OFFICE OF INSPECTOR GENERAL
U.S. ENVIRONMENTAL PROTECTION AGENCY

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Improving air quality

The EPA Needs to Develop a Strategy to Complete Overdue Residual Risk and Technology Reviews and to Meet the Statutory Deadlines for Upcoming Reviews

Report No. 22-E-0026 **March 30, 2022**

Report Contributors: Bao Chuong
Jenny Drzewiecki
Lauretta Joseph
Chad Kincheloe
Renee McGhee-Lenart

Abbreviations:

CAA	Clean Air Act
C.F.R.	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
GACT	Generally Available Control Technology or Management Practices
MACT	Maximum Achievable Control Technology
NESHAP	National Emission Standards for Hazardous Air Pollutants
OAQPS	Office of Air Quality Planning and Standards
OAR	Office of Air and Radiation
OIG	Office of Inspector General
RTR	Residual Risk and Technology Review
TR	Technology Review
U.S.C.	United States Code

Key Definitions:

Air Toxics	Air pollutants known or suspected to cause cancer or other serious health effects or adverse environmental effects.
Residual Risk Review	Statutorily required review assessing the health and environmental risks remaining eight years after implementation of technology-based emission standards for certain industrial source categories.
Technology Review	Statutorily required review conducted at least once every eight years after technology-based emission standards are implemented to assess whether there are cost-effective approaches to further reduce emissions.
Residual Risk and Technology Review	Combination of a residual risk review and the first technology review for certain industrial source categories.

Cover Image: Playground with smokestack emissions in the background. (EPA image)

EPA Office of Inspector General
1200 Pennsylvania Avenue, NW (2410T)
Washington, D.C. 20460
(202) 566-2391
www.epa.gov/oig

Office of Inspector General
U.S. Environmental Protection Agency
At a Glance

22-E-0026
March 30, 2022

The EPA Needs to Develop a Strategy to Complete Overdue Residual Risk and Technology Reviews and to Meet the Statutory Deadlines for Upcoming Reviews

Why We Did This Evaluation

We conducted this evaluation to determine whether the U.S. Environmental Protection Agency has conducted residual risk and technology reviews in a timely manner, as required for the EPA to revise standards, as needed, to protect the public from air toxics emitted by stationary sources. A *stationary source* is any building, structure, facility, or installation that emits or may emit an air pollutant.

The Clean Air Act requires the EPA to conduct *residual risk reviews* to assess the health and environmental risks that remain after the EPA issues technology standards and the stationary sources implement the technology to limit air toxics emissions in accordance with those standards. If the risks are deemed unacceptable, the EPA is required to revise the standards to reduce the risks. Separately, the EPA is required to conduct a *technology review* of each technology-based standard at least once every eight years and, if necessary, revise the standard.

This evaluation supports an EPA mission-related effort:

- *Improving air quality.*

This evaluation addresses a top EPA management challenge:

- *Integrating and leading environmental justice, including communicating risks.*

Address inquiries to our public affairs office at (202) 566-2391 or OIG_WEBCOMMENTS@epa.gov.

List of OIG reports.

What We Found

As of November 1, 2021, the EPA had 93 overdue RTRs or TRs, almost half of which were overdue by more than five years. These reviews are used to establish limits for air toxics emissions and to protect public health.

The EPA has not conducted all statutorily mandated residual risk and technology reviews, or RTRs, or recurring eight-year technology reviews, or TRs, that are used to revise standards, as needed, to protect the public from air toxics emitted by stationary sources. As of November 1, 2021, 93 of the 169 industrial sources that require such reviews, known as *source categories*, had overdue RTRs or TRs. The majority (79) of the 93 overdue reviews were TRs. The EPA had initiated the reviews for only 30 percent (28) of those 93 source categories.

Although the EPA has conducted internal exercises to prioritize certain source categories for RTRs or TRs, the EPA lacks a strategy to meet the statutory deadlines for RTRs and TRs and to complete all overdue reviews. Of the 28 overdue reviews in progress as of November 1, 2021, the EPA initiated 25 in response to court orders, consent decrees, or Office of Inspector General recommendations issued in May 2021 in Report No. 21-P-0129. In addition, although EPA staff told us that the volume of work, resource limitations, and other competing administration priorities are impediments to meeting statutory review time frames, we found that the EPA has not conducted a workforce analysis to determine the level and types of staff and resources needed to conduct the required RTRs and TRs.

Air toxics emitted from source categories with overdue RTRs and TRs can cause cancer and other serious health conditions. Overdue RTRs and TRs may also disproportionately impact communities with environmental justice concerns, given that minority and low-income populations are more likely to live near industrial facilities or other pollution sources.

Recommendations and Planned Agency Corrective Actions

We recommend that the EPA perform a workforce analysis to determine the staff and resources needed to meet statutory RTR and TR deadlines. We also recommend that the EPA develop and implement a strategy to conduct RTRs and TRs by the statutory deadlines, as well as all overdue reviews in as timely a manner as practicable. The strategy should take into account the Agency's environmental justice responsibilities.

The EPA concurred with Recommendation 1 and partially concurred with Recommendation 2. Both recommendations are unresolved because the EPA's proposed completion dates are not aggressive enough to ensure that public health risks are reduced in conformity with statutory direction.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE INSPECTOR GENERAL

March 30, 2022

MEMORANDUM

SUBJECT: The EPA Needs to Develop a Strategy to Complete Overdue Residual Risk and Technology Reviews and to Meet the Statutory Deadlines for Upcoming Reviews
Report No. 22-E-0026

FROM: Sean W. O'Donnell

TO: Joseph Goffman, Principal Deputy Assistant Administrator
Office of Air and Radiation

This is our report on the subject evaluation conducted by the Office of Inspector General of the U.S. Environmental Protection Agency. The project number for this evaluation was OSRE-FY21-0224. This report contains findings that describe the problems the OIG has identified and corrective actions the OIG recommends. Final determinations on matters in this report will be made by EPA managers in accordance with established resolution procedures.

The Office of Air and Radiation is responsible for the issues discussed in this report.

Action Required

This report contains unresolved recommendations. The resolution process, as described in EPA's Audit Management Procedures, begins immediately with the issuance of this report. Furthermore, we request a written response to the final report within 60 days of this memorandum. Your response will be posted on the OIG's website, along with our memorandum commenting on your response. Your response should be provided as an Adobe PDF file that complies with the accessibility requirements of Section 508 of the Rehabilitation Act of 1973, as amended. The final response should not contain data that you do not want to be released to the public; if your response contains such data, you should identify the data for redaction or removal along with corresponding justification.

We will post this report to our website at www.epa.gov/oig.

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Chapter 1
Introduction

Purpose

The U.S. Environmental Protection Agency's Office of Inspector General initiated this evaluation to determine whether the EPA has conducted residual risk and technology reviews, or RTRs, in a timely manner, as required for the EPA to revise standards, as needed, to protect the public from air toxics emitted by stationary sources. Through these reviews, the EPA determines whether more health-protective standards are necessary. If the reviews are delayed or not performed, public health may be impacted.

Top Management Challenge Addressed

This evaluation addresses the following top management challenge for the Agency in fiscal year 2022, as identified in OIG Report No. 22-N-0004, *EPA's Fiscal Year 2022 Top Management Challenges*, issued November 12, 2021:

- Integrating and leading environmental justice, including communicating risks.

Background

Hazardous air pollutants are those pollutants known or suspected to cause serious health effects—such as cancer, reproductive issues, or birth defects—or adverse environmental effects. Hazardous air pollutants are also known as air toxics. The Clean Air Act, or CAA, Amendments of 1990 established a list of 189 air toxics that the EPA must regulate. Since 1990, the EPA has slightly revised the list so that, as of January 2022, it included 188 air toxics.

According to the EPA, most air toxics originate from human-made sources, both mobile and stationary. Mobile sources are pollution sources that move and produce exhaust and evaporative emissions. Examples of mobile sources are vehicles and motorized equipment. Mobile sources are not addressed in this report. Stationary sources are any buildings, structures, facilities, or installations that emit or may emit an air pollutant. Examples of stationary sources are factories, refineries, boilers, and power plants. Stationary sources are further divided into two groups: major and area sources (Table 1).

Table 1: Definitions of stationary sources of air toxics emissions

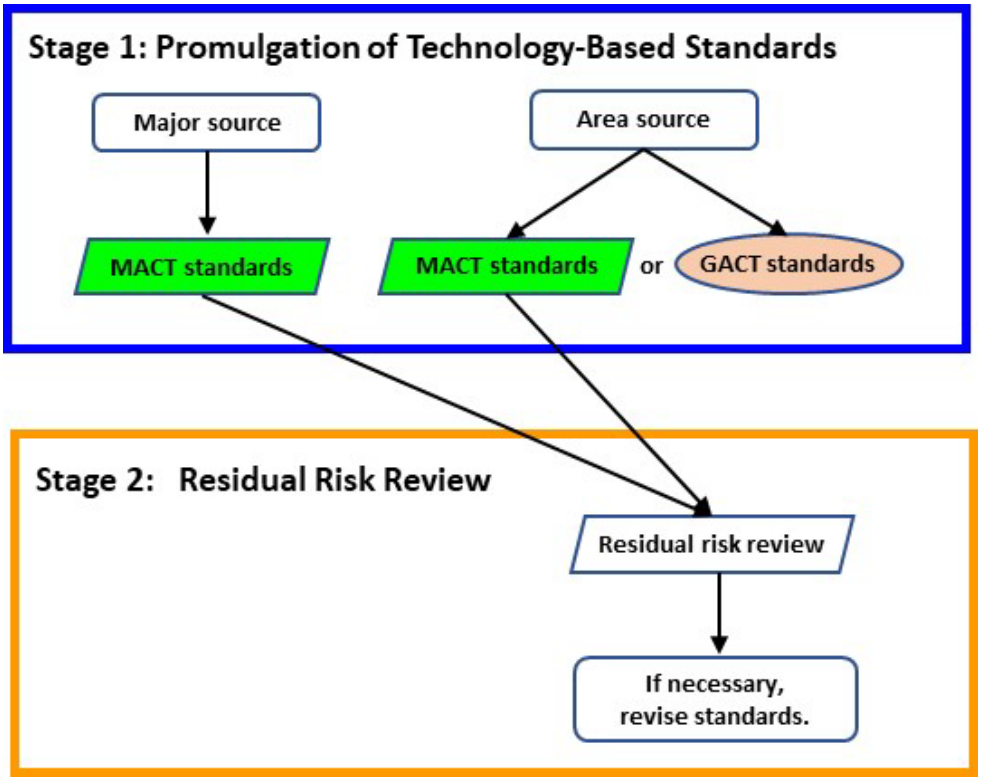
Stationary source	Definition
Major	Emits or has the potential to emit 10 tons or more per year of a single listed air toxic or 25 tons or more per year of a combination of listed air toxics.
Area	Emits or has the potential to emit less than 10 tons per year of a single listed air toxic or less than 25 tons per year of any combination of listed air toxics.

Source: CAA and information from EPA. (EPA OIG table)

Two-Stage Regulatory Process to Control Air Toxics Emissions from Stationary Sources

Section 112 of the CAA outlines a two-stage regulatory process for addressing air toxics emissions from stationary sources: promulgation of technology-based standards and residual risk reviews. Figure 1 is a schematic of this two-stage regulatory process.

Figure 1: Two-stage regulatory process for addressing air toxics emissions from major and area stationary sources



Source: OIG summary of CAA process. (EPA OIG image)

Legend: MACT = Maximum Achievable Control Technology.
GACT = Generally Available Control Technologies or Management Practices.

Stage 1: Promulgation of Technology-Based Standards

In the first stage, the EPA is required to promulgate technology-based national emission standards for hazardous air pollutants, or NESHAP, for types of industrial sources—for example, the synthetic organic chemical manufacturing industry or the commercial sterilizer industry. Types of industrial sources are referred to as *source categories*. In accordance with the CAA, the EPA has identified a total of 169 source categories that require NESHAPs.

Depending on the source category, the NESHAP may be based either on maximum achievable control technology, or MACT, standards or on generally available control technologies or management practices, or GACT, standards:

- For major sources, the EPA must promulgate MACT standards. MACT standards reflect, at a minimum, either the level of emissions achieved by the best-performing 12 percent of sources

in a category with 30 or more sources or the average emission limit achieved by the best-performing five sources in a category or subcategory with fewer than 30 sources. This level of emissions control may be achieved through various control methods, such as control devices and work practices.

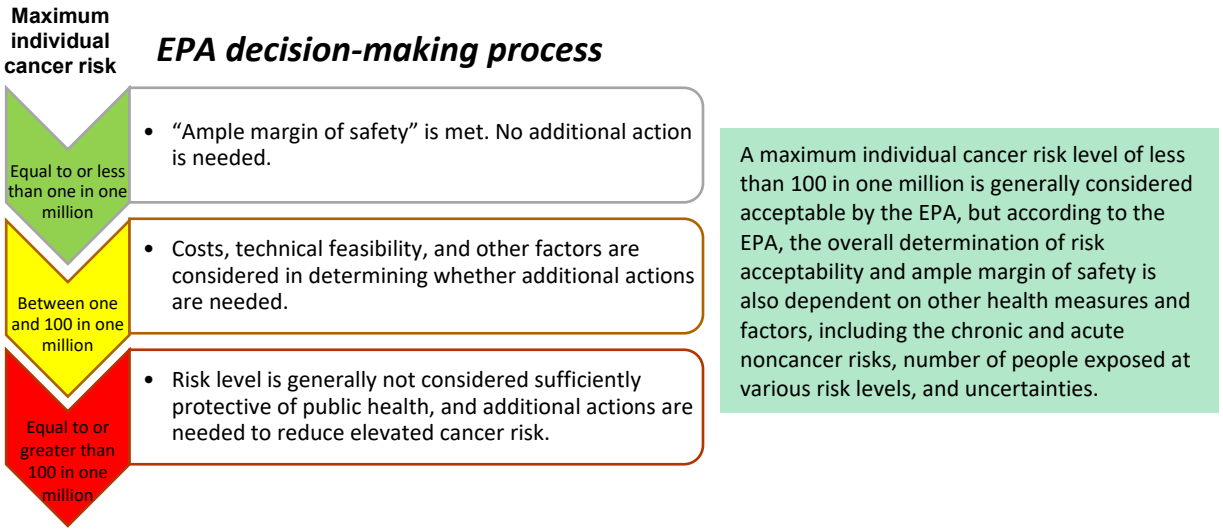
- For area sources, the CAA gives the EPA discretion to set either MACT or GACT standards. GACT standards are based on typical performance in the source category and are usually less stringent than MACT standards.

The EPA has promulgated MACT or GACT standards, as required under the first stage of the process, for almost all source categories. Of the 169 source categories, 119 major and area source categories have MACT standards, and 50 area source categories have GACT standards.

Stage 2: Residual Risk Reviews

For NESHAPs based on MACT standards, the EPA is required to complete the second stage of the regulatory process, the residual risk review, within eight years of promulgating the MACT standard.[1] For NESHAPs based on GACT standards, the EPA is not required to conduct a residual risk review. In the residual risk review, the EPA is required to assess the health and environmental risks that remain after the EPA issues the technology standards and the stationary sources implement the technology (in other words, the control methods) to meet those standards. For example, Figure 2 shows the decision-making process that the EPA uses to assess the residual risk to public health from inhaling carcinogens. The EPA has not completed a residual risk review for all source categories.

Figure 2: EPA decision-making process for addressing residual risk for carcinogens



Source: OIG summary of EPA process. (EPA OIG image)

Separately, the EPA must also review each of the technology-based standards at least every eight years and, if necessary, revise those standards to account for developments in practices, processes, and control technologies.[2] The EPA calls this the technology review, or TR. Based on the results of its

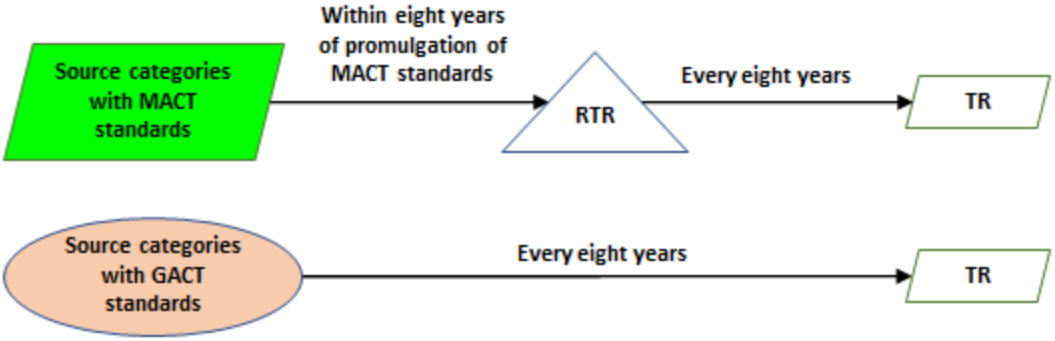
[1] CAA § 112(f)(2), 42 U.S.C. § 7412(f)(2).

[2] CAA § 112(d)(6), 42 U.S.C. § 7412(d)(6).

residual risk reviews, TRs, or both, the EPA either revises the NESHAP or determines that revisions are not necessary.

Appendix A compares residual risk reviews with TRs. For NESHAPs with MACT standards, the EPA combines the residual risk review and the first required TR and calls it the risk and technology review, or RTR. The results of RTRs and TRs, along with any modification to the standards, are published in the *Federal Register* as rules, which are "mandatory requirements that can apply to individuals, businesses, state or local governments, non-profit institutions, or others." Figure 3 shows the time frames for the RTRs and recurring eight-year TRs.

Figure 3: Time frames for RTRs and TRs



Source: OIG summary of CAA requirements. (EPA OIG image)

RTR and TR Processes and Time Frames

The EPA has identified nine phases involved in RTR rulemakings, as detailed in Table 2.

Table 2: Phases involved in RTR rulemakings

Phase	Activities	Time *in months*
1	Establish project team, determine whether to hire a contractor, identify stakeholders interested in rule development, prepare written materials, and conduct meetings with stakeholder groups.	2
2	Collect preliminary information from project files, the EPA's library, major university libraries, and the internet, and gather data on emissions from facilities in the source category.	3
3	Collect supplemental information.	0–28
4	Conduct data analysis to determine inputs for risk models.	3–4
5	Conduct risk analysis and TR.	2–6
6	Develop rule proposal package, including drafting proposed rules, briefing materials, and supporting documentation, as well as submitting the package to the EPA workgroup for review. EPA management is briefed on the rule proposal package, which may also require a 90-day review by the Office of Management and Budget.	12–15
7	Conduct a public comment period, which includes one month for publication in the *Federal Register* and a planned 60-day comment period. Outreach, such as webinars for communities with environmental justice concerns and tribal consultations, may be required.	3
8	Summarize comments, and develop responses to comments.	3–5
9	Develop the final rule package, which involves drafting changes and preparing recommendations based on comments, briefing EPA management, preparing the final rule, and updating supporting documentation. The final rule package may require a 90-day review by the Office of Management and Budget.	6–8
	Total	**34–74**

Source: Summary of court decision, *California Communities Against Toxics, et al., v. EPA,* and information from the EPA. (EPA OIG table)

According to staff in the Office of Air Quality Planning and Standards, or OAQPS, while many TR phases are the same for RTRs, TRs typically do not include risk analysis (Phase 5 in Table 2). In addition, some phases, such as information gathering (Phases 2 and 3 in Table 2), are more resource-intensive when conducting a risk analysis, so less time is expected to be needed to complete those phases for a TR.

EPA Mission and Commitment to Environmental Justice

The EPA's mission is to protect human health and the environment. The Agency achieves its mission, in part, by ensuring that U.S. residents have clean air, land, and water. The EPA is also committed to environmental justice in accordance with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. Signed on February 11, 1994, Executive Order 12898 requires federal agencies:

> To the greatest extent practicable and permitted by law, … make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.

The EPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies." According to the EPA, "fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies." Also, according to the EPA, the integration of environmental justice principles into all EPA programs and across all regions is necessary to achieve environmental equity across all communities.

In an April 7, 2021 announcement to all EPA employees, EPA Administrator Michael Regan stated that equity and environmental justice principles and priorities must be infused into all EPA practices, policies, and programs for the Agency to succeed in its pursuit of equity. He outlined four steps for all EPA offices to take to ensure that the "country's environmental laws – and the policies implemented under them – deliver benefits to all individuals and communities." One of those steps is to:

> Take immediate and affirmative steps to incorporate environmental justice considerations into their work, including assessing impacts to pollution-burdened, underserved, and Tribal communities in regulatory development processes and considering regulatory options to maximize benefits to these communities.

The Office of Air and Radiation, or OAR, has developed a working document that outlines procedures to address environmental justice and tribal issues in rulemaking.

Responsible Offices

The EPA's OAQPS, within the OAR, conducts RTRs and TRs. The OAQPS's primary mission is to preserve and improve air quality in the United States by:

- Compiling and reviewing air pollution data.
- Developing regulations to limit and reduce air pollution, such as through RTRs and TRs.

- Assisting state and local agencies with monitoring and controlling air pollution.
- Making information about air pollution available to the public.
- Reporting to Congress on the status of air pollution and the progress made in reducing it.

OAQPS Resources for RTRs and TRs

According to the OAQPS, the following staff and budget were dedicated to RTRs, TRs, and NESHAP issues, including addressing petitions for reconsideration of RTR rules:[3]

- 53 full-time equivalent employees and a budget of $6.657 million in fiscal year 2020.
- 51.5 full-time equivalent employees and a budget of $3.567 million in fiscal year 2021.

As shown, resources for RTRs, TRs, and NESHAP issues decreased from fiscal year 2020 to fiscal year 2021.

OAR Priorities

The *Office of Air and Radiation Final (OAR) FY 2020–2021 National Program Guidance* stated that the EPA will prioritize key activities to support attainment of National Ambient Air Quality Standards and implementation of stationary source regulations.[4] The guidance also said that the EPA will work with state and tribal partners to promptly review and make approval decisions on their implementation plans for attaining air quality standards and reducing contaminants that cause or exacerbate health issues.

Scope and Methodology

We conducted this evaluation from June 2021 to February 2022 in accordance with the *Quality Standards for Inspection and Evaluation* published in January 2012 by the Council of the Inspectors General on Integrity and Efficiency. Those standards require that we plan and perform the evaluation to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings, conclusions, and recommendations based on our review objective. We believe that the evidence obtained provides a reasonable basis for our findings, conclusions, and recommendations based on our review.

To address our objective, we determined the number of source categories with technology-based emission standards and their RTR and TR status by reviewing the EPA's internal spreadsheet on the status of RTRs and TRs, as well as the EPA's responses to our questions about review statuses, staffing, and resources.

[3] Members of the public who disagree with any aspects of a final rule may submit a petition for reconsideration, requesting the EPA to revise the rule.

[4] National Ambient Air Quality Standards are set for six criteria pollutants that are "common in outdoor air, considered harmful to public health and the environment, and that come from numerous and diverse sources." These six criteria pollutants are ground-level ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and particulate matter. Lead is also a hazardous air pollutant. Particulate matter may or may not comprise hazardous air pollutants. Hazardous air pollutants that typically exist as particulate matter include heavy metals (such as cadmium, mercury, chromium, and lead compounds) and semivolatile organic compounds (such as polycyclic aromatic hydrocarbons that are generally emitted from fuel combustion).

To determine whether source categories had overdue RTRs or TRs, we reviewed the EPA's internal spreadsheet on RTR and TR statuses to determine the time that elapsed since the:

- MACT standards were developed for any source categories that did not have a residual risk review or an initial TR.
- Last TR, if applicable, was conducted for each source category with MACT or area source standards.
- Area source standards were developed for any source categories that had not had an initial TR.

For overdue RTRs and TRs that were not, as of November 1, 2021, under court order to be completed, we reviewed the health effects of the air toxics emitted from these source categories, including information from the Agency for Toxic Substances and Disease Registry. The Agency for Toxic Substances and Disease Registry is a federal public health agency of the U.S. Department of Health and Human Services that responds to environmental health emergencies, investigates emerging environmental health threats, conducts research on the health impacts of hazardous waste sites, and builds the capabilities of and provides actionable guidance to state and local health partners.

Prior Report

In EPA OIG Report No. 21-P-0129, *EPA Should Conduct New Residual Risk and Technology Reviews for Chloroprene- and Ethylene Oxide-Emitting Source Categories to Protect Human Health*, issued May 6, 2021, we found that, despite the EPA classifying chloroprene as a likely carcinogen in 2010 and ethylene oxide as a carcinogen in 2016, the EPA had not conducted new RTRs for most source categories that emit chloroprene or ethylene oxide. We recommended that the EPA:

- Develop and implement an internal control process with specific criteria to determine whether and when new residual risk reviews of existing NESHAPs and uncontrolled emission sources are needed to incorporate new risk information that demonstrates an air pollutant is more toxic than previously determined.
- Conduct new residual risk reviews for five source categories that emit chloroprene or ethylene oxide.
- Revise the NESHAP for chemical manufacturing area sources to regulate ethylene oxide and conduct a residual risk review.
- Conduct overdue TRs for five source categories.

The EPA agreed to conduct the overdue TRs for five source categories and provided acceptable corrective actions with estimated completion dates. As of March 2022, the EPA had not provided acceptable corrective actions for the other three recommendations, which remain unresolved.

Chapter 2
The EPA Has Not Conducted All Statutorily Mandated RTRs and TRs

As of November 1, 2021, the EPA had not conducted, in a timely manner, all the CAA-mandated reviews used to revise standards, as needed, to protect the public from air toxics emitted from stationary sources. Specifically, of the 169 source categories, 93 had overdue RTRs or TRs:[5]

- RTRs were overdue for 14 of 16 source categories with MACT standards.[6]
- Recurring TRs were overdue for 35 of 101 source categories with MACT standards and completed RTRs.
- TRs were overdue for 44 of 50 area source categories with GACT standards.

Of the 93 overdue RTRs or TRs, 42 were overdue by five or more years. In addition, the EPA had not initiated reviews for 65, or 70 percent, of those 93 source categories. Of the 28 reviews in progress, 25 were initiated only in response to court orders; consent decrees; and an OIG recommendation issued in Report No. 21-P-0129, as outlined in the "Prior Report" section of Chapter 1. According to EPA staff, the volume of work, litigation, resource limitations, and other competing administration priorities are impediments to meeting the statutory review time frames. The EPA, however, does not know the number of staff and resources it needs to complete the statutorily mandated reviews within required time frames because it has not conducted a workforce analysis to determine the level of funding and staffing needed to complete its statutory obligations. In addition, the EPA lacks a strategy to meet the statutory deadlines for RTRs and TRs and to complete overdue RTRs and TRs. Air toxics emitted from source categories with overdue RTRs and TRs can cause cancer and other serious health conditions. Also, overdue statutorily mandated reviews may disproportionately impact communities with environmental justice concerns, given that minority and low-income populations are more likely to live near industrial facilities or other pollution sources.

RTRs and TRs Overdue for 93 Source Categories

Of the 169 source categories, there were 93 with overdue statutorily required reviews as of November 1, 2021,[7] 42 of which were overdue by five years or more and 65 of which had not yet been initiated. These overdue reviews include:

- RTRs for source categories with MACT standards.
- Recurring TRs for source categories with MACT standards and completed RTRs.
- TRs for area source categories with GACT standards.

[5] The second number—the 93 source categories with overdue RTRs or TRs—excludes two source categories with MACT standards that have overdue RTRs because there are no facilities within those two source categories that are regulated under the corresponding NESHAPs.
[6] The second number—the 16 source categories with MACT standards—excludes two source categories that do not have any facilities that are regulated under the corresponding NESHAPs. There are a total of 18 source categories with MACT standards, as shown in Appendix B.
[7] See Footnote 5.

A source category may contain anywhere from one facility to thousands of facilities. The RTR or TR for a source category would consider all the facilities within the source category. For example, a TR for the glass manufacturing area source category has been overdue for more than five years. In 2007, the EPA estimated there were 21 facilities within the glass manufacturing area source category in the United States. Glass manufacturing emits several air toxics, including chromium compounds. Human studies have established that inhaled hexavalent chromium is a human carcinogen that causes lung cancer.

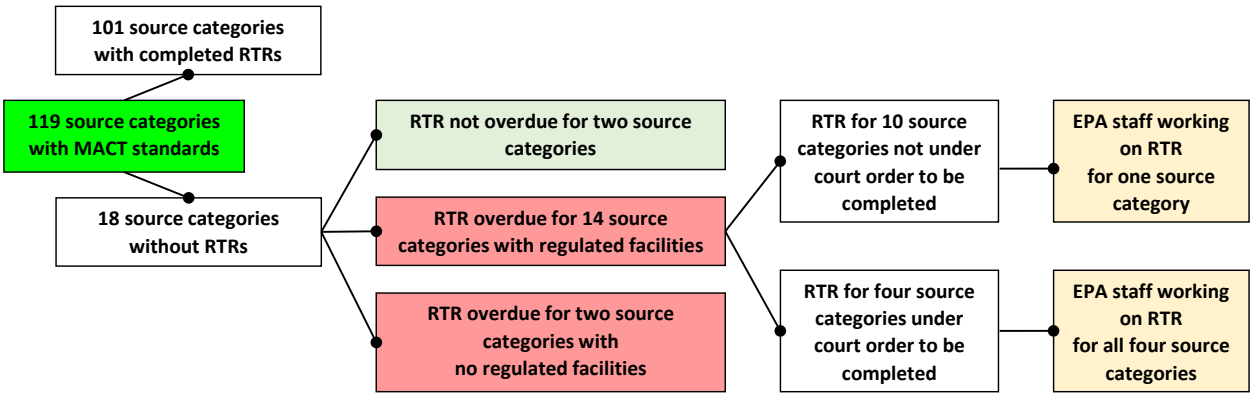
RTRs Overdue for 14 of 16 Source Categories with MACT Standards

Of the 169 source categories, 119 have MACT standards and require RTRs. The EPA had not conducted RTRs for 18 of the 119 source categories (Appendix B). As of March 2022, there are no facilities regulated by NESHAPs for two of the 18 source categories without RTRs. Of the remaining 16 source categories without RTRs that have NESHAP-regulated facilities, the EPA missed the statutory deadlines for 14, seven of which were overdue by at least five years. Of these 14 overdue RTRs, the EPA is under a court order to conduct four by various dates from April 1, 2022, through December 26, 2022. According to the EPA, staff are working on the four overdue RTRs under court order but on just one of the other ten overdue RTRs. The EPA initiated the one overdue RTR not under court order for efficiency purposes, since it was working concurrently on a petition for reconsideration of the MACT standards for the same source category. Figure 4 describes the RTR status of the 119 source categories with MACT standards.

Examples of source categories with overdue RTRs

- Primary copper smelting.
- Coke ovens: pushing, quenching, and battery stacks.
- Primary magnesium refining.
- Gold mine ore and ore processing and production.
- Polyvinyl chloride and copolymers production.

Figure 4: RTR status of the 119 source categories with MACT standards*



Source: OIG analysis of the CAA and information from the EPA. (EPA OIG image)

*As of November 1, 2021

Legend: Source category with MACT standards. Not overdue. Overdue. In progress.

Recurring TRs Overdue for 35 of 101 Source Categories with MACT Standards and Completed RTRs

Of the 101 source categories with MACT standards and completed RTRs, the eight-year recurring TRs for 35 were overdue (Appendix C). Nine of these TRs were overdue by at least five years. According to the EPA, of the 35 source categories with overdue recurring TRs, staff were working to complete four by

December 2022 because of court orders or consent decrees. For the other 31 overdue recurring TRs, EPA staff were working on two for the following source categories:

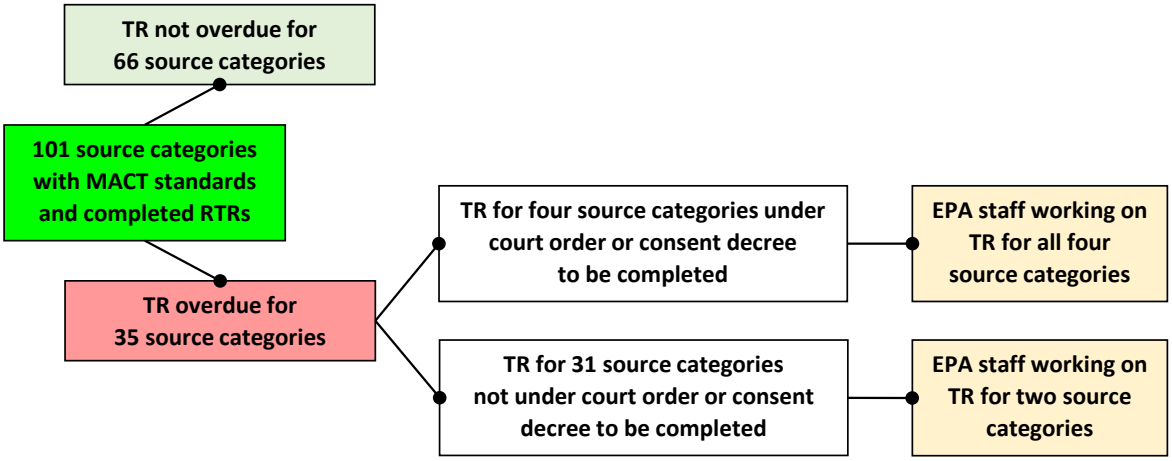
- *Synthetic organic chemical manufacturing industry.* In response to a May 2021 OIG recommendation issued in Report No. 21-P-0129, the Agency committed to completing the overdue TR for this source category by the second quarter of fiscal year 2024.
- *Commercial sterilizers.* In response to a May 2021 OIG recommendation issued in Report No. 21-P-0129, the EPA committed to conducting the overdue TR by the fourth quarter of fiscal year 2022.

Examples of source categories with MACT standards and completed RTRs but overdue TRs

- Coke ovens: charging, top side, door leaks.
- Gasoline distribution (Stage 1).
- Halogenated solvent cleaning.
- Industrial cooling towers.
- Marine vessel loading operations.

Figure 5 describes the TR status for the 101 source categories with MACT standards and completed RTRs.

Figure 5: TR status of the 101 source categories with MACT standards and completed RTRs*



Source: OIG analysis based on the CAA and information from the EPA. (EPA OIG image)

*As of November 1, 2021

Legend: Source category with MACT standards. Not overdue. Overdue. In progress.

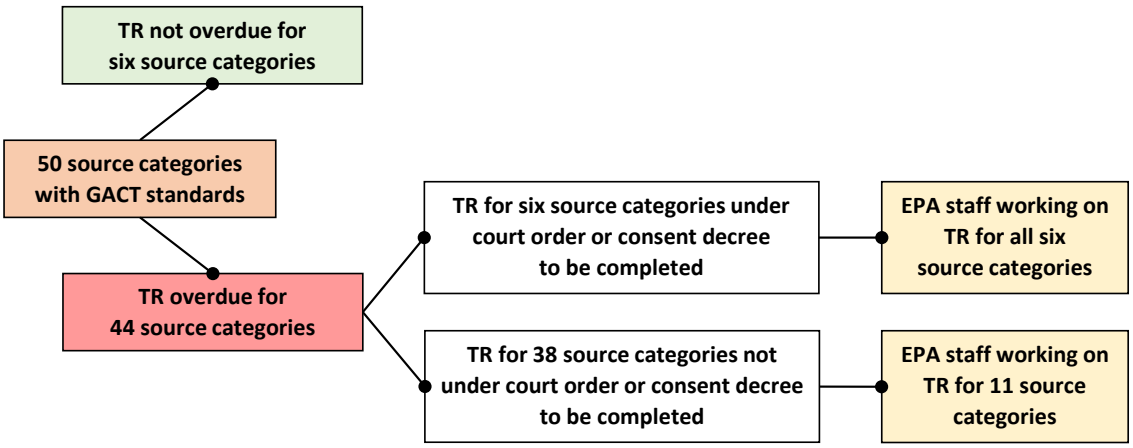
TRs Overdue for 44 of 50 Area Source Categories with GACT Standards

Of the 50 area source categories with GACT standards, TRs for 44 were overdue (Appendix D). TRs were overdue by five years or more for 26 of these 50 area source categories. According to the EPA, of the 44 area source categories with overdue TRs, staff were working to complete four by 2022 and two by 2023 because of court orders or consent decrees. For the remaining 38 overdue TRs, EPA staff were working on 11 of them. Figure 6 describes the TR status for the 50 area source categories with GACT standards.

Examples of area source categories with GACT standards and overdue TRs

- Lead acid battery manufacturing.
- Wood preserving.
- Paint stripping and miscellaneous surface coating operations.
- Glass manufacturing.
- Asphalt processing and asphalt roofing manufacturing.

Figure 6: TR status of the 50 area source categories with GACT standards*



Source: OIG analysis based on the CAA and information from the EPA. (EPA OIG image)

*As of November 1, 2021

Legend: Source category with GACT standards. Not overdue. Overdue. In progress.

Several Factors Contribute to Overdue RTRs and TRs

According to OAQPS staff, the factors contributing to overdue RTRs and TRs are the volume of work, litigation, insufficient resources, and other competing administration priorities. The EPA has not, however, conducted a workforce analysis to determine the resources needed to conduct the statutory reviews. In addition, the EPA lacks a strategy to conduct the RTRs and TRs within the required time frames. These reviews need to be conducted for the EPA to determine whether updated standards need to be developed to protect the public from air toxics emissions.

Workforce Analysis Has Not Been Conducted

The OAQPS does not know the number of staff or amount of resources needed to meet statutory deadlines for RTRs and TRs and has not conducted a workforce analysis. A workforce analysis includes determining what the current workforce resources are and how these resources will evolve through turnover. A workforce analysis also includes developing specifications for the types, numbers, and location of workers and managers needed to accomplish the Agency's strategic requirements, as well as determining what gaps exist between the existing and projected workforce needs. OAQPS staff stated that conducting a workforce analysis for the RTR and TR requirements would be challenging because of the following factors, which may vary from year to year:

- Number of source categories that need RTRs or TRs.
- Complexity of a given NESHAP undergoing an RTR or TR, such as the number of affected facilities in the source category, as well as of rule elements needing review; the existence of significant local issues for the affected facilities; and the impacts to small businesses.
- Statutorily required timing of the RTRs and TRs.
- Availability of funding for contractor assistance, which is often necessary for RTRs and TRs.
- Rulemakings prioritized by the administration.
- Litigation, including petitions for reconsiderations and lawsuits to impose deadlines on the EPA.

OAQPS staff could conduct a workforce analysis that accounts for these challenges and that is based on resources needed for previous RTRs and TRs. Without a workforce analysis, the EPA is not prepared to adequately staff RTRs and TRs. Without adequate staffing, RTRs and TRs cannot be conducted on time to meet statutory time frames, which would limit the information that the EPA can use to assess whether it is necessary to revise NESHAPs to protect the public from air toxics emitted from stationary sources. While completion of a workforce analysis does not guarantee that the RTR and TR program will receive the resources needed, the results of the analysis can be used to identify resources that the program needs to meet statutory deadlines and complete overdue reviews.

EPA Lacks Strategy to Meet Statutory Review Deadlines and Complete Overdue Reviews

According to OAQPS staff, since 2015, the Agency's work on RTRs and TRs has been driven by lawsuits and administration priorities. From 2015 through November 1, 2021, the OAQPS has completed RTRs for 55 source categories, all of which were completed under court order or consent decree except for one that was an administration priority. Beyond addressing court orders, consent decrees, and administration priorities, the OAQPS does not have a strategy to meet statutory RTR and TR deadlines or to complete all overdue reviews. Developing and implementing a strategy that includes sufficient funding and staffing to complete RTRs and TRs within statutory time frames, as well as all overdue RTRs and TRs, would ensure that these reviews are not conducted solely in reaction to lawsuits or administration priorities. Implementing the strategy also requires sufficient resources. The EPA could use the results of the workforce analysis to identify necessary program resources to implement the strategy to meet statutory deadlines and complete overdue reviews.

According to the OAQPS, when there are resources available to conduct RTRs and TRs that are not administration priorities or subject to court orders or consent decrees, the Agency has conducted internal prioritization exercises to choose which RTRs and TRs to perform. Risk metrics considered for these internal prioritization exercises include maximum individual cancer risk, noncancer hazard index, acute hazard quotient,[8] number of people with estimated cancer risk above one in one million, potential for high multipathway risk, and toxicity weighting of all air toxics. Risks to minority or low-income populations are not considered as part of these exercises.

Overdue RTRs and TRs May Delay the Development of Updated Standards that Reduce Public Health Risks

Overdue RTRs and TRs delay the EPA's assessment of source categories to determine whether the Agency needs to update NESHAPs to protect the public from air toxics emissions and reduce public health risks. Source categories with overdue statutory reviews emit certain hazardous air pollutants,

[8] According to the EPA's glossary of National Air Toxics Assessment terms, a hazard quotient is defined as the "ratio of the potential exposure to a substance and the level at which no adverse effects are expected (calculated as the exposure divided by the appropriate chronic or acute value). A hazard quotient of 1 or lower means adverse noncancer effects are unlikely, and thus can be considered to have negligible hazard. For HQs greater than 1, the potential for adverse effects increases, but we [the EPA] do not know by how much." A hazard index is defined as the "sum of hazard quotients for toxics that affect the same target organ or organ system. Because different air toxics can cause similar adverse health effects, combining hazard quotients from different toxics is often appropriate. A hazard index (HI) of 1 or lower means air toxics are unlikely to cause adverse noncancer health effects over a lifetime of exposure. However, an HI greater than 1 doesn't necessarily mean adverse effects are likely. Instead, EPA evaluates this on a case-by-case basis." (Webpage accessed January 11, 2022.)

such as mercury, vinyl chloride, arsenic, or lead. These pollutants can damage the nervous or respiratory systems, cause cancer, or even result in death. Appendix E lists some of the hazardous air pollutants emitted from the sources with overdue RTRs and TRs, along with the corresponding human health risks. For example, most dry-cleaning facilities use and emit tetrachloroethylene, which has been classified as a likely carcinogen (see green sidebar).

Most dry-cleaning facilities use and emit tetrachloroethylene

Breathing high levels of tetrachloroethylene for a brief period may cause dizziness or drowsiness, headache, and incoordination; higher levels may cause unconsciousness and even death. Exposure for longer periods to low levels of tetrachloroethylene may cause changes in mood, memory, attention, reaction time, and vision.

Tetrachloroethylene exposure may also cause adverse effects in the kidney, liver, and immune and hematologic systems, as well as on development and reproduction. The EPA has classified tetrachloroethylene as likely to be carcinogenic to humans.

In January 2022, the EPA and the World Health Organization signed an agreement to protect the public from increased environmental and public health risks and address environmental justice. Increased public health risks are a concern for minority and low-income populations. The EPA's overdue RTRs and TRs may disproportionately impact minority and low-income populations, thus negatively affecting the EPA administrator's goal—described in Chapter 1—to achieve environmental justice. While not specifically concerning RTRs and TRs, disparities in residential proximity to industrial facilities and other pollution sources in terms of income level, race, and ethnicity have been a concern in the United States.[9]

According to the administrator, the EPA's responsibility is to "protect the health and environment of all Americans, including those historically marginalized, overburdened, underserved, and living with the legacy of structural racism." To meet the administrator's directive to incorporate environmental justice considerations into the regulatory development processes and to consider regulatory options to maximize benefits to these communities, it is important to address overdue RTRs and TRs of source categories with facilities that may be disproportionately sited in areas with large minority or low-income populations. It is also important to address overdue RTRs and TRs of source categories emitting air toxics that can cause cancer or other serious health conditions.

Conclusions

The EPA needs to complete overdue RTRs or TRs to ensure that NESHAPs are updated to protect the public from air toxics emissions, including minority and low-income communities that are disproportionately impacted by industrial facilities and other pollution sources sited in their communities. The EPA needs to determine the workforce needed to meet its statutory mandate. In addition, rather than being driven by court orders and consent decrees, as well as by administration priorities that may detract from the Agency's ability to meet statutory deadlines, the EPA should develop a strategy incorporating the results of its workforce analysis to ensure that overdue reviews are completed in as timely a manner as practicable and that future reviews are conducted in accordance with statutory deadlines.

[9] Mohai, P.; Lantz, P.M.; Morenoff, J.; House, J.S.; and Mero, R.P., "Racial and Socioeconomic Disparities in Residential Proximity to Polluting Industrial Facilities: Evidence from the Americans' Changing Lives Study," *American Journal of Public Health* 99, no. S3 (2009), accessed June 25, 2021. Mikati, I.; Benson, A.F.; Luben, T.J.; Sacks, J.D.; Richmond-Bryant, J., "Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status," *American Journal of Public Health* 108, no. 4 (April 2018), accessed June 25, 2021. Terrell, K.A. and St. Julien, G., *Toxic Air Pollution is Linked to Higher Cancer Rates among Impoverished Communities in Louisiana*, July 23, 2021, accessed July 12, 2021.

Recommendations

We recommend that the assistant administrator for Air and Radiation:

1. Perform a workforce analysis to determine the staff and resources needed to meet the statutory deadlines for residual risk and technology reviews, initial technology reviews, and recurring eight-year technology reviews, as well as to complete any such reviews that are overdue.

2. Develop and implement a strategy to conduct (a) residual risk and technology reviews and recurring technology reviews by the applicable statutory deadlines and (b) any overdue residual risk and technology reviews and recurring technology reviews in as timely a manner as practicable. The strategy should take into account the Agency's environmental justice responsibilities under Executive Order 12898 and other applicable EPA and executive branch policies, procedures, and directives.

Agency Response and OIG Assessment

The OAR concurred with Recommendation 1 and partially concurred with Recommendation 2. However, both recommendations are unresolved because the OAR's estimated completion dates for the proposed corrective actions are not aggressive enough to ensure that public health risks are reduced in conformity with statutory direction.

In response to Recommendation 1, the OAR committed to completing a workforce analysis by the end of the first quarter of fiscal year 2024, which is December 31, 2023. A more aggressive time frame than the 21 months allotted is needed, given the large number of overdue RTRs and TRs that had not been initiated as of November 1, 2021. Therefore, Recommendation 1 is unresolved.

For Recommendation 2, the OAR concurred with developing a strategy but did not concur with implementing the strategy. The OAR was concerned that it may not have sufficient resources to successfully implement the strategy. Instead, the OAR committed to developing a strategy by the end of the first quarter of fiscal year 2025, which is December 31, 2024, and then seeking the necessary resources to implement the strategy. The OAR's 33-month time frame for completing the development of the strategy is not aggressive enough for the same reason stated above. Furthermore, by not committing to the implementation of the strategy, the OAR's planned corrective actions do not meet the intent of the recommendation. Actual implementation of the strategy is needed to ensure that overdue RTRs and TRs are conducted in as timely a manner as practicable and that future reviews will be completed by statutory deadlines. We acknowledge that strategy implementation requires sufficient resources. However, the OAR could start implementing the strategy with the funding that it has while it uses the results of the workforce analysis to identify the resources it needs to fully implement the strategy to meet statutory deadlines and address overdue reviews. Therefore, Recommendation 2 is unresolved.

Appendix F contains the Agency's response to the draft report. The response also included technical comments, and we updated the report where appropriate.

Status of Recommendations

RECOMMENDATIONS

Rec. No.	Page No.	Subject	Status[1]	Action Official	Planned Completion Date
1	14	Perform a workforce analysis to determine the staff and resources needed to meet the statutory deadlines for residual risk and technology reviews, initial technology reviews, and recurring eight-year technology reviews, as well as to complete any such reviews that are overdue.	U	Assistant Administrator for Air and Radiation	
2	14	Develop and implement a strategy to conduct (a) residual risk and technology reviews and recurring technology reviews by the applicable statutory deadlines and (b) any overdue residual risk and technology reviews and recurring technology reviews in as timely a manner as practicable. The strategy should take into account the Agency's environmental justice responsibilities under Executive Order 12898 and other applicable EPA and executive branch policies, procedures, and directives.	U	Assistant Administrator for Air and Radiation	

[1] C = Corrective action completed.
R = Recommendation resolved with corrective action pending.
U = Recommendation unresolved with resolution efforts in progress

Appendix A

Comparison of Residual Risk Review and TR

	Residual risk review	TR
Purpose	The EPA assesses the remaining health and environmental risks from air toxics emissions after implementation of the original MACT standards.	The EPA assesses advances in practices, processes, and control technologies. The EPA also takes this opportunity to address unregulated emission points, to require appropriate monitoring and add electronic compliance reporting, and to resolve administrative requirements that are duplicative or inconsistent.
Frequency	The EPA conducts a residual risk review within eight years of promulgating the original MACT standard. The CAA is silent on the frequency of residual risk reviews after the initial one is conducted.[a] The EPA stated in the 2006 commercial sterilizers RTR rulemaking that it has the authority to revisit past rulemakings if improvements to science suggest that the public is exposed to significant increases in risk as compared to the initial residual risk review.[b]	The CAA requires the EPA to conduct a TR every eight years after the original standard was developed.
Reason for revising standards	If risks are determined to be unacceptable, the EPA revises the MACT standards without cost considerations. If current MACT standards do not provide an "ample margin of safety" to protect public health or to prevent an adverse environmental effect, the EPA revises the standards.	If the EPA finds cost-effective approaches to further reduce emissions, it revises the MACT or GACT standards, taking into account advances in practices, processes, and control technologies.
Whether review is required for area sources with GACT standards	The EPA is not required to conduct residual risk reviews of area source categories subject to GACT standards.	The EPA is required to conduct TRs of all major and area source categories.

Source: CAA and EPA information. (EPA OIG table)

[a] The court in *Citizens for Pennsylvania's Future v. Andrew R. Wheeler*, 469 F. Supp. 3d 920 (N.D. Cal. 2020), found that the CAA did not create a mandatory duty for the EPA to review risk-based standards for potential revision when technology-based standards are revised.

[b] *Ethylene Oxide Emissions Standards for Sterilization Facilities, Final Decision*, 71 Fed. Reg. 17712, 17715, April 7, 2006.

Appendix B

Source Categories with MACT Standards that Need RTRs

Subpart of 40 C.F.R. part 63	Source category	Number of source types within category	Statutory due date for RTR	Court order due date for RTR	Years overdue[a]	EPA staff working on RTR?[a]
QQQ	Primary copper smelting	1	6/12/10	4/1/22	11.4	Yes
YY	Spandex production (generic MACT II)	1	7/12/10	N/A [b]	11.3	No [b]
CCCCC	Coke ovens: pushing, quenching, and battery stacks	1	4/14/11	12/26/22	10.6	Yes
BBBBB	Semiconductor manufacturing	1	5/22/11	N/A [b]	10.5	No [b]
TTTTT	Primary magnesium refining	1	10/10/11	8/1/22	10.1	Yes
IIIII	Mercury cell chlor-alkali plants (includes area sources)	1	12/19/11	5/2/22	9.9	Yes
ZZZZ	Stationary reciprocating internal-combustion engines (includes area sources)	1	6/15/12	N/A	9.4	No
EEE	Hazardous waste combustors (includes area sources)	1	10/12/13	N/A	8.1	No
YYYYY	Electric arc furnace steelmaking facilities (area sources)	1	12/28/15	N/A	5.8	No
EEEEEEE	Gold mine ore and ore processing and production	1	2/17/19	N/A	2.7	No
JJJJJJ	Industrial, commercial, and institutional boilers (area sources)	2	3/21/19	N/A	2.6	No
DDDDD	Industrial, commercial and institutional boilers and process heaters—major sources	3	3/21/19	N/A	2.6	No
J	Polyvinyl chloride and copolymers production	1	4/17/20	N/A	1.5	Yes [c]
JJJJJ	Brick and structural clay products manufacturing	1	10/26/23	N/A	N/A	No
KKKKK	Clay ceramics manufacturing	1	10/26/23	N/A	N/A	No
	Total	**18**				

Source: OIG analysis based on the CAA and EPA information. (EPA OIG table)

[a] As of November 1, 2021.

[b] RTR for the source category was originally under a court order to be completed by October 1, 2021, but the plaintiffs in the court case agreed with the EPA that an RTR is no longer warranted because there are currently no facilities in the United States that are subject to the NESHAP.

[c] For efficiency, EPA staff is working on the RTR while addressing the petition for reconsideration of the original MACT standards.

Appendix C

All Regulated Source Categories with MACT Standards and Completed RTRs

Subpart of 40 C.F.R. part 63	Source category	Number of source types within category	Statutory due date for TR	Court order or consent decree due date for TR	Years overdue[a]	EPA staff working on TR?[a]
L	Coke ovens: charging, top side, door leaks	1	4/15/13	12/26/22	8.6	Yes
R	Gasoline distribution (Stage 1)	1	4/6/14	12/1/22	7.6	Yes
Q	Industrial cooling towers	1	4/7/14	N/A	7.6	No
O	Commercial sterilizers (includes area sources)	1	4/7/14	N/A	7.6	Yes[b]
EE	Magnetic tape	1	4/7/14	N/A	7.6	No
M	Dry cleaning (includes area sources)	2	7/27/14	12/1/22	7.3	Yes
F, G, H, I	Hazardous organic NESHAP	1	12/21/14	N/A	6.9	Yes[c]
T	Halogenated solvent cleaning (includes area sources)	1	4/16/15	N/A	6.6	No
W	Polymers and resins II (two categories)	2	12/16/16	N/A	4.9	No
YY, UU	Generic MACT I–acetal resins	1	12/16/16	N/A	4.9	No
YY, UU	Generic MACT I–hydrogen fluoride	1	12/16/16	N/A	4.9	No
Y	Marine vessel loading operations	1	4/21/19	N/A	2.5	No
KK	Printing and publishing	1	4/21/19	N/A	2.5	No
U	Polymers and resins I (seven of nine categories)	7	4/21/19	N/A	2.5	No
GGG	Pharmaceuticals production	1	4/21/19	N/A	2.5	No
TTT	Primary lead smelting	1	11/15/19	N/A	2.0	No
JJ	Wood furniture	1	11/21/19	N/A	1.9	No
II	Shipbuilding and ship repair	1	11/21/19	N/A	1.9	No
X	Secondary lead smelters (includes area sources)	1	1/5/20	N/A	1.8	No
HHH	Natural gas transmission and storage	1	8/16/20	N/A	1.2	No
HH	Oil and natural gas production (includes area sources)	2	8/16/20	N/A	1.2	No
S	Pulp and paper (non-combust) MACT	1	9/11/20	N/A	1.1	No
N	Chromium electroplating (includes area sources)	3	9/19/20	N/A	1.1	No
CCC	Steel pickling-hydrogen chloride process facilities and hydrogen chloride regeneration plants	1	9/19/20	N/A	1.1	No
JJJ	Polymers and resins IV (five of seven categories)	5	3/27/22	N/A	N/A	No
PPP	Polyether polyols production	1	3/27/22	N/A	N/A	Yes[d]
MMM	Pesticide active ingredient production	1	3/27/22	N/A	N/A	No
III	Flexible polyurethane foam production	1	8/15/22	N/A	N/A	No
YY, UU	Generic MACT I–polycarbonates production	1	10/8/22	N/A	N/A	No

Subpart of 40 C.F.R. part 63	Source category	Number of source types within category	Statutory due date for TR	Court order or consent decree due date for TR	Years overdue[a]	EPA staff working on TR?[a]
YY, UU	Generic MACT I–acrylic/modacrylic fibers	1	10/8/22	N/A	N/A	No
OOO	Polymers and resins III	1	10/8/22	N/A	N/A	No
DD	Off-site waste recovery operations	1	3/18/23	N/A	N/A	No
XXX	Ferroalloys production (major sources)	1	6/30/23	N/A	N/A	No
DDD	Mineral wool production	1	7/29/23	N/A	N/A	No
NNN	Wool fiberglass manufacturing	1	7/29/23	N/A	N/A	No
AA, BB	Phosphoric acid/phosphate fertilizers	2	8/19/23	N/A	N/A	No
RRR	Secondary aluminum (area source MACT for dioxin and furan emissions)	1	9/8/23	N/A	N/A	No
LL	Primary aluminum	1	10/15/23	N/A	N/A	No
GG	Aerospace	1	11/19/23	N/A	N/A	No
CC	Petroleum refineries	1	12/1/23	N/A	N/A	No
UUU	Petroleum refineries (catalytic cracking, catalytic reforming, sulfur plant units, associated bypass lines)	1	12/1/23	N/A	N/A	No
MM	Pulp and paper combustion sources	1	9/29/25	N/A	N/A	No
CCCC	Nutritional yeast manufacturing	1	9/29/25	N/A	N/A	No
VVV	Publicly owned treatment works (includes area sources)	1	10/16/25	N/A	N/A	No
LLL	Portland cement manufacturing (includes area sources)	1	7/25/26	N/A	N/A	No
QQQQQ	Friction products manufacturing	1	2/8/27	N/A	N/A	No
TTTT	Leather finishing operations	1	2/12/27	N/A	N/A	No
HHHH	Wet formed fiberglass mat production	1	2/28/27	N/A	N/A	No
QQQQ	Wood building products	1	3/4/27	N/A	N/A	No
NNNN	Large appliances	1	3/15/27	N/A	N/A	No
RRRR	Metal furniture	1	3/15/27	N/A	N/A	No
OOOO	Fabric printing	1	3/15/27	N/A	N/A	No
SSSS	Metal coil	1	2/25/28	N/A	N/A	No
KKKK	Metal can	1	2/25/28	N/A	N/A	No
YYYY	Stationary combustion turbines	1	3/9/28	N/A	N/A	No
LLLLL	Asphalt processing and roofing manufacturing	2	3/12/28	N/A	N/A	No
GGGG	Solvent extraction for vegetable oil	1	3/18/28	N/A	N/A	No
VVVV	Boat manufacturing	1	3/20/28	N/A	N/A	No
WWWW	Reinforced plastics and composites production	1	3/20/28	N/A	N/A	No
AAAA	Municipal solid waste landfills (includes area sources)	1	3/26/28	N/A	N/A	No
NNNNN	Hydrochloric acid production	1	4/5/28	N/A	N/A	No
UUUUU	Utility NESHAP (mercury and air toxics standards) (includes area sources)	1	5/22/28	N/A	N/A	No
PPPPP	Engine test cells/stands	1	6/3/28	N/A	N/A	No
UUUU	Cellulose products manufacturing	2	7/2/28	N/A	N/A	No
YY	Ethylene processes	1	7/6/28	N/A	N/A	No
EEEE	Organic liquids distribution	1	7/7/28	N/A	N/A	No

Subpart of 40 C.F.R. part 63	Source category	Number of source types within category	Statutory due date for TR	Court order or consent decree due date for TR	Years overdue[a]	EPA staff working on TR?[a]
PPPP	Plastic parts	1	7/8/28	N/A	N/A	No
IIII	Auto and light duty	1	7/8/28	N/A	N/A	No
MMMM	Miscellaneous metal parts	1	7/8/28	N/A	N/A	No
JJJJ	Paper and other web coating	1	7/9/28	N/A	N/A	No
GGGGG	Site remediation	1	7/10/28	N/A	N/A	No
FFFFF	Integrated iron and steel	1	7/13/28	N/A	N/A	No
AAAAA	Lime manufacturing	1	7/24/28	N/A	N/A	No
XXXX	Rubber tire manufacturing	1	7/24/28	N/A	N/A	No
HHHHH	Miscellaneous coating manufacturing	1	8/14/28	N/A	N/A	No
EEEEE	Iron and steel foundries	1	9/10/28	N/A	N/A	No
RRRRR	Taconite iron ore processing	1	7/28/28	N/A	N/A	No
FFFF	Miscellaneous organic NESHAP	1	8/12/28	N/A	N/A	No
DDDD	Plywood and composite wood products	1	8/13/28	N/A	N/A	No
YY	Carbon black production	1	11/19/29	N/A	N/A	No
YY	Cyanide chemicals manufacturing	1	11/19/29	N/A	N/A	No
MMMMM	Flexible polyurethane foam fabrication	1	11/18/29	N/A	N/A	No
SSSSS	Refractory products manufacturing	1	11/19/29	N/A	N/A	No
	Total	**101**				

Source: OIG analysis of the CAA and EPA information. (EPA OIG table)

[a] As of November 1, 2021.

[b] EPA staff is working on the overdue TR as part of its two-pronged strategy to address ethylene oxide emissions. The Agency also committed to conducting the TR by the fourth quarter of fiscal year 2022 to address an OIG recommendation in Report No. 21-P-0129, issued May 6, 2021.

[c] EPA staff is working on the overdue TR because the Agency committed to conducting the TR by the second quarter of fiscal year 2024 to address an OIG recommendation in Report No. 21-P-0129, issued May 6, 2021.

[d] EPA staff is working on the TR after the Agency committed to conducting the review by the fourth quarter of fiscal year 2024 to address an OIG recommendation in Report No. 21-P-0129, issued May 6, 2021.

All Regulated Area Source Categories with GACT Standards

Subpart of 40 C.F.R. part 63	Source category	Number of source types within category	Statutory due date for TR	Court order or consent decree due date for TR	Years overdue [a]	EPA staff working on TR? [a]
EEEEEE	Primary copper smelting (area sources)	1	1/23/15	N/A	6.8	Yes [b]
GGGGGG	Primary nonferrous metals-zinc, cadmium, and beryllium (area sources)	1	1/23/15	N/A	6.8	No
FFFFFF	Secondary copper smelting (area sources)	1	1/23/15	N/A	6.8	No
LLLLLL	Acrylic/modacrylic fiber (area sources)	1	7/16/15	N/A	6.3	No
NNNNNN	Chromium compounds (area sources)	1	7/16/15	N/A	6.3	No
PPPPPP	Lead acid battery manufacturing (area sources)	1	7/16/15	2/9/23	6.3	Yes
QQQQQQ	Wood preserving (area sources)	1	7/16/15	3/1/23	6.3	Yes
RRRRRR	Clay ceramics manufacturing (area sources)	1	12/26/15	N/A	5.9	No
SSSSSS	Glass manufacturing (area sources)	1	12/26/15	N/A	5.9	No
TTTTTT	Secondary nonferrous metals processing (brass, bronze, magnesium and zinc) (area sources)	1	12/26/15	N/A	5.9	No
WWWWW	Hospitals: ethylene oxide sterilizers (area sources)	1	12/28/15	N/A	5.8	No
HHHHHH	Paint stripping and miscellaneous surface coating operations (area sources): rule covers miscellaneous surface coating, motor vehicle and mobile equipment surface coating, and paint stripping source categories	3	1/9/16	11/1/22	5.8	Yes
CCCCCC	Gasoline dispensing facilities (area sources)	1	1/10/16	N/A	5.8	No
BBBBBB	Gasoline distribution bulk terminals, bulk plants, and pipeline facilities (area sources)	1	1/10/16	12/1/22	5.8	Yes
WWWWWW	Plating and polishing operations (area sources)	1	7/1/16	N/A	5.3	No
XXXXXX	Metal fabrication and finishing-nine source categories (area sources)	9	7/23/16	N/A	5.3	No
YYYYYY	Ferroalloys production (area sources)	1	12/23/16	N/A	4.9	No
ZZZZZZ	Nonferrous foundries: aluminum, copper, and other (area sources)	3	6/25/17	N/A	4.4	No
VVVVVV	Chemical manufacturing industry (area sources)	9	10/29/17	N/A	4.0	Yes [c]
AAAAAAA	Asphalt processing and asphalt roofing manufacturing (area sources)	1	12/2/17	N/A	3.9	No
CCCCCCC	Paints and allied products manufacturing (area sources)	1	12/3/17	N/A	3.9	No
BBBBBBB	Chemical preparations industry (area sources)	1	12/30/17	N/A	3.8	No
DDDDDDD	Prepared feeds manufacturing (area sources)	1	1/5/18	N/A	3.8	No

Subpart of 40 C.F.R. part 63	Source category	Number of source types within category	Statutory due date for TR	Court order or consent decree due date for TR	Years overdue [a]	EPA staff working on TR? [a]
DDDDDD	Polyvinyl chloride and copolymers production (area sources)	1	4/17/20	N/A	1.5	Yes [d]
NN	Wool fiberglass manufacturing (area sources)	1	7/29/23	N/A	N/A	No
ZZZZZ	Iron and steel foundries (area sources)	2	9/10/28	N/A	N/A	No
MMMMMM	Carbon black production (area sources)	1	11/19/29	N/A	N/A	No
OOOOOO	Flexible polyurethane foam production and fabrication (area sources)	2	11/18/29	N/A	N/A	No
	Total	**50**				

Source: OIG analysis based on the CAA and information from the EPA. (EPA OIG image)

[a] As of 1, November 2021.

[b] EPA staff is working on the overdue TR as part of the major source RTR that the Agency is conducting under court order.

[c] EPA staff is working on the overdue TR after the Agency committed to conducting the TR by the fourth quarter of fiscal year 2024 to address an OIG recommendation in Report No. 21-P-0129, issued May 6, 2021.

[d] For efficiency, EPA staff is working on the TR while addressing the petition for reconsideration of the original GACT standards.

Appendix E

Examples: Emitted Air Toxics and Human Health Risks for Source Categories with Overdue Statutory Reviews

Gold mine ore and ore processing and production
Mercury: According to the ATSDR,* the nervous system is very sensitive to all forms of mercury. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems. Short-term exposure to high levels of metallic mercury vapors cause lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation. Very young children are more sensitive to mercury than adults. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.
Polyvinyl chloride and copolymers production
Vinyl chloride: The Department of Health and Human Services has determined that vinyl chloride is a known carcinogen. According to the ATSDR, breathing high levels of vinyl chloride can cause dizziness or sleepiness. Breathing very high levels can cause people to pass out, and breathing extremely high levels can cause death. Studies in workers who have breathed vinyl chloride over many years showed an increased risk of liver, brain, and lung cancer. Some cancers of the blood have also been observed in these workers. Animal studies suggest that infants and young children might be more susceptible than adults to vinyl chloride-induced cancer.
Vinylidene chloride (1,1 dichloroethylene): According to the EPA, the primary acute* effects in humans from vinylidene chloride exposure impact the central nervous system. Effects from exposure to high concentrations of vinylidene chloride include depression and symptoms of inebriation, convulsions, spasms, and unconsciousness. Low-level, chronic* inhalation exposure of vinylidene chloride in humans may affect the liver. Human data are considered inadequate in providing evidence of cancer from exposure to vinylidene chloride.
Vinyl acetate: According to the ATSDR, the major effects of breathing high levels of vinyl acetate for a short time are irritated eyes, nose, and throat. The effects of breathing lower levels of vinyl acetate for a long time are unknown. The International Agency for Research on Cancer has determined that vinyl acetate is not classifiable as a carcinogen to humans. There are no human studies on the carcinogenicity of vinyl acetate. An animal study has shown an increase in tumors of the noses of rats who breathed vinyl acetate.
Glass manufacturing
Arsenic: According to the EPA, acute high-level inhalation exposure to inorganic arsenic has resulted in respiratory effects, such as cough, dyspnea, and chest pain; gastrointestinal effects, such as nausea, diarrhea, and abdominal pain; and central and peripheral nervous system effects. Chronic inhalation exposure to inorganic arsenic in humans is associated with skin, cardiovascular, and neurological effects. The EPA has concluded that inorganic arsenic is a human carcinogen. According to the ATSDR, there is some evidence that long-term exposure to arsenic in children may result in lower Intelligent Quotient scores. There is also some evidence that exposure to arsenic in the womb and early childhood may increase mortality in young adults.
Cadmium: According to the EPA, the acute effects of cadmium in humans through inhalation exposure mainly involve the lungs, such as pulmonary irritation. Chronic inhalation or oral exposure to cadmium leads to a buildup of cadmium in the kidneys, which can cause kidney disease. The EPA has classified cadmium as a probable human carcinogen, while the Department of Health and Human Services and the International Agency for Research on Cancer have determined that cadmium and cadmium compounds are human carcinogens.
Chromium: According to the EPA, chromium occurs in primarily in two valence states: (1) trivalent chromium, or Cr III, and (2) hexavalent chromium, or Cr VI. Cr III is much less toxic than Cr VI. The respiratory tract is the major target organ for Cr III and VI exposure. Acute exposure to Cr VI resulted in shortness of breath, coughing, and wheezing, while chronic exposure resulted in perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, and other respiratory effects. Human studies have established that inhaled Cr VI is a human carcinogen, resulting in an increased risk of lung cancer. According to the ATSDR, it is likely that health effects seen in children exposed to high amounts of chromium will be similar to the effects seen in adults.
Lead: According to the ATSDR, lead can affect almost every organ and system in the human body. The nervous system is the main target for lead poisoning in children and adults. Chronic exposure can result in decreased learning, memory, and attention, as well as weakness in fingers, wrists, or ankles. Lead exposure can cause anemia and kidney damage. It can also cause increases in blood pressure, particularly in middle-aged and older individuals. Exposure to high lead levels can severely damage the brain and kidneys and can cause death. In pregnant women, exposure to high levels of lead may cause

miscarriage. In men, it can cause damage to reproductive organs. Children are more vulnerable to lead poisoning than adults because their nervous systems are still developing. The EPA has classified lead as a probable human carcinogen.
Manganese: According to the EPA, chronic exposure to high levels of manganese by inhalation in humans may affect the central nervous system. Visual reaction time, hand steadiness, and eye-hand coordination were affected in chronically exposed workers. Manganism—a syndrome characterized by feelings of weakness and lethargy, tremors, a mask-like face, and psychological disturbances—may result from chronic exposure to higher levels. Respiratory effects have been noted in workers chronically exposed by inhalation to manganese-bearing particles. According to the ATSDR, whether children are more sensitive to the effects of manganese is unknown, but experiments on laboratory animals suggest that they may be. The EPA has concluded that the existing scientific information cannot determine whether excess manganese can cause cancer.
Nickel: According to the ATSDR, some people have asthma attacks following exposure to nickel. Workers in nickel refineries or nickel-processing plants have experienced chronic bronchitis and reduced lung function. Cancers of the lung and nasal sinus have resulted when these workers breathed dust containing high levels of nickel compounds. It is likely that the health effects seen in children exposed to nickel will be similar to those seen in adults. Nickel can be transferred from the mother to an infant in breast milk and can cross the placenta. The EPA has determined that nickel refinery dust and nickel subsulfide are human carcinogens.
Asphalt processing and asphalt roofing manufacturing [a]
Formaldehyde: According to the EPA, acute and chronic inhalation exposure to formaldehyde in humans can result in respiratory symptoms, as well as eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. The EPA considers formaldehyde a probable human carcinogen, while the Department of Health and Human Services determined in 2011 that formaldehyde is a known human carcinogen.
Polycyclic organic matter: According to the EPA, the term *polycyclic organic matter* defines a broad class of compounds, including polycyclic aromatic hydrocarbon compounds such as benzo[a]pyrene. Cancer is the major concern of exposure to polycylic organic matter. Epidemiologic studies have reported an increase in lung cancer in humans exposed to mixtures that contain polycylic organic matter. Animal studies have reported respiratory tract tumors from inhalation exposure to benzo[a]pyrene. The EPA has classified seven polycyclic aromatic hydrocarbon compounds as probable human carcinogens: benzo[a]pyrene, benz[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, and indeno[1,2,3- cd]pyrene.

Source: Information from the EPA and ATSDR. (EPA OIG table)

[a] The asphalt processing and asphalt roofing manufacturing area source category also emits hexane, phenol, and toluene, but the EPA does not regulate these three air toxics for area sources.

* Legend: ATSDR = Agency for Toxic Substances and Disease Registry; Acute = Short-Term; Chronic = Long-Term.

Agency Response to Draft Report

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

March 3, 2022

OFFICE OF
AIR AND RADIATION

MEMORANDUM

SUBJECT: EPA Response to Draft Report: "EPA Needs to Develop a Strategy to Complete Overdue Residual Risk and Technology Reviews and Meet Statutory Deadlines for Upcoming Reviews" – Project No. OSRE-FY21-0224, July 30, 2020

FROM: Joseph Goffman
Principal Deputy Assistant Administrator

TO: Lauretta Joseph, Director
Programs, Offices and Centers Oversight Directorate
Office of Special Reviews and Evaluation
Office of the Inspector General

The Office of Air and Radiation (OAR) welcomes the opportunity to provide a written response to the findings and recommendations of the draft report titled "EPA Needs to Develop a Strategy to Complete Overdue Residual Risk and Technology Reviews and Meet Statutory Deadlines for Upcoming Reviews." Specifically, we address the two recommendations presented in the draft report. Our responses to these Office of Inspector General (OIG) recommendations include the following:

Recommendation 1: *Perform a workforce analysis to determine the staff and resources needed to meet the statutory deadlines for residual risk and technology reviews, initial technology reviews, and recurring eight-year technology reviews, as well as to complete any such reviews that are overdue.*

Response 1: OAR concurs with the OIG's first recommendation that OAR should develop a workforce analysis that will enable the Agency to determine the staff and resources needed to complete future reviews in accordance with statutory deadlines and complete overdue Residual Risk and Technology Reviews (RTRs) and Technology Reviews (TRs). The workforce analysis will enable OAR to identify proper staffing levels for the RTR and TR program to ensure critical

competencies are fulfilled, succession planning is well managed, costs are optimized, agility is achieved and resiliency is retained.

The report notes that OAQPS staff interviewed stated that conducting a workforce analysis would be challenging thanks to a number of factors, including: the sheer number of actions, complexity, required timing and availability of funding. OAR would clarify that these factors do not necessarily make *conducting* a workforce analysis challenging. Instead, these factors make *maintaining* the staff and necessary contractor resources identified in a workforce analysis challenging, particularlyin recent years where the Agency has encountered reduction in both intramural and extramural funding.

In any case, OAR fully supports and concurs with the OIG's first recommendation to conduct a workforce analysis to determine the staff and resources needed for the RTR and TR program to complete overdue reviews and to complete future reviews in accordance with statutory deadlines, contingent on available resources. As noted in the February 28th exit interview, OAR would like to understand the key components the OIG believes should be included in a workforce analysis (e.g., past workforce analysis examples). OAR would also appreciate further dialogue with the OIG to share proposed ideas for conducting a workforce analysis to ensure it meets expectations.

Planned Completion Date: FY 2024, Quarter 1 – *to complete a workforce analysis*

Recommendation 2: *Develop and implement a strategy to conduct (a) residual risk and technology reviews and recurring technology reviews by the applicable statutory deadlines and (b) any overdue residual risk and technology review and recurring technology review in as timely a manner as practicable. The strategy should take into account the Agency's environmental justice responsibilities under Executive Order 12898 and other applicable EPA and executive branch policies, procedures, and directives.*

Response 2: OAR concurs with the part of the OIG's second recommendation that OAR should *develop* a strategy to timely meet statutory deadlines for RTRs and TRs and complete all overdue RTRs and TRs. OAR fully supports developing a strategy that integrates the workforce analysis with the Agency's administration priorities, legal deadlines (e.g., court-ordered deadlines, settlement agreements), risk prioritization, and other factors in an effort to protect human health and the environment, particularly for those groups that have been historically marginalized, overburdened, underserved, and living with the legacy structural racism.

Concerning the part of the recommendation to *implement* such a strategy, we could support implementing the strategy if we receive adequate resources in the future. We will seek to include the necessary resources to implement the strategy in a future budget formulation opportunity (e.g., FY 2024 and out years).

The report also notes that such a strategy "should include sufficient funding and staffing to complete future reviews in accordance with statutory deadlines, rather than waiting to react to court orders or consent decrees on overdue reviews or being directed by senior leadership." OAR has two comments on this statement. First, similar to development of a workforce analysis, development of a strategy is distinct from implementation of such a strategy. As noted above, OAR fully supports and concurs with the recommendation to develop an RTR and TR strategy. However,

we wish to reiterate that successful implementation of such a strategy is contingent on the Agency receiving sufficient resources, both intramural and extramural, to allocate to these activities.

Second, the statement indicates that OAQPS merely "waits" to react to legal action or Administration direction. OAR would clarify that although a formal workforce analysis and strategy have not been carried out for the RTR and TR program, OAQPS is very strategic when allocating resources and staff to the RTR and TR program. Indeed, in FY 2021, the Sector and Policies and Programs Division in OAQPS developed and implemented a strategy that optimizes the allocation of resources and gains efficiencies. We would disagree with the characterization that OAQPS passively waits to react with respect to program direction; instead, OAQPS is very deliberate in prioritizing the Agency's limited resources to reduce risks to human health, particularly as it relates to environmental justice and equity issues.

Planned Completion Date: FY 2025, Quarter 1 – *to complete a strategy and seek necessary resources to implement the strategy*

Thank you for providing OAR the opportunity to review and provide comments on this draft OIG report. If you have any questions regarding this response, please contact Tiffany Purifoy, OAQPS/OAR Audit Liaison, at (919) 541-0878.

cc: James Hatfield
Bao Chuong
Betsy Shaw
Grant Peacock
Marc Vincent
Peter Tsirigotis
Mike Koerber
Penny Lassiter
Peter South
Juan Santiago
Tiffany Purifoy
Jodi Howard
Brian Shrager

Appendix G

Distribution

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