**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 63**

**[EPA-HQ-OAR-2020-0532; FRL-10018-49-OAR]**

**RIN 2060-AU64**

# National Emission Standards for Hazardous Air Pollutants: Cyanide Chemicals Manufacturing Residual Risk and Technology Review

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION**: Proposed rule.

**SUMMARY:** The U.S. Environmental Protection Agency (EPA) is proposing the results of the residual risk and technology review (RTR) for the National Emission Standards for Hazardous Air Pollutants (NESHAP) for the Cyanide Chemicals Manufacturing source category as required under the Clean Air Act (CAA). We are proposing to find that risk from emissions of air toxics from this source category is acceptable, and that the current standards provide an ample margin of safety to protect public health. We are also proposing to find that there are no developments in practices, processes, and control technologies, and, as such, we are not proposing any development-based changes to the current standards pursuant to the technology review. The EPA is, however, proposing new emissions standards to address emissions from process wastewater at existing sources. We are proposing to amend provisions addressing startup, shutdown, and malfunction (SSM), to add electronic reporting, and to update the reporting and recordkeeping requirements. We do not expect these proposed amendments to result in changes in emissions from the source category but anticipate improved monitoring, compliance, and implementation of the existing standards.

**DATES:**.Comments must be received on or before **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best assured of consideration if

the Office of Management and Budget (OMB) receives a copy of your comments on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

*Public hearing:* If anyone contacts us requesting a public hearing on or before **[INSERT DATE 5 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, we will hold a virtual public hearing. See **SUPPLEMENTARY INFORMATION** for information on requesting and registering for a public hearing.

**ADDRESSES:** You may send comments, identified by Docket ID No. EPA-HQ-OAR-2020-0532, by any of the following methods:

- Federal eRulemaking Portal: *https://www.regulations.gov/* (our preferred method). Follow the online instructions for submitting comments.
- Email: *a-and-r-docket@epa.gov*. Include Docket ID No. EPA-HQ-OAR-2020-0532 in the subject line of the message.
- Fax: (202) 566-9744. Attention Docket ID No. EPA-HQ-OAR-2020-0532.
- Mail: U.S. Environmental Protection Agency, EPA Docket Center, Docket ID No. EPA-HQ-OAR-2020-0532, Mail Code 28221T, 1200 Pennsylvania Avenue, NW, Washington, DC 20460.
- Hand/Courier Delivery: EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. The Docket Center's hours of operation are 8:30 a.m. – 4:30 p.m., Monday – Friday (except federal holidays).

*Instructions:* All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to *https://www.regulations.gov/*, including any personal information provided. For detailed instructions on sending comments and additional information on the rulemaking process, see the **SUPPLEMENTARY**

**INFORMATION** section of this document. Out of an abundance of caution for members of the public and our staff, the EPA Docket Center and Reading Room are closed to the public, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. We encourage the public to submit comments via *https://www.regulations.gov/* or email, as there may be a delay in processing mail and faxes. Hand deliveries and couriers may be received by scheduled appointment only. For further information on EPA Docket Center services and the current status, please visit us online at *https://www.epa.gov/dockets*.

**FOR FURTHER INFORMATION CONTACT:** For questions about this proposed action, contact Nathan Topham, Sector Policies and Programs Division (D243-02), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-0483; fax number: (919) 541-4991; and email address: *topham.nathan@epa.gov*. For specific information regarding the risk modeling methodology, contact James Hirtz, Health and Environmental Impacts Division (C539-02), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-0881; fax number: (919) 541-0840; and email address: *Hirtz.James@epa.gov*.

**SUPPLEMENTARY INFORMATION:**

*Participation in virtual public hearing.* Please note that the EPA is deviating from its typical approach for public hearings because the President has declared a national emergency. Due to the current Centers for Disease Control and Prevention (CDC) recommendations, as well as state and local orders for social distancing to limit the spread of COVID-19, the EPA cannot hold in-person public meetings at this time.

To request a virtual public hearing, contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov*. If requested, the virtual hearing will be held on **[INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL**

**REGISTER]**. The hearing will convene at 9:00 a.m. Eastern Time (ET) and will conclude at 3:00 p.m. ET. The EPA may close a session 15 minutes after the last pre-registered speaker has testified if there are no additional speakers. The EPA will announce further details at *https://www.epa.gov/stationary-sources-air-pollution/acetal-resins-acrylic-modacrylic-fibers-carbon-black-hydrogen*.

The EPA will begin pre-registering speakers for the hearing upon publication of this document in the **Federal Register**, if a hearing is requested. To register to speak at the virtual hearing, please use the online registration form available at *https://www.epa.gov/stationary-sources-air-pollution/acetal-resins-acrylic-modacrylic-fibers-carbon-black-hydrogen* or contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov*. The last day to pre-register to speak at the hearing will be **[INSERT DATE 12 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Prior to the hearing, the EPA will post a general agenda that will list pre-registered speakers in approximate order at: *https://www.epa.gov/stationary-sources-air-pollution/acetal-resins-acrylic-modacrylic-fibers-carbon-black-hydrogen*.

The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearings to run either ahead of schedule or behind schedule.

Each commenter will have 5 minutes to provide oral testimony. The EPA encourages commenters to provide the EPA with a copy of their oral testimony electronically (via email) by emailing it to *topham.nathan@epa.gov*. The EPA also recommends submitting the text of your oral testimony as written comments to the rulemaking docket.

The EPA may ask clarifying questions during the oral presentations but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral testimony and supporting information presented at the public hearing.

Please note that any updates made to any aspect of the hearing will be posted online at *https://www.epa.gov/stationary-sources-air-pollution/acetal-resins-acrylic-modacrylic-fibers-carbon-black-hydrogen*. While the EPA expects the hearing to go forward as set forth above, please monitor our website or contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov* to determine if there are any updates. The EPA does not intend to publish a document in the **Federal Register** announcing updates.

If you require the services of a translator or a special accommodation such as audio description, please pre-register for the hearing with the public hearing team and describe your needs by **[INSERT DATE 7 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The EPA may not be able to arrange accommodations without advanced notice.

*Docket*. The EPA has established a docket for this rulemaking under Docket ID No. EPA-HQ-OAR-2020-0532. All documents in the docket are listed in *https://www.regulations.gov*. Although listed, some information is not publicly available, *e.g.*, Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy. With the exception of such material, publicly available docket materials are available electronically in Regulations.gov.

*Instructions*. Direct your comments to Docket ID No. EPA-HQ-OAR-2020-0532. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *https://www.regulations.gov/*, including any personal information provided, unless the comment includes information claimed to be CBI or other information whose disclosure is restricted by statute. Do not submit electronically any information that you consider to be CBI or other information whose disclosure is restricted by statute. This type of information should be submitted by mail as discussed below.

The EPA may publish any comment received to its public docket. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written

comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the Web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *https://www.epa.gov/dockets/commenting-epa-dockets*.

The *https://www.regulations.gov/* website allows you to submit your comment anonymously, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to the EPA without going through *https://www.regulations.gov/*, your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any digital storage media you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should not include special characters or any form of encryption and be free of any defects or viruses. For additional information about the EPA's public docket, visit the EPA Docket Center homepage at *https://www.epa.gov/dockets.*

The EPA is temporarily suspending its Docket Center and Reading Room for public visitors, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. We encourage the public to submit comments via *https://www.regulations.gov/* as there may be a delay in processing mail and faxes. Hand deliveries or couriers will be received by scheduled appointment only. For further information and updates on EPA Docket Center services, please visit us online at *https://www.epa.gov/dockets*.

The EPA continues to carefully and continuously monitor information from the CDC, local area health departments, and our Federal partners so that we can respond rapidly as conditions change regarding COVID-19.

*Submitting CBI*. Do not submit information containing CBI to the EPA through *https://www.regulations.gov/* or email. Clearly mark the part or all of the information that you claim to be CBI. For CBI information on any digital storage media that you mail to the EPA, mark the outside of the digital storage media as CBI and then identify electronically within the digital storage media the specific information that is claimed as CBI. In addition to one complete version of the comments that includes information claimed as CBI, you must submit a copy of the comments that does not contain the information claimed as CBI directly to the public docket through the procedures outlined in *Instructions* above. If you submit any digital storage media that does not contain CBI, mark the outside of the digital storage media clearly that it does not contain CBI. Information not marked as CBI will be included in the public docket and the EPA's electronic public docket without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 Code of Federal Regulations (CFR) part 2. Send or deliver information identified as CBI only to the following address: OAQPS Document Control Officer (C404-02), OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention Docket ID No. EPA-HQ-OAR-2020-0532. Note that written comments containing CBI and submitted by mail may be delayed and no hand deliveries will be accepted.

*Preamble acronyms and abbreviations*. We use multiple acronyms and terms in this preamble. While this list may not be exhaustive, to ease the reading of this preamble and for reference purposes, the EPA defines the following terms and acronyms here:

| | |
|---|---|
| AEGL | acute exposure guideline level |
| AERMOD | air dispersion model used by the HEM-3 model |
| CAA | Clean Air Act |
| CalEPA | California EPA |
| CBI | Confidential Business Information |

| | |
|---|---|
| CFR | Code of Federal Regulations |
| EPA | Environmental Protection Agency |
| ERPG | emergency response planning guideline |
| ERT | Electronic Reporting Tool |
| HAP | hazardous air pollutant(s) |
| HCl | hydrochloric acid |
| HEM-3 | Human Exposure Model, Version 1.5.5 |
| HF | hydrogen fluoride |
| HI | hazard index |
| HQ | hazard quotient |
| IRIS | Integrated Risk Information System |
| km | kilometer |
| MACT | maximum achievable control technology |
| mg/kg-day | milligrams per kilogram per day |
| $mg/m^3$ | milligrams per cubic meter |
| MIR | maximum individual risk |
| NAAQS | National Ambient Air Quality Standards |
| NAICS | North American Industry Classification System |
| NESHAP | national emission standards for hazardous air pollutants |
| NRC | National Research Council |
| OAQPS | Office of Air Quality Planning and Standards |
| OMB | Office of Management and Budget |
| PAH | polycyclic aromatic hydrocarbons |
| PB-HAP | hazardous air pollutants known to be persistent and bio-accumulative in the environment |
| PM | particulate matter |
| POM | polycyclic organic matter |
| ppm | parts per million |
| REL | reference exposure level |
| RFA | Regulatory Flexibility Act |
| RfC | reference concentration |
| RfD | reference dose |
| RTR | residual risk and technology review |
| SAB | Science Advisory Board |
| SBA | Small Business Administration |
| SSM | startup, shutdown, and malfunction |
| SV | screening value |
| TOSHI | target organ-specific hazard index |
| tpy | tons per year |
| TRIM.FaTE | Total Risk Integrated Methodology.Fate, Transport, and Ecological Exposure model |
| UF | uncertainty factor |
| $\mu g/m^3$ | microgram per cubic meter |

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|---|---|
| URE | unit risk estimate |
| VCS | voluntary consensus standards |

*Organization of this document*. The information in this preamble is organized as follows:



## I. General Information

*A. Does this action apply to me?*

The source category that is the subject of this proposal is cyanide chemicals manufacturing major sources regulated under 40 CFR 63, subpart YY. The North American Industry Classification System (NAICS) codes for the cyanide chemicals manufacturing industry are 325188 and 325199. This list of categories and NAICS codes is not intended to be exhaustive, but rather provides a guide for readers regarding the entities that this proposed action is likely to affect. The proposed standards, once promulgated, will be directly applicable to the affected sources. Federal, state, local, and tribal government entities would not be affected by this proposed action. As defined in the *Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990* (see 57 FR 31576, July 16, 1992) and *Documentation for Developing the Initial Source Category List, Final Report* (see EPA-450/3-91-030, July 1992), the Cyanide Chemicals Manufacturing source category is any facility engaged in the production of hydrogen cyanide or sodium cyanide. Hydrogen cyanide production includes, but is not limited to, production of hydrogen cyanide using any of the following methods: reaction of methane and ammonia over a platinum catalyst, reaction of methane and ammonia over a platinum-rhodium catalyst, co-production with acrylonitrile (via Sohio process), or pyrolysis of formaldehyde. Sodium cyanide production includes, but is not limited to, production of sodium cyanide via the neutralization process, or so-called wet process. In this process, hydrogen cyanide reacts with sodium hydroxide solution usually in a reactor that involves evaporation of water and crystallization of the product, commonly called white cyanide.

*B. Where can I get a copy of this document and other related information?*

In addition to being available in the docket, an electronic copy of this action is available on the Internet. Following signature by the EPA Administrator, the EPA will post a copy of this proposed action at *https://www.epa.gov/stationary-sources-air-pollution/acetal-resins-acrylic-modacrylic-fibers-carbon-black-hydrogen*. Following publication in the **Federal Register**, the EPA will post the **Federal Register** version of the proposal and key technical documents at this

same website. Information on the overall RTR program is available at *https://www3.epa.gov/ttn/atw/rrisk/rtrpg.html*.

The proposed changes to the CFR that would be necessary to incorporate the changes proposed in this action are set out in an attachment to the memorandum titled *Proposed Regulation Edits for 40 CFR Part 63, Subpart YY*, available in the docket for this action (Docket ID No. EPA-HQ-OAR-2020-0532). The document includes the specific proposed amendatory language for revising the CFR and, for the convenience of interested parties, a redline version of the regulation. Following signature by the EPA Administrator, the EPA will also post a copy of this memorandum and the attachments to *https://www.epa.gov/stationary-sources-air-pollution/acetal-resins-acrylic-modacrylic-fibers-carbon-black-hydrogen*.

## II. Background

### *A. What is the statutory authority for this action?*

The statutory authority for this action is provided by sections 112 and 301 of the CAA, as amended (42 U.S.C. 7401 *et seq*.). Section 112 of the CAA establishes a two-stage regulatory process to develop standards for emissions of hazardous air pollutants (HAP) from stationary sources. Generally, the first stage involves establishing technology-based standards and the second stage involves evaluating those standards that are based on maximum achievable control technology (MACT) to determine whether additional standards are needed to address any remaining risk associated with HAP emissions. This second stage is commonly referred to as the "residual risk review." In addition to the residual risk review, the CAA also requires the EPA to review standards set under CAA section 112 every 8 years and revise the standards as necessary taking into account any "developments in practices, processes, or control technologies." This review is commonly referred to as the "technology review." When the two reviews are combined into a single rulemaking, it is commonly referred to as the "risk and technology review." The discussion that follows identifies the most relevant statutory sections and briefly explains the contours of the methodology used to implement these statutory requirements. A more

comprehensive discussion appears in the document titled *CAA Section 112 Risk and Technology Reviews: Statutory Authority and Methodology*, in the docket for this rulemaking.

In the first stage of the CAA section 112 standard setting process, the EPA promulgates technology-based standards under CAA section 112(d) for categories of sources identified as emitting one or more of the HAP listed in CAA section 112(b). Sources of HAP emissions are either major sources or area sources, and CAA section 112 establishes different requirements for major source standards and area source standards. "Major sources" are those that emit or have the potential to emit 10 tons per year (tpy) or more of a single HAP or 25 tpy or more of any combination of HAP. All other sources are "area sources." For major sources, CAA section 112(d)(2) provides that the technology-based NESHAP must reflect the maximum degree of emission reductions of HAP achievable (after considering cost, energy requirements, and non-air quality health and environmental impacts). These standards are commonly referred to as MACT standards. CAA section 112(d)(3) also establishes a minimum control level for MACT standards, known as the MACT "floor." In certain instances, as provided in CAA section 112(h), the EPA may set work practice standards in lieu of numerical emission standards. The EPA must also consider control options that are more stringent than the floor. Standards more stringent than the floor are commonly referred to as beyond-the-floor standards. For area sources, CAA section 112(d)(5) gives the EPA discretion to set standards based on generally available control technologies or management practices (GACT standards) in lieu of MACT standards.

The second stage in standard-setting focuses on identifying and addressing any remaining (*i.e.,* "residual") risk pursuant to CAA section 112(f). For source categories subject to MACT standards, section 112(f)(2) of the CAA requires the EPA to determine whether promulgation of additional standards is needed to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect. Section 112(d)(5) of the CAA provides that this residual risk review is not required for categories of area sources subject to GACT standards. Section 112(f)(2)(B) of the CAA further expressly preserves the EPA's use of the two-step

approach for developing standards to address any residual risk and the Agency's interpretation of "ample margin of safety" developed in the National Emissions Standards for Hazardous Air Pollutants: Benzene Emissions from Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, Benzene Storage Vessels, Benzene Equipment Leaks, and Coke By-Product Recovery Plants (Benzene NESHAP) (54 FR 38044, September 14, 1989). The EPA notified Congress in the Residual Risk Report that the Agency intended to use the Benzene NESHAP approach in making CAA section 112(f) residual risk determinations (EPA–453/R–99–001, p. ES–11). The EPA subsequently adopted this approach in its residual risk determinations and the United States Court of Appeals for the District of Columbia Circuit (the court) upheld the EPA's interpretation that CAA section 112(f)(2) incorporates the approach established in the Benzene NESHAP. See *NRDC v. EPA*, 529 F.3d 1077, 1083 (D.C. Cir. 2008).

The approach incorporated into the CAA and used by the EPA to evaluate residual risk and to develop standards under CAA section 112(f)(2) is a two-step approach. In the first step, the EPA determines whether risks are acceptable. This determination "considers all health information, including risk estimation uncertainty, and includes a presumptive limit on maximum individual lifetime [cancer] risk (MIR)[1] of approximately 1 in 10 thousand." (54 FR 38045). If risks are unacceptable, the EPA must determine the emissions standards necessary to reduce risk to an acceptable level without considering costs. In the second step of the approach, the EPA considers whether the emissions standards provide an ample margin of safety to protect public health "in consideration of all health information, including the number of persons at risk levels higher than approximately 1 in 1 million, as well as other relevant factors, including costs and economic impacts, technological feasibility, and other factors relevant to each particular decision." *Id.* The EPA must promulgate emission standards necessary to provide an ample

[1] Although defined as "maximum individual risk," MIR refers only to cancer risk. MIR, one metric for assessing cancer risk, is the estimated risk if an individual were exposed to the maximum level of a pollutant for a lifetime.

margin of safety to protect public health or determine that the standards being reviewed provide an ample margin of safety without any revisions. After conducting the ample margin of safety analysis, we consider whether a more stringent standard is necessary to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.

CAA section 112(d)(6) separately requires the EPA to review standards promulgated under CAA section 112 and revise them "as necessary (taking into account developments in practices, processes, and control technologies)" no less often than every 8 years. In conducting this review, which we call the "technology review," the EPA is not required to recalculate the MACT floor. *Natural Resources Defense Council (NRDC) v. EPA*, 529 F.3d 1077, 1084 (D.C. Cir. 2008). *Association of Battery Recyclers, Inc. v. EPA*, 716 F.3d 667 (D.C. Cir. 2013). The EPA may consider cost in deciding whether to revise the standards pursuant to CAA section 112(d)(6). The EPA is required to address regulatory gaps, such as missing standards for listed air toxics known to be emitted from the source category. *Louisiana Environmental Action Network (LEAN) v. EPA,* 955 F.3d 1088 (D.C. Cir. 2020).

*B. What is this source category and how does the current NESHAP regulate its HAP emissions?*

The MACT standards for the Cyanide Chemicals Manufacturing source category are contained in the Generic Maximum Achievable Control Technology (GMACT) NESHAP which also includes MACT standards for several other source categories. The cyanide chemicals manufacturing standards were promulgated on July 12, 2002, (67 FR 46258) and codified at 40 CFR part 63, subpart YY. As promulgated in 2002, the cyanide chemicals manufacturing standards regulate HAP emissions from cyanide chemicals manufacturing units located at major sources. The HAP emitted from the source category include cyanide compounds (hydrogen cyanide and sodium cyanide), acetonitrile, and acrylonitrile.

The NESHAP defines the affected source as each cyanide chemicals manufacturing process unit (CCMPU). The rule states that the CCMPU is the equipment assembled and connected by hard-piping or duct work to process raw materials to manufacture, store, and

transport a cyanide chemicals product. A CCMPU shall be limited to any one of the following: an Andrussow process unit, a Blausaure Methane Anlage process unit, a sodium cyanide process unit, or a Sohio hydrogen cyanide process unit. For the purpose of this subpart, a CCMPU includes reactors and associated unit operations, associated recovery devices, and any feed, intermediate and product storage vessels, product transfer racks, and connected ducts and piping. A CCMPU also includes pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, instrumentation systems, and control devices or systems.

The NESHAP established emissions standards for process vents, storage vessels, transfer racks, and equipment leaks. Cyanide process vents are subject to a 98 weight-percent reduction of total HAP[2] performance standard or 20 parts per million by volume (ppmv) total HAP outlet exit concentration limit. For storage vessels in the Cyanide Chemicals Manufacturing source category, sources may either choose to comply with a 98 weight-percent reduction of hydrogen cyanide performance standard, a 20 ppmv hydrogen cyanide exit outlet concentration limit, or equipment standards (*e.g.*, use a flare). Transfer racks are subject to equipment standards or the same performance standard or concentration limit[3] as cyanide process vents. Equipment leaks are subject to work practice standards required by either 40 CFR part 63, subpart TT or subpart UU.

C. *What data collection activities were conducted to support this action?*

The EPA used a variety of resources to obtain data about facilities and their emissions for use in our risk assessment. We used the EPA's Enforcement and Compliance History Online (ECHO) database to develop a list of potentially subject facilities. Using this list, we searched state environmental agency websites and correspondence with industry to obtain copies of title V

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[2] "Dry end" process vents at sodium cyanide units must meet a 98 percent reduction performance standard for emissions of sodium cyanide since this is the form of cyanide compounds emitted from these emission points. The HAP emitted from other process vents that make up the "total HAP" emitted from these sources are hydrogen cyanide, acetonitrile, and acrylonitrile.

[3] Transfer racks emissions limits are expressed in terms of hydrogen cyanide as this is the only HAP emitted from these sources.

permits to confirm whether facilities have cyanide chemicals manufacturing subject to the NESHAP. Once the facility list was finalized, the EPA used the 2017 National Emissions Inventory (NEI) to get emissions data for each facility. We compared the NEI data to title V permits to provide additional information regarding the applicability of the Cyanide Chemicals Manufacturing NESHAP. Further discussion of the methodology used to develop the emissions dataset for the risk assessment can be found in the memorandum titled *Technical Support Document for the Cyanide Chemicals Manufacturing NESHAP Residual Risk and Technology Review Proposal*, which is available in the docket for this action.

*D. What other relevant background information and data are available?*

We searched for information from the Reasonably Available Control Technology, Best Available Control Technology, and Lowest Achievable Emission Rate Clearinghouse (RBLC) database, reviewed title V permits for each cyanide chemicals manufacturing facility, and reviewed regulatory actions related to emissions controls at similar sources that could be applicable to cyanide chemicals manufacturing. We reviewed the RBLC to identify potential additional control technologies. No additional control technologies applicable to cyanide chemicals manufacturing were found using the RBLC. Additional information related to the promulgation and subsequent amendments of the NESHAP is available in docket ID: No. EPA-HQ-OAR-2004-0041.

## III. Analytical Procedures and Decision-Making

In this section, we describe the analyses performed to support the proposed decisions for the RTR and other issues addressed in this proposal.

*A. How do we consider risk in our decision-making?*

As discussed in section II.A of this preamble and in the Benzene NESHAP, in evaluating and developing standards under CAA section 112(f)(2), we apply a two-step approach to determine whether or not risks are acceptable and to determine if the standards provide an ample margin of safety to protect public health. As explained in the Benzene NESHAP, “the first step

judgment on acceptability cannot be reduced to any single factor" and, thus, "[t]he Administrator believes that the acceptability of risk under section 112 is best judged on the basis of a broad set of health risk measures and information." (54 FR at 38046). Similarly, with regard to the ample margin of safety determination, "the Agency again considers all of the health risk and other health information considered in the first step. Beyond that information, additional factors relating to the appropriate level of control will also be considered, including cost and economic impacts of controls, technological feasibility, uncertainties, and any other relevant factors." *Id.*

The Benzene NESHAP approach provides flexibility regarding factors the EPA may consider in making determinations and how the EPA may weigh those factors for each source category. The EPA conducts a risk assessment that provides estimates of the MIR posed by emissions of HAP that are carcinogens from each source in the source category, the hazard index (HI) for chronic exposures to HAP with the potential to cause noncancer health effects, and the hazard quotient (HQ) for acute exposures to HAP with the potential to cause noncancer health effects.[4] The assessment also provides estimates of the distribution of cancer risk within the exposed populations, cancer incidence, and an evaluation of the potential for an adverse environmental effect. The scope of the EPA's risk analysis is consistent with the explanation in EPA's response to comments on our policy under the Benzene NESHAP:

> The policy chosen by the Administrator permits consideration of multiple measures of health risk. Not only can the MIR figure be considered, but also incidence, the presence of non-cancer health effects, and the uncertainties of the risk estimates. In this way, the effect on the most exposed individuals can be reviewed as well as the impact on the general public. These factors can then be weighed in each individual case. This approach complies with the *Vinyl Chloride* mandate that the Administrator ascertain an acceptable level of risk to the public by employing his expertise to assess available data. It also complies with the Congressional intent behind the CAA, which did not exclude the use of any particular measure of public health risk from the EPA's consideration with respect to CAA section 112 regulations, and thereby implicitly permits consideration of any and all measures of health risk which the Administrator, in his judgment, believes are appropriate to determining what will "protect the public health.

[4] The MIR is defined as the cancer risk associated with a lifetime of exposure at the highest concentration of HAP where people are likely to live. The HQ is the ratio of the potential HAP exposure concentration to the noncancer dose-response value; the HI is the sum of HQs for HAP that affect the same target organ or organ system.

(54 FR at 38057). Thus, the level of the MIR is only one factor to be weighed in determining acceptability of risk. The Benzene NESHAP explained that "an MIR of approximately one in 10 thousand should ordinarily be the upper end of the range of acceptability. As risks increase above this benchmark, they become presumptively less acceptable under CAA section 112, and would be weighed with the other health risk measures and information in making an overall judgment on acceptability. Or, the Agency may find, in a particular case, that a risk that includes an MIR less than the presumptively acceptable level is unacceptable in the light of other health risk factors." *Id.* at 38045. In other words, risks that include an MIR above 100-in-1 million may be determined to be acceptable, and risks with an MIR below that level may be determined to be unacceptable, depending on all of the available health information. Similarly, with regard to the ample margin of safety analysis, the EPA stated in the Benzene NESHAP that: "EPA believes the relative weight of the many factors that can be considered in selecting an ample margin of safety can only be determined for each specific source category. This occurs mainly because technological and economic factors (along with the health-related factors) vary from source category to source category." *Id.* at 38061. We also consider the uncertainties associated with the various risk analyses, as discussed earlier in this preamble, in our determinations of acceptability and ample margin of safety.

The EPA notes that it has not considered certain health information to date in making residual risk determinations. At this time, we do not attempt to quantify the HAP risk that may be associated with emissions from other facilities that do not include the source category under review, mobile source emissions, natural source emissions, persistent environmental pollution, or atmospheric transformation in the vicinity of the sources in the category.

The EPA understands the potential importance of considering an individual's total exposure to HAP in addition to considering exposure to HAP emissions from the source category and facility. We recognize that such consideration may be particularly important when assessing noncancer risk, where pollutant-specific exposure health reference levels (*e.g.*, reference

concentrations (RfCs)) are based on the assumption that thresholds exist for adverse health effects. For example, the EPA recognizes that, although exposures attributable to emissions from a source category or facility alone may not indicate the potential for increased risk of adverse noncancer health effects in a population, the exposures resulting from emissions from the facility in combination with emissions from all of the other sources (*e.g.*, other facilities) to which an individual is exposed may be sufficient to result in an increased risk of adverse noncancer health effects. In May 2010, the Science Advisory Board (SAB) advised the EPA "that RTR assessments will be most useful to decision makers and communities if results are presented in the broader context of aggregate and cumulative risks, including background concentrations and contributions from other sources in the area."[5]

In response to the SAB recommendations, the EPA incorporates cumulative risk analyses into its RTR risk assessments. The Agency (1) conducts facility-wide assessments, which include source category emission points, as well as other emission points within the facilities; (2) combines exposures from multiple sources in the same category that could affect the same individuals; and (3) for some persistent and bioaccumulative pollutants, analyzes the ingestion route of exposure. In addition, the RTR risk assessments consider aggregate cancer risk from all carcinogens and aggregated noncancer HQs for all noncarcinogens affecting the same target organ or target organ system.

Although we are interested in placing source category and facility-wide HAP risk in the context of total HAP risk from all sources combined in the vicinity of each source, we are concerned about the uncertainties of doing so. Estimates of total HAP risk from emission sources other than those that we have studied in depth during this RTR review would have significantly greater associated uncertainties than the source category or facility-wide estimates. Such

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[5] Recommendations of the SAB Risk and Technology Review Methods Panel are provided in their report, which is available at: *https://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf*.

aggregate or cumulative assessments would compound those uncertainties, making the assessments too unreliable.

*B. How do we perform the technology review?*

Our technology review primarily focuses on the identification and evaluation of developments in practices, processes, and control technologies that have occurred since the MACT standards were promulgated. Where we identify such developments, we analyze their technical feasibility, estimated costs, energy implications, and non-air environmental impacts. We also consider the emission reductions associated with applying each development. This analysis informs our decision of whether it is "necessary" to revise the emissions standards. In addition, we consider the appropriateness of applying controls to new sources versus retrofitting existing sources. For this exercise, we consider any of the following to be a "development":

- Any add-on control technology or other equipment that was not identified and considered during development of the original MACT standards;
- Any improvements in add-on control technology or other equipment (that were identified and considered during development of the original MACT standards) that could result in additional emissions reduction;
- Any work practice or operational procedure that was not identified or considered during development of the original MACT standards;
- Any process change or pollution prevention alternative that could be broadly applied to the industry and that was not identified or considered during development of the original MACT standards; and
- Any significant changes in the cost (including cost effectiveness) of applying controls (including controls the EPA considered during the development of the original MACT standards).

In addition to reviewing the practices, processes, and control technologies that were considered at the time we originally developed (or last updated) the NESHAP, we review a variety of data sources in our investigation of potential practices, processes, or controls. We also review the NESHAP and the available data to determine if there are any unregulated emissions of HAP within the source category and evaluate this data for use in developing new emission standards. See sections II.C and II.D of this preamble for information on the specific data sources that were reviewed as part of the technology review.

*C. How do we estimate post-MACT risk posed by the source category?*

In this section, we provide a complete description of the types of analyses that we generally perform during the risk assessment process. In some cases, we do not perform a specific analysis because it is not relevant. For example, in the absence of emissions of HAP known to be persistent and bioaccumulative in the environment (PB-HAP), we would not perform a multipathway exposure assessment. Where we do not perform an analysis, we state that we do not and provide the reason. While we present all of our risk assessment methods, we only present risk assessment results for the analyses actually conducted (see section IV.B of this preamble).

The EPA conducts a risk assessment that provides estimates of the MIR for cancer posed by the HAP emissions from each source in the source category, the HI for chronic exposures to HAP with the potential to cause noncancer health effects, and the HQ for acute exposures to HAP with the potential to cause noncancer health effects. The assessment also provides estimates of the distribution of cancer risk within the exposed populations, cancer incidence, and an evaluation of the potential for an adverse environmental effect. The seven sections that follow this paragraph describe how we estimated emissions and conducted the risk assessment. The docket for this rulemaking contains the following document which provides more information on the risk assessment inputs and models: *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the 2020 Risk and Technology Review Proposed*

*Rule*. The methods used to assess risk (as described in the seven primary steps below) are consistent with those described by the EPA in the document reviewed by a panel of the EPA's SAB in 2009;[6] and described in the SAB review report issued in 2010. They are also consistent with the key recommendations contained in that report.

1. How did we estimate actual emissions and identify the emissions release characteristics?

The list of facilities subject to the NESHAP was created through searching the EPA's ECHO database, the 2017 NEI, and state databases of title V permits. The list of facilities is available in the memorandum titled *Technical Support Document for the Cyanide Chemicals Manufacturing NESHAP Residual Risk and Technology Review Proposal*. Once the facility list was finalized, available emissions data were obtained from the NEI. Title V permits were used to determine which emission points at each facility are subject to the Cyanide Chemicals Manufacturing NESHAP.

We compared the NEI data to title V permits to confirm that the NEI included all emission points listed as subject to the NESHAP according to the permit. We evaluated latitudes and longitudes listed in the NEI to ensure their accuracy using satellite imagery. All of the latitudes and longitudes used in our dispersion modeling are in the modeling file used for the proposed rule, which is available in Docket ID No. EPA-HQ-OAR-2020-0532. Corrections were made to emission point characteristics for one non-category emission point that appeared to have erroneous stack velocity entered into the NEI. This emission point's stack velocity was corrected to a default maximum value. All corrections made to emission point parameters are documented in the modeling file, available in Docket ID No. EPA-HQ-OAR-2020-0532.

2. How did we estimate MACT-allowable emissions?

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[6] U.S. EPA. *Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing*, June 2009. EPA-452/R-09-006. *https://www3.epa.gov/airtoxics/rrisk/rtrpg.html*.

The available emissions data in the RTR emissions dataset include estimates of the mass of HAP emitted during a specified annual time period. These "actual" emission levels are often lower than the emission levels allowed under the requirements of the current MACT standards. The emissions allowed under the MACT standards are referred to as the "MACT-allowable" emissions. We discussed the consideration of both MACT-allowable and actual emissions in the final Coke Oven Batteries RTR (70 FR 19992, 19998 and 19999, April 15, 2005) and in the proposed and final Hazardous Organic NESHAP RTR (71 FR 34421, 34428, June 14, 2006, and 71 FR 76603, 76609, December 21, 2006, respectively). In those actions, we noted that assessing the risk at the MACT-allowable level is inherently reasonable since that risk reflects the maximum level facilities could emit and still comply with national emission standards. We also explained that it is reasonable to consider actual emissions, where such data are available, in both steps of the risk analysis, in accordance with the Benzene NESHAP approach. (54 FR 38044).

We have determined that the actual emissions data are reasonable estimates of the MACT-allowable emissions levels for the Cyanide Chemicals Manufacturing source category. The ability to estimate MACT-allowable emissions from the actual emissions dataset is largely dependent on the format of the standard for a given emissions source as well as the types of controls employed for the source. With respect to the various types of controls used within the Cyanide Chemicals Manufacturing source category, the most prevalent is the use of a flare as a combustion control device. A flare can be used to control emissions for a single emissions source, or, as is generally the case, to control emissions from multiple emission sources/emission source types. Flares are designed to handle a wide range of flowrates and compositions of combustible waste gases. Within the Cyanide Chemicals Manufacturing source category, flares generally control emissions from multiple emission source types. Consideration of this, along with not having a specific limit on how much gas can be combusted in a flare (given that in many cases multiple emissions sources are being controlled by this control device), means that it is extremely difficult to determine an allowable emission rate for flares. We have determined that

flares in the Cyanide Chemicals Manufacturing source category are currently complying with design and operational requirements that are generally expected to achieve 98 percent destruction efficiencies or control, which is the level of control required by the NESHAP. HAP emissions inventories for flares in the Cyanide Chemicals Manufacturing source category are developed using engineering knowledge and, in many instances, presume this 98 percent level of control. The Agency is unaware of any data that suggest that flares used as controls in the Cyanide Chemicals Manufacturing source category are consistently overcontrolling HAP emissions beyond 98 percent control. Thus, weighing all of these factors for flares, we determined that the actual emission levels are a reasonable estimation of the MACT-allowable emissions levels where the performance standards allow the use of a flare as an air pollution control device (*e.g.*, storage vessels, process vents, and transfer racks).

For equipment leaks, which are currently subject to work practice standards, there would be no difference between actual and MACT-allowable emissions for facilities in the Cyanide Chemicals Manufacturing source category, provided the facilities are complying with the MACT standards as well as not conducting additional work practices that would reduce emissions beyond those required by the rule. We are aware of only one rule in the state of Texas, the Texas Commission of Environmental Quality (TCEQ) Highly Reactive Volatile Organic Compounds (HRVOC) Rule (*i.e.*, 30 TAC Chapter 115, Subchapter H, Division 3), that may contain more stringent leak definitions and/or monitoring frequencies for certain pieces of equipment for the three facilities located in Texas that might be subject to this rule. However, based on our review of the Texas rule, we note the following: (1) specific facilities located in the Houston-Galveston-Brazoria area still conduct a leak detection and repair (LDAR) program using EPA Method 21; (2) the vast majority of equipment, including almost all pieces of equipment in gas and vapor service that would tend to contribute considerably to the overall equipment leak air emissions, are complying with the same leak definition as in the MACT standards; and (3) the TCEQ HRVOC Rule generally requires quarterly monitoring while the MACT standards have varying

monitoring frequencies depending on the percentage of leaking equipment that could lead to more stringent, the same, or less stringent frequencies that would require an EPA Method 21 measurement and repair of a leaking component (if measured). Therefore, considering these factors for equipment leaks, we determined that the actual emission levels for equipment leaks are a reasonable estimation of the MACT-allowable emissions levels.

3. How do we conduct dispersion modeling, determine inhalation exposures, and estimate individual and population inhalation risk?

Both long-term and short-term inhalation exposure concentrations and health risk from the source category addressed in this proposal were estimated using the Human Exposure Model (HEM-3).[7] The HEM-3 performs three primary risk assessment activities: (1) conducting dispersion modeling to estimate the concentrations of HAP in ambient air, (2) estimating long-term and short-term inhalation exposures to individuals residing within 50 kilometers (km) of the modeled sources, and (3) estimating individual and population-level inhalation risk using the exposure estimates and quantitative dose-response information.

*a. Dispersion Modeling*

The air dispersion model AERMOD, used by the HEM-3 model, is one of the EPA's preferred models for assessing air pollutant concentrations from industrial facilities.[8] To perform the dispersion modeling and to develop the preliminary risk estimates, HEM-3 draws on three data libraries. The first is a library of meteorological data, which is used for dispersion calculations. This library includes 1 year (2016) of hourly surface and upper air observations from 826 meteorological stations, selected to provide coverage of the United States and Puerto Rico. A second library of United States Census Bureau census block[9] internal point locations and

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[7] For more information about HEM-3, go to *https://www.epa.gov/fera/risk-assessment-and-modeling-human-exposure-model-hem.*

[8] U.S. EPA. Revision to the *Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions* (70 FR 68218, November 9, 2005).

[9] A census block is the smallest geographic area for which census statistics are tabulated.

populations provides the basis of human exposure calculations (U.S. Census, 2010). In addition, for each census block, the census library includes the elevation and controlling hill height, which are also used in dispersion calculations. A third library of pollutant-specific dose-response values is used to estimate health risk. These are discussed below.

*b. Risk from Chronic Exposure to HAP*

In developing the risk assessment for chronic exposures, we use the estimated annual average ambient air concentrations of each HAP emitted by each source in the source category. The HAP air concentrations at each nearby census block centroid located within 50 km of the facility are a surrogate for the chronic inhalation exposure concentration for all the people who reside in that census block. A distance of 50 km is consistent with both the analysis supporting the 1989 Benzene NESHAP (54 FR 38044) and the limitations of Gaussian dispersion models, including AERMOD.

For each facility, we calculate the MIR as the cancer risk associated with a continuous lifetime (24 hours per day, 7 days per week, 52 weeks per year, 70 years) exposure to the maximum concentration at the centroid of each inhabited census block. We calculate individual cancer risk by multiplying the estimated lifetime exposure to the ambient concentration of each HAP (in micrograms per cubic meter ($\mu g/m^3$)) by its unit risk estimate (URE). The URE is an upper-bound estimate of an individual's incremental risk of contracting cancer over a lifetime of exposure to a concentration of 1 microgram of the pollutant per cubic meter of air. For residual risk assessments, we generally use UREs from the EPA's Integrated Risk Information System (IRIS). For carcinogenic pollutants without IRIS values, we look to other reputable sources of cancer dose-response values, often using California EPA (CalEPA) UREs, where available. In cases where new, scientifically credible dose-response values have been developed in a manner consistent with EPA guidelines and have undergone a peer review process similar to that used by the EPA, we may use such dose-response values in place of, or in addition to, other values, if appropriate. The pollutant-specific dose-response values used to estimate health risk are

available at *https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants*.

No data are available on the carcinogenic effects of cyanide compounds in humans via inhalation. Under the U.S. EPA (2005a) *Guidelines for Carcinogen Risk Assessment*, there is "inadequate information to assess the carcinogenic potential" of cyanide compounds.

To estimate individual lifetime cancer risks associated with exposure to HAP emissions from each facility in the source category, we sum the risks for each of the carcinogenic HAP[10] emitted by the modeled facility. We estimate cancer risk at every census block within 50 km of every facility in the source category. The MIR is the highest individual lifetime cancer risk estimated for any of those census blocks. In addition to calculating the MIR, we estimate the distribution of individual cancer risks for the source category by summing the number of individuals within 50 km of the sources whose estimated risk falls within a specified risk range. We also estimate annual cancer incidence by multiplying the estimated lifetime cancer risk at each census block by the number of people residing in that block, summing results for all of the census blocks, and then dividing this result by a 70-year lifetime.

To assess the risk of noncancer health effects from chronic exposure to HAP, we calculate either an HQ or a target organ-specific hazard index (TOSHI). We calculate an HQ

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[10] The EPA's 2005 *Guidelines for Carcinogen Risk Assessment* classifies carcinogens as: "carcinogenic to humans," "likely to be carcinogenic to humans," and "suggestive evidence of carcinogenic potential." These classifications also coincide with the terms "known carcinogen, probable carcinogen, and possible carcinogen," respectively, which are the terms advocated in the EPA's *Guidelines for Carcinogen Risk Assessment*, published in 1986 (51 FR 33992, September 24, 1986). In August 2000, the document, *Supplemental Guidance for Conducting Health Risk Assessment of Chemical Mixtures* (EPA/630/R-00/002), was published as a supplement to the 1986 document. Copies of both documents can be obtained from *https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=20533&CFID=70315376&CFTOKEN=71597944*. Summing the risk of these individual compounds to obtain the cumulative cancer risk is an approach that was recommended by the EPA's SAB in their 2002 peer review of the EPA's National Air Toxics Assessment (NATA) titled *NATA - Evaluating the National-scale Air Toxics Assessment 1996 Data -- an SAB Advisory*, available at *https://yosemite.epa.gov/sab/sabproduct.nsf/214C6E915BB04E14852570CA007A682C/$File/ecadv02001.pdf*.

when a single noncancer HAP is emitted. Where more than one noncancer HAP is emitted, we sum the HQ for each of the HAP that affects a common target organ or target organ system to obtain a TOSHI. The HQ is the estimated exposure divided by the chronic noncancer dose-response value, which is a value selected from one of several sources. The preferred chronic noncancer dose-response value is the EPA RfC, defined as "an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime" (*https://iaspub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&vocabName=IRIS%20Glossary*). In cases where an RfC from the EPA's IRIS is not available or where the EPA determines that using a value other than the RfC is appropriate, the chronic noncancer dose-response value can be a value from the following prioritized sources, which define their dose-response values similarly to the EPA: (1) the Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Level (*https://www.atsdr.cdc.gov/mrls/index.asp*); (2) the CalEPA Chronic Reference Exposure Level (REL) (*https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0*); or (3) as noted above, a scientifically credible dose-response value that has been developed in a manner consistent with the EPA guidelines and has undergone a peer review process similar to that used by the EPA. The pollutant-specific dose-response values used to estimate health risks are available at *https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants*.

Cyanide is extremely toxic to humans. Acute (10-minute) inhalation exposure to 579 milligrams per cubic meter ($mg/m^3$) of hydrogen cyanide will cause death in 50 percent of exposed humans. Nonlethal exposures to hydrogen cyanide gas will cause a variety of effects in humans, such as headache, dizziness, upper respiratory irritation, cough, altered sense of smell, nasal congestion, nosebleed, and difficulty breathing. Chronic (long-term) inhalation exposure of

humans to cyanide results primarily in effects on the central nervous system. Other effects in humans include cardiovascular and respiratory effects, effects to the endocrine system (*e.g.*, thyroid enlargement, altered iodine uptake), and irritation to the eyes and skin. However, short term exposure levels below the acute REL and chronic exposures below the RfC are not likely to cause adverse effects.

*c. Risk from Acute Exposure to HAP that May Cause Health Effects Other Than Cancer*

For each HAP for which appropriate acute inhalation dose-response values are available, the EPA also assesses the potential health risks due to acute exposure. For these assessments, the EPA makes conservative assumptions about emission rates, meteorology, and exposure location. As part of our efforts to continually improve our methodologies to evaluate the risks that HAP emitted from categories of industrial sources pose to human health and the environment,[11] we revised our treatment of meteorological data to use reasonable worst-case air dispersion conditions in our acute risk screening assessments instead of worst-case air dispersion conditions. This revised treatment of meteorological data and the supporting rationale are described in more detail in *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the 2020 Risk and Technology Review Proposed Rule* and in Appendix 5 of the report: *Technical Support Document for Acute Risk Screening Assessment.* This revised approach has been used in this proposed rule and in all other RTR rulemakings proposed on or after June 3, 2019.

To assess the potential acute risk to the maximally exposed individual, we use the peak hourly emission rate for each emission point,[12] reasonable worst-case air dispersion conditions

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[11] See, *e.g.*, U.S. EPA. *Screening Methodologies to Support Risk and Technology Reviews (RTR): A Case Study Analysis* (Draft Report, May 2017. *https://www3.epa.gov/ttn/atw/rrisk/rtrpg.html*).

[12] In the absence of hourly emission data, we develop estimates of maximum hourly emission rates by multiplying the average actual annual emissions rates by a factor (either a category-specific factor or a default factor of 10) to account for variability. This is documented in *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the 2020 Risk and Technology Review Proposed Rule* and in Appendix 5 of the report:

(*i.e.*, 99th percentile), and the point of highest off-site exposure. Specifically, we assume that peak emissions from the source category and reasonable worst-case air dispersion conditions co-occur and that a person is present at the point of maximum exposure.

To characterize the potential health risks associated with estimated acute inhalation exposures to a HAP, we generally use multiple acute dose-response values, including acute RELs, acute exposure guideline levels (AEGLs), and emergency response planning guidelines (ERPG) for 1-hour exposure durations, if available, to calculate acute HQs. The acute HQ is calculated by dividing the estimated acute exposure concentration by the acute dose-response value. For each HAP for which acute dose-response values are available, the EPA calculates acute HQs.

An acute REL is defined as "the concentration level at or below which no adverse health effects are anticipated for a specified exposure duration."[13] Acute RELs are based on the most sensitive, relevant, adverse health effect reported in the peer-reviewed medical and toxicological literature. They are designed to protect the most sensitive individuals in the population through the inclusion of margins of safety. Because margins of safety are incorporated to address data gaps and uncertainties, exceeding the REL does not automatically indicate an adverse health impact. AEGLs represent threshold exposure limits for the general public and are applicable to emergency exposures ranging from 10 minutes to 8 hours.[14] They are guideline levels for "once-

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*Technical Support Document for Acute Risk Screening Assessment*. Both are available in the docket for this rulemaking.

[13] CalEPA issues acute RELs as part of its Air Toxics Hot Spots Program, and the 1-hour and 8-hour values are documented in *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I, The Determination of Acute Reference Exposure Levels for Airborne Toxicants*, which is available at *https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary*.

[14] National Academy of Sciences, 2001. *Standing Operating Procedures for Developing Acute Exposure Levels for Hazardous Chemicals*, page 2. Available at *https://www.epa.gov/sites/production/files/2015-09/documents/sop_final_standing_operating_procedures_2001.pdf*. Note that the National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances ended in October 2011, but the AEGL program continues to operate at the EPA and works with the National Academies to publish final AEGLs (*https://www.epa.gov/aegl*).

in-a-lifetime, short-term exposures to airborne concentrations of acutely toxic, high-priority chemicals." *Id.* at 21. The AEGL–1 is specifically defined as "the airborne concentration (expressed as ppm (parts per million) or mg/m$^3$ (milligrams per cubic meter)) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure." The document also notes that "Airborne concentrations below AEGL–1 represent exposure levels that can produce mild and progressively increasing but transient and nondisabling odor, taste, and sensory irritation or certain asymptomatic, nonsensory effects." *Id.* AEGL–2 are defined as "the airborne concentration (expressed as parts per million or milligrams per cubic meter) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape." *Id.*

ERPGs are "developed for emergency planning and are intended as health-based guideline concentrations for single exposures to chemicals."[15] *Id.* at 1. The ERPG–1 is defined as "the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or without perceiving a clearly defined, objectionable odor." *Id.* at 2. Similarly, the ERPG–2 is defined as "the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action." *Id.* at 1.

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[15] *ERPGS Procedures and Responsibilities*. March 2014. American Industrial Hygiene Association. Available at: *https://www.aiha.org/get-involved/AIHAGuidelineFoundation/EmergencyResponsePlanningGuidelines/Documents/ERPG%20Committee%20Standard%20Operating%20Procedures%20%20-%20March%202014%20Revision%20%28Updated%2010-2-2014%29.pdf.*

An acute REL for 1-hour exposure durations is typically lower than its corresponding AEGL–1 and ERPG–1. Even though their definitions are slightly different, AEGL–1s are often the same as the corresponding ERPG–1s, and AEGL–2s are often equal to ERPG–2s. The maximum HQs from our acute inhalation screening risk assessment typically result when we use the acute REL for a HAP. In cases where the maximum acute HQ exceeds 1, we also report the HQ based on the next highest acute dose-response value (usually the AEGL–1 and/or the ERPG–1).

For this source category, we used acute factors between 2 and 10, depending on the type of source, to estimate peak hourly emissions from annual emissions estimates for input into the risk assessment modeling analysis. Specifically, we used a factor of 2 for process vents and equipment leaks, a factor of 4 for storage vessels, and a factor of 10 for transfer racks. A further discussion of why these factors were chosen can be found in the memorandum, *Technical Support Document for the Cyanide Chemicals Manufacturing NESHAP Residual Risk and Technology Review Proposal*, available in the docket for this rulemaking.

In our acute inhalation screening risk assessment, acute impacts are deemed negligible for HAP for which acute HQs are less than or equal to 1, and no further analysis is performed for these HAP. In cases where an acute HQ from the screening step is greater than 1, we assess the site-specific data to ensure that the acute HQ is at an off-site location. For this source category, no data were conducted.

4. How do we conduct the multipathway exposure and risk screening assessment?

The EPA conducts a tiered screening assessment examining the potential for significant human health risks due to exposures via routes other than inhalation (*i.e.*, ingestion). We first determine whether any sources in the source category emit any HAP known to be persistent and bioaccumulative in the environment, as identified in the EPA's Air Toxics Risk Assessment Library (see Volume 1, Appendix D, at *https://www.epa.gov/fera/risk-assessment-and-modeling-air-toxics-risk-assessment-reference-library)*.

For the Cyanide Chemicals Manufacturing source category, we identified potential PB-HAP emissions of arsenic, cadmium, lead, mercury, and polycyclic organic matter (POM) based on entries in the NEI. We note that for the Cyanide Chemicals Manufacturing source category, we modeled these pollutants to provide a conservative assessment of risks because these pollutants are included in the NEI. However, we do not believe these HAP are emitted from the cyanide chemicals manufacturing process. Very small amounts of these HAP are included in the NEI as byproducts of fuel combustion and are unrelated to cyanide chemicals manufacturing.

After identifying potential PB-HAP emissions, the next step of the evaluation is a tiered screening assessment. Except for lead, the human health risk screening assessment for PB-HAP consists of three progressive tiers. In a Tier 1 screening assessment, we determine whether the magnitude of the facility-specific emissions of PB-HAP warrants further evaluation to characterize human health risk through ingestion exposure. To facilitate this step, we evaluate emissions against previously developed screening threshold emission rates for several PB-HAP that are based on a hypothetical upper-end screening exposure scenario developed for use in conjunction with the EPA's Total Risk Integrated Methodology.Fate, Transport, and Ecological Exposure (TRIM.FaTE) model. The PB-HAP with screening threshold emission rates are arsenic compounds, cadmium compounds, chlorinated dibenzodioxins and furans, mercury compounds, and POM. Based on the EPA estimates of toxicity and bioaccumulation potential, these pollutants represent a conservative list for inclusion in multipathway risk assessments for RTR rules. (See Volume 1, Appendix D at *https://www.epa.gov/sites/production/files/2013-08/documents/volume_1_reflibrary.pdf*.) In this assessment, we compare the facility-specific emission rates of these PB-HAP to the screening threshold emission rates for each PB-HAP to assess the potential for significant human health risks via the ingestion pathway. We call this application of the TRIM.FaTE model the Tier 1 screening assessment. The ratio of a facility's actual emission rate to the Tier 1 screening threshold emission rate is a "screening value (SV)."

We derive the Tier 1 screening threshold emission rates for these PB-HAP (other than lead compounds) to correspond to a maximum excess lifetime cancer risk of 1-in-1 million (*i.e.*, for arsenic compounds, polychlorinated dibenzodioxins and furans, and POM) or, for HAP that cause noncancer health effects (*i.e.*, cadmium compounds and mercury compounds), a maximum HQ of 1. If the emission rate of any one PB-HAP or combination of carcinogenic PB-HAP in the Tier 1 screening assessment exceeds the Tier 1 screening threshold emission rate for any facility (*i.e.*, the SV is greater than 1), we conduct a second screening assessment, which we call the Tier 2 screening assessment. The Tier 2 screening assessment separates the Tier 1 combined fisher and farmer exposure scenario into fisher, farmer, and gardener scenarios that retain upper-bound ingestion rates.

In the Tier 2 screening assessment, the location of each facility that exceeds a Tier 1 screening threshold emission rate is used to refine the assumptions associated with the Tier 1 fisher and farmer exposure scenarios at that facility. A key assumption in the Tier 1 screening assessment is that a lake and/or farm is located near the facility. As part of the Tier 2 screening assessment, we use a U.S. Geological Survey (USGS) database to identify actual waterbodies within 50 km of each facility and assume the fisher only consumes fish from lakes within that 50 km zone. We also examine the differences between local meteorology near the facility and the meteorology used in the Tier 1 screening assessment. We then adjust the previously-developed Tier 1 screening threshold emission rates for each PB-HAP for each facility based on an understanding of how exposure concentrations estimated for the screening scenario change with the use of local meteorology and the USGS lakes database.

In the Tier 2 farmer scenario, we maintain an assumption that the farm is located within 0.5 km of the facility and that the farmer consumes meat, eggs, dairy, vegetables, and fruit produced near the facility. We may further refine the Tier 2 screening analysis by assessing a gardener scenario to characterize a range of exposures, with the gardener scenario being more plausible in RTR evaluations. Under the gardener scenario, we assume the gardener consumes

home-produced eggs, vegetables, and fruit products at the same ingestion rate as the farmer. The Tier 2 screen continues to rely on the high-end food intake assumptions that were applied in Tier 1 for local fish (adult female angler at 99th percentile fish consumption[16]) and locally grown or raised foods (90th percentile consumption of locally grown or raised foods for the farmer and gardener scenarios[17]). If PB-HAP emission rates do not result in a Tier 2 SV greater than 1, we consider those PB-HAP emissions to pose risks below a level of concern. If the PB-HAP emission rates for a facility exceed the Tier 2 screening threshold emission rates, we may conduct a Tier 3 screening assessment.

There are several analyses that can be included in a Tier 3 screening assessment, depending upon the extent of refinement warranted, including validating that the lakes are fishable, locating residential/garden locations for urban and/or rural settings, considering plume-rise to estimate emissions lost above the mixing layer, and considering hourly effects of meteorology and plume-rise on chemical fate and transport (a time-series analysis). If necessary, the EPA may further refine the screening assessment through a site-specific assessment.

In evaluating the potential multipathway risk from emissions of lead compounds, rather than developing a screening threshold emission rate, we compare maximum estimated chronic inhalation exposure concentrations to the level of the current National Ambient Air Quality Standard (NAAQS) for lead.[18] Values below the level of the primary (health-based) lead NAAQS are considered to have a low potential for multipathway risk.

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[16] Burger, J. 2002. *Daily consumption of wild fish and game: Exposures of high end recreationists. International Journal of Environmental Health Research,* 12:343–354.
[17] U.S. EPA. *Exposure Factors Handbook 2011 Edition (Final)*. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R–09/052F, 2011.
[18] In doing so, the EPA notes that the legal standard for a primary NAAQS – that a standard is requisite to protect public health and provide an adequate margin of safety (CAA section 109(b)) – differs from the CAA section 112(f) standard (requiring, among other things, that the standard provide an "ample margin of safety to protect public health"). However, the primary lead NAAQS is a reasonable measure of determining risk acceptability (*i.e.*, the first step of the Benzene NESHAP analysis) since it is designed to protect the most susceptible group in the human population – children, including children living near major lead emitting sources. 73 FR

For further information on the multipathway assessment approach, see the *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the Risk and Technology Review 2020 Proposed Rule*, which is available in the docket for this action.

5. How do we conduct the environmental risk screening assessment?

*a. Adverse Environmental Effect, Environmental HAP, and Ecological Benchmarks*

The EPA conducts a screening assessment to examine the potential for an adverse environmental effect as required under section 112(f)(2)(A) of the CAA. Section 112(a)(7) of the CAA defines "adverse environmental effect" as "any significant and widespread adverse effect, which may reasonably be anticipated, to wildlife, aquatic life, or other natural resources, including adverse impacts on populations of endangered or threatened species or significant degradation of environmental quality over broad areas."

The EPA focuses on eight HAP, which are referred to as "environmental HAP," in its screening assessment: six PB-HAP and two acid gases. The PB-HAP included in the screening assessment are arsenic compounds, cadmium compounds, dioxins/furans, POM, mercury (both inorganic mercury and methyl mercury), and lead compounds. The acid gases included in the screening assessment are hydrochloric acid (HCl) and hydrogen fluoride (HF).

HAP that persist and bioaccumulate are of particular environmental concern because they accumulate in the soil, sediment, and water. The acid gases, HCl and HF, are included due to their well-documented potential to cause direct damage to terrestrial plants. In the environmental risk screening assessment, we evaluate the following four exposure media: terrestrial soils, surface water bodies (includes water-column and benthic sediments), fish consumed by wildlife, and air. Within these four exposure media, we evaluate nine ecological assessment endpoints, which are defined by the ecological entity and its attributes. For PB-HAP (other than lead), both

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67002/3; 73 FR 67000/3; 73 FR 67005/1. In addition, applying the level of the primary lead NAAQS at the risk acceptability step is conservative, since that primary lead NAAQS reflects an adequate margin of safety.

community-level and population-level endpoints are included. For acid gases, the ecological assessment evaluated is terrestrial plant communities.

An ecological benchmark represents a concentration of HAP that has been linked to a particular environmental effect level. For each environmental HAP, we identified the available ecological benchmarks for each assessment endpoint. We identified, where possible, ecological benchmarks at the following effect levels: probable effect levels, lowest-observed-adverse-effect level, and no-observed-adverse-effect level. In cases where multiple effect levels were available for a particular PB-HAP and assessment endpoint, we use all of the available effect levels to help us to determine whether ecological risks exist and, if so, whether the risks could be considered significant and widespread.

For further information on how the environmental risk screening assessment was conducted, including a discussion of the risk metrics used, how the environmental HAP were identified, and how the ecological benchmarks were selected, see Appendix 9 of the *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the Risk and Technology Review 2020 Proposed Rule*, which is available in the docket for this action.

*b. Environmental Risk Screening Methodology*

For the environmental risk screening assessment, the EPA first determined whether any facilities in the Cyanide Chemicals Manufacturing source category emitted any of the environmental HAP. For the Cyanide Chemicals Manufacturing source category, we identified potential emissions of arsenic, cadmium, lead, mercury, POM, and one acid gas, HCl, based on entries in the NEI. Because one or more of the environmental HAP evaluated may be emitted by at least one facility in the source category, we proceeded to the second step of the evaluation. As noted above, we modeled these emissions to err on the side of an overly conservative analysis because they are included in the NEI; however, we do not believe these HAP are emitted from the Cyanide Chemicals Manufacturing source category. The NEI entries for these HAP from

these sources are likely the result of emissions factors that are used for fuel combustion and are unrelated to cyanide chemicals manufacturing.

*c. PB-HAP Methodology*

The environmental screening assessment includes six PB-HAP, arsenic compounds, cadmium compounds, dioxins/furans, POM, mercury (both inorganic mercury and methyl mercury), and lead compounds. With the exception of lead, the environmental risk screening assessment for PB-HAP consists of three tiers. The first tier of the environmental risk screening assessment uses the same health-protective conceptual model that is used for the Tier 1 human health screening assessment. TRIM.FaTE model simulations were used to back-calculate Tier 1 screening threshold emission rates. The screening threshold emission rates represent the emission rate in tons of pollutant per year that results in media concentrations at the facility that equal the relevant ecological benchmark. To assess emissions from each facility in the category, the reported emission rate for each PB-HAP was compared to the Tier 1 screening threshold emission rate for that PB-HAP for each assessment endpoint and effect level. If emissions from a facility do not exceed the Tier 1 screening threshold emission rate, the facility "passes" the screening assessment, and, therefore, is not evaluated further under the screening approach. If emissions from a facility exceed the Tier 1 screening threshold emission rate, we evaluate the facility further in Tier 2.

In Tier 2 of the environmental screening assessment, the screening threshold emission rates are adjusted to account for local meteorology and the actual location of lakes in the vicinity of facilities that did not pass the Tier 1 screening assessment. For soils, we evaluate the average soil concentration for all soil parcels within a 7.5-km radius for each facility and PB-HAP. For the water, sediment, and fish tissue concentrations, the highest value for each facility for each pollutant is used. If emission concentrations from a facility do not exceed the Tier 2 screening threshold emission rate, the facility "passes" the screening assessment and typically is not

evaluated further. If emissions from a facility exceed the Tier 2 screening threshold emission rate, we evaluate the facility further in Tier 3.

As in the multipathway human health risk assessment, in Tier 3 of the environmental screening assessment, we examine the suitability of the lakes around the facilities to support life and remove those that are not suitable (*e.g.*, lakes that have been filled in or are industrial ponds), adjust emissions for plume-rise, and conduct hour-by-hour time-series assessments. If these Tier 3 adjustments to the screening threshold emission rates still indicate the potential for an adverse environmental effect (*i.e.*, facility emission rate exceeds the screening threshold emission rate), we may elect to conduct a more refined assessment using more site-specific information. If, after additional refinement, the facility emission rate still exceeds the screening threshold emission rate, the facility may have the potential to cause an adverse environmental effect.

To evaluate the potential for an adverse environmental effect from lead, we compared the average modeled air concentrations (from HEM-3) of lead around each facility in the source category to the level of the secondary NAAQS for lead. The secondary lead NAAQS is a reasonable means of evaluating environmental risk because it is set to provide substantial protection against adverse welfare effects which can include "effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being."

*d. Acid Gas Environmental Risk Methodology*

The environmental screening assessment for acid gases evaluates the potential phytotoxicity and reduced productivity of plants due to chronic exposure to HF and HCl. The environmental risk screening methodology for acid gases is a single-tier screening assessment that compares modeled ambient air concentrations (from AERMOD) to the ecological benchmarks for each acid gas. To identify a potential adverse environmental effect (as defined in section 112(a)(7) of the CAA) from emissions of HF and HCl, we evaluate the following

metrics: the size of the modeled area around each facility that exceeds the ecological benchmark for each acid gas, in acres and square kilometers; the percentage of the modeled area around each facility that exceeds the ecological benchmark for each acid gas; and the area-weighted average SV around each facility (calculated by dividing the area-weighted average concentration over the 50-km modeling domain by the ecological benchmark for each acid gas). For further information on the environmental screening assessment approach, see Appendix 9 of the *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the Risk and Technology Review 2020 Proposed Rule*, which is available in the docket for this action.

6. How do we conduct facility-wide assessments?

To put the source category risks in context, we typically examine the risks from the entire "facility," where the facility includes all HAP-emitting operations within a contiguous area and under common control. In other words, we examine the HAP emissions not only from the source category emission points of interest, but also emissions of HAP from all other emission sources at the facility for which we have data. For this source category, we conducted the facility-wide assessment using a dataset compiled from the 2017 NEI. The source category records of that NEI dataset were removed, evaluated, and updated as described in section II.C of this preamble: What data collection activities were conducted to support this action? Once a quality assured source category dataset was available, it was placed back with the remaining records from the NEI for that facility. The facility-wide file was then used to analyze risks due to the inhalation of HAP that are emitted "facility-wide" for the populations residing within 50 km of each facility, consistent with the methods used for the source category analysis described above. For these facility-wide risk analyses, the modeled source category risks were compared to the facility-wide risks to determine the portion of the facility-wide risks that could be attributed to the source category addressed in this proposal. We also specifically examined the facility that was associated with the highest estimate of risk and determined the percentage of that risk attributable to the source category of interest. The *Residual Risk Assessment for the Cyanide*

*Chemicals Manufacturing Source Category in Support of the Risk and Technology Review 2020 Proposed Rule*, available through the docket for this action, provides the methodology and results of the facility-wide analyses, including all facility-wide risks and the percentage of source category contribution to facility-wide risks.

For this source category, we conducted the facility-wide assessment using a dataset that the EPA compiled from the 2017 NEI. We used the NEI data for the facility and did not adjust any category or "non-category" data. Therefore, there could be differences in the dataset from that used for the source category assessments described in this preamble. We analyzed risks due to the inhalation of HAP that are emitted "facility-wide" for the populations residing within 50 km of each facility, consistent with the methods used for the source category analysis described above. For these facility-wide risk analyses, we made a reasonable attempt to identify the source category risks, and these risks were compared to the facility-wide risks to determine the portion of facility-wide risks that could be attributed to the source category addressed in this proposal. We also specifically examined the facility that was associated with the highest estimate of risk and determined the percentage of that risk attributable to the source category of interest. The *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the Risk and Technology Review 2020 Proposed Rule*, available through the docket for this action, provides the methodology and results of the facility-wide analyses, including all facility-wide risks and the percentage of source category contribution to facility-wide risks.

7. How do we consider uncertainties in risk assessment?

Uncertainty and the potential for bias are inherent in all risk assessments, including those performed for this proposal. Although uncertainty exists, we believe that our approach, which used conservative tools and assumptions, ensures that our decisions are health and environmentally protective. A brief discussion of the uncertainties in the RTR emissions dataset, dispersion modeling, inhalation exposure estimates, and dose-response relationships follows below. Also included are those uncertainties specific to our acute screening assessments,

multipathway screening assessments, and our environmental risk screening assessments. A more thorough discussion of these uncertainties is included in the *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the Risk and Technology Review 2020 Proposed Rule*, which is available in the docket for this action. If a multipathway site-specific assessment was performed for this source category, a full discussion of the uncertainties associated with that assessment can be found in Appendix 11 of that document, *Site-Specific Human Health Multipathway Residual Risk Assessment Report*.

*a. Uncertainties in the RTR Emissions Dataset*

Although the development of the RTR emissions dataset involved quality assurance/quality control processes, the accuracy of emissions values will vary depending on the source of the data, the degree to which data are incomplete or missing, the degree to which assumptions made to complete the datasets are accurate, errors in emission estimates, and other factors. The emission estimates considered in this analysis generally are annual totals for certain years, and they do not reflect short-term fluctuations during the course of a year or variations from year to year. The estimates of peak hourly emission rates for the acute effects screening assessment were based on an emission adjustment factor applied to the average annual hourly emission rates, which are intended to account for emission fluctuations due to normal facility operations.

*b. Uncertainties in Dispersion Modeling*

We recognize there is uncertainty in ambient concentration estimates associated with any model, including the EPA's recommended regulatory dispersion model, AERMOD. In using a model to estimate ambient pollutant concentrations, the user chooses certain options to apply. For RTR assessments, we select some model options that have the potential to overestimate ambient air concentrations (*e.g.*, not including plume depletion or pollutant transformation). We select other model options that have the potential to underestimate ambient impacts (*e.g.*, not including building downwash). Other options that we select have the potential to either under- or

overestimate ambient levels (*e.g.*, meteorology and receptor locations). On balance, considering the directional nature of the uncertainties commonly present in ambient concentrations estimated by dispersion models, the approach we apply in the RTR assessments should yield unbiased estimates of ambient HAP concentrations. We also note that the selection of meteorology dataset location could have an impact on the risk estimates. As we continue to update and expand our library of meteorological station data used in our risk assessments, we expect to reduce this variability.

*c. Uncertainties in Inhalation Exposure Assessment*

Although every effort is made to identify all of the relevant facilities and emission points, as well as to develop accurate estimates of the annual emission rates for all relevant HAP, the uncertainties in our emission inventory likely dominate the uncertainties in the exposure assessment. Some uncertainties in our exposure assessment include human mobility, using the centroid of each census block, assuming lifetime exposure, and assuming only outdoor exposures. For most of these factors, there is neither an under nor overestimate when looking at the maximum individual risk or the incidence, but the shape of the distribution of risks may be affected. With respect to outdoor exposures, actual exposures may not be as high if people spend time indoors, especially for very reactive pollutants or larger particles. For all factors, we reduce uncertainty when possible. For example, with respect to census-block centroids, we analyze large blocks using aerial imagery and adjust locations of the block centroids to better represent the population in the blocks. We also add additional receptor locations where the population of a block is not well represented by a single location.

*d. Uncertainties in Dose-Response Relationships*

There are uncertainties inherent in the development of the dose-response values used in our risk assessments for cancer effects from chronic exposures and noncancer effects from both chronic and acute exposures. Some uncertainties are generally expressed quantitatively, and others are generally expressed in qualitative terms. We note, as a preface to this discussion, a

point on dose-response uncertainty that is stated in the EPA's *2005 Guidelines for Carcinogen Risk Assessment*; namely, that "the primary goal of EPA actions is protection of human health; accordingly, as an Agency policy, risk assessment procedures, including default options that are used in the absence of scientific data to the contrary, should be health protective" (the EPA's *2005 Guidelines for Carcinogen Risk Assessment*, pages 1 through 7). This is the approach followed here as summarized in the next paragraphs.

Cancer UREs used in our risk assessments are those that have been developed to generally provide an upper bound estimate of risk.[19] That is, they represent a "plausible upper limit to the true value of a quantity" (although this is usually not a true statistical confidence limit). In some circumstances, the true risk could be as low as zero; however, in other circumstances the risk could be greater.[20] Chronic noncancer RfC and reference dose (RfD) values represent chronic exposure levels that are intended to be health-protective levels. To derive dose-response values that are intended to be "without appreciable risk," the methodology relies upon an uncertainty factor (UF) approach,[21] which considers uncertainty, variability, and gaps in the available data. The UFs are applied to derive dose-response values that are intended to protect against appreciable risk of deleterious effects.

Many of the UFs used to account for variability and uncertainty in the development of acute dose-response values are quite similar to those developed for chronic durations. Additional adjustments are often applied to account for uncertainty in extrapolation from observations at one exposure duration (*e.g.*, 4 hours) to derive an acute dose-response value at another exposure

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[19] IRIS glossary (*https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&glossaryName=IRIS%20Glossary*).

[20] An exception to this is the URE for benzene, which is considered to cover a range of values, each end of which is considered to be equally plausible, and which is based on maximum likelihood estimates.

[21] See *A Review of the Reference Dose and Reference Concentration Processes*, U.S. EPA, December 2002, and *Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry*, U.S. EPA, 1994.

duration (*e.g.*, 1 hour). Not all acute dose-response values are developed for the same purpose, and care must be taken when interpreting the results of an acute assessment of human health effects relative to the dose-response value or values being exceeded. Where relevant to the estimated exposures, the lack of acute dose-response values at different levels of severity should be factored into the risk characterization as potential uncertainties.

Uncertainty also exists in the selection of ecological benchmarks for the environmental risk screening assessment. We established a hierarchy of preferred benchmark sources to allow selection of benchmarks for each environmental HAP at each ecological assessment endpoint. We searched for benchmarks for three effect levels (*i.e.*, no-effects level, threshold-effect level, and probable effect level), but not all combinations of ecological assessment/environmental HAP had benchmarks for all three effect levels. Where multiple effect levels were available for a particular HAP and assessment endpoint, we used all of the available effect levels to help us determine whether risk exists and whether the risk could be considered significant and widespread.

For a group of compounds that are unspeciated (*e.g.*, glycol ethers), we conservatively use the most protective dose-response value of an individual compound in that group to estimate risk. Similarly, for an individual compound in a group (*e.g.*, ethylene glycol diethyl ether) that does not have a specified dose-response value, we also apply the most protective dose-response value from the other compounds in the group to estimate risk.

*e. Uncertainties in Acute Inhalation Screening Assessments*

In addition to the uncertainties highlighted above, there are several factors specific to the acute exposure assessment that the EPA conducts as part of the risk review under section 112 of the CAA. The accuracy of an acute inhalation exposure assessment depends on the simultaneous occurrence of independent factors that may vary greatly, such as hourly emissions rates, meteorology, and the presence of a person. In the acute screening assessment that we conduct under the RTR program, we assume that peak emissions from the source category and reasonable

worst-case air dispersion conditions (*i.e.*, 99th percentile) co-occur. We then include the additional assumption that a person is located at this point at the same time. Together, these assumptions represent a reasonable worst-case actual exposure scenario. In most cases, it is unlikely that a person would be located at the point of maximum exposure during the time when peak emissions and reasonable worst-case air dispersion conditions occur simultaneously.

*f. Uncertainties in the Multipathway and Environmental Risk Screening Assessments*

For each source category, we generally rely on site-specific levels of PB-HAP or environmental HAP emissions to determine whether a refined assessment of the impacts from multipathway exposures is necessary or whether it is necessary to perform an environmental screening assessment. This determination is based on the results of a three-tiered screening assessment that relies on the outputs from models – TRIM.FaTE and AERMOD – that estimate environmental pollutant concentrations and human exposures for five PB-HAP (dioxins, POM, mercury, cadmium, and arsenic) and two acid gases (HF and HCl). For lead, we use AERMOD to determine ambient air concentrations, which are then compared to the secondary NAAQS standard for lead. Two important types of uncertainty associated with the use of these models in RTR risk assessments and inherent to any assessment that relies on environmental modeling are model uncertainty and input uncertainty.[22]

Model uncertainty concerns whether the model adequately represents the actual processes (*e.g.*, movement and accumulation) that might occur in the environment. For example, does the model adequately describe the movement of a pollutant through the soil? This type of uncertainty is difficult to quantify. However, based on feedback received from previous EPA SAB reviews and other reviews, we are confident that the models used in the screening assessments are

[22] In the context of this discussion, the term "uncertainty" as it pertains to exposure and risk encompasses both ***variability*** in the range of expected inputs and screening results due to existing spatial, temporal, and other factors, as well as ***uncertainty*** in being able to accurately estimate the true result.

appropriate and state-of-the-art for the multipathway and environmental screening risk assessments conducted in support of RTRs.

Input uncertainty is concerned with how accurately the models have been configured and parameterized for the assessment at hand. For Tier 1 of the multipathway and environmental screening assessments, we configured the models to avoid underestimating exposure and risk. This was accomplished by selecting upper-end values from nationally representative datasets for the more influential parameters in the environmental model, including selection and spatial configuration of the area of interest, lake location and size, meteorology, surface water, soil characteristics, and structure of the aquatic food web. We also assume an ingestion exposure scenario and values for human exposure factors that represent reasonable maximum exposures.

In Tier 2 of the multipathway and environmental screening assessments, we refine the model inputs to account for meteorological patterns in the vicinity of the facility versus using upper-end national values, and we identify the actual location of lakes near the facility rather than the default lake location that we apply in Tier 1. By refining the screening approach in Tier 2 to account for local geographical and meteorological data, we decrease the likelihood that concentrations in environmental media are overestimated, thereby increasing the usefulness of the screening assessment. In Tier 3 of the screening assessments, we refine the model inputs again to account for hour-by-hour plume-rise and the height of the mixing layer. We can also use those hour-by-hour meteorological data in a TRIM.FaTE run using the screening configuration corresponding to the lake location. These refinements produce a more accurate estimate of chemical concentrations in the media of interest, thereby reducing the uncertainty with those estimates. The assumptions and the associated uncertainties regarding the selected ingestion exposure scenario are the same for all three tiers.

For the environmental screening assessment for acid gases, we employ a single-tiered approach. We use the modeled air concentrations and compare those with ecological benchmarks.

For all tiers of the multipathway and environmental screening assessments, our approach to addressing model input uncertainty is generally cautious. We choose model inputs from the upper end of the range of possible values for the influential parameters used in the models, and we assume that the exposed individual exhibits ingestion behavior that would lead to a high total exposure. This approach reduces the likelihood of not identifying high risks for adverse impacts.

Despite the uncertainties, when individual pollutants or facilities do not exceed screening threshold emission rates (*i.e.*, screen out), we are confident that the potential for adverse multipathway impacts on human health is very low. On the other hand, when individual pollutants or facilities do exceed screening threshold emission rates, it does not mean that impacts are significant, only that we cannot rule out that possibility and that a refined assessment for the site might be necessary to obtain a more accurate risk characterization for the source category.

The EPA evaluates the following HAP in the multipathway and/or environmental risk screening assessments, where applicable: arsenic, cadmium, dioxins/furans, lead, mercury (both inorganic and methyl mercury), POM, HCl, and HF. These HAP represent pollutants that can cause adverse impacts either through direct exposure to HAP in the air or through exposure to HAP that are deposited from the air onto soils and surface waters and then through the environment into the food web. These HAP represent those HAP for which we can conduct a meaningful multipathway or environmental screening risk assessment. For other HAP not included in our screening assessments, the model has not been parameterized such that it can be used for that purpose. In some cases, depending on the HAP, we may not have appropriate multipathway models that allow us to predict the concentration of that pollutant. The EPA acknowledges that other HAP beyond these that we are evaluating may have the potential to cause adverse effects and, therefore, the EPA may evaluate other relevant HAP in the future, as modeling science and resources allow.

## IV. Analytical Results and Proposed Decisions

*A. What actions are we taking pursuant to CAA sections 112(d)(2) and 112(d)(3)?*

We are proposing standards pursuant to CAA section 112(d)(2) for process wastewater from existing cyanide chemical manufacturing process units, which was previously unregulated[23]. During development of the initial MACT standards, we identified process wastewater at existing sources as a potential source of emissions of hydrogen cyanide, acetonitrile, and acrylonitrile. See 65 FR 76408, 76411, and 76413, December 6, 2000, for a discussion of the HAP emitted from cyanide chemicals manufacturing. At that time, we identified measures undertaken at cyanide chemicals manufacturing facilities to comply with other NESHAP as the "MACT floor," but we did not include these measures in 40 CFR part 63, subpart YY for existing cyanide chemical manufacturing process units. Based on our review, we are proposing to find that these measures reflect the best performing sources in the source category. The results and proposed decisions based on the analyses performed pursuant to CAA section 112(d)(2) and (3) are presented below.

For this proposal, we reviewed title V permits for facilities subject to the Cyanide Chemicals Manufacturing NESHAP and determined that all cyanide chemicals manufacturing facilities are co-located with processes subject to the Hazardous Organic NESHAP (HON) or substantively similar requirements. In the 2000 NESHAP proposal, we stated that wastewater treatment units at cyanide chemicals manufacturing facilities are typical of synthetic organic chemicals manufacturing facilities subject to the HON. The wastewater requirements of the HON are already an approved means of compliance for wastewater emission sources subject to 40 CFR part 63, subpart YY as stated in 40 CFR 63.1100(g)(5). We are proposing to require compliance with HON wastewater requirements for process wastewater at existing sources, which will ensure all affected sources at cyanide chemicals manufacturing facilities are subject

[23] The EPA not only has authority under CAA section 112(d)(2) and (3) to set MACT standards for previously unregulated HAP emissions at any time, but is required to address any previously unregulated HAP emissions as part of its periodic review of MACT standards under CAA section 112(d)(6). *LEAN v. EPA*, 955 F3d at 1091-1099.

to MACT standards. We are proposing these requirements for cyanide chemicals manufacturing existing sources because such requirements represent: (1) the measures employed by the best performing sources in the category; and (2) an already acceptable means of compliance for wastewater emissions at sources subject to subpart YY. We believe that these requirements will not require additional controls or emissions reductions since existing sources we have identified as subject to the Cyanide Chemicals Manufacturing NESHAP are already subject to the HON or substantively identical wastewater requirements in another NESHAP.

We are also adding the HON requirements for waste management units upstream of an open or closed biological treatment process to the new source standard to ensure demonstrable compliance measures are in place for these sources; however, we believe these measures would already be employed by any new sources to achieve the combined 93 percent capture and control of HAP emissions from wastewater required for process wastewater emissions at new sources subject to the Cyanide Chemicals Manufacturing NESHAP.

We have identified three HAP that may be present in process wastewater streams at cyanide chemicals manufacturing facilities: hydrogen cyanide, acetonitrile, and acrylonitrile. We are proposing to include hydrogen cyanide in the calculations required to determine compliance with the wastewater standard for the Cyanide Chemicals Manufacturing source category to ensure all HAP potentially present in process wastewater are subject to MACT standards. The other two HAP that may be present in cyanide chemicals manufacturing wastewater (acetonitrile and acrylonitrile) are already included in the list of compounds subject to the HON wastewater provisions. We do not expect significant amounts of hydrogen cyanide to be present in these process wastewater streams. When developing the 2002 NESHAP, facilities that were surveyed reported very low levels of hydrogen cyanide in their wastewaters with one exception. The only facility that had high levels of hydrogen cyanide in its wastewater used add-on controls to remove the hydrogen cyanide prior to discharge. That facility was the basis for the “new source” MACT floor. We expect any facilities with high levels of hydrogen cyanide in their wastewater

would already possess add-on controls similar to those present at the single existing source with high levels of hydrogen cyanide in order to meet effluent discharge limits and protect the biological wastewater treatment systems used at these facilities. We are including hydrogen cyanide in these calculations to ensure that all HAP emitted by the source category are subject to MACT standards.

Nevertheless, we are seeking comment on whether facilities would need to install additional controls, achieve additional emissions reductions, or incur significant costs as a result of the proposed standards for process wastewater. For this proposed rule, we did not identify any new control technologies or developments in existing technologies to evaluate as "beyond-the-floor" controls other than the controls evaluated during the initial MACT standards. We did not find any data to support changing the conclusion that application of the new source MACT limit for process wastewater emissions to existing sources is unreasonable (See 65 FR 76419 and Docket Item No. EPA-HQ-OAR-2004-0041-0003).

*B. What are the results of the risk assessment and analyses?*

1. Chronic Inhalation Risk Assessment Results

The EPA estimated inhalation risk based on actual and allowable emissions, which we determined are the same for this category. The estimated baseline inhalation MIR posed by the source category is 5-in-1 million based on actual emissions and MACT-allowable emissions. The total estimated cancer incidence based on actual or allowable emission levels is 0.004 excess cancer cases per year, or one case every 250 years. Emissions of acrylonitrile from process vents account for 95 percent of the cancer incidence. Approximately 61,653 people are exposed to cancer risk greater than or equal to 1-in-1 million based upon actual and allowable emissions (see Table 1 of this preamble).

The maximum chronic noncancer TOSHI values for the source category were estimated to be 1 for neurological effects based on actual and allowable emissions. For both actual and

allowable emissions, risk was driven by hydrogen cyanide emissions from process vents, wastewater, and equipment leaks.

TABLE 1: INHALATION RISK ASSESSMENT SUMMARY FOR CYANIDE CHEMICALS MANUFACTURING[1] SOURCE CATEGORY (40 CFR PART 63, SUBPART YY)

| Risk Assessment | Number of Facilities[2] | Maximum Individual Cancer Risk (1-in-1 million)[3] | Estimated Population at Increased Risk of Cancer ≥ 1-in-1 Million | Estimated Annual Cancer Incidence (cases per year) | Maximum Chronic Noncancer TOSHI[4] | Maximum Screening Acute Noncancer HQ[5] |
|---|---|---|---|---|---|---|
| Baseline Actual Emissions | | | | | | |
| Source Category | 13 | 5 | 61,653 | 0.004 | 1 (neurological) | 1 (REL) |
| Facility-Wide | 13 | 200 | 266,532 | 0.04 | 1 (neurological) | - |
| Baseline Allowable Emissions | | | | | | |
| Source Category | 13 | 5 | 61,653 | 0.004 | 1 (neurological) | - |

[1] Based on actual and allowable emissions.
[2] Number of facilities evaluated in the risk assessment. Includes 13 operating facilities subject to 40 CFR part 63, subpart YY.
[3] Maximum individual excess lifetime cancer risk due to HAP emissions from the source category.
[4] Maximum TOSHI. The target organ with the highest TOSHI for the Cyanide Chemicals Manufacturing source category is the neurological system.
[5] The maximum estimated acute exposure concentration was divided by available short-term threshold values to develop an array of HQ values. The acute HQ shown was based upon the lowest acute 1-hour dose-response value, the REL for hydrogen cyanide. When an HQ exceeds 1, we also show the HQ using the next lowest available acute dose-response value.

2. Screening Level Acute Risk Assessment Results

Based on our screening analysis of reasonable worst-case acute exposure to actual emissions from the category, no HAP exposures result in an HQ greater than 1 based upon the 1-hour REL. As discussed in section III.C.3.c of this preamble, for this source category, we used acute factors between 2 and 10, depending on the type of source. Specifically, we used a factor of 2 for process vents and equipment leaks, a factor of 4 for storage vessels, and a factor of 10 for transfer racks. A further discussion of why these factors were chosen can be found in the

memorandum, *Technical Support Document for the Cyanide Chemicals Manufacturing NESHAP Residual Risk and Technology Review Proposal*, available in the docket for this rulemaking.

3. Multipathway Risk Screening Results

Three of the 13 facilities in this source category reported emissions of PB-HAP in the NEI which include POM (of which polycyclic aromatic hydrocarbons is a subset), lead compounds, arsenic compounds, cadmium compounds, and mercury compounds. We note that for the Cyanide Chemicals Manufacturing source category, while we modeled these emissions, none of these HAP are expected to be emitted from the source category and they were only modeled to provide a conservative estimate of risk because they were included in the NEI. To identify potential multipathway health risks from PB-HAP other than lead, we first performed a tiered screening assessment (Tiers 1, 2, and 3) based on emissions of PB-HAP emitted from each facility in the source category. Arsenic emissions from a single facility exceeded the Tier 1 cancer screening threshold emission rate with a maximum SV of 2. No facilities had POM emissions exceeding the Tier 1 cancer screening threshold emission rate. Mercury emissions from a single facility exceeded the Tier 1 noncancer screening threshold emission rate with a maximum SV of 2. No facilities had cadmium emissions exceeding the Tier 1 noncancer screening threshold emission rate. For the facilities and HAP for which the Tier 1 threshold emissions rates were exceeded (*i.e.*, SV greater than 1), we conducted a Tier 2 screening analysis. In the Tier 2 screening analysis, no facilities had an SV greater than 1. Specifically, the maximum Tier 2 cancer SV was less than 1 for both the farmer scenario for arsenic (0.4) and the fisher scenario for mercury (0.3).

Further facility details on the multipathway screening analysis can be found in Appendix 10 of the *Residual Risk Assessment for the Cyanide Chemical Manufacturing Source Category in Support of the Risk and Technology Review 2020 Proposed Rule.*

An SV in any of the tiers is not an estimate of the cancer risk or a noncancer HQ. Rather, an SV represents a high-end estimate of what the risk or HQ may be. For example, facility

emissions resulting in an SV of 2 for a non-carcinogen can be interpreted to mean that we are confident that the HQ would be lower than 2. Similarly, facility emissions resulting in a cancer SV of 20 for a carcinogen means that we are confident that the cancer risk is lower than 20-in-1 million. Our confidence comes from the health-protective assumptions that are incorporated into the screens: we choose inputs from the upper end of the range of possible values for the influential parameters used in the screens and we assume food consumption behaviors that would lead to high total exposure. This risk assessment estimates the maximum hazard for mercury and cadmium through fish consumption based on upper bound screens and the maximum excess cancer risks from POM and arsenic through ingestion of fish and farm produce.

In evaluating the potential for adverse health effects from emissions of lead, the EPA compared modeled annual lead concentrations to the secondary NAAQS level for lead (0.15 $\mu g/m^3$, arithmetic mean concentration over a 3-month period). The highest annual average lead concentration, 0.00000065 $\mu g/m^3$, is orders of magnitude below the NAAQS level for lead, indicating a low potential for adverse health impacts.

4. Environmental Risk Screening Results

As described in section III.A of this preamble, we conducted an environmental risk screening assessment for the Cyanide Chemical Manufacturing source category for the following pollutants: arsenic, cadmium, HCl, lead, mercury (methyl mercury and mercuric chloride), and POM. As noted in our discussion of the multipathway risk assessment results, these HAP are not associated with cyanide chemicals manufacturing and are not emitted from the source category. There were NEI entries for small amounts of these pollutants and we chose to model these emissions to err on the side of an overly conservative assessment.

In the Tier 1 screening analysis for the above PB-HAP (other than lead, which was evaluated differently), the maximum Tier 1 SV was less than or equal to 1 for all PB-HAP.

For lead, we did not estimate any exceedances of the secondary lead NAAQS. For HCl, the average modeled concentration around each facility (*i.e.,* the average concentration of all off-

site data points in the modeling domain) did not exceed any ecological benchmark. In addition, for the one facility that reported HCl emissions, each individual modeled concentration of HCl (*i.e.,* each off-site data point in the modeling domain) was below the ecological benchmarks for HCl.

Based on the results of the environmental risk screening analysis, we do not expect an adverse environmental effect as a result of HAP emissions from this source category.

5. Facility-Wide Risk Results

The EPA estimated inhalation risk based on facility-wide emissions. The estimated maximum individual excess lifetime cancer risk based on facility-wide emissions was 200-in-1 million, with 0.04 excess cancer cases per year, or one case every 25 years. This cancer risk is driven by emissions sources that are not in the Cyanide Chemicals Manufacturing source category; specifically, emissions of ethylene oxide and coke oven emissions from non-category sources account for 95 percent of the cancer incidence. Approximately 150 people are exposed to an excess cancer risk greater than or equal to 100-in-1 million, with 266,532 people exposed to an excess cancer risk above 1-in-1 million (see Table 1 of this preamble). The estimated maximum chronic noncancer TOSHI values for the facility-wide assessment was the same as estimated based on actual and allowable emissions from the source category -- a TOSHI equal to 1 for neurological effects driven by hydrogen cyanide emissions from process vents, wastewater, and equipment leaks.

Regarding the facility-wide risks due to ethylene oxide, which are emitted by sources that are not part of the Cyanide Chemicals Manufacturing source category, we intend to continue to evaluate those facility-wide estimated emissions and risks further and may address these in separate actions, as appropriate. In particular, the EPA is addressing ethylene oxide in response to the results of the latest NATA released in August 2018, which identified the chemical as a potential concern in several areas across the country (NATA is the Agency's nationwide air toxics screening tool, designed to help the EPA and state, local, and tribal air agencies identify

areas, pollutants, or types of sources for further examination). The latest NATA estimates that ethylene oxide significantly contributes to potential elevated cancer risks in some census tracts across the U.S. (less than 1 percent of the total number of tracts). These elevated risks are largely driven by an EPA risk value that was updated in late 2016. The EPA will work with industry and state, local, and tribal air agencies as the EPA takes a two-pronged approach to address ethylene oxide emissions by: (1) reviewing and, as appropriate, revising CAA regulations for facilities that emit ethylene oxide – starting with air toxics emissions standards for miscellaneous organic chemical manufacturing facilities (85 FR 49084, August 12, 2020) and commercial sterilizers; and (2) conducting site-specific risk assessments and, as necessary, implementing emission control strategies for targeted high-risk facilities. The EPA will post updates on its work to address ethylene oxide on its website at: *https://www.epa.gov/ethylene-oxide*.

6. What demographic groups might benefit from this regulation?

To examine the potential for any environmental justice issues that might be associated with the source category, we performed a demographic analysis, which is an assessment of risk to individual demographic groups of the populations living within 5 km and within 50 km of the facilities. In the analysis, we evaluated the distribution of HAP-related cancer and noncancer risk from the Cyanide Chemicals Manufacturing source category across different demographic groups within the populations living near facilities.[24]

The results of the demographic analysis are summarized in Table 2 below. These results, for various demographic groups, are based on the estimated risk from actual emissions levels for the population living within 50 km of the facilities.

TABLE 2. CYANIDE CHEMICALS MANUFACTURING DEMOGRAPHIC RISK ANALYSIS RESULTS

[24] Demographic groups included in the analysis are: White, African American, Native American, other races and multiracial, Hispanic or Latino, children 17 years of age and under, adults 18 to 64 years of age, adults 65 years of age and over, adults without a high school diploma, people living below the poverty level, people living two times the poverty level, and linguistically isolated people.

| | Nationwide | Population with Cancer Risk at or Above 1-in-1 Million Due to Cyanide Chemicals Manufacturing | Population with Chronic HI Above 1 Due to Cyanide Chemicals Manufacturing |
|---|---|---|---|
| Total Population | 317,746,049 | 61,653 | 0 |
| Race by Percent | | | |
| White | 62 | 73 | |
| All Other Races | 38 | 27 | |
| Race by Percent | | | |
| White | 62 | 73 | |
| African American | 12 | 19 | |
| Native American | 0.8 | 0.4 | |
| Other and Multiracial | 7 | 4 | |
| Ethnicity by Percent | | | |
| Hispanic | 18 | 3 | |
| Non-Hispanic | 82 | 97 | |
| Income by Percent | | | |
| Below Poverty Level | 14 | 16 | |
| Above Poverty Level | 86 | 84 | |
| Education by Percent | | | |
| Over 25 and without High School Diploma | 14 | 16 | |
| Over 25 and with a High School Diploma | 86 | 84 | |

The results of the Cyanide Chemicals Manufacturing source category demographic analysis indicate that emissions from the source category expose approximately 61,653 people to a cancer risk at or above 1-in-1 million and nobody to a chronic noncancer TOSHI greater than 1. The percentages of the at-risk population in the White, African American, Below Poverty, and Over 25 without High School Diploma demographic groups are greater than their respective nationwide percentages.

The methodology and the results of the demographic analysis are presented in a technical report, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Cyanide Chemicals Manufacturing*, available in the docket for this action.

*C. What are our proposed decisions regarding risk acceptability, ample margin of safety, and adverse environmental effect?*

1. Risk Acceptability

As explained in section II.A of this preamble, the EPA sets standards under CAA section 112(f)(2) using "a two-step standard-setting approach, with an analytical first step to determine an 'acceptable risk' that considers all health information, including risk estimation uncertainty, and includes a presumptive limit on maximum individual risk (MIR) of approximately 1-in-10 thousand." (54 FR 38045, September 14, 1989). The EPA weighed all health risk measures and information, including science policy assumptions and estimation uncertainties, in determining whether risk posed by emissions from the source category is acceptable.

The estimated maximum cancer risk for inhalation exposure to actual and allowable emissions from the Cyanide Chemicals Manufacturing source category was 5-in-1 million, 20 times below 100-in-1 million, which is the presumptive upper limit of acceptable risk. The EPA estimates emissions from the category would result in a cancer incidence of 0.004 excess cancer cases per year, or one case every 250 years. Inhalation exposures to HAP associated with chronic noncancer health effects result in a TOSHI of 1 based on actual and allowable emissions, an exposure level that the EPA has determined is without appreciable risk of adverse health effects. Exposures to HAP associated with acute noncancer health effects also are below levels of health concern with no HAP exposures resulting in an HQ greater than 1 based upon the 1-hour REL.

Maximum cancer risk due to ingestion exposures, estimated using health-protective risk screening assumptions, is below 1-in-1 million for the Tier 2 farmer exposure scenario. Tier 2 screening analyses of mercury exposure due to fish ingestion determined that the maximum HQ for mercury would be less than 1 as explained in section III.C.4 of this preamble.

Considering all of the health risk information and factors discussed above, as well as the uncertainties discussed in section III of this preamble, we propose that the risks posed by emissions from the Cyanide Chemicals Manufacturing source category are acceptable.

2. Ample Margin of Safety Analysis

As directed by CAA section 112(f)(2), we conducted an analysis to determine whether the current emissions standards provide an ample margin of safety to protect public health. Under the ample margin of safety analysis, we evaluated the cost and feasibility of available control technologies and other measures (including the controls, measures, and costs reviewed under the technology review) that could be applied to this source category to further reduce the risks (or potential risks) due to emissions of HAP from the source category. In light of the low cancer and noncancer risk posed to individuals exposed to HAP emitted from this source category and lack of additional control technologies, we are proposing to conclude that the existing standards under the NESHAP provide an ample margin of safety to protect public health.

3. Adverse Environmental Effect

Based on the results of our environmental risk screening analysis, we do not anticipate an adverse environmental effect as a result of HAP emissions from this source category. Therefore, the EPA is proposing that it is not necessary to set a more stringent standard to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.

*D. What are the results and proposed decisions based on our technology review?*

As part of the technology review, we identified a previously unregulated process, and are proposing a MACT standard for the process under CAA section 112(d)(2) and (3), as described in Section IV.A of this preamble, above. We did not identify any developments in processes, practices, or control technologies for cyanide chemicals manufacturing facilities during our analysis for this proposal. Facilities subject to this NESHAP use flares to control emissions from point sources and LDAR programs to address emissions from equipment leaks. As discussed in the memorandum titled *Technical Support Document for the Cyanide Chemicals Manufacturing NESHAP Residual Risk and Technology Review Proposal*, we did not identify any developments in these technologies during our technology review.

*E. What other actions are we proposing?*

In addition to the proposed actions described above, we are proposing additional revisions to the NESHAP. We are proposing revisions to the SSM provisions of the MACT rule in order to ensure that they are consistent with the decision in *Sierra Club v. EPA*, 551 F. 3d 1019 (D.C. Cir. 2008), in which the court vacated two provisions that exempted sources from the requirement to comply with otherwise applicable CAA section 112(d) emission standards during periods of SSM. We note that for the Cyanide Chemicals Manufacturing source category, the NESHAP currently does not include an exemption for SSM events, and already includes standards that apply at all times, including periods of SSM. Therefore, we have determined that the NESHAP is already consistent with the court decision mentioned above. However, we are making revisions to the MACT rule at 40 CFR 63.1108 through 40 CFR 63.1112 to ensure this is clearly and consistently communicated throughout and no confusion results from referenced subparts associated with the GMACT that may contain SSM exemptions for other source categories. We also are proposing other changes to add electronic reporting. Our analyses and proposed changes related to these issues are discussed below.

*Electronic Reporting.* The EPA is proposing that owners and operators of cyanide chemicals manufacturing facilities submit electronic copies of required notifications of compliance, performance test reports, and periodic reports through the EPA's Central Data Exchange (CDX) using the Compliance and Emissions Data Reporting Interface (CEDRI). A description of the electronic data submission process is provided in the memorandum, *Electronic Reporting Requirements for New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) Rules*, available in the docket for this action. The proposed rule requires that performance test results collected using test methods that are supported by the EPA's Electronic Reporting Tool (ERT) as listed on the ERT website[25] at the time of the test be submitted in the format generated through the use of the ERT or an electronic

[25] *https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert.*

file consistent with the xml schema on the ERT website, and other performance test results be submitted in portable document format (PDF) using the attachment module of the ERT. The proposed rule requires that Notification of Compliance Status (NOCS) be submitted as a PDF upload in CEDRI.

For periodic reports, the proposed rule requires that owners and operators use the appropriate spreadsheet template to submit information to CEDRI. A draft version of the proposed template for these reports is included in the docket for this action.[26] The EPA specifically requests comment on the content, layout, and overall design of the template. Additionally, the EPA has identified two broad circumstances in which electronic reporting extensions may be provided. These circumstances are (1) outages of the EPA's CDX or CEDRI which preclude an owner or operator from accessing the system and submitting required reports and (2) *force majeure* events, which are defined as events that will be or have been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevent an owner or operator from complying with the requirement to submit a report electronically. Examples of *force majeure* events are acts of nature, acts of war or terrorism, or equipment failure or safety hazards beyond the control of the facility. The EPA is providing these potential extensions to protect owners and operators from noncompliance in cases where they cannot successfully submit a report by the reporting deadline for reasons outside of their control. In both circumstances, the decision to accept the claim of needing additional time to report is within the discretion of the Administrator, and reporting should occur as soon as possible.

The electronic submittal of the reports addressed in this proposed rulemaking will increase the usefulness of the data contained in those reports, is in keeping with current trends in data availability and transparency, will further assist in the protection of public health and the

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[26] See Draft Form_5900-485_Subpart_YY_Cyanide_Draft_Periodic_Report_Template_Proposal.xlsm , available at Docket ID No. EPA-HQ-OAR-2020-0532.

environment, will improve compliance by facilitating the ability of regulated facilities to demonstrate compliance with requirements and by facilitating the ability of delegated state, local, tribal, and territorial air agencies and the EPA to assess and determine compliance, and will ultimately reduce burden on regulated facilities, delegated air agencies, and the EPA. Electronic reporting also eliminates paper-based, manual processes, thereby saving time and resources, simplifying data entry, eliminating redundancies, minimizing data reporting errors, and providing data quickly and accurately to the affected facilities, air agencies, the EPA, and the public. Moreover, electronic reporting is consistent with the EPA's plan[27] to implement Executive Order 13563 and is in keeping with the EPA's Agency-wide policy[28] developed in response to the White House's Digital Government Strategy.[29] For more information on the benefits of electronic reporting, see the memorandum, *Electronic Reporting Requirements for New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) Rules*, referenced earlier in this section.

*F. What compliance dates are we proposing?*

The EPA is proposing that existing affected sources and affected sources that commenced construction or reconstruction on or before **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, must comply with the proposed process wastewater standards no later than 365 days after the effective date of the final rule and all of the other amendments no later than 180 days after the effective date of the final rule. The final action is not expected to be a ''major rule'' as defined by 5 U.S.C. 804(2), so the effective date of the final rule will be the promulgation date as specified in CAA section 112(d)(10). For existing sources, we are

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[27] EPA's Final Plan for Periodic Retrospective Reviews, August 2011. Available at: *https://www.regulations.gov/document?D=EPA-HQ-OA-2011-0156-0154*.

[28] E-Reporting Policy Statement for EPA Regulations, September 2013. Available at: *https://www.epa.gov/sites/production/files/2016-03/documents/epa-ereporting-policy-statement-2013-09-30.pdf*.

[29] Digital Government: Building a 21st Century Platform to Better Serve the American People, May 2012. Available at: *https://obamawhitehouse.archives.gov/sites/default/files/omb/egov/digital-government/digital-government.html*.

proposing a change that would impact ongoing compliance requirements for 40 CFR part 63, subpart YY. As discussed elsewhere in this preamble, we are proposing to change the requirements for SSM by removing references to exemptions in other subparts. Our experience with similar industries shows that this sort of regulated facility generally requires a time period of 180 days to read and understand the amended rule requirements; to evaluate their operations to ensure that they can meet the standards during periods of startup and shutdown as defined in the rule and make any necessary adjustments; and to update their operations to reflect the revised requirements.

From our assessment of the timeframe needed for compliance with the revised requirements, the EPA considers a period of 180 days to be the most expeditious compliance period practicable, and, thus, is proposing that existing affected sources be in compliance with this regulation's revised requirements within 180 days of the regulation's effective date. We solicit comment on this proposed compliance period, and we specifically request submission of information from sources in this source category regarding specific actions that would need to be undertaken to comply with the proposed amended requirements, including the proposed amendments related to recordkeeping and reporting and the time needed to make the adjustments for compliance with them. We note that information provided may result in changes to the proposed compliance date; however, we expect the proposed compliance time to be sufficient given that cyanide chemicals manufacturing facilities are already subject to standards during these periods. We are proposing that facilities will have 1 year to comply with the proposed process wastewater standards for existing sources. We note that we do not expect the proposed wastewater standards for existing sources to require installation of any additional controls. We believe that all affected sources are already complying with the proposed wastewater requirements or requirements that are substantively identical. We are proposing that facilities must comply within 365 days in order to provide time to evaluate wastewater operations, perform compliance calculations, and adjust plans and reports as necessary. We are seeking

comment on the assumption that facilities will not need to install additional add-on controls and whether facilities would require more or less time to comply with the proposed process wastewater requirements. Affected sources that commence construction or reconstruction after **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, must comply with all requirements of the subpart, including the amendments being proposed, no later than the effective date of the final rule or upon startup, whichever is later. All affected facilities would have to continue to meet the current requirements of 40 CFR part 63, subpart YY, until the applicable compliance date of the amended rule.

## V. Summary of Cost, Environmental, and Economic Impacts

### *A. What are the affected sources?*

There are 13 cyanide chemicals manufacturing facilities currently operating as major sources of HAP subject to the proposed amendments. A list of facilities that are currently subject to the MACT standards is available in the memorandum titled *Technical Support Document for the Cyanide Chemicals Manufacturing NESHAP Residual Risk and Technology Review Proposal*, available in Docket ID No. EPA-HQ-OAR-2020-0532.

### *B. What are the air quality impacts?*

We do not anticipate that the proposed amendments to this subpart will impact air quality. We are not proposing changes to the standard that will result in additional emission reductions beyond the levels already achieved by the NESHAP.

### *C. What are the cost impacts?*

The proposed amendments will have a limited cost impact on affected facilities. Total estimated costs are $47,527 based on a $3,656 per facility cost for all 13 facilities. The costs result from reading and understanding rule requirements and adjusting compliance plans based on the rule proposal. All costs are one-time expenses expected to occur in the first year after the rule is finalized. Costs are based on Agency knowledge and experience with the NESHAP program, related ICRs, and Bureau of Labor Statistics data.

*D. What are the economic impacts?*

Economic impact analyses focus on changes in market prices and output levels. If changes in market prices and output levels in the primary markets are significant enough, impacts on other markets may also be examined. Both the magnitude of costs associated with the proposed requirements and the distribution of these costs among affected facilities can have a role in determining how the market will change in response to a proposed rule.

Economic costs to owners of cyanide chemicals manufacturing facilities were measured in present value (PV) total costs and equivalent annual value (EAV) costs. All cyanide chemicals manufacturing facilities were estimated to have similar costs. All costs are presented in 2019 dollars. See section V.C of this preamble for additional information on costs.

PV total costs and EAV costs were measured at the 3 percent and 7 percent discount rates. The duration of analysis was 8 years. Per facility PV total cost estimate is $3,656 at the 3 percent and 7 percent discount rates. The similarity in both discount rates is due to the costs all occuring in the first year after the rule is finalized. EAV costs per facility are measured to be $521 and $612 at the 3 percent and 7 percent discount rates, respectively. Combined total PV cost of the proposed requirements for all facilities is measured to be $47,527 at the 3 percent and 7 percent discount rates. The similarity in both discount rates is due to the costs all coming in the first year that the rule will be finalized. Combined EAV costs of the proposed requirements for all facilities are measured to be $6,771 and $7,959 at the 3 percent and 7 percent discount rates, respectively.

As required by the Regulatory Flexibility Act (RFA), we performed an analysis to determine if any small entities would be unduly burdened by the proposed amendments. We determined that all facilities subject to the NESHAP are owned by large parent entities based on Small Business Administration standards. No significant economic impacts from the proposed amendments are anticipated because the PV and EAV costs associated with the proposed revisions are minimal.

*E. What are the benefits?*

As discussed in section V.B of this preamble, we do not anticipate the proposed amendments to this subpart to impact air quality. The electronic submittal of the reports addressed in this proposed rulemaking will increase the usefulness of the data contained in those reports, is in keeping with current trends in data availability and transparency, will further assist in the protection of public health and the environment, will improve compliance by facilitating the ability of regulated facilities to demonstrate compliance with requirements, and by facilitating the ability of delegated state, local, tribal, and territorial air agencies and the EPA to assess and determine compliance, and will ultimately reduce burden on regulated facilities, delegated air agencies, and the EPA. Electronic reporting also eliminates paper-based, manual processes, thereby saving time and resources, simplifying data entry, eliminating redundancies, minimizing data reporting errors, and providing data quickly and accurately to the affected facilities, air agencies, the EPA, and the public.

## VI. Request for Comments

We solicit comments on this proposed action. In addition to general comments on this proposed action, we are also interested in additional data that may improve the risk assessments and other analyses. We are specifically interested in receiving any improvements to the data used in the site-specific emissions profiles used for risk modeling. Such data should include supporting documentation in sufficient detail to allow characterization of the quality and representativeness of the data or information. Section VII of this preamble provides more information on submitting data.

## VII. Submitting Data Corrections

The site-specific emissions profiles used in the source category risk and demographic analyses and instructions are available for download on the RTR website at *https://www.epa.gov/stationary-sources-air-pollution/acetal-resins-acrylic-modacrylic-fibers-*

*carbon-black-hydrogen*. The data files include detailed information for each HAP emissions release point for the facilities in the source category.

If you believe that the data are not representative or are inaccurate, please identify the data in question, provide your reason for concern, and provide any "improved" data that you have, if available. When you submit data, we request that you provide documentation of the basis for the revised values to support your suggested changes. To submit comments on the data downloaded from the RTR website, complete the following steps:

1. Within this downloaded file, enter suggested revisions to the data fields appropriate for that information.

2. Fill in the commenter information fields for each suggested revision (*i.e.*, commenter name, commenter organization, commenter email address, commenter phone number, and revision comments).

3. Gather documentation for any suggested emissions revisions (*e.g.*, performance test reports, material balance calculations).

4. Send the entire downloaded file with suggested revisions in Microsoft® Access format and all accompanying documentation to Docket ID No. EPA-HQ-OAR-2020-0532 (through the method described in the **ADDRESSES** section of this preamble).

5. If you are providing comments on a single facility or multiple facilities, you need only submit one file for all facilities. The file should contain all suggested changes for all sources at that facility (or facilities). We request that all data revision comments be submitted in the form of updated Microsoft® Excel files that are generated by the Microsoft® Access file. These files are provided on the project website at *https://www.epa.gov/stationary-sources-air-pollution/acetal-resins-acrylic-modacrylic-fibers-carbon-black-hydrogen*.

## VIII. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders*.

*A. Executive Orders 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review*

This action is not a significant regulatory action and was, therefore, not submitted to OMB for review.

*B. Executive Order 13771: Reducing Regulations and Controlling Regulatory Costs*

This action is not expected to be an Executive Order 13771 regulatory action because this action is not significant under Executive Order 12866.

*C. Paperwork Reduction Act (PRA)*

The information collection activities in this proposed rule have been submitted to the OMB under the PRA. The Information Collection Request (ICR) document that the EPA prepared has been assigned EPA ICR number 2678.01. You can find a copy of the ICR in the docket for this rule, and it is briefly summarized here.

The EPA is proposing amendments that revise provisions pertaining to emissions during periods of SSM, add requirements for electronic reporting of NOCS, periodic reports, and performance test results, and make other minor clarifications and corrections. This information will be collected to assure compliance with the Cyanide Chemicals Manufacturing NESHAP.

*Respondents/affected entities*: Owners or operators of cyanide chemicals manufacturing facilities.

*Respondent's obligation to respond*: Mandatory (40 CFR part 63, subpart YY).

*Estimated number of respondents*: 13 (assumes no new respondents over the next 3 years).

*Frequency of response*: Initially, occasionally, and annually.

*Total estimated burden*: 160 hours (per year) to comply with all of the requirements in the NESHAP. Burden is defined at 5 CFR 1320.3(b).

*Total estimated cost*: $15,800 (per year), including no annualized capital or operation and maintenance costs, to comply with all of the requirements in the NESHAP.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for the EPA's regulations in 40 CFR are listed in 40 CFR part 9.

Submit your comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden to the EPA using the docket identified at the beginning of this rule. You may also send your ICR-related comments to OMB's Office of Information and Regulatory Affairs via email to *OIRA_submission@omb.eop.gov*, Attention: Desk Officer for the EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after receipt, OMB must receive comments n later than **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The EPA will respond to any ICR-related comments in the final rule.

*D. Regulatory Flexibility Act (RFA)*

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. This action will not impose any requirements on small entities. There are no small entities among the eight ultimate parent companies impacted by this proposed action given the Small Business Administration small business size definition for this industry (1,000 employees or greater for NAICS 325180 – Other Basic Inorganic Chemical Manufacturing), and no significant economic impact on any of these entities.

*E. Unfunded Mandates Reform Act (UMRA)*

This action does not contain an unfunded mandate of $100 million or more as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local, or tribal governments or the private sector.

*F. Executive Order 13132: Federalism*

This action does not have federalism implications. 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.

*G. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments*

This action does not have tribal implications as specified in Executive Order 13175. None of the cyanide chemicals manufacturing production facilities that have been identified as being affected by this proposed action are owned or operated by tribal governments or located within tribal lands. Thus, Executive Order 13175 does not apply to this action.

*H. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks*

This action is not subject to Executive Order 13045 because the EPA does not believe the environmental health risks or safety risks addressed by this action present a disproportionate risk to children. This action's health and risk assessments are contained in section IV.B of this preamble and the document, *Residual Risk Assessment for the Cyanide Chemicals Manufacturing Source Category in Support of the Risk and Technology Review 2020 Proposed Rule*, which is available in the docket for this rulemaking.

*I. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use*

This action is not subject to Executive Order 13211, because it is not a significant regulatory action under Executive Order 12866.

*J. National Technology Transfer and Advancement Act (NTTAA)*

This action involves technical standards. Therefore, the EPA conducted a search to identify potentially applicable voluntary consensus standards. However, the Agency identified no such standards. A thorough summary of the search and results are included in the memorandum titled *Voluntary Consensus Standard Results for Cyanide Chemicals Manufacturing Residual Risk and Technology Review*, which is available in the docket for this action.

*K. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

The EPA believes that this action does not have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, and/or indigenous peoples, as specified in Executive Order 12898 (59 FR 7629, February 16, 1994). The documentation for this decision is contained in section IV.B of this preamble and in the technical report, *Risk and Technology Review—Analysis of Demographic Factors for Populations Living Near Cyanide Chemicals Manufacturing Facilities*, available in the docket for this action.

**List of Subjects in 40 CFR Part 63**

Environmental protection, Air pollution control, Hazardous substances, Reporting and recordkeeping requirements.

**Andrew Wheeler,**

*Administrator*.

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