475,733	$4,591,127	$11,068,591	$15,939,219
333999	$90,349	$105,898	$568,223	$2,134,447	$6,398,116	$40,546,802	$105,731,261
334111	$88,914	$98,724	$340,726	$1,256,061	$5,118,766	$26,397,509	$57,943,947
334112	$88,561	$96,961	$331,549	$1,045,656	$4,954,107	$447,502,028	$1,034,095,715
334118	$89,361	$100,960	$446,735	$1,556,438	$5,331,890	$43,908,406	$644,095,927
334210	$91,524	$111,776	$614,922	$2,807,943	$12,299,320	$486,213,568	$1,041,838,023
334220	$90,287	$105,590	$533,766	$2,400,797	$7,481,991	$188,919,062	$982,379,122
334290	$89,547	$101,887	$417,570	$1,447,904	$5,755,006	$26,397,509	$139,327,808
334310	$89,250	$100,404	$343,818	$936,721	$3,084,263	$34,978,453	$86,144,040
334412	$92,577	$118,678	$654,201	$2,360,701	$7,794,000	$39,258,975	$433,333,098
334413	$90,311	$105,707	$537,944	$2,396,779	$7,284,487	$143,882,107	$973,371,731
334416	$92,029	$114,298	$908,725	$3,093,720	$8,429,681	$43,736,249	$70,194,793
334417	$93,309	$133,437	$765,288	$3,272,586	$9,039,999	$81,175,274	$893,823,312
334418	$91,072	$109,512	$1,145,572	$4,207,469	$12,422,289	$68,534,117	$598,728,104
334419	$90,392	$106,112	$454,389	$1,685,753	$6,600,970	$39,148,302	$242,938,106
334510	$91,490	$111,604	$650,905	$2,918,499	$9,757,178	$100,094,439	$917,353,855
334511	$90,428	$106,295	$751,925	$2,951,860	$9,265,398	$79,207,446	$846,003,174
334512	$89,429	$101,297	$398,308	$1,467,761	$6,198,789	$38,137,492	$351,861,753
334513	$89,505	$101,678	$468,941	$2,071,815	$5,888,622	$43,785,436	$709,184,447
334514	$89,545	$101,880	$708,210	$2,678,382	$8,116,730	$82,651,145	$949,992,997
334515	$90,263	$105,467	$574,977	$2,188,624	$7,546,713	$50,342,325	$711,752,566
334516	$92,537	$116,839	$841,794	$2,700,890	$9,339,677	$80,638,593	$883,727,949
334517	$0	$0	$0	$0	$0	$0	$0
334519	$89,941	$103,858	$543,104	$2,826,908	$8,196,172	$44,670,817	$163,237,877
334613	$87,324	$90,773	$108,018	$314,373	$921,792	$4,648,501	$5,651,732
334614	$87,515	$91,730	$112,803	$486,878	$2,388,605	$12,127,162	$22,625,027
335110	$90,798	$108,144	$737,670	$3,622,469	$9,593,251	$575,022,395	$1,059,599,788
335121	$89,341	$100,858	$290,493	$590,372	$1,901,067	$9,199,827	$32,548,574
335122	$91,391	$111,112	$862,650	$2,673,568	$10,576,811	$61,049,758	$319,981,661
335129	$90,482	$106,563	$492,827	$2,065,712	$5,755,006	$62,357,917	$736,193,969
335210	$90,022	$104,264	$369,991	$1,603,990	$4,776,623	$15,526,042	$869,913,243
335220	$91,787	$113,090	$532,862	$1,789,159	$6,180,347	$21,769,158	$901,793,335
335311	$92,244	$115,372	$614,922	$3,432,204	$8,731,455	$93,475,381	$892,305,212
335312	$90,059	$104,449	$540,921	$2,314,124	$6,641,391	$38,275,218	$477,256,780
335313	$91,185	$110,077	$760,331	$2,697,832	$9,321,478	$107,742,135	$951,679,774
335314	$90,604	$107,172	$500,121	$2,065,712	$7,544,400	$40,832,986	$204,416,329
335911	$94,222	$148,558	$794,323	$2,852,350	$11,173,972	$55,789,304	$909,763,357
335912	$89,885	$103,580	$497,585	$1,512,607	$5,755,006	$23,121,824	$941,643,449
335921	$92,167	$114,992	$1,158,521	$3,394,462	$12,176,350	$75,640,757	$782,242,991
335929	$93,243	$149,482	$2,578,062	$6,021,748	$16,234,346	$90,031,681	$766,302,945

335931	$91,346	$110,883	$1,262,017	$4,363,971	$12,545,259	$78,592,499	$801,725,269
335932	$92,548	$118,074	$983,166	$4,363,055	$16,234,346	$106,266,264	$826,520,896
335991	$91,787	$113,090	$1,286,097	$3,865,166	$11,658,727	$95,935,166	$808,809,734
335999	$90,559	$106,947	$494,232	$1,889,818	$5,746,810	$36,189,654	$87,890,488
336111	$135,059	$202,999	$542,700	$2,038,057	$5,332,522	$27,697,473	$452,815,376
336112	$156,942	$312,410	$1,007,716	$4,673,090	$11,560,371	$742,392,876	$1,093,073,885
336120	$149,286	$274,132	$1,229,909	$5,164,870	$21,154,310	$867,846,941	$1,118,164,698
336211	$97,113	$180,645	$973,346	$3,769,712	$12,191,106	$56,969,930	$114,568,039
336212	$93,328	$139,536	$1,069,090	$4,270,725	$12,845,851	$110,324,909	$955,083,096
336213	$643,399	$855,508	$2,840,059	$5,082,907	$14,266,833	$463,442,074	$1,037,283,724
336214	$91,548	$111,894	$551,229	$2,500,002	$6,549,182	$46,982,646	$615,597,057
336310	$89,562	$101,963	$377,189	$1,078,389	$3,279,714	$46,638,331	$747,706,225
336320	$90,546	$106,883	$638,739	$2,262,371	$7,925,483	$81,846,124	$895,501,211
336330	$96,098	$171,265	$1,032,266	$3,808,509	$12,545,259	$586,899,292	$1,061,975,168
336340	$98,330	$182,012	$977,029	$5,335,102	$49,443,439	$792,205,519	$1,103,036,413
336350	$92,494	$116,625	$704,937	$3,347,683	$12,972,416	$285,444,895	$1,001,684,288
336360	$94,042	$160,475	$2,247,244	$7,833,011	$36,529,050	$776,339,270	$1,099,863,163
336370	$105,025	$366,420	$3,470,534	$12,008,664	$38,843,114	$532,515,606	$1,051,098,431
336390	$91,422	$111,264	$600,570	$2,361,951	$8,406,961	$117,974,842	$968,023,759
336411	$93,522	$130,850	$501,356	$2,149,995	$10,625,989	$113,645,620	$956,617,432
336412	$91,297	$110,638	$835,868	$5,208,262	$15,496,529	$82,159,188	$946,956,798
336413	$90,673	$107,521	$874,446	$3,359,678	$8,649,492	$58,024,061	$721,139,482
336414	$128,701,111	$171,207,900	$383,741,844	$649,409,275	$915,076,706	$1,127,610,651	$1,170,117,440
336415	$128,701,111	$171,207,900	$383,741,844	$649,409,275	$915,076,706	$1,127,610,651	$1,170,117,440
336419	$141,630	$235,854	$786,769	$1,939,288	$6,641,391	$649,409,275	$1,074,477,165
336510	$204,895	$552,175	$2,431,242	$7,379,060	$23,466,138	$609,559,161	$1,066,507,142
336611	$90,385	$106,078	$604,268	$2,603,014	$10,699,756	$82,545,726	$842,815,165
336612	$88,524	$96,773	$317,942	$1,241,776	$4,351,542	$59,037,207	$696,639,041
336991	$88,283	$95,569	$238,530	$629,281	$2,351,366	$10,201,829	$21,577,326
336992	$1,278,091	$1,667,476	$13,578,203	$21,646,189	$206,630,224	$985,921,354	$1,141,779,580
336999	$88,720	$97,752	$288,754	$893,632	$3,469,799	$15,268,476	$32,897,808
337110	$88,140	$94,857	$199,668	$496,359	$1,284,213	$5,814,397	$27,351,928
337121	$88,522	$96,762	$297,304	$900,785	$2,740,086	$30,564,963	$555,761,506
337122	$87,833	$93,319	$149,098	$425,014	$1,014,049	$5,858,718	$28,589,881
337124	$88,795	$98,127	$303,156	$816,457	$3,759,785	$43,982,188	$93,180,206
337125	$87,804	$93,174	$161,467	$658,356	$2,036,213	$8,608,510	$782,242,991
337127	$89,980	$104,055	$563,427	$2,533,724	$8,190,497	$47,651,418	$103,103,683
337211	$89,191	$100,108	$338,391	$879,512	$2,883,345	$15,142,376	$83,418,598
337212	$90,058	$104,447	$512,137	$1,633,475	$4,444,075	$18,823,564	$62,323,480
337214	$90,511	$106,711	$677,412	$2,292,627	$7,446,121	$52,778,708	$84,245,086
337215	$89,144	$99,876	$391,926	$1,119,030	$4,669,978	$37,547,238	$104,642,806
337910	$91,055	$109,431	$583,203	$2,909,197	$10,895,021	$69,368,305	$507,011,532
337920	$89,129	$99,798	$285,445	$603,181	$2,367,405	$15,407,991	$51,243,894

339910	$87,806	$93,183	$146,329	$445,461	$1,342,235	$7,987,262	$27,687,635
339920	$87,906	$93,682	$183,924	$622,966	$2,415,329	$23,134,121	$256,221,478
339930	$87,885	$93,577	$162,793	$472,042	$1,554,567	$10,642,381	$39,534,427
339940	$88,793	$98,118	$272,461	$614,421	$2,620,468	$24,647,827	$701,362,017
339950	$88,077	$94,541	$196,785	$515,866	$1,749,728	$9,717,793	$39,937,767
339991	$91,522	$111,765	$887,598	$2,578,497	$5,992,241	$39,613,127	$226,466,725
339992	$87,723	$92,770	$128,733	$431,442	$1,110,697	$5,607,472	$18,183,365
339993	$88,073	$94,517	$210,615	$590,372	$2,338,010	$7,969,196	$21,842,940
339994	$90,694	$107,626	$546,006	$2,449,198	$6,838,103	$164,566,214	$977,508,552
339995	$90,164	$104,974	$304,242	$581,593	$2,010,401	$16,431,098	$22,177,417
339999	$88,388	$96,096	$217,322	$486,816	$1,112,879	$5,307,987	$20,561,246
423110	$91,305	$110,680	$653,058	$2,665,638	$10,382,869	$70,669,860	$636,954,329
423120	$91,377	$111,037	$490,489	$1,528,371	$5,068,585	$30,907,860	$76,921,602
423130	$92,144	$114,873	$656,147	$2,583,980	$10,067,467	$53,752,724	$94,058,701
423140	$89,914	$103,725	$328,826	$752,722	$2,228,347	$8,709,817	$20,624,487
423210	$90,153	$104,921	$426,105	$1,369,702	$4,865,383	$25,110,414	$47,256,269
423220	$90,689	$107,598	$501,749	$1,763,967	$5,501,525	$26,576,214	$49,971,442
423310	$92,545	$116,880	$751,319	$2,747,137	$9,264,043	$43,462,764	$79,383,771
423320	$90,985	$109,079	$553,476	$1,879,811	$5,605,013	$25,808,394	$51,500,854
423330	$92,772	$123,911	$866,931	$3,103,177	$11,235,161	$58,248,942	$114,373,716
423390	$91,572	$112,016	$663,780	$2,383,883	$6,276,137	$27,687,635	$42,919,731
423410	$89,926	$103,782	$493,023	$1,837,898	$5,390,510	$31,609,086	$98,333,457
423420	$90,045	$104,377	$476,619	$1,455,123	$4,637,213	$23,704,315	$53,206,685
423430	$89,892	$103,613	$453,006	$1,572,743	$5,964,224	$51,623,243	$489,284,269
423440	$90,651	$107,410	$466,462	$1,428,117	$4,280,374	$19,024,263	$38,434,890
423450	$89,456	$101,433	$347,514	$942,756	$3,142,494	$21,319,467	$66,552,797
423490	$90,487	$106,588	$468,943	$1,381,393	$4,527,272	$20,116,133	$46,419,937
423510	$92,200	$115,152	$750,541	$2,728,165	$9,764,148	$54,096,038	$420,192,559
423520	$93,433	$130,850	$533,296	$2,269,935	$14,168,457	$94,459,295	$798,183,037
423610	$90,837	$108,338	$516,287	$1,898,533	$5,852,393	$34,329,173	$86,346,392
423620	$90,941	$108,859	$517,733	$2,105,695	$8,031,380	$61,951,106	$607,197,672
423690	$90,226	$105,284	$463,905	$1,618,171	$5,408,196	$38,680,686	$111,672,400
423710	$90,701	$107,661	$473,934	$1,451,988	$4,722,509	$23,474,336	$53,417,974
423720	$93,444	$135,535	$741,800	$2,582,710	$8,176,541	$42,910,411	$94,478,338
423730	$95,941	$173,408	$946,885	$3,164,563	$10,615,764	$51,252,131	$87,094,026
423740	$92,983	$124,233	$493,736	$1,676,862	$5,448,589	$33,274,765	$72,454,217
423810	$91,906	$113,686	$781,555	$2,692,346	$9,101,471	$51,022,079	$115,920,197
423820	$92,293	$115,617	$816,014	$2,814,301	$8,449,581	$36,597,994	$74,789,354
423830	$91,452	$111,415	$539,051	$1,791,590	$5,179,170	$22,080,890	$41,350,506
423840	$93,045	$127,999	$692,815	$2,288,464	$6,948,753	$29,260,202	$56,320,586
423850	$90,837	$108,340	$505,038	$1,520,739	$4,413,503	$18,306,254	$38,267,348
423860	$93,664	$136,357	$624,403	$2,218,218	$7,244,486	$43,205,538	$95,064,402
423910	$89,606	$102,182	$382,815	$1,125,547	$4,047,955	$20,509,780	$51,443,945

423920	$90,021	$104,259	$431,425	$1,295,012	$4,877,466	$34,166,854	$136,671,134
423930	$91,008	$109,194	$534,051	$1,764,608	$5,258,365	$27,273,935	$62,518,645
423940	$89,780	$103,054	$385,164	$1,042,663	$3,204,805	$18,669,074	$57,243,339
423990	$89,010	$99,202	$303,708	$778,320	$2,662,103	$14,520,970	$37,097,170
424110	$91,287	$110,590	$488,365	$1,427,897	$4,915,197	$43,539,497	$197,774,643
424120	$89,511	$101,708	$344,954	$895,753	$2,908,458	$16,354,891	$38,572,805
424130	$92,734	$121,767	$641,240	$2,315,017	$6,877,445	$35,547,753	$76,461,569
424310	$89,973	$104,018	$396,537	$1,061,324	$3,699,533	$19,680,683	$45,769,814
424320	$90,537	$106,841	$442,908	$1,318,043	$4,589,078	$27,125,010	$62,717,660
424330	$89,874	$103,525	$412,976	$1,204,789	$4,535,152	$26,771,458	$81,772,487
424340	$89,913	$103,720	$418,627	$1,361,760	$5,377,010	$34,287,234	$96,451,721
424410	$90,391	$106,110	$510,081	$2,119,673	$8,218,478	$58,198,162	$642,697,677
424610	$92,027	$114,291	$657,993	$2,365,775	$8,006,767	$41,547,390	$88,766,649
424690	$90,996	$109,137	$510,363	$1,856,219	$6,499,691	$48,410,392	$115,346,385
424710	$110,018	$580,246	$3,900,730	$13,565,645	$46,578,305	$644,275,605	$1,073,450,430
424720	$94,786	$162,461	$1,118,006	$6,759,418	$39,357,351	$680,108,623	$1,080,617,034
424910	$92,275	$115,530	$678,705	$2,430,567	$8,600,679	$64,996,915	$640,817,477
424920	$88,489	$96,600	$261,994	$674,542	$2,418,805	$15,053,838	$44,714,103
424930	$90,177	$105,039	$400,137	$1,122,712	$3,196,169	$13,338,413	$24,693,231
424950	$91,079	$109,551	$586,530	$1,934,281	$5,387,656	$21,901,965	$71,955,420
424990	$88,884	$98,576	$296,359	$745,063	$2,367,405	$11,465,406	$33,152,207
425110	$88,582	$97,063	$260,348	$606,211	$2,440,469	$28,484,478	$207,642,290
425120	$89,103	$99,670	$350,369	$1,169,160	$7,067,401	$55,618,041	$591,990,060
441110	$103,107	$374,965	$6,841,880	$27,449,399	$58,270,897	$287,659,688	$1,002,127,247
441120	$90,679	$107,548	$455,043	$1,168,678	$3,041,737	$10,936,855	$22,248,159
441210	$94,560	$155,643	$854,573	$2,802,059	$7,533,930	$23,834,977	$32,681,267
441222	$91,585	$112,080	$525,420	$1,654,099	$4,709,167	$15,597,715	$27,005,892
441228	$91,938	$113,846	$562,617	$2,107,408	$5,780,580	$17,313,530	$27,494,668
441310	$90,336	$105,835	$360,675	$812,874	$1,955,545	$5,546,688	$13,367,219
441320	$89,384	$101,076	$346,508	$843,402	$2,055,422	$5,581,360	$13,994,192
442110	$89,941	$103,862	$380,682	$930,019	$2,326,708	$7,457,927	$16,241,328
442210	$91,500	$111,652	$462,790	$1,041,653	$2,396,210	$5,575,086	$8,037,707
442291	$88,753	$97,921	$250,981	$534,444	$1,105,712	$2,965,479	$5,823,553
442299	$88,400	$96,153	$210,856	$460,291	$991,231	$3,463,858	$10,308,276
443141	$89,772	$103,016	$316,507	$699,597	$2,131,141	$9,040,783	$22,246,936
443142	$88,327	$95,792	$215,995	$497,655	$1,151,515	$5,304,185	$15,385,036
444110	$92,065	$114,481	$574,517	$1,559,708	$3,648,016	$14,326,818	$28,277,889
444120	$89,984	$104,077	$347,016	$791,158	$1,987,774	$6,579,271	$16,716,966
444130	$90,973	$109,018	$429,153	$1,002,058	$2,328,199	$5,686,508	$9,577,561
444190	$91,804	$113,174	$500,561	$1,316,767	$3,389,882	$11,364,567	$19,886,376
444210	$91,931	$113,810	$478,446	$1,097,489	$2,482,141	$5,725,022	$8,156,004
444220	$90,336	$105,835	$393,935	$976,786	$2,534,326	$7,963,463	$14,711,802
447110	$101,103	$229,673	$989,379	$2,183,315	$4,229,815	$9,781,152	$20,543,496

447190	$93,582	$137,546	$722,974	$2,125,838	$4,778,379	$13,753,761	$23,476,212
448110	$89,039	$99,351	$270,295	$558,700	$1,312,563	$5,444,704	$20,105,380
448120	$88,157	$94,941	$188,859	$439,692	$907,989	$2,980,826	$11,077,102
448130	$87,704	$92,677	$123,303	$375,855	$737,181	$2,600,232	$8,169,843
448140	$88,537	$96,839	$235,390	$519,122	$1,154,865	$5,200,482	$17,663,253
448150	$87,817	$93,241	$142,870	$385,436	$742,694	$2,774,205	$10,429,277
448190	$88,309	$95,699	$203,421	$453,608	$949,613	$3,771,655	$14,415,052
448210	$89,697	$102,640	$319,687	$696,478	$1,705,871	$5,656,003	$15,045,968
448310	$88,922	$98,765	$254,174	$523,516	$1,126,806	$4,708,171	$10,744,875
448320	$88,359	$95,948	$212,166	$474,702	$1,009,891	$4,823,212	$19,688,513
451110	$89,314	$100,725	$288,652	$586,196	$1,378,101	$5,089,380	$11,607,700
451120	$88,172	$95,014	$187,889	$430,002	$863,070	$2,783,956	$6,281,845
451130	$87,990	$94,106	$161,727	$375,871	$593,994	$2,259,784	$5,408,473
451140	$88,671	$97,510	$241,944	$517,760	$1,115,867	$4,552,925	$11,039,084
451211	$87,984	$94,072	$166,967	$411,054	$858,046	$4,807,589	$17,410,919
451212	$87,985	$94,078	$159,984	$368,566	$577,148	$2,128,397	$4,974,715
452210	$87,298	$90,646	$107,384	$294,743	$1,328,239	$2,626,191	$2,885,782
452311	$86,766	$87,983	$94,069	$101,678	$109,286	$115,372	$116,589
452319	$88,361	$95,957	$205,667	$449,631	$958,727	$3,667,340	$12,856,277
453110	$87,988	$94,093	$157,914	$354,705	$551,497	$1,666,179	$3,820,970
453210	$88,558	$96,946	$220,692	$465,311	$989,482	$4,456,955	$13,624,112
453220	$87,955	$93,928	$161,146	$394,160	$731,792	$2,616,521	$5,992,539
453310	$87,642	$92,366	$115,986	$372,759	$769,510	$2,926,427	$7,911,736
453910	$89,032	$99,313	$271,747	$563,685	$1,231,577	$4,381,672	$11,241,943
453920	$87,908	$93,692	$158,860	$416,555	$918,264	$4,025,190	$8,360,571
453930	$89,956	$103,933	$456,085	$1,361,231	$3,633,327	$9,158,845	$15,337,898
453998	$88,475	$96,530	$220,666	$480,054	$1,030,885	$3,876,302	$7,008,442
454110	$88,178	$95,043	$218,010	$561,773	$1,944,453	$8,260,938	$17,464,098
454210	$87,789	$93,099	$139,656	$399,473	$893,654	$5,293,020	$11,586,039
454310	$97,217	$191,397	$900,863	$2,231,853	$5,079,116	$18,596,543	$40,051,602
454390	$87,662	$92,462	$116,465	$401,728	$915,131	$3,929,087	$11,454,701
515210	$88,265	$95,480	$219,575	$531,738	$1,415,531	$9,357,197	$17,403,049
531190	$88,192	$95,112	$198,972	$471,888	$1,022,710	$3,526,792	$10,144,044
541330	$88,228	$95,293	$216,963	$535,071	$1,854,891	$8,420,363	$17,576,036
551112	$88,077	$94,541	$240,233	$1,023,849	$6,336,148	$28,246,800	$38,198,759
561499	$87,689	$92,601	$120,535	$407,109	$979,703	$5,556,538	$13,743,929
562920	$87,612	$92,216	$115,232	$394,482	$939,463	$4,700,630	$10,675,456
812320	$88,134	$94,826	$169,417	$357,952	$546,487	$1,598,758	$3,208,088